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PROJECT SCHEDULE**

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1.0 GENERAL

1.1. REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

- U.S. ARMY CORPS OF ENGINEERS (USACE) ER 1-1-11 (1995) Progress, Schedules, and Network Analysis Systems <http://www.usace.army.mil/publications/eng-regs/er1-1-11/entire.pdf>

1.2. QUALIFICATIONS

Designate an authorized representative who shall be responsible for the preparation of the schedule and all required updating (statusing) and preparation of reports. The authorized representative shall be experienced in scheduling projects similar in nature to this project and shall be experienced in the use of the scheduling software that meets the requirements of this specification.

2.0 PRODUCTS (Not Applicable)

3.0 EXECUTION

3.1. GENERAL REQUIREMENTS

3.1.1. Submit a project schedule as specified herein for approval showing the sequence in which the Contractor proposes to perform the work and dates on which the Contractor contemplates starting and completing all schedule activities. The scheduling of the entire project, including the design and construction sequences is required. Contractor management personnel shall actively participate in its development. Designers, subcontractors and suppliers working on the project shall also contribute in developing an accurate project schedule. The schedule must be a forward planning as well as a project monitoring tool. The approved project schedule shall be used to measure the progress of the work and to aid in evaluating requests for excusable time extensions. The schedule shall be cost loaded and activity coded as specified herein. The schedule will provide the basis for all progress payments. If the Contractor fails to submit any schedule within the time prescribed, the Contracting Officer may withhold approval of progress payments until the Contractor submits the required schedule

3.1.2. Status the schedule on at least a monthly basis, as specified herein. If in the opinion of the Contracting Officer, the Contractor falls behind the approved schedule, the Contractor shall take steps necessary to improve its progress including those that may be required by the Contracting Officer, without additional cost to the Government. In this circumstance, the Contracting Officer may require the Contractor to increase the number of shifts, overtime operations, days of work, and/or the amount of construction plant, and to submit for approval any supplementary schedule or schedules as the Contracting Officer deems necessary to demonstrate how the approved rate of progress will be regained. See paragraph 3.7.4.

3.1.3. Failure of the Contractor to comply with the requirements of the Contracting Officer shall be grounds for a determination by the Contracting Officer that the Contractor is not prosecuting the work with sufficient diligence to ensure completion within the time specified in the contract. Upon making this determination, the Contracting Officer may terminate the Contractor's right to proceed with the work, or any separable part of it, in accordance with the default terms of the contract.

3.2. BASIS FOR PAYMENT AND COST LOADING

The schedule shall be the basis for determining contract earnings during each update period and therefore the amount of each progress payment. Lack of an approved schedule update or qualified scheduling personnel will result in an inability of the Contracting Officer to evaluate contract earned value for the purposes of payment. Failure of the Contractor to provide all information, as specified herein will result in the disapproval of the preliminary, initial and subsequent schedule updates. In the event schedule revisions are directed by the Contracting Officer and those revisions have not been included in subsequent revisions or updates, the Contracting Officer may hold retainage up to the maximum allowed by contract, each payment period, until such revisions to the project schedule have been made. Activity cost loading shall be reasonable as determined by the Contracting Officer. The aggregate value of all activities coded to a contract CLIN as specified herein shall equal the value of the CLIN on the Schedule.

3.3. PROJECT SCHEDULE DETAILED REQUIREMENTS

The computer software system utilized to produce and update the project schedule shall be capable of meeting all requirements of this specification. Failure of the Contractor to meet the requirements of this specification will result in the disapproval of the schedule. Scheduling software that meets the activity coding structure defined in the Standard Data Exchange Format (SDEF) in ER-1-1-11(1995) referenced herein are Primavera Project Planner (P3) by Primavera, and Open Plan by Deltek.

3.3.1. Use of the Critical Path Method

Use the Critical Path Method (CPM) of network calculation to generate the project schedule. Prepare the project schedule using the Precedence Diagram Method (PDM).

3.3.2. Level of Detail Required

Develop the project schedule to an appropriate level of detail. Failure to develop the project schedule to an appropriate level of detail, as determined by the Contracting Officer, will result in its disapproval. The Contracting Officer will consider, but is not limited to, the following characteristics and requirements to determine appropriate level of detail:

3.3.2.1. Activity Durations

Reasonable activity durations are those that allow the progress of ongoing activities to be accurately determined between update periods. Less than 2 percent of all non-procurement activities shall have Original Durations (OD) greater than 20 work days or 30 calendar days. Procurement activities are defined herein.

3.3.2.2. Design and Permit Activities

Include design and permit activities, including necessary conferences and follow-up actions and design package submission activities. Include the design schedule in the project schedule, showing the sequence of events involved in carrying out the project design tasks within the specific contract period. This shall be at a detailed level of scheduling sufficient to identify all major design tasks, including those that control the flow of work. Include review and correction periods associated with each item.

3.3.2.3. Procurement Activities

Include activities associated with the submittal, approval, procurement, fabrication and delivery of long lead materials, equipment, fabricated assemblies and supplies. Long lead procurement activities are those with an anticipated procurement sequence of over 90 calendar days. A typical procurement sequence includes the string of activities: submit, approve/review, procure, fabricate, and deliver.

3.3.2.4. Mandatory Tasks

Include and properly schedule the following tasks (See also the Sample Preliminary Submittal Register Input Form):

3.3.2.4.1. Submission, review and acceptance of design packages, including BIM

3.3.2.4.2. Submission of mechanical/electrical/information systems layout drawings

3.3.2.4.3. Submission and approval of O & M manuals

3.3.2.4.4. Submission and approval of as-built drawings

3.3.2.4.5. Submission and approval of 1354 data and installed equipment lists

3.3.2.4.6. Submission and approval of testing and air balance (TAB)

3.3.2.4.7. Submission of TAB specialist design review report

- 3.3.2.4.8. Submission and approval of fire protection specialist
- 3.3.2.4.9. Submission and approval of testing and balancing of HVAC plus commissioning plans and data. Develop the schedule logic associated with testing and commissioning of mechanical systems to a level of detail consistent with the contract commissioning requirements.
- 3.3.2.4.10. Air and water balancing
- 3.3.2.4.11. HVAC commissioning
- 3.3.2.4.12. Controls testing plan submission
- 3.3.2.4.13. Controls testing
- 3.3.2.4.14. Performance Verification testing
- 3.3.2.4.15. Other systems testing, if required
- 3.3.2.4.16. Contractor's pre-final inspection
- 3.3.2.4.17. Correction of punch list from Contractor's pre-final inspection
- 3.3.2.4.18. Government's pre-final inspection
- 3.3.2.4.19. Correction of punch list from Government's pre-final inspection
- 3.3.2.4.20. Final Inspection

3.3.2.5. Government Activities. Show Government and other agency activities that could impact progress. These activities include but are not limited to: approvals, design reviews, review conferences, release for construction of design package(s), environmental permit approvals by State regulators, inspections, utility tie-ins, Government Furnished Property/Equipment (GFP) and Notice to Proceed for phasing requirements, if any.

3.3.2.6. Activity Responsibility Coding (RESP)

Assign Responsibility Code for all activities to the Prime Contractor, Subcontractor or Government agency responsible for performing the activity. Activities coded with a Government Responsibility code include, but are not limited to: Government approvals, Government design reviews, environmental permit approvals by State regulators, Government Furnished Equipment (GFE) and Notice to Proceed (NTP) for phasing requirements. Code all activities not coded with a Government Responsibility Code to the Prime Contractor or Subcontractor responsible to perform the work. Activities shall not have more than one Responsibility Code. Examples of acceptable activity code values are: DOR (for the designer of record); ELEC (for the electrical subcontractor); MECH (for the mechanical subcontractor); and GOVT (for USACE). Unacceptable code values are abbreviations of the names of subcontractors.

3.3.2.7. Activity Work Area Coding (AREA)

Assign Work Area code to activities based upon the work area in which the activity occurs. Define work areas based on resource constraints or space constraints that would preclude a resource, such as a particular trade or craft work crew from working in more than one work area at a time due to restraints on resources or space. Examples of Work Area Coding include different areas within a floor of a building, different floors within a building, and different buildings within a complex of buildings. Activities shall not have more than one Work Area Code. Not all activities are required to be Work Area coded. A lack of Work Area coding will indicate the activity is not resource or space constrained.

3.3.2.8. Contract Changes/Requests for Equitable Adjustment (REA) Coding (MODF)

Assign Activity code to any activity or sequence of activities added to the schedule as a result of a Contract Modification, when approved by Contracting Officer, with a Contract Changes/REA Code. Key all Code values to

the Government's modification numbering system. Any activity or sequence of activities added to the schedule as a result of alleged constructive changes made by the Government may be added to a copy of the current schedule, subject to the approval of the Contracting Officer. Assign Activity codes for these activities with a Contract Changes/REA Code. Key the code values to the Contractor's numbering system. Approval to add these activities does not necessarily mean the Government accepts responsibility and therefore liability for such activities and any associated impacts to the schedule, but rather the Government recognizes such activities are appropriately added to the schedule for the purposes of maintaining a realistic and meaningful schedule. Such activities shall not be Responsibility Coded to the Government unless approved. An activity shall not have more than one Contract Changes/REA Code

3.3.2.9. Contract Line Item (CLIN) Coding (BIDI)

Code all activities to the CLIN on the Contract Line Item Schedule to which the activity belongs. An activity shall not contain more than one CLIN Item Code. CLIN Item code all activities, even when an activity is not cost loaded.

3.3.2.10. Phase of Work Coding (PHAS)

Assign Phase of Work Code to all activities, based upon the phase of work in which the activity occurs. Code activities to either a Design Phase or a Construction Phase. Code fast track design and construction phases proposed by the Contractor to allow filtering and organizing the schedule by fast track design and construction packages. If the contract specifies construction phasing with separately defined performance periods, identify a Construction Phase Code to allow filtering and organizing the schedule accordingly. Each activity shall have only one Phase of Work code.

3.3.2.11. Category of Work Coding (CATW)

Assign Category of Work code to all Activities based upon the category of work which the activity belongs. Category of Work Code must include, but is not limited to: Design, Design Submittal, design reviews, review conferences, Construction Submittal, Approvals (if any), Acceptance, Procurement, Fabrication, Delivery, Weather Sensitive Installation, Non-Weather Sensitive Installation, Start Up, Test, and Turnover. Assign a Category of Work code to each activity. Each activity shall have only one Category of Work Code.

3.3.2.12. Definable Features of Work Coding (FOW1, FOW2, FOW3)

Assign a Definable Feature of Work Code to appropriate activities based on the definable feature of work to which the activity belongs. Definable Feature of Work is defined in Specification Section 01 45 04.00 10, Contractor Quality Control. An activity shall not have more than one Definable Feature of Work Code. Not all activities are required to be Definable Feature of Work Coded.

3.3.3. Scheduled Project Completion and Activity Calendars

The schedule interval shall extend from NTP date to the required contract completion date. The contract completion activity (End Project) shall finish based on the required contract duration, as adjusted for any approved contract time extensions. The first scheduled work period shall be the day after NTP is acknowledged by the Contractor. Schedule activities on a calendar to which the activity logically belongs. Activities may be assigned to a 7 day calendar when the contract assigns calendar day durations for the activity such as a Government Acceptance activity. If the Contractor intends to perform physical work less than seven days per week, schedule the associated activities on a calendar with non-work periods identified including weekends and holidays. Assign the Category of Work Code - Weather Sensitive Installation to those activities that are weather sensitive. Original durations must account for anticipated normal adverse weather. The Government will interpret all work periods not identified as non-work periods on each calendar as meaning the Contractor intends to perform work during those periods.

3.3.3.1. Project Start Date

The schedule shall start no earlier than the date on which the NTP was acknowledged. Include as the first activity in the project schedule an activity called "Start Project" or "NTP". The "Start Project" activity shall have an "ES" constraint date equal to the date that the NTP was acknowledged, with a zero day duration.

3.3.3.2. Schedule Constraints and Open Ended Logic

Constrain completion of the last activity in the schedule by the contract completion date. Schedule calculations shall result in negative float when the calculated early finish date of the last activity is later than the contract completion date. Include as the last activity in the project schedule an activity called "End Project". The "End Project" activity shall have an "LF" constraint date equal to the contract completion date for the project, and with a zero day duration or by using the "project must finish by" date in the scheduling software. The schedule shall have no constrained dates other than those specified in the contract. The use of artificial float constraints such as "zero fee float" or "zero total float" are typically prohibited. There shall only be 2 open ended activities: Start Project (or NTP) with no predecessor logic and End Project with no successor logic.

3.3.3.3. Early Project Completion

In the event the Preliminary or Initial project schedule calculates an early completion date of the last activity prior to the contract completion date, the Contractor shall identify those activities that it intends to accelerate and/or those activities that are scheduled in parallel to support the Contractor's "early" completion. The last activity shall have a late finish constraint equal to the contract completion date and the schedule will calculate positive float. The Government will not approve an early completion schedule with zero float on the longest path. The Government is under no obligation to accelerate activities for which it is responsible to support a proposed early contract completion.

3.3.4. Interim Completion Dates

Constrain contractually specified interim completion dates to show negative float when the calculated early finish date of the last activity in that phase is later than the specified interim completion date.

3.3.4.1. Start Phase

Include as the first activity for a project phase an activity called "Start Phase X" where "X" refers to the phase of work. The "Start Phase X" activity shall have an "ES" constraint date equal to the date on which the NTP was acknowledged, and a zero day duration.

3.3.4.2. End Phase

Include as the last activity for a project phase an activity called "End Phase X" where "X" refers to the phase of work. The "End Phase X" activity shall have an "LF" constraint date equal to the specified completion date for that phase and a zero day duration.

3.3.4.3. Phase "X" Hammock

Include a hammock type activity for each project phase called "Phase X" where "X" refers to the phase of work. The "Phase X" hammock activity shall be logically tied to the earliest and latest activities in the phase.

3.3.5. Default Progress Data Disallowed

Do not automatically update Actual Start and Finish dates with default mechanisms that may be included in the scheduling software. Activity Actual Start (AS) and Actual Finish (AF) dates assigned during the updating process shall match those dates provided from Contractor Quality Control Reports. Failure of the Contractor to document the AS and AF dates on the Daily Quality Control report for every in-progress or completed activity, and failure to ensure that the data contained on the Daily Quality Control reports is the sole basis for schedule updating shall result in the disapproval of the Contractor's updated schedule and the inability of the Contracting Officer to evaluate Contractor progress for payment purposes. Updating of the percent complete and the remaining duration of any activity shall be independent functions. Disable program features which calculate one of these parameters from the other.

3.3.6. Out-of-Sequence Progress

Activities that have progressed before all preceding logic has been satisfied (Out-of-Sequence Progress) will be allowed only on a case-by-case basis subject to approval by the Contracting Officer. Propose logic corrections to eliminate all out of sequence progress or justify not changing the sequencing for approval prior to submitting an

updated project schedule. Correct out of sequence progress that continues for more than two update cycles by logic revision, as approved by the Contracting Officer.

3.3.7. Negative Lags and Start to Finish Relationships

Lag durations contained in the project schedule shall not have a negative value. Do not use Start to Finish relationships (SF).

3.3.8. Calculation Mode

Schedule calculations shall retain the logic between predecessors and successors even when the successor activity starts and the predecessor activity has not finished. Software features that in effect sever the tie between predecessor and successor activities when the successor has started and the predecessor logic is not satisfied ("progress override") will not be allowed.

3.3.9. Milestones

Include milestone activities for each significant project event including but not limited to: milestone activities for each fast track design package released for construction; design complete; foundation/substructure construction complete; superstructure construction complete; building dry-in or enclosure complete to allow the initiation of finish activities; permanent power complete; and building systems commissioning complete.

3.4. PROJECT SCHEDULE SUBMISSIONS

Provide the submissions as described below. The data CD, reports, and network diagrams required for each submission are contained in paragraph SUBMISSION REQUIREMENTS.

3.4.1. Preliminary Project Schedule Submission

Submit the Preliminary Project Schedule, defining the Contractor's planned operations for the first 90 calendar days for approval within 15 calendar days after the NTP is acknowledged. The approved Preliminary Project Schedule will be used for payment purposes not to exceed 90 calendar days after NTP. Completely cost load the Preliminary Project Schedule to balance the contract award CLINS shown on the Price Schedule. Detail it for the first 90 calendar days. It may be summary in nature for the remaining performance period. It must be early start and late finish constrained and logically tied as previously specified. The Preliminary Project Schedule forms the basis for the Initial Project Schedule specified herein and must include all of the required Plan and Program preparations, submissions and approvals identified in the contract (for example, Quality Control Plan, Safety Plan, and Environmental Protection Plan) as well as design activities, the planned submissions of all early design packages, permitting activities, design review conference activities and other non-construction activities intended to occur within the first 90 calendar days. Schedule any construction activities planned for the first 90 calendar days after NTP. Constrain planned construction activities by Government acceptance of the associated design package(s) and all other specified Program and Plan approvals. Activity code any activities that are summary in nature after the first 90 calendar days with Responsibility Code (RESP) and Feature of Work code (FOW1, FOW2, FOW3)

3.4.2. Initial Project Schedule Submission

Submit the Initial Project Schedule for approval within 42 calendar days after NTP. The schedule shall demonstrate a reasonable and realistic sequence of activities which represent all work through the entire contract performance period. The Initial Schedule shall be at a reasonable level of detail as determined by the Contracting Officer. Include detailed design and permitting activities, including but not limited to identification of individual design packages, design submission, reviews and conferences; permit submissions and any required Government actions; and long lead procurement activities required prior to design completion. The Initial Project Schedule shall include the entire construction sequence and all fast track construction activities, with as much detail as is known at the time but, as a minimum, shall include all construction start and completion milestone activities, and detailed construction activities through the dry-in milestone, including all activity coding and cost loading. Include the remaining construction, including cost loading, but it may be scheduled summary in nature. As the design proceeds and design packages are developed, fully detail the remaining construction activities concurrent with the monthly schedule updating process. Constrain construction activities by Government acceptance of associated

designs. When the design is complete, incorporate into the then approved schedule update all remaining detailed construction activities that are planned to occur after the dry-in milestone.

3.4.3. Design Package Schedule Submission:

With each design package submitted to the Government, submit a frag-net schedule extracted from the then current Preliminary, Initial or Updated schedule which covers the activities associated with that Design Package including construction, procurement and permitting activities.

3.4.4. Periodic Schedule Updates

Based on the result of the meeting specified in PERIODIC SCHEDULE UPDATE MEETINGS, submit periodic schedule updates. These submissions shall enable the Contracting Officer to assess Contractor's progress. If the Contractor fails or refuses to furnish the information and project schedule data, which in the judgment of the Contracting Officer or authorized representative is necessary for verifying the Contractor's progress, the Contractor shall be deemed not to have provided an estimate upon which progress payment may be made. Update the schedule to include detailed lower WBS activities procurement and construction activities as the design progresses, but not later than the submission of the final, un-reviewed design submission for each separate design package. The Contracting Officer may require submission of detailed schedule activities for any distinct construction that is started prior to submission of a final design submission, if such activity is authorized.

3.4.5. Standard Activity Coding Dictionary

Use the activity coding structure defined in the Standard Data Exchange Format (SDEF) in ER 1-1-11, Appendix A. This exact structure is mandatory, even if some fields are not used. A template SDEF compatible schedule backup file (sdef.prx) is available on the QCS website: www.rmssupport.com. The SDEF format is as follows:

Field	Activity Code	Length	Description
1	WRKP	3	Workers per Day
2	RESP	4	Responsible Party (e.g. GC, subcontractor, USACE)
3	AREA	4	Area of Work
4	MODF	6	Modification or REA number
5	BIDI	6	Bid Item (CLIN)
6	PHAS	2	Phase of Work
7	CATW	1	Category of Work
8	FOW1	10	Feature of Work (used up to 10 characters in length)
9	FOW2	10	Feature of Work (used up to 20 characters in length)
10	FOW3	10	Feature of Work (used up to 30 characters in length)

3.5. SUBMISSION REQUIREMENTS

Submit the following items for the Preliminary Schedule, Initial Schedule, and every Periodic Schedule Update throughout the life of the project:

3.5.1. Data CD's

Provide two sets of data CD's containing the project schedule in the backup format. Each CD shall also contain all previous update backup files. File medium shall be CD. Label each CD, indicating the type of schedule (Preliminary, Initial, Update), full contract number, Data Date and file names. Each schedule shall have a unique file name as determined by the Contractor.

3.5.2. Narrative Report

Provide a Narrative Report with the Preliminary, Initial, and each Periodic Update of the project schedule, as the basis of the progress payment request. The Narrative Report shall include: a description of activities along the 2 most critical paths where the total float is less than or equal to 20 work days, a description of current and anticipated problem areas or delaying factors and their impact, and an explanation of corrective actions taken or required to be taken. The narrative report is expected to communicate to the Government, the Contractor's thorough analysis of the schedule output and its plans to compensate for any problems, either current or potential, which are revealed through its analysis. Identify and explain why any activities that, based their calculated late dates, should have either started or finished during the update period but did not.

3.5.3. Approved Changes Verification

Include only those project schedule changes in the schedule submission that have been previously approved by the Contracting Officer. The Narrative Report shall specifically reference, on an activity by activity basis, all changes made since the previous period and relate each change to documented, approved schedule changes.

3.5.4. Schedule Reports

The format, filtering, organizing and sorting for each schedule report shall be as directed by the Contracting Officer. Typically reports shall contain: Activity Numbers, Activity Description, Original Duration, Remaining Duration, Early Start Date, Early Finish Date, Late Start Date, Late Finish Date Total Float, Actual Start Date, Actual Finish Date, and Percent Complete. The following lists typical reports that will be requested. One or all of these reports may be requested for each schedule submission.

3.5.4.1. Activity Report

A list of all activities sorted according to activity number.

3.5.4.2. Logic Report

A list of detailed predecessor and successor activities for every activity in ascending order sorted by activity number.

3.5.4.3. Total Float Report

A list of all incomplete activities sorted in ascending order of total float. List activities which have the same amount of total float in ascending order of Early Start Dates. Do not show completed activities on this report.

3.5.4.4. Earnings Report by CLIN

A compilation of the Contractor's Total Earnings on the project from the NTP to the data date. This report shall reflect the earnings of specific activities based on the agreements made in the schedule update meeting defined herein. Provided that the Contractor has provided a complete schedule update, this report shall serve as the basis of determining progress payments. Group activities by CLIN Item number and sort by activity number. This report shall: sum all activities coded to a particular CLIN and provide a CLIN Item percent earned value; and complete and sum CLIN items to provide a total project percent complete. The printed report shall contain, for each activity: the Activity Number, Activity Description, Original Budgeted Amount, Quantity to Date, Percent Complete (based on cost), and Earnings to Date.

3.5.5. Network Diagram

The network diagram is required for the Preliminary, Initial and Periodic Updates. Depict and display the order and interdependence of activities and the sequence in which the work is to be accomplished. The Contracting Officer will use, but is not limited to, the following conditions to review compliance with this paragraph:

3.5.5.1. Continuous Flow

Show a continuous flow from left to right with no arrows from right to left. Show the activity number, description, duration, and estimated earned value on the diagram.

3.5.5.2. Project Milestone Dates

Show dates on the diagram for start of project, any contract required interim completion dates, and contract completion dates.

3.5.5.3. Critical Path

Clearly show the critical path.

3.5.5.4. Banding

Organize activities as directed to assist in the understanding of the activity sequence. Typically, this flow will group activities by category of work, work area and/or responsibility.

3.5.5.5. S-Curves

Earnings curves showing projected early and late earnings and earnings to date.

3.6. PERIODIC SCHEDULE UPDATE MEETINGS

Conduct periodic schedule update meetings for the purposes of reviewing the Contractor's proposed out of sequence corrections, determining causes for delay, correcting logic, maintaining schedule accuracy and determining earned value. Meetings shall occur at least monthly within five days of the proposed schedule data date and after the Contractor has updated the schedule with Government concurrence respecting actual start dates, actual finish dates, remaining durations and percent complete for each activity it intend to status. Match the actual start and finish dates with the dates exported, as described in paragraph 3.3.5. Provide a computer with the scheduling software loaded and a projector during the meeting which allows all meeting participants to view the proposed schedule update during the meeting. The meeting and resultant approvable schedule update shall be a condition precedent to a formal submission of the update as described in SUBMISSION REQUIREMENTS and to the submission of an invoice for payment. The meeting will be a working interactive exchange which will allow the Government and the Contractor the opportunity review the updated schedule on a real time and interactive basis. The Contractor's authorized scheduling representative will organize, sort, filter and schedule the update as requested by the Government. The meeting will last no longer than 8 hours. A rough draft of the proposed activity logic corrections and narrative report shall be provided to the Government 48 hours in advance of the meeting. The Contractor's Project Manager and Authorized Scheduler shall attend the meeting with the Authorized Representative of the Contracting Officer.

3.6.1. Update Submission Following Progress Meeting

Submit a complete update of the project schedule containing all approved progress, revisions, and adjustments, pursuant to paragraph SUBMISSION REQUIREMENTS not later than 4 working days after the periodic schedule update meeting, reflecting only those changes made during the previous update meeting.

3.6.2. Status of Activities

Update status information, including Actual Start Dates (AS), Actual Finish Dates (AF), Remaining Durations (RD) and Percent Complete shall be subject to the approval of the Government prior to the meeting. As a minimum, address the following items on an activity by activity basis during each progress meeting:

3.6.2.1. Actual Start and Finish Dates

Accurately status the AS and/or AF dates for each activity currently in-progress or completed since the last update. The Government may allow an AF date to be assigned with the percent complete less than 100% to account for the value of work remaining but not restraining successor activities. Only assign AS dates when actual progress occurs on an activity.

3.6.2.2. Remaining Duration

Update the estimated RD for all incomplete activities independent of Percent Complete. Remaining durations may exceed the activity OD or may exceed the activity's prior update RD if the Government considers the current OD or RD to be understated based on current progress, insufficient work crews actually manning the job, unrealistic OD or deficiencies that must be corrected that restrain successor activities.

3.6.2.3. Percent Complete

Update the percent complete for each activity started, based on the realistic assessment of earned value. Activities which are complete but for remaining minor punch list work and which do not restrain the initiation of successor activities may be statused 100 percent complete. To allow for proper schedule management, cost load the correction of punch list from Government pre-final inspection activity(ies) not less than 1% of the total contract value, which activity(ies) may be declared 100 percent complete upon completion and correction of all punch list work identified during Government pre-final inspection(s).

3.6.2.4. Logic Changes

Specifically identify and discuss all logic changes pertaining to NTP on change orders, change orders to be incorporated into the schedule, contractor proposed changes in work sequence, corrections to schedule logic for out-of-sequence progress, and other changes that have been made pursuant to contract provisions. The Government will only approve logic revisions for the purpose of keeping the schedule valid in terms of its usefulness in calculating a realistic completion date, correcting erroneous logic ties, and accurately sequencing the work.

3.6.2.5. Other Changes

Other changes required due to delays in completion of any activity or group of activities include: 1) delays beyond the Contractor's control, such as strikes and unusual weather. 2) delays encountered due to submittals, Government Activities, deliveries or work stoppages which make re-planning the work necessary. 3) Changes required to correct a schedule that does not represent the actual or planned prosecution and progress of the work.

3.7. REQUESTS FOR TIME EXTENSIONS

In the event the Contractor believes it is entitled to an extension of the contract performance period, completion date, or any interim milestone date, furnish the following for a determination by the Contracting Officer: justification, project schedule data, and supporting evidence as the Contracting Officer may deem necessary. Submission of proof of excusable delay, based on revised activity logic, duration, and costs (updated to the specific date that the delay occurred) is a condition precedent to any approvals by the Government. In response to each Request For Proposal issued by the Government, the Contractor shall submit a schedule impact analysis demonstrating whether or not the change contemplated by the Government impacts the critical path.

3.7.1. Justification of Delay

The project schedule shall clearly display that the Contractor has used, in full, all the float time available for the work involved with its request. The Contracting Officer's determination as to the number of allowable days of contract extension shall be based upon the project schedule updates in effect for the time period in question, and other factual information.

Actual delays that are found to be caused by the Contractor's own actions, which result in a calculated schedule delay, will not be a cause for an extension to the performance period, completion date, or any interim milestone date.

3.7.2. Submission Requirements

Submit a justification for each request for a change in the contract completion date of less than 2 weeks based upon the most recent schedule update at the time of the NTP or constructive direction issued for the change. Such a request shall be in accordance with the requirements of other appropriate Contract Clauses and shall include, as a minimum:

3.7.2.1. A list of affected activities, with their associated project schedule activity number.

3.7.2.2. A brief explanation of the causes of the change

3.7.2.3. An analysis of the overall impact of the changes proposed.

3.7.2.4. A sub-network of the affected area

Identify activities impacted in each justification for change by a unique activity code contained in the required data file.

3.7.3. Additional Submission Requirements

The Contracting Officer may request an interim update with revised activities for any requested time extension of over 2 weeks. Provide this disk within 4 days of the Contracting Officer's request.

3.7.4. If Progress Falls Behind the Approved Project Schedule

3.7.4.1. Should progress fall behind the approved schedule (more than 20 work days of negative float) due to Contractor generated problems, promptly provide a supplemental recovery or completion schedule that illustrates its efforts to regain time to assure a completion by the required contract completion date.

3.7.4.2. The supplemental recovery or completion schedule will not replace the original, approved schedule as the official contract schedule. Continue to update the original, approved schedule on at least a monthly basis. In addition, the Contractor and the Contracting Officer will monitor the supplemental recovery or completion schedule on at least a bi-weekly basis to determine its effect on regaining the rate of progress to assure project completion by the contractually required completion date.

3.7.4.3. Do not artificially improve progress by simply revising the schedule logic, modifying or adding constraints, or shortening future work activity durations. Resource and manpower load the supplemental recovery schedule or completion schedule with crew size and productivity for each remaining activity, indicating overtime, weekend work, and/or double shifts needed to regain the schedule, in accordance with FAR 52.236.15, without additional cost to the Government. Indicate assumptions made and the basis for any logic, constraint, or duration changes used in the creation of the supplemental recovery or completion schedule in a narrative submitted for the Contracting Officer's approval. Any additional resources or manpower must be evident at the work site. Do not modify the official contract schedule to include these assumptions.

3.7.4.4. Failure to perform work and maintain progress in accordance with the supplemental recovery or completion schedule may result in an interim and final unsatisfactory performance rating and/or may result in corrective action by the Contracting Officer in accordance with FAR 52.236-15.

3.8. DIRECTED CHANGES

If the NTP is issued for changes prior to settlement of price and/or time, submit proposed schedule revisions to the Contracting Officer within 2 weeks of the NTP being issued. The Contracting Officer will approve proposed revisions to the schedule prior to inclusion of those changes within the project schedule. If the Contractor fails to submit the proposed revisions, the Contracting Officer may furnish the Contractor with suggested revisions to the project schedule. The Contractor shall include these revisions in the project schedule until revisions are submitted and final changes and impacts have been negotiated. If the Contractor has any objections to the revisions furnished by the Contracting Officer, advise the Contracting Officer within 2 weeks of receipt of the revisions. Regardless of the objections, the Contractor shall continue to update the schedule with the Contracting Officer's revisions until a mutual agreement in the revisions is reached. If the Contractor fails to submit alternative revisions within 2 weeks of

receipt of the Contracting Officer's proposed revisions, the Contractor will be deemed to have concurred with the Contracting Officer's proposed revisions. The proposed revisions will then be the basis for an equitable adjustment for performance of the work.

3.9. WEEKLY PROGRESS MEETINGS

3.9.1. The Government and the Contractor shall meet weekly (or as otherwise mutually agreed to) between the meetings described in paragraph PERIODIC SCHEDULE UPDATE MEETINGS for the purpose of jointly reviewing the actual progress of the project as compared to the as planned progress and to review planned activities for the upcoming two weeks. The then current and approved schedule update shall be used for the purposes of this meeting and for the production and review of reports. The Contractor's Project Manager and the Authorized Representative of the Contracting Officer shall attend. The weekly progress meeting will address the status of RFI's, RFP's and Submittals.

3.9.2. Provide a bar chart produced by the scheduling software, organized by Total Float and Sorted by Early Start Date, and a two week "look-ahead" schedule by filtering all schedule activities to show only current ongoing activities and activities schedule to start during the upcoming two weeks, organized by Work Area Code (AREA) and sorted by Early Start Date.

3.9.3. The Government and the Contractor shall jointly review the reports. If it appears that activities on the longest path(s) which are currently driving the calculated completion date (driving activities), are not progressing satisfactorily and therefore could jeopardize timely project completion, corrective action must be taken immediately. Corrective action includes but is not limited to: increasing the number of work crews; increasing the number of work shifts; increasing the number of hours worked per shift; and determining if Government responsibility coded activities require Government corrective action.

3.10. OWNERSHIP OF FLOAT

Float available in the schedule, at any time, shall not be considered for the exclusive use of either the Government or the Contractor.

3.11. TRANSFER OF SCHEDULE DATA INTO RMS/QCS

Download and upload the schedule data into the Resident Management System (RMS) prior to RMS databases being transferred to the Government and is considered to be additional supporting data in a form and detail required by the Contracting Officer pursuant to FAR 52.232-5 - Payments under Fixed-Price Construction Contracts. The receipt of a proper payment request pursuant to FAR 52.232-27 - Prompt Payment for Construction Contracts is contingent upon the Government receiving both acceptable and approvable hard copies and electronic export from QCS of the application for progress payment.

End of Section 01 32 01.00 10

**SECTION 01 33 00
SUBMITTAL PROCEDURES**

1.0 GENERAL

- 1.1. DEFINITIONS
- 1.2. NOT USED
- 1.3. SUBMITTAL CLASSIFICATION
- 1.4. APPROVED OR CONCURRED WITH SUBMITTALS
- 1.5. DISAPPROVED SUBMITTALS
- 1.6. WITHHOLDING OF PAYMENT
- 1.7. GENERAL
- 1.8. SUBMITTAL REGISTER
- 1.9. SCHEDULING
- 1.10. TRANSMITTAL FORM (ENG FORM 4025)
- 1.11. SUBMITTAL PROCEDURES
- 1.12. CONTROL OF SUBMITTALS
- 1.13. GOVERNMENT APPROVED SUBMITTALS
- 1.14. INFORMATION ONLY SUBMITTALS
- 1.15. STAMPS

1.0 GENERAL

1.1. DEFINITIONS

1.1.1. Submittal

Contract Clauses "FAR 52.236-5, Material and Workmanship," paragraph (b) and "FAR 52.236-21, Specifications and Drawings for Construction," paragraphs (d), (e), and (f) apply to all "submittals."

1.1.2. Submittal Descriptions (SD)

Submittals requirements are specified in the technical sections. Submittals are identified by SD numbers and titles as follows.

SD-01 Preconstruction Submittals

- Certificates of insurance.
- Surety bonds.
- List of proposed subcontractors.
- List of proposed products.
- Construction Progress Schedule.
- Submittal register.
- Schedule of prices.
- Accident Prevention Plan.
- Work plan.
- Quality control plan.
- Environmental protection plan.

SD-02 Shop Drawings

- Drawings, diagrams and schedules specifically prepared to illustrate some portion of the work.
- Diagrams and instructions from a manufacturer or fabricator for use in producing the product and as aids to the Contractor for integrating the product or system into the project.
- Drawings prepared by or for the Contractor to show how multiple systems and interdisciplinary work will be coordinated.

SD-03 Product Data

- Catalog cuts, illustrations, schedules, diagrams, performance charts, instructions and brochures illustrating size, physical appearance and other characteristics of materials or equipment for some portion of the work.
- Samples of warranty language when the contract requires extended product warranties.

SD-04 Samples

- Physical examples of materials, equipment or workmanship that illustrate functional and aesthetic characteristics of a material or product and establish standards by which the work can be judged.
- Color samples from the manufacturer's standard line (or custom color samples if specified) to be used in selecting or approving colors for the project.
- Field samples and mock-ups constructed on the project site establish standards by which the ensuring work can be judged. Includes assemblies or portions of assemblies that are to be incorporated into the project and those which will be removed at conclusion of the work.

SD-05 Design Data

- Calculations, mix designs, analyses or other data pertaining to a part of work.
- Design submittals, design substantiation submittals and extensions of design submittals.

SD-06 Test Reports

- Report signed by authorized official of testing laboratory that a material, product or system identical to the material, product or system to be provided has been tested in accord with specified requirements. (Testing must

have been within three years of date of contract award for the project.)

- Report which includes findings of a test required to be performed by the Contractor on an actual portion of the work or prototype prepared for the project before shipment to job site.
- Report which includes finding of a test made at the job site or on sample taken from the job site, on portion of work during or after installation.
- Investigation reports.
- Daily checklists.
- Final acceptance test and operational test procedure.

SD-07 Certificates

- Statements printed on the manufacturer's letterhead and signed by responsible officials of manufacturer of product, system or material attesting that product, system or material meets specification requirements. Must be dated after award of project contract and clearly name the project.
- Document required of Contractor, or of a supplier, installer or subcontractor through Contractor, the purpose of which is to further quality of orderly progression of a portion of the work by documenting procedures, acceptability of methods or personnel qualifications.
- Confined space entry permits.
- Text of posted operating instructions.

SD-08 Manufacturer's Instructions

- Preprinted material describing installation of a product, system or material, including special notices and Material Safety Data sheets concerning impedances, hazards and safety precautions.

SD-09 Manufacturer's Field Reports

- Documentation of the testing and verification actions taken by manufacturer's representative to confirm compliance with manufacturer's standards or instructions.
- Factory test reports.

SD-10 Operation and Maintenance Data

- Data that is furnished by the manufacturer, or the system provider, to the equipment operating and maintenance personnel. This data is needed by operating and maintenance personnel for the safe and efficient operation, maintenance and repair of the item.

SD-11 Closeout Submittals

- Documentation to record compliance with technical or administrative requirements or to establish an administrative mechanism.

1.1.3. Approving Authority

Office authorized to approve submittal.

1.1.4. Work

As used in this section, on- and off-site construction required by contract documents, including labor necessary to produce submittals, construction, materials, products, equipment, and systems incorporated or to be incorporated in such construction.

1.2. NOT USED

1.3. SUBMITTAL CLASSIFICATION

Submittals are classified as follows:

1.3.1. Designer of Record Approved (DA)

1.3.1.1. Designer of Record (DOR) approval is required for all extensions of design, critical materials, equipment whose compatibility with the entire system must be checked, and other items as designated by the Contracting Officer. Within the terms of the Contract Clause entitled "Specifications and Drawings for Construction", they are considered to be "shop drawings". Provide the Government the number of copies designated hereinafter of all DOR approved submittals, after the DOR has taken appropriate action. The DOR shall ensure that submittals conform to the Solicitation, the Accepted Proposal and the completed design, however see below for those submittals proposing a deviation to the contract or a substitution of a material, system, or piece of equipment that was identified by manufacturer, brand name or model description in the accepted contract proposal.

1.3.1.2. The DOR shall ensure that the submittals comply with all applicable Buy American Act and Trade Agreement Act clauses in the contract. The DOR may confer with the Contracting Officer's Representative for advice and interpretation of those clauses, as necessary.

1.3.1.3. The Government may, but is not required to, review any or all DOR approved submittals for conformance to the solicitation, accepted proposal and the completed design. Except for submittals designated as deviating from the Solicitation, the Accepted Proposal or completed design, the Contractor may proceed with acquisition and installation upon DOR approval. Government Approved (GA)

1.3.2. Government Approved (GA)

Government approval is required for any item specifically designated as requiring Government approval in the Solicitation, for internal and external color finish selections and other items as designated by the Contracting Officer. Within the terms of the Contract Clause entitled "Specifications and Drawings for Construction," they are considered to be "shop drawings."

1.3.3. Government Conformance Review of Design (CR)

The Government will review all intermediate and final design submittals for conformance with the technical requirements of the solicitation. Section 01 33 16 **DESIGN AFTER AWARD** covers the design submittal and review process in detail. Review will be only for conformance with the applicable codes, standards and contract requirements. Design data includes the design documents described in Section 01 33 16 **DESIGN AFTER AWARD**. Generally, design submittals should be identified as SD-05 Design Data submittals.

1.3.4. Designer of Record Approved/Government Conformance Review (DA/CR)

1.3.4.1. Deviations to the Accepted Design. Designer of Record approval and the Government's concurrence are required for any proposed deviation from the accepted design which still complies with the contract (the Solicitation and Accepted Proposal) before the Contractor is authorized to proceed with material acquisition or installation. Within the terms of the Contract Clause entitled "Specifications and Drawings for Construction", they are considered to be "shop drawings." If necessary to facilitate the project schedule, the Contractor and the DOR may discuss a submittal proposing a deviation with the Contracting Officer's Representative prior to officially submitting it to the Government. However, the Government reserves the right to review the submittal before providing an opinion, if it deems it necessary. In any case, the Government will not formally agree to or provide a preliminary opinion on any deviation without the DOR's approval or recommended approval. The Government reserves the right to non-concur with any deviation from the design, which may impact furniture, furnishings, equipment selections or operations decisions that were made, based on the reviewed and concurred design.

1.3.4.2. Substitutions. Unless prohibited or provided for otherwise elsewhere in the Contract, where the accepted contract proposal named products, systems, materials or equipment by manufacturer, brand name and/or by model number or other specific identification, and the Contractor desires to substitute manufacturer or model after award, submit a requested substitution for Government concurrence. Include substantiation, identifying information and the DOR's approval, as meeting the contract requirements and that it is equal in function, performance, quality and salient features to that in the accepted contract proposal.

1.3.5. Designer of Record Approved/Government Approved (DA/GA)

Any proposed deviation to the solicitation and/or the accepted proposal constitutes a change to the contract. In addition to the above stated requirements for proposed deviations to the accepted design, both Designer of Record and Government Approval and, where applicable, a contract modification are required before the Contractor is

authorized to proceed with material acquisition or installation for any proposed deviation to the contract. Within the terms of the Contract Clause entitled "Specifications and Drawings for Construction", they are considered to be "shop drawings". The Government reserves the right to accept or reject any such proposed deviation at its discretion.

1.3.6. Information Only

All submittals not requiring Designer of Record or Government approval will be for information only. Provide the Government "For Information Only" copies of all submittals not requiring Government approval or concurrence, after the Designer of Record has taken the appropriate action.

1.4. APPROVED OR CONCURRED WITH SUBMITTALS

Do not construe the Contracting Officer's approval of or concurrence with submittals as a complete check, but only that design, general method of construction, materials, detailing and other information appear to meet the Solicitation and Accepted Proposal. Approval or concurrence will not relieve the Contractor of the responsibility for any error which may exist, as the Contractor under the Contractor Quality Control (CQC) requirements of this contract is responsible for design, dimensions, all design extensions, such as the design of adequate connections and details, etc., and the satisfactory construction of all work. The Government won't consider re-submittals for the purpose of substituting previously approved materials or equipment unless accompanied by an explanation of why a substitution is necessary.

1.5. DISAPPROVED SUBMITTALS

Make all corrections required by the Contracting Officer, obtain the Designer of Record's approval when applicable, and promptly furnish a corrected submittal in the form and number of copies specified for the initial submittal. Resubmit any "information only" submittal found to contain errors or unapproved deviations from the Solicitation or Accepted Proposal as one requiring "approval" action, requiring both Designer of Record and Government approval. If the Contractor considers any correction indicated on the submittals to constitute a change to the contract, provide prompt notice in accordance with the Contract Clause "Changes" to the Contracting Officer.

1.6. WITHHOLDING OF PAYMENT

No payment for materials incorporated in the work will be made if all required Designer of Record or required Government approvals have not been obtained. No payment will be made for any materials incorporated into the work for any conformance review submittals or information only submittals found to contain errors or deviations from the Solicitation or Accepted Proposal.

1.7. GENERAL

Make submittals as required by the specifications. The Contracting Officer may request submittals in addition to those specified when deemed necessary to adequately describe the work covered in the respective sections. Units of weights and measures used on all submittals shall be the same as those used in the contract drawings. Each submittal shall be complete and in sufficient detail to allow ready determination of compliance with contract requirements. Prior to submittal, the Contractor's Quality Control (CQC) System Manager and the Designer of Record, if applicable, shall check, approve, sign, and stamp all items, indicating action taken. Clearly identify proposed deviations from the contract requirements. Include items such as: Contractor's, manufacturer's, or fabricator's drawings; descriptive literature including (but not limited to) catalog cuts, diagrams, operating charts or curves; test reports; test cylinders; samples; O&M manuals (including parts list); certifications; warranties; and other such required submittals. Schedule and make submittals requiring Government approval prior to the acquisition of the material or equipment covered thereby. Pick up and dispose of samples remaining upon completion of the work in accordance with manufacturer's Material Safety Data Sheets (MSDS) and in compliance with existing laws and regulations.

1.8. SUBMITTAL REGISTER (GA)

Develop a complete list of submittals, including each separate design package submittal. Submit the initial submittal register within 15 days after Notice to Proceed, including, as a minimum, the design packages and other initial submittals required elsewhere in the contract. The Designer of Record shall identify required submittals in the

specifications, and use the list to prepare the Submittal Register, utilizing the government-provided software, QCS (see Section 01 45 01.10), to create the ENG Form 4288. Appendix Ris a preliminary submittal register input form for use with the Quality Management System and the Resident Office Management System (QCS and RMS). The Government will provide the Contractor the actual Excel Spreadsheet version of this sample input form after award to modify and to use for input into QCS. The Excel Spreadsheet is not totally inputable into QCS, so additional keystroke input will be necessary. The sample input form is not all-inclusive. In addition, additional submittals may be required by other parts of the contract. After award, the parties will meet to discuss contract specific (or task order specific for a task order contract) distribution for the submittals all-inclusive and additional submittals may be required by other parts of the contract. Develop and complete the submittal register as the design is completed. Submit it to the Contracting Officer with the un-reviewed final design package submission or as soon as the design specifications are completed, if before the final design submission. When applicable, if the Contractor elects to fast track design and construction, using multiple design package submissions, update the submittal register to reflect the submittals associated with each design submission, clearly denoting all revisions to the previous submission. The submittal register serves as a scheduling document for submittals and for control of submittal actions throughout the contract period. Coordinate the submit dates and need dates used in the submittal register with dates in the Contractor prepared progress schedule. Submit monthly updates to the submittal register showing the Contractor action codes and actual dates with Government action codes and actual dates or until all submittals have been satisfactorily completed. Revise and submit the submittal register when revising the progress schedule.

1.9. SCHEDULING

Schedule submittals covering component items forming a system or items that are interrelated to be coordinated and submitted concurrently. Schedule certifications to be submitted with the pertinent drawings. Allow adequate time (a minimum of 15 calendar days exclusive of mailing time) and show on the register for those items requiring Government approval or concurrence. No delay damages or time extensions will be allowed for time lost in late submittals by the Contractor.

1.10. TRANSMITTAL FORM (ENG FORM 4025)

Use the transmittal form (ENG Form 4025) for submitting submittals in accordance with the instructions on the reverse side of the form. These forms will be furnished to the Contractor or are included in the QCS software if the Contractor is required to use QCS for this contract. Use a separate transmittal form for each specification section. Complete this form by filling out all the heading blank spaces and identify each item submitted. Exercise special care to ensure proper listing of the specification paragraph and/or sheet number of the contract drawings pertinent to the data submitted for each item.

1.11. SUBMITTAL PROCEDURES

Make submittals as follows:

1.11.1. Procedures

The Government will further discuss detailed submittal procedures with the Contractor at the Post-Award Conference.

1.11.2. Deviations

For submittals which include proposed deviations requested by the Contractor, check the column "variation" of ENG Form 4025. Set forth in writing the reason for any deviations and annotate such deviations on the submittal. The Government reserves the right to rescind inadvertent approval of submittals containing unnoted deviations.

1.12. CONTROL OF SUBMITTALS

Carefully control his procurement operations to ensure that each individual submittal is made on or before the scheduled submittal date shown on the approved "Submittal Register."

1.13. GOVERNMENT APPROVED OR CONCURRED WITH SUBMITTALS

Upon completion of review of submittals requiring Government approval or concurrence, the Government will stamp and date the submittals as approved or concurred.. The Government will retain three (3) copies of the submittal and return one (1) copy(ies) of the submittal.

1.14. INFORMATION ONLY SUBMITTALS

Normally submittals for information only will not be returned. Approval of the Contracting Officer is not required on information only submittals. The Government reserves the right to require the Contractor to resubmit any item found not to comply with the contract. This does not relieve the Contractor from the obligation to furnish material conforming to the plans and specifications; will not prevent the Contracting Officer from requiring removal and replacement of nonconforming material incorporated in the work; and does not relieve the Contractor of the requirement to furnish samples for testing by the Government laboratory or for check testing by the Government in those instances where the technical specifications so prescribe. The Government will retain two (2) copies of information only submittals.

1.15. STAMPS

Use stamps similar to the following on the submittal data to certify that the submittal meets contract requirements:

CONTRACTOR

(FIRM NAME)

Approved

Approved with corrections as noted on submittal data and/or attached sheet(s)

Signature:

Title:

Date:

For design-build construction, both the Contractor Quality Control System Manager and the Designer of Record shall stamp and sign to certify that the submittal meets contract requirements.

**SECTION 01 33 16
DESIGN AFTER AWARD**

1.0 GENERAL INFORMATION

1.1. INTRODUCTION

1.2. DESIGNER OF RECORD

2.0 PRODUCTS (Not Applicable)

3.0 EXECUTION

3.1. PRE-WORK ACTIVITIES & CONFERENCES

3.1.1. Design Quality Control Plan

3.1.2. Post Award Conference

3.1.3. Partnering & Project Progress Processes

3.1.4. Initial Design Conference

3.1.5. Pre-Construction Conference

3.2. STAGES OF DESIGN SUBMITTALS AND OVER THE SHOULDER PROGRESS REVIEWS

3.2.1. Site/Utilities

3.2.2. Interim Design Submittals

3.2.3. Over-the-Shoulder Progress Reviews

3.2.4. Final Design Submissions

3.2.5. Design Complete Submittals

3.2.6. Holiday Periods for Government Review or Actions

3.2.7. Late Submittals and Reviews

3.3. DESIGN CONFIGURATION MANAGEMENT

3.3.1. Procedures

3.3.2. Tracking Design Review Comments

3.3.3. Design and Code Checklists

3.4. INTERIM DESIGN REVIEWS AND CONFERENCES

3.4.1. General

3.4.2. Procedures

3.4.3. Conference Documentation

3.5. INTERIM DESIGN REQUIREMENTS

3.5.1. Drawings

3.5.2. Design Analyses

3.5.3. Geotechnical Investigations and Reports

3.5.4. LEED Documentation

3.5.5. Energy Conservation

3.5.6. Specifications

3.5.7. Building Rendering

3.5.8. Interim Building Design Contents

3.6. FINAL DESIGN REVIEWS AND CONFERENCES

3.7. FINAL DESIGN REQUIREMENTS

3.7.1. Drawings

3.7.2. Design Analysis

3.7.3. Specifications

3.7.4. Submittal Register

3.7.5. Preparation of DD Form 1354 (Transfer of Real Property)

3.7.6. Acceptance and Release for Construction

3.8. DESIGN COMPLETE CONSTRUCTION DOCUMENT REQUIREMENTS

3.9. SUBMITTAL DISTRIBUTION, MEDIA AND QUANTITIES

3.9.1. Submittal Distribution and Quantities

3.9.2. Web based Design Submittals

3.9.3. Mailing of Design Submittals

3.10. AS-BUILT DOCUMENTS

ATTACHMENT A STRUCTURAL INTERIOR DESIGN (SID) REQUIREMENTS

ATTACHMENT B FURNITURE, FIXTURES AND EQUIPMENT REQUIREMENTS

ATTACHMENT C TRACKING COMMENTS IN DRCHECKS

ATTACHMENT D SAMPLE FIRE PROTECTION AND LIFE SAFETY CODE REVIEW

ATTACHMENT E LEED SUBMITTALS

ATTACHMENT F BUILDING INFORMATION MODELING REQUIREMENTS

ATTACHMENT G DESIGN SUBMITTAL DIRECTORY AND SUBDIRECTORY FILE ARRANGEMENT

1.0 GENERAL INFORMATION

1.1. INTRODUCTION

1.1.1. The information contained in this section applies to the design required after award. After award, the Contractor will develop the accepted proposal into the completed design, as described herein.

1.1.2. The Contractor may elect to fast track the design and construction that is, proceed with construction of parts of the sitework and facilities prior to completion of the overall design. To facilitate fast tracking, the Contractor may elect to divide the design into no more than six (6) design packages per major facility type and no more than three (3) design packages for site and associated work. Designate how it will package the design, consistent with its overall plan for permitting (where applicable) and construction of the project. See Sections 01 33 00 SUBMITTAL PROCEDURES and 01 32 01.00 10 PROJECT SCHEDULE for requirements for identifying and scheduling the design packaging plan in the submittal register and project schedule. See also Sections 01 10 00 STATEMENT OF WORK and 01 57 20.00 10 ENVIRONMENTAL PROTECTION for any specified permit requirements. If early procurement of long-lead item construction materials or installed equipment, prior to completion of the associated design package, is necessary to facilitate the project schedule, also identify those long-lead items and how it will assure design integrity of the associated design package to meet the contract requirements (The Contract consists of the Solicitation requirements and the accepted proposal). Once the Government is satisfied that the long-lead items meet the contract requirements, the Contracting Officer will allow the Contractor to procure the items at its own risk.

1.1.3. The Contractor may proceed with the construction work included in a separate design package after the Government has reviewed the final (100%) design submission for that package, review comments have been addressed and resolved to the Government's satisfaction and the Contracting Officer (or the Administrative Contracting Officer) has agreed that the design package may be released for construction.

1.1.4. **INTEGRATED DESIGN.** To the maximum extent permitted for this project, use a collaborative, integrated design process for all stages of project delivery with comprehensive performance goals for siting, energy, water, materials and indoor environmental quality and ensures incorporation of these goals. Consider all stages of the building lifecycle, including deconstruction.

1.2. DESIGNER OF RECORD

Identify, for approval, the Designer of Record ("DOR") that will be responsible for each area of design. One DOR may be responsible for more than one area. Listed, Professional Registered, DOR(s) shall account for all areas of design disciplines shall be accounted for by a listed. The DOR's shall stamp, sign, and date each design drawing and other design deliverables under their responsible discipline at each design submittal stage (see contract clause Registration of Designers). If the deliverables are not ready for release for construction, identify them as "preliminary" or "not for release for construction" or by using some other appropriate designation. The DOR(s) shall also be responsible for maintaining the integrity of the design and for compliance with the contract requirements through construction and documentation of the as-built condition by coordination, review and approval of extensions of design, material, equipment and other construction submittals, review and approval or disapproval of requested deviations to the accepted design or to the contract, coordination with the Government of the above activities, and by performing other typical professional designer responsibilities.

2.0 PRODUCTS (Not Applicable)

3.0 EXECUTION

3.1. PRE-WORK ACTIVITIES & CONFERENCES

3.1.1. Design Quality Control Plan

Submit for Government acceptance, a Design Quality Control Plan in accordance with Section 01 45 04.00 10 CONTRACTOR QUALITY CONTROL before design may proceed.

3.1.2. Post Award Conference

3.1.2.1. The government will conduct a post award contract administration conference at the project site, as soon as possible after contract award. This will be coordinated with issuance of the contract notice to proceed (NTP). The Contractor and major sub-contractor representatives shall participate. All designers need not attend this first meeting. Government representatives will include COE project delivery team members, facility users, facility command representatives, and installation representatives. The Government will provide an agenda, meeting goals, meeting place, and meeting time to participants prior to the meeting.

3.1.2.2. The post award conference shall include determination and introduction of contact persons, their authorities, contract administration requirements, discussion of expected project progress processes, and coordination of subsequent meetings for quality control (see Section 01 45 04.00 10 CONTRACTOR QUALITY CONTROL), Partnering (see below and SCR: Partnering), and the initial design conference (see below).

3.1.2.3. The government will introduce COE project delivery team members, facility users, facility command representatives, and installation representatives. The DB Contractor shall introduce major subcontractors, and other needed staff. Expectations and duties of each person shall be defined for all participants. A meeting roster shall be developed and distributed by the government with complete contact information including name, office, project role, phone, mailing and physical address, and email address.

3.1.3. Partnering & Project Progress Processes

3.1.3.1. The initial Partnering conference may be scheduled and conducted at any time with or following the post award conference. The Government proposes to form a partnership with the DB Contractor to develop a cohesive building team. This partnership will involve the COE project delivery team members, facility users, facility command representatives, installation representatives, Designers of Record, major subcontractors, contractor quality control staff, and contractor construction management staff. This partnership will strive to develop a cooperative management team drawing on the strengths of each team member in an effort to achieve a quality project within budget and on schedule. This partnership will be bilateral in membership and participation will be totally voluntary. All costs, excluding labor and travel expenses, shall be shared equally between the Government and the Contractor. The Contractor and Government shall be responsible for their own labor and travel costs. Normally, partnering meetings will be held at or in the vicinity of the project installation.

3.1.3.2. As part of the partnering process, the Government and Contractor shall develop, establish, and agree to comprehensive design development processes including conduct of conferences, expectations of design development at conferences, fast-tracking, design acceptance, Structural Interior Design (SID)/ Furniture, Fixtures & Equipment (FF&E) design approval, project closeout, etc. The government will explain contract requirements and the DB Contractor shall review their proposed project schedule and suggest ways to streamline processes.

3.1.4. Initial Design Conference

The initial design conference may be scheduled and conducted at the project installation any time after the post award conference, although it is recommended that the partnering process be initiated with or before the initial design conference. Any design work conducted after award and prior to this conference should be limited to site and is discouraged for other items. All Designers of Record shall participate in the conference. The purpose of the meeting is to introduce everyone and to make sure any needs the contractor has are assigned and due dates established as well as who will get the information. See also Attachment F, BUILDING INFORMATION MODELING REQUIREMENTS for discussion concerning the BIM Implementation Plan demonstration at this meeting. The DB Contractor shall conduct the initial design conference.

3.1.5. Pre-Construction Conference

Before starting construction activities, the Contractor and Government will jointly conduct a pre-construction administrative conference to discuss any outstanding requirements and to review local installation requirements for start of construction. It is possible there will be multiple Pre-Construction Conferences based on the content of the design packages selected by the Contractor. The Government will provide minutes of this meeting to all participants.

3.2. STAGES OF DESIGN SUBMITTALS AND OVER THE SHOULDER PROGRESS REVIEWS

The stages of design submittals described below define Government expectations with respect to process and content. The Contractor shall determine how to best plan and execute the design and review process for this project, within the parameters listed below. As a minimum, the Government expects to see at least one interim design submittal, at least one final design submittal before construction of a design package may proceed and at least one Design Complete submittal that documents the accepted design. The Contractor may sub-divide the design into separate packages for each stage of design and may proceed with construction of a package after the Government accepts the final design for that package. See discussion on waivers to submission of one or more intermediate design packages where the parties partner during the design process. See also Attachment F, BUILDING INFORMATION MODELING REQUIREMENTS for discussion concerning BIM and the various stages of design submittals and over-the-shoulder progress reviews.

3.2.1. Site/Utilities

To facilitate fast-track design-construction activities the contractor may submit a final (100%) site and utility design as the first design submittal or it may elect to submit interim and final site and utility design submittals as explained below. Following review, resolution, and incorporation of all Government comments, and submittal of a satisfactory set of site/utility design documents, after completing all other pre-construction requirements in this contract and after the pre-construction meeting, the Government will allow the Contractor to proceed with site development activities, including demolition where applicable, within the parameters set forth in the accepted design submittal. For the first site and utility design submission, whether an interim or final, the submittal review, comment, and resolution times from this specification apply, except that the Contractor shall allow the Government a 14 calendar day review period, exclusive of mailing time. No on-site construction activities shall begin prior to written Government clearance to proceed.

3.2.2. Interim Design Submittals

The Contractor may submit either a single interim design for review, representing a complete package with all design disciplines, or split the interim design into smaller, individual design packages as it deems necessary for fast-track construction purposes. As required in Section 01 32 01.00 10 PROJECT SCHEDULE, the Contractor shall schedule its design and construction packaging plan to meet the contract completion period. This submission is the Government's primary opportunity to review the design for conformance to the solicitation and to the accepted contract proposal and to the Building Codes at a point where required revisions may be still made, while minimizing lost design effort to keep the design on track with the contract requirements. The requirements for the interim design review submittals and review conferences are described hereinafter. This is not necessarily a hold point for the design process; the Contractor may designate the interim design submittal(s) as a snapshot and proceed with design development at its own risk. See below for a waiver, where the parties establish an effective over-the-shoulder progress review procedure through the partnering process that would eliminate the need for or expedite a formal intermediate design review on one or more individual design packages.

3.2.3. Over-the-Shoulder Progress Reviews

To facilitate a streamlined design-build process, the Government and the Contractor may agree to one-on-one reviewer or small group reviews, electronically, on-line (if available within the Contractor's standard design practices) or at the Contractor's design offices or other agreed location, when practicable to the parties. The Government and Contractor will coordinate such reviews to minimize or eliminate disruptions to the design process. Any data required for these reviews shall normally be provided in electronic format, rather than in hard copy. If the Government and Contractor establish and implement an effective, mutually agreeable partnering procedure for regular (e.g., weekly) over-the-shoulder review procedures that allow the Government reviewers the opportunity to keep fully informed of the progress, contents, design intent, design documentation, etc. of the design package, the Government will agree to waive or to expedite the formal intermediate design review period for that package. The Contractor shall still be required to submit the required intermediate design documentation, however the parties may agree to how that material will be provided, in lieu of a formal consolidated submission of the package. It should be noted that Government funding is extremely limited for non-local travel by design reviewers, so the maximum use of virtual teaming methods must be used. Some possible examples include electronic file sharing, interactive software with on-line or telephonic conferencing, televideo conferencing, etc. The Government must still perform its Code and Contract conformance reviews, so the Contractor is encouraged to partner with the reviewers to find ways to facilitate this process and to facilitate meeting or bettering the design-build schedule. The Contractor shall maintain a fully functional configuration management system as described herein to track design revisions, regardless of whether or not there is a need for a formal intermediate design review. The formal intermediate

review procedures shall form the contractual basis for the official schedule, in the event that the partnering process determines that the formal intermediate review process to be best suited for efficient project execution. However, the Government pledges to support and promote the partnering process to work with the Contractor to find ways to better the design schedule.

3.2.4. Final Design Submissions

This submittal is required for each design package prior to Government acceptance of that design package for construction. The requirements for the final design submittal review conferences and the Government's acceptance for start of construction are described herein after.

3.2.5. Design Complete Submittals

After the final design submission and review conference for a design package, revise the design package to incorporate the comments generated and resolved in the final review conferences, perform and document a back-check review and submit the final, design complete documents, which shall represent released for construction documents. The requirements for the design complete submittals are described hereinafter.

3.2.6. Holiday Periods for Government Review or Actions

Do not schedule meetings, Government reviews or responses during the last two weeks of December or other designated Government Holidays (including Friday after Thanksgiving). Exclude such dates and periods from any durations specified herein for Government actions.

3.2.7. Late Submittals and Reviews

If the Contractor cannot meet its scheduled submittal date for a design package, it must revise the proposed submittal date and notify the government in writing, at least one (1) week prior to the submittal, in order to accommodate the Government reviewers' other scheduled activities. If a design submittal is over one (1) day late in accordance with the latest revised design schedule, or if notification of a proposed design schedule change is less than seven (7) days from the anticipated design submission receipt date, the Government review period may be extended up to seven (7) days due to reviewers' schedule conflicts. If the Government is late in meeting its review commitment and the delay increases the Contractor's cost or delays completion of the project, the Suspension of Work and Defaults clauses provide the respective remedy or relief for the delay.

3.3. DESIGN CONFIGURATION MANAGEMENT

3.3.1. Procedures

Develop and maintain effective, acceptable design configuration management (DCM) procedures to control and track all revisions to the design documents after the Interim Design Submission through submission of the As-Built documents. During the design process, this will facilitate and help streamline the design and review schedule. After the final design is accepted, this process provides control of and documents revisions to the accepted design (See Special Contract Requirement: Deviating From the Accepted Design). The system shall include appropriate authorities and concurrences to authorize revisions, including documentation as to why the revision must be made. The DCM data shall be available to the Government reviewers at all times. The Contractor may use its own internal system with interactive Government concurrences, where necessary or may use the Government's "DrChecks Design Review and Checking System" (see below and Attachment C).

3.3.2. Tracking Design Review Comments

Although the Contractor may use its own internal system for overall design configuration management, the Government and the Contractor shall use the DrChecks Design Review and Checking System to initiate, respond to, resolve and track Government design compliance review comments. This system may be useful for other data which needs to be interactive or otherwise available for shared use and retrieval. See Attachment C for details on how to establish an account and set-up the DrChecks system for use on the project.

3.3.3. Design and Code Checklists

Develop and complete various discipline-specific checklists to be used during the design and quality control of each submittal. Submit these completed checklists with each design submittal, as applicable, as part of the project documentation. See Section 01 45 04.00 10 Contractor Quality Control, Attachment D for a Sample Fire Protection and Life Safety Code review checklist and Attachment E for LEED SUBMITTALS.

3.4. INTERIM DESIGN REVIEWS AND CONFERENCES

3.4.1. General

At least one interim design submittal, review and review conference is required for each design package (except that, per paragraph 3.2.1, the Contractor may skip the interim design submission and proceed directly to final design on the sitework and utilities package). The DB Contractor may include additional interim design conferences or over-the-shoulder reviews, as needed, to assure continued government concurrence with the design work. Include the interim submittal review periods and conferences in the project schedule and indicate what part of the design work is at what percentage of completion. The required interim design conferences shall be held when interim design requirements are reached as described below. See also Paragraph: **Over-the-Shoulder Progress Reviews** for a waiver to the formal interim design review.

3.4.2. Procedures

After receipt of an Interim Design submission, allow the Government fourteen (14) calendar days after receipt of the submission to review and comment on the interim design submittal. For smaller design packages, especially those that involve only one or a few separate design disciplines, the parties may agree on a shorter review period or alternative review methods (e.g., over-the-shoulder or electronic file sharing), through the partnering process. For each interim design review submittal, the COR will furnish, to the Contractor, a single consolidated, validated listing of all comments from the various design sections and from other concerned agencies involved in the review process using the DrChecks Design Review and Checking System. The review will be for conformance with the technical requirements of the solicitation and the Contractor's RFP proposal. If the Contractor disagrees technically with any comment or comments and does not intend to comply with the comment, he/she must clearly outline, with ample justification, the reasons for noncompliance within five (5) days after receipt of these comments in order that the comment can be resolved. Furnish disposition of all comments, in writing, through DrChecks. The Contractor is cautioned that if it believes the action required by any comment exceeds the requirements of this contract, that it should take no action and notify the COR in writing immediately. The Interim Review conference will be held for each design submittal at the installation. Bring the personnel that developed the design submittal to the review conference. The conference will take place the week after the receipt of the comments by the Contractor. For smaller fast-track packages that involve only a few reviewers, the parties may agree to alternative conferencing methods, such as teleconferencing, or televideo, where available, as determined through Partnering.

3.4.3. Conference Documentation

3.4.3.1. In order to facilitate and accelerate the Government code and contract conformance reviews, identify, track resolution of and maintain all comments and action items generated during the design process and make this available to the designers and reviewers prior to the Interim and subsequent design reviews.

3.4.3.2. The DB Contractor shall prepare meeting minutes and enter final resolution of all comments into DrChecks. Copies of comments, annotated with comment action agreed on, will be made available to all parties before the conference adjourns. Unresolved problems will be resolved by immediate follow-on action at the end of conferences. Incorporate valid comments. The Government reserves the right to reject design document submittals if comments are significant. Participants shall determine if any comments are critical enough to require further design development prior to government concurrence. Participants shall also determine how to proceed in order to obtain government concurrence with the design work presented.

3.5. INTERIM DESIGN REQUIREMENTS

Interim design deliverables shall include drawings, specifications, and design analysis for the part of design that the Contractor considers ready for review.

3.5.1. Drawings

Include comments from any previous design conferences incorporated into the documents to provide an interim design for the "part" submitted.

3.5.2. Design Analyses

3.5.2.1. The designers of record shall prepare and present design analyses with calculations necessary to substantiate and support all design documents submitted. Address design substantiation required by the applicable codes and references and pay particular attention to the following listed items:

3.5.2.2. For parts including sitework, include site specific civil calculations.

3.5.2.3. For parts including structural work, include structural calculations.

(a) Identify all loads to be used for design.

(b) Describe the method of providing lateral stability for the structural system to meet seismic and wind load requirements. Include sufficient calculations to verify the adequacy of the method.

(c) Provide calculations for all principal roof, floor, and foundation members and bracing and secondary members.

(d) Provide complete seismic analyses for all building structural, mechanical, electrical, architectural, and building features as dictated by the seismic zone for which the facility is being constructed.

(e) Computer generated calculations must identify the program name, source, and version. Provide input data, including loads, loading diagrams, node diagrams, and adequate documentation to illustrate the design. The schematic models used for input must show, as a minimum, nodes/joints, element/members, materials/properties, and all loadings, induced settlements/deflections, etc., and a list of load combinations. Include an output listing for maximum/minimum stresses/forces and deflections for each element and the reactions for each loading case and combination.

(f) See also the Security (Anti-Terrorism) requirements below for members subject to Anti-Terrorist Force Protection (ATFP) and Progressive Collapse requirements.

(g) Fully coordinate and integrate the overall structural design between two different or interfacing construction types, such as modular and stick-built or multistory, stacked modular construction. Provide substantiation of structural, consolidation/settlement analysis, etc., as applicable, through the interfaces.

3.5.2.4. For Security (Anti-Terrorism): Provide a design narrative and calculations where applicable, demonstrating compliance with each of the 22 standards in UFC 4-010-01, which includes Design of Buildings to Resist Progressive Collapse (use the most recent version of UFC 4-023-03, regardless of references to any specific version in UFC 4-010-01). Where sufficient standoff distance is not being provided, show calculations for blast resistance of the structural system and building envelope. Show complete calculations for members subjected to ATFP loads, e.g., support members of glazed items (jamb, headers, sills) connections of windows to support members and connections of support members to the rest of the structure. For 3 story and higher buildings, provide calculations to demonstrate compliance with progressive collapse requirements.

3.5.2.5. For parts including architectural work, include building floor area analysis.

3.5.2.6. For parts including mechanical work, include HVAC analysis and calculations. Include complete design calculations for mechanical systems. Include computations for sizing equipment, compressed air systems, air duct design, and U-factors for ceilings, roofs and exterior walls and floors. Contractor shall employ commercially available energy analysis techniques to determine the energy performance of all passive systems and features. Use of hourly energy load computer simulation is required (see paragraph 3.5.5.2 for list of acceptable software). Based on the results of calculations, provide a complete list of the materials and equipment proposed with the manufacturer's published cataloged product installation specifications and roughing-in data.

3.5.2.7. For parts including life safety, include building code analysis and sprinkler and other suppression systems. Notwithstanding the requirements of the Codes, address the following:

(a) A registered fire protection engineer (FPE) must perform all fire protection analyses. Provide the fire protection engineer's qualifications. See Section 01 10 00, paragraph 5 for qualifications.

- (b) Provide all references used in the design including Government design documents and industry standards used to generate the fire protection analysis.
- (c) Provide classification of each building in accordance with fire zone, building floor areas and height and number of stories.
- (d) Provide discussion and description of required fire protection requirements including extinguishing equipment, detection equipment, alarm equipment and water supply. Alarm and detection equipment shall interface to requirements of Electronic Systems.
- (e) Provide hydraulic calculations based on water flow test for each sprinkler system to insure that flow and pressure requirements can be met with current water supply. Include copies of Contractor's water flow testing done to certify the available water source.

3.5.2.8. For parts including plumbing systems:

- (a) List all references used in the design.
- (b) Provide justification and brief description of the types of plumbing fixtures, piping materials and equipment proposed for use.
- (c) Detail calculations for systems such as sizing of domestic hot water heater and piping; natural gas piping; LP gas piping and tanks, fuel oil piping and tanks, etc., as applicable.
- (d) When the geotechnical report indicates expansive soils are present, indicate in the first piping design submittal how piping systems will be protected against damage or backfall/backflow due to soil heave (from penetration of slab to the 5 foot building line).

3.5.2.9. For elevator systems:

- (a) List all criteria codes, documents and design conditions used.
- (b) List any required permits and registrations for construction of items of special mechanical systems and equipment.

3.5.2.10. For parts including electrical work, include lighting calculations to determine maintained foot-candle levels, electrical load analysis and calculations, electrical short circuit and protective device coordination analysis and calculations and arc fault calculations.

3.5.2.11. For parts including telecommunications voice/data (including SIPRNET, where applicable), include analysis for determining the number and placement of outlets

3.5.2.12. For Cathodic Protection Systems, provide the following stamped report by the licensed corrosion engineer or NACE specialist with the first design submission. The designer must be qualified to engage in the practice of corrosion control of buried or submerged metallic surfaces. He/she must be accredited or certified by the National Association of Corrosion Engineers (NACE) as a NACE Accredited Corrosion Specialist or a NACE certified Cathodic Protection Specialist, or must be a registered professional engineer with a minimum of five years experience in corrosion control and cathodic protection, Clearly describe structures, systems or components in soil or water to be protected. Describe methods proposed for protection of each.

3.5.3. Geotechnical Investigations and Reports:

3.5.3.1. The contractor's licensed geotechnical engineer shall prepare a final geotechnical evaluation report, to be submitted along with the first foundation design submittal. Make this information available as early as possible during the over-the-shoulder progress review process. Summarize the subsurface conditions and provide recommendations for the design of appropriate utilities, foundations, floor slabs, retaining walls, embankments, and pavements. Include compaction requirements for fill and backfill under buildings, sidewalks, other structures and open areas. Recommend foundation systems to be used, allowable bearing pressures for footings, lateral load resistance capacities for foundation systems, elevations for footings, grade beams, slabs, etc. Provide an assessment of post-construction settlement potential including total and differential. Provide recommendations regarding lateral earth pressures (active, at-rest, passive) to be used in the design of retaining walls. Include the recommended spectral accelerations and Site Class for seismic design along with an evaluation of any seismic hazards and recommendations for mitigation, if required. Include calculations to support the recommendations for bearing capacity, settlement, and pavement sections. Include supporting documentation for all recommended

design parameters such as Site Class, shear strength, earth pressure coefficients, friction factors, subgrade modulus, California Bearing Ratio (CBR), etc. Provide earthwork recommendations, expected frost penetration, expected groundwater levels, recommendations for dewatering and groundwater control and the possible presence of any surface or subsurface features that may affect the construction of the project such as sinkholes, boulders, shallow rock, old fill, old structures, soft areas, or unusual soil conditions. Include pH tests, salinity tests, resistivity measurements, etc., required to design corrosion control and grounding systems. Include the raw field data. Arrange a meeting with the Government subsequent to completion and evaluation of the site specific geotechnical exploration to outline any differences encountered that are inconsistent with the Government provided preliminary soils information. Clearly outline differences which require changes in the foundation type, or pavement and earthwork requirements from that possible and contemplated using the Government furnished preliminary soils investigation, which result in a change to the design or construction. Any equitable adjustment is subject to the provisions of the contract's Differing Site Conditions Clause.

3.5.3.2. Vehicle Pavements: The Contractor's geotechnical report shall contain flexible and rigid pavement designs, as applicable for the project, including design CBR and modulus of subgrade reaction and the required compaction effort for subgrades and pavement layers. Provide Information on the types of base course materials available in the area and design strengths.

3.5.3.3. The Contractor and the professional geotechnical engineer consultant shall certify in writing that the design of the project has been developed consistent with the Contractor's final geotechnical report. The certification shall be stamped by the consulting professional geotechnical engineer and shall be submitted with the first design submission. If revisions are made to the initial design submission, a new certification shall be provided with the final design submission.

3.5.4. LEED Documentation:

Assign a LEED Accredited Professional, responsible to track LEED planning, performance and documentation for each LEED credit through construction closeout. Incorporate LEED credits in the plans, specifications and design analyses. Develop LEED supporting documentation as a separable portion of the Design Analysis and provide with each required design submittal. Include the LEED Project checklist for each non-exempt facility (one checklist may be provided for multiple facilities in accordance with the LEED-NC Application Guide for Multiple Buildings and On-Campus Building Projects and the LEED SUBMITTALS (Attachment E, herein) with each submittal. Final design submittal for each portion of the work must include all required design documentation relating to that portion of work (example - all site credit design documents with final site design). Submittal requirements are as indicated in Attachment E, LEED SUBMITTALS. Submit all documentation indicated on Attachment E as due at final design at final design submittal (for fast-track projects with multiple final design submittals, this shall be at the last scheduled final design submittal). All project documentation related to LEED shall conform to USGBC requirements for both content and format, including audit requirements and be separate from other design analyses. Maintain and update the LEED documentation throughout project progress to construction closeout and shall compile product data, receipts, calculations and other data necessary to substantiate and support all credits claimed. The Government may audit any or all individual credits. Audit documentation is not required to be submitted unless requested. These requirements apply to all projects. If the project requires the Contractor to obtain USGBC certification, the Contractor shall also be responsible for obtaining USGBC certification and shall provide written evidence of certification with the construction closeout LEED documentation submittal. Install the USGBC building plaque at the location indicated by the Government upon receipt. If Contractor obtains USGBC interim design review, submit the USGBC review to the Government within 30 days of receipt for information only.

3.5.4.1. LEED Documentation for Technology Solution Set. If the Solicitation provides a Prescriptive Technology Solution Set, use of the Technology Solution set has no effect on LEED documentation requirements. Provide all required LEED documentation, including energy analysis, in accordance with LEED requirements when using the Technology Solution Set.

3.5.5. Energy Conservation:

3.5.5.1. Refer to Section 01 10 00, Paragraph 5. Interim and Final Design submittals shall demonstrate that each building including the building envelope, HVAC systems, service water heating, power, and lighting systems meet the Mandatory Provisions and the Prescriptive Path requirements of ASHRAE 90.1. Use Compliance Documentation forms available from ASHRAE and included in the ASHRAE 90.1 User's Manual for this purpose. The Architectural Section of the Design Analysis shall include completed forms titled "Building Envelope

Compliance Documentation Parts I and II". The Heating Ventilating and Air Conditioning (HVAC) Section of the Design Analysis shall include a completed form titled "HVAC Simplified Approach Option - Part I" if this approach is allowed by the Standard. Otherwise, the HVAC Section of the Design Analysis shall include completed forms titled "HVAC Mandatory Provisions - Part II" and "HVAC Prescriptive Requirements - Part III". The Plumbing Section of the Design Analysis shall include a completed form titled "Service Water Heating Compliance Documentation". The Electrical Section of the Design Analysis shall include an explanatory statement on how the requirements of ASHRAE 90.1-2004 Chapter 8 Power were met. The Electrical Section of the Design Analysis shall also include a completed form titled "Lighting Compliance Documentation".

3.5.5.2. Interim and Final Design submittals which address energy consuming systems, (heating, cooling, service hot water, lighting, power, etc.) must also include calculations in a separate Energy Conservation Section of the Design Analysis which demonstrate and document (a) the baseline energy consumption for the facility or facilities under contract, that would meet the requirements of ANSI/ASHRAE/IESNA Standard 90.1 and (b) the energy consumption of the facility or facilities under contract utilizing the materials and methods required by this construction contract. Use the USGBC Energy and Atmosphere (EA) Credit 1 compliance template / form or an equivalently detailed form for documenting compliance with the energy reduction requirements. This template / form is titled PERFORMANCE RATING METHOD and is available when the project is registered for LEED. The calculation methodology used for this documentation and analysis shall follow the guidelines set forth in Appendix G of ASHRAE 90.1, with two exceptions: a) receptacle and process loads may be omitted from the calculation; and b) the definition of the terms in the formula for Percentage Improvement found in paragraph G1.2 are modified as follows: Baseline Building Performance shall mean the annual energy consumption calculated for a building design intended for use as a baseline for rating above standard design meeting the minimum requirements of the energy standard, and Proposed Building Performance shall mean annual energy consumption calculated for the proposed building design intended for construction. This calculation shall address all energy consuming systems in a single integrated methodology. Include laboratory fume hoods and kitchen ventilation loads in the energy calculation. They are not considered process loads. Individual calculations for heating, cooling, power, lighting, power, etc. systems will not be acceptable. The following building simulation software is acceptable for use in calculating building energy consumption: Hourly Analysis Program (HAP) by Carrier Corp., TRACE 700 by Trane Corp., DOE-2 by US Department of Energy, EnergyPlus by DOD/DOE.

3.5.6. Specifications

Specifications may be any one of the major, well known master guide specification sources (use only one source) such as MASTERSPEC from the American Institute of Architects, SPECTEXT from Construction Specification Institute or Unified Facility Guide Specifications (UFGS using MASTERFORMAT 2004 numbering system), etc. (including specifications from these sources). Manufacturers' product specifications, utilizing CSI's Manu-Spec, three part format may be used in conjunction with the selected specifications. The designers of record shall edit and expand the appropriate Specifications to insure that all project design requirements, current code requirements, and regulatory requirements are met. Specifications shall clearly identify, where appropriate, specific products chosen to meet the contract requirements (i.e., manufacturers' brand names and model numbers or similar product information).

3.5.7. Building Rendering

Present and provide a draft color computer, artist, or hand drawn rendering with the conceptual design submittal of the building exterior. Perspective renderings shall include a slightly overhead view of the entire building to encompass elevations and the roof configuration of the building. After Government review and acceptance, provide a final rendering, including the following:

Three (3) 18" x 24" color prints, framed and matted behind glass with project title underneath the print.

One (1) Image file (high resolution) in JPG format on CD for those in the submittal distribution list.

3.5.8. Interim Building Design Contents

The following list represents what the Government considers should be included in the overall completed design for a facility or project. It is not intended to limit the contractor from providing different or additional information as needed to support the design presented, including the require design analyses discussed above. As the Contractor develops individual design packages and submits them for Interim review, include as much of the applicable

information for an individual design package as is developed at the Interim design level for review purposes. These pieces shall be developed as the design progresses toward the design complete stage.

3.5.8.1. Lawn and Landscaping Irrigation System

3.5.8.2. Landscape, Planting and Turfing

3.5.8.3. Architectural

- (a) Design Narrative
- (b) Architectural Floor Plans, Typical Wall and Roof Sections, Elevations
- (c) Finish schedule
- (d) All required equipment
- (e) Special graphics requirements
- (f) Door and Window Schedules
- (g) Hardware sets using BHMA designations
- (h) Composite floor plan showing all pre-wired workstations
- (i) Structural Interior Design (SID) package: See ATTACHMENT A for specific requirements
- (j) Furniture, Fixtures & Equipment (FF&E) design package: See ATTACHMENT B for specific requirements

3.5.8.4. Structural Systems. Include:

- (a) Drawings showing principal members for roof and floor framing plans as applicable
- (b) Foundation plan showing main foundation elements where applicable
- (c) Typical sections for roof, floor, and foundation conditions

3.5.8.5. Plumbing Systems

- (a) Show locations and general arrangement of plumbing fixtures and major equipment
- (b) Plan and isometric riser diagrams of all areas including hot water, cold water, waste and vent piping. Include natural gas (and meter as required), (natural gas and meter as required), (LP gas), (fuel oil) and other specialty systems as applicable.
- (c) Include equipment and fixture connection schedules with descriptions, capacities, locations, connection sizes and other information as required

3.5.8.6. HVAC Systems

- (a) Mechanical Floor Plans: The floor plans shall show all principle architectural features of the building which will affect the mechanical design. The floor plans shall also show the following:
 - (1) Room designations.
 - (2) Mechanical legend and applicable notes.
 - (3) Location and size of all ductwork and piping.
 - (4) Location and capacity of all terminal units (i.e., registers, diffusers, grilles, hydronic baseboards).
 - (5) Pre-Fabricated Paint Spray Booth (where applicable to project scope)
 - (6) Paint Preparation Area (where applicable to project scope)
 - (7) Exhaust fans and specialized exhaust systems.
 - (8) Thermostat location.
 - (9) Location of heating/cooling plant (i.e., boiler, chiller, cooling tower, etc).
 - (10) Location of all air handling equipment.

- (11) Air balancing information.
- (12) Flue size and location.
- (13) Piping diagram for forced hot water system (if used).
- (b) Equipment Schedule: Provide complete equipment schedules. Include:
 - (1) Capacity
 - (2) Electrical characteristics
 - (3) Efficiency (if applicable)
 - (4) Manufacturer's name
 - (5) Optional features to be provided
 - (6) Physical size
 - (7) Minimum maintenance clearances
- (a) Details: Provide construction details, sections, elevations, etc., only where required for clarification of methods and materials of design.
- (b) HVAC Controls: Submit complete HVAC controls equipment schedules, sequences of operation, wiring and logic diagrams, Input/Output Tables, equipment schedules, and all associated information. See the Statement of Work for additional specific requirements.

3.5.8.7. Fire Protection and Life Safety.

- (a) Provide plan for each floor of each building that presents a compendium of the total fire protection features being incorporated into the design. Include the following types of information:
 - (1) The location and rating of any fire-resistive construction such as occupancy separations, area separations, exterior walls, shaft enclosures, corridors, stair enclosures, exit passageways, etc.
 - (2) The location and coverage of any fire detection systems
 - (3) The location and coverage of any fire suppression systems (sprinkler risers, standpipes, etc.)
 - (4) The location of any other major fire protection equipment
 - (5) Indicate any hazardous areas and their classification
 - (6) Schedule describing the internal systems with the following information: fire hazard and occupancy classifications, building construction type, GPM/square foot sprinkler density, area of operation and other as required
- (b) Working plans and all other materials submitted shall meet NFPA 13 requirements, with respect to required minimum level of detail.

3.5.8.8. Elevators. Provide:

- (a) Description of the proposed control system
- (b) Description, approximate capacity and location of any special mechanical equipment for elevators.

3.5.8.9. Electrical Systems.

- (a) Electrical Floor Plan(s): Show all principle architectural features of the building which will affect the electrical design. Show the following:
 - (1) Room designations.
 - (2) Electrical legend and applicable notes.
 - (3) Lighting fixtures, properly identified.
 - (4) Switches for control of lighting.
 - (5) Receptacles.

- (6) Location and designation of panelboards. Clearly indicate type of mounting required (flush or surface) and reflect accordingly in specifications.
- (7) Service entrance (conduit and main disconnect).
- (8) Location, designation and rating of motors and/or equipment which requires electrical service. Show method of termination and/or connection to motors and/or equipment. Show necessary junction boxes, disconnects, controllers (approximate only), conduit stubs, and receptacles required to serve the motor and/or equipment.
- (b) Building Riser Diagram(s) (from pad-mounted transformer to unit load center panelboard): Indicate the types and sizes of electrical equipment and wiring. Include grounding and metering requirements.
- (c) Load Center Panelboard Schedule(s): Indicate the following information:
 - (1) Panelboard Characteristics (Panel Designation, Voltage, Phase, Wires, Main Breaker Rating and Mounting.
 - (2) Branch Circuit Designations.
 - (3) Load Designations.
 - (4) Circuit Breaker Characteristics. (Number of Poles, Trip Rating, AIC Rating)
 - (5) Branch Circuit Connected Loads (AMPS).
 - (6) Special Features
- (d) Lighting Fixture Schedule(s): Indicate the following information:
 - (1) Fixture Designation.
 - (2) General Fixture Description.
 - (3) Number and Type of Lamp(s).
 - (4) Type of Mounting.
 - (5) Special Features.
- (e) Details: Provide construction details, sections, elevations, etc. only where required for clarification of methods and materials of design.

3.5.8.10. Electronic Systems including the following responsibilities:

- (a) Fire Detection and Alarm System. Design shall include layout drawings for all devices and a riser diagram showing the control panel, annunciator panel, all zones, radio transmitter and interfaces to other systems (HVAC, sprinkler, etc.)
- (b) Fire Suppression System Control. Specify all components of the Fire Suppression (FS) System in the FS section of the specifications. Clearly describe how the system will operate and interact with other systems such as the fire alarm system. Include a riser diagram on the drawings showing principal components and interconnections with other systems. Include FS system components on drawing legend. Designate all components shown on floor plans "FS system components" (as opposed to "Fire Alarm components"). Show location of FS control panels, HVAC control devices, sensors, and 120V power panel connections on floor plans. Indicate zoning of areas by numbers (1, 2, 3) and detectors sub-zoned for cross zoning by letter designations (A and B). Differentiate between ceiling mounted and under floor detectors with distinct symbols and indicate sub-zone of each.
- (c) Public Address System
- (d) Special Grounding Systems. Completely reflect all design requirements in the specifications and drawings. Specifications shall require field tests (in the construction phase), witnessed by the Government, to determine the effectiveness of the grounding system. Include drawings showing existing construction, if any.
- (e) Cathodic Protection.
- (f) Intrusion Detection, Card Access System
- (g) Central Control and Monitoring System
- (h) Mass Notification System
- (i) Electrical Power Distribution Systems

3.5.8.11. Separate detailed Telecommunications drawings for Information Systems including the following responsibilities:

- (a) Telecommunications Cabling
- (b) Supporting Infrastructure
- (a) Outside Plant (OSP) Cabling - Campus or Site Plans - Exterior Pathways and Inter-Building Backbones
 - (a) Include a layout of the voice/data outlets (including voice only wall & pay phones) on telecommunication floor plan drawing, location of SIPRNET data outlets (where applicable), and a legend and symbol definition to indicate height above finished floor. Show size of conduit and cable type and size on Riser Diagram. Do not show conduit runs between backboard and outlets on the floor plans. Show underground distribution conduit and cable with sizing from point of presence to entrance facility of building.
 - (b) Layout of complete building per floor - Serving Zone Boundaries, Backbone Systems, and Horizontal Pathways including Serving Zones Drawings - Drop Locations and Cable ID's
 - (c) Communication Equipment Rooms - Plan Views - Tech and AMEP/Elevations - Racks and Walls. Elevations with a detailed look at all telecomm rooms. Indicate technology layout (racks, ladder-racks, etc.), mechanical/electrical layout, rack elevation and backboard elevation. They may also be an enlargement of a congested area of T1 or T2 series drawing.

3.6. FINAL DESIGN REVIEWS AND CONFERENCES

A final design review and review conference will be held upon completion of final design at the project installation, or – where equipment is available - by video teleconference or a combination thereof, for any design package to receive Government acceptance to allow release of the design package for construction. For smaller separate design packages, the parties may agree on alternative reviews and conferences (e.g., conference calls and electronic file sharing, etc.) through the Partnering process. Include the final design conference in the project schedule and shall indicate what part of the design work is at 100% completion. The final design conference will be held after the Government has had seven (7) calendar days after receipt of the submission to review the final design package and supporting data. For smaller packages, especially those involving only one or a few design disciplines the parties may agree on a shorter period.

3.7. FINAL DESIGN REQUIREMENTS

Final design deliverables for a design package shall consist of 100% complete drawings, specifications, submittal register and design analyses for Government review and acceptance. The 100% design submission shall consist of drawings, specifications, updated design analyses and any permits required by the contract for each package submitted. In order to expedite the final design review, prior to the conference, ensure that the design configuration management data and all review comment resolutions are up-to-date. Include the 100% SID and 100% FF&E binders for government approval. The Contractor shall have performed independent technical reviews (ITR's) and back-checks of previous comment resolutions, as required by Section 01 45 04.00 10 CONTRACTOR QUALITY CONTROL, including providing documentation thereof. Use DrChecks or other acceptable comment tracking system during the ITR and submit the results with each final design package

3.7.1. Drawings

3.7.1.1. Submit drawings complete with all contract requirements incorporated into the documents to provide a 100% design for each package submitted.

3.7.1.2. Prepare all drawings with the Computer-Aided Design and Drafting (CADD)/Computer-Aided Design (CAD) system, organized and easily referenced electronically, presenting complete construction information.

3.7.1.3. Drawings shall be complete. The Contractor is encouraged to utilize graphics, views, notes, and details which make the drawings easier to review or to construct but is also encouraged to keep such materials to those that are necessary.

3.7.1.4. Provide detail drawings that illustrate conformance with the contract. Include room finish schedules, corresponding color/finish/special items schedules, and exterior finish schedules that agree with the submitted SID binders.

3.7.1.5. The design documents shall be in compliance with the latest version of the A/E/C CAD Standard, available at <https://cadbim.usace.army.mil/CAD>. Use the approved vertical Corps of Engineers title blocks and borders on all drawings with the appropriate firm name included within the title block area.

3.7.1.6. CAD System and Building Information Modeling (BIM) (NOTE: If this is a Single Award or Multiple Award, Indefinite Delivery/Indefinite Quantity Contract, this information will be provided for each task order.)

All CAD files shall be fully compatible with MicroStation V8 or higher. Save all design CAD files as MicroStation V8 or higher files. All submitted BIM Models and associated Facility Data shall be fully compatible with Bentley BIM file format and the USACE Bentley BIM v8 Workspace.

(a) CAD Data Final File Format: During the design development capture geo-referenced coordinates of all changes made to the existing site (facility footprint, utility line installations and alterations, roads, parking areas, etc) as a result of this contract. There is no mandatory methodology for how the geo-referenced coordinates will be captured, however, Engineering and Construction Bulletin No. 2006-15, Subject: Standardizing Computer Aided Design (CAD) and Geographic Information Systems (GIS) Deliverables for all Military Design and Construction Projects identifies the format for final as-built drawings and data sets to be delivered to the government. Close-out requirements at the as-built stage; require final geo-referenced GIS Database of the new facility along with all exterior modifications. The Government will incorporate this data set into the Installation's GIS Masterplan or Enterprise GIS System. See also, Section 01 78 02.00 10 Closeout Submittals.

(b) Electronic Drawing Files: In addition to the native CAD design files, provide separate electronic drawing files (in editable CAD format and Adobe Acrobat PDF version 7.0 or higher) for each project drawing.

(c) Each file (both CAD and PDF) shall represent one complete drawing from the drawing set, including the date, submittal phase, and border. Each drawing file shall be completely independent of any data in any other file, including fonts and shapes not included with the basic CAD software program utilized. Fonts that are not included as part of the default CAD software package installation or recognized as an allowable font by the A/E/C CAD Standard are not acceptable in delivered CAD files. All displayed graphic elements on all levels of the drawing files shall be part of the project drawing image. The drawing files shall not contain any graphic element that is not part of the drawing image.

(d) Deliver BIM Model and associated Facility Data files in their native format. At a minimum, BIM files shall address major architecture design elements, major structural components, mechanical systems and electrical/communication distribution and elements as defined in Attachment F. See Attachment F for additional BIM requirements.

(e) Drawing Index: Provide an index of drawings sheet in CAD as part of the drawing set, and an electronic list in Microsoft Excel of all drawings on the CD. Include the electronic file name, the sheet reference number, the sheet number, and the sheet title, containing the data for each drawing.

(f) Hard Copies: Plot submitted hard copy drawings directly from the "electronic drawing files" and copy for quantities and sizes indicated in the distribution list at the end of this specification section. The Designers of Record shall stamp, sign and date original hard copy sheets as Released For Construction, and provide copies for distribution from this set.

3.7.2. Design Analyses

3.7.2.1. The designers of record shall update, finalize and present design analyses with calculations necessary to substantiate and support all design documents submitted.

3.7.2.2. The responsible DOR shall stamp, sign and date the design analysis. Identify the software used where, applicable (name, version, vendor). Generally, provide design analyses, individually, in an original (file copy) and one copy for the assigned government reviewer.

3.7.2.3. All disciplines review the LEED design analysis in conjunction with their discipline-specific design analysis; include a copy of the separable LEED design analysis in all design analysis submittals.

3.7.2.4. Do not combine multi-disciplined volumes of design-analysis, unless multiple copies are provided to facilitate multiple reviewers (one copy per each separate design analysis included in a volume).

3.7.3. Specifications

Specifications shall be 100% complete and in final form.

3.7.4. Submittal Register

Prepare and update the Submittal Register and submit it with the 100% design specifications (see Specification Section 01 33 00, SUBMITTAL PROCEDURES) with each design package. Include the required submittals for each specification section in a design package in the submittal register.

3.7.5. Preparation of DD Form 1354 (Transfer of Real Property)

This form itemizes the types, quantities and costs of various equipment and systems that comprise the project, for the purpose of transferring the new construction project from the Corps Construction Division to the Installation's inventory of real property. The Government will furnish the DB Contractor's design manager a DD Form 1354 checklist to use to produce a draft Form 1354. Submit the completed checklist and prepared draft Form DD 1354 with the 100% design in the Design Analysis. The Corps will use these documents to complete the final DD 1354 upon completion of construction.

3.7.6. Acceptance and Release for Construction

3.7.6.1. At the conclusion of the Final Design Review (after resolutions to the comments have been agreed upon between DOR and Government reviewers), the Contracting Officer or the ACO will accept the Final Design Submission for the design package in writing and allow construction to start for that design package. The Government may withhold acceptance until all major corrections have been made or if the final design submission requires so many corrections, even though minor, that it isn't considered acceptably complete.

3.7.6.2. Government review and acceptance of design submittals is for contract conformance only and shall not relieve the Contractor from responsibility to fully adhere to the requirements of the contract, including the Contractor's accepted contract proposal, or limit the Contractor's responsibility of design as prescribed under Special Contract Requirement: "Responsibility of the Contractor for Design" or limit the Government's rights under the terms of the contract. The Government reserves the right to rescind inadvertent acceptance of design submittals containing contract deviations not separately and expressly identified in the submittal for Government consideration and approval.

3.8. DESIGN COMPLETE CONSTRUCTION DOCUMENT REQUIREMENTS

After the Final Design Submission and Review Conference and after Government acceptance of the Final Design submission, revise the design documents for the design package to incorporate the comments generated and resolved in the final review conference, perform and document a back-check review and submit the final, design complete documents. Label the final design complete documents "FOR CONSTRUCTION" or use similar language. In addition to the final drawings and specifications, the following deliverables are required for distribution and field use. The deliverable includes all documentation and supporting design analysis in final form, as well as the final review comments, disposition and the back-check. As part of the quality assurance process, the Government may perform a back-check of the released for construction documentation. Promptly correct any errors or omissions found during the Government back-check. The Government may withhold retainage from progress payments for work or materials associated with a final design package until this submittal has been received and the Government determines that it is complete.

3.9. SUBMITTAL DISTRIBUTION, MEDIA AND QUANTITIES

3.9.1. Submittal Distribution and Quantities

General: The documents which the Contractor shall submit to the Government for each submittal are listed and generally described in preceding paragraphs in this Section. Provide copies of each design submittal and design substantiation as follows (NOTE: If this is a Single Award or Multiple Award, Indefinite Delivery/Indefinite Quantity Contract, this information will be provided for each task order):

Activity and Address	Drawing Size (Full Size) ANSI D Full Sets/ *Partial Sets	Design Analyses & Specs Full Sets/ *Partial Sets	Drawing Size (Half Size) ANSI B Full Sets/ *Partial Sets	Non-BIM Data CD-ROM or DVD as Necessary (PDF & <u>.dgn</u>)	Furniture Submittal (Per Attachment B)	Structural Interior Design Submittal	BIM Data DVD (Per Attach F)
Commander, U.S.Army Engineer District Norfolk	1/0	1/0	1/0	2	1	1	2
Commander, U.S.Army Engineer District, Center of Standardization USAESCH	1/0	2/0	2/0	2	N/A	1	2
Installation	1/0	2/0	2/0	2	2	1	1
U.S.Army Corps of Engineers Construction Area Office	1/0	1/0	2/0	2	1	2	1
Information Systems Engineering Command (ISEC)	0/0	0/1	0/0	1	N/A	N/A	1
Other Offices	0/0	0/0	0/0	1	N/A	0	1

***NOTE: For partial sets of drawings, specifications and design analyses, see paragraph 3.9.3.3, below.**

****NOTE: When specified below in 3.9.2, furnish Installation copies of Drawings as paper copies, in lieu of the option to provide secure web-based submittals.**

3.9.2. Web based Design Submittals

Except for full or half-sized drawings for Installation personnel, as designated in the Table above, Web based design submittals will be acceptable as an alternative to the paper copies listed in the Table above, provided a single hard-copy PDF based record set is provided to the Contracting Officer for record purposes. Where the contract requires the Contractor to submit documents to permitting authorities, still provide those authorities paper copies (or in an alternate format where required by the authority). Web based design submittal information shall be provided with adequate security and availability to allow unlimited access those specifically authorized to Government reviewers while preventing unauthorized access or modification. File sizes must be of manageable size for reviewers to quickly download or open on their computers. As a minimum, drawings shall be full scale on American National Standards Institute (ANSI) D sheets (34" x 22"). In addition to the optional website, provide the BIM data submission on DVD to each activity and address noted above in paragraph 3.9.1 for each BIM submission required in Attachment F.

3.9.3. Mailing of Design Submittals

3.9.3.1. Mail all design submittals to the Government during design and construction, using an overnight mailing service. The Government will furnish the Contractor addresses where each copy shall be mailed to after award of the contract (or individual task order if this is an indefinite delivery/indefinite quantity, task order contract). Mail the submittals to nine (9) different addresses. Assemble drawing sheets, specs, design analyses, etc. into individual sets; do not combine duplicate pages from individual sets so that the government has to assemble a set.

3.9.3.2. Each design submittal shall have a transmittal letter accompanying it indicating the date, design percentage, type of submittal, list of items submitted, transmittal number and point of contact with telephone number.

3.9.3.3. Provide partial sets of drawings, specifications, design analyses, etc., as designated in the Table in paragraph 3.9.1, to those reviewers who only need to review their applicable portions of the design, such as the various utilities. The details of which office receives what portion of the design documentation will be worked out after award.

3.10. AS-BUILT DOCUMENTS

Provide as-built drawings and specifications in accordance with Section 01 78 02.00 10, CLOSEOUT SUBMITTALS. Update LEED design phase documentation during construction as needed to reflect construction changes and advancing project completion status (example - Commissioning Plan updates during construction phase) and include updated LEED documentation in construction closeout submittal.

ATTACHMENT A STRUCTURAL INTERIOR DESIGN (SID) REQUIREMENTS

1.0 GENERAL INFORMATION

Structural Interior Design includes all building related elements and components generally part of the building itself, such as wall finishes, ceilings finishes, floor coverings, marker/bulletin boards, blinds, signage and built in casework. Develop the SID in conjunction with the furniture footprint.

2.0 STRUCTURAL INTERIOR DESIGN (SID) REQUIREMENTS FOR THE INTERIM AND FINAL DESIGN SUBMITTALS

2.1. FORMAT AND SCHEDULE

Prepare and submit for approval an interior and exterior building finishes scheme for an interim design submittal. The DOR shall meet with and discuss the finish schemes with the appropriate Government officials prior to preparation of the schemes to be presented. Present original sets of the schemes to reviewers at an interim design conference.

At the conclusion of the interim phase, after resolutions to the comments have been agreed upon between DOR and Government reviewers, the Contractor may proceed to final design with the interior finishes scheme presented.

The SID information and samples are to be submitted in 8 ½" x 11" format using three ring binders with pockets on the inside of the cover. When there are numerous pages with thick samples, use more than one binder. Large D-ring binders are preferred to O-ring binders. Use page protectors that are strong enough to keep pages from tearing out. Anchor large or heavy samples with mechanical fasteners, Velcro, or double-faced foam tape rather than rubber cement or glue. Fold out items must have a maximum spread of 25 ½". Provide cover and spine inserts sheets identifying the document as "Structural Interior Design" package. Include the project title and location, project number, Contractor/A/E name and phone number(s), submittal stage and date.

Design submittal requirements include, but are not limited to:

2.1.1. Narrative of the Structural Interior Design Objectives

The SID shall include a narrative that discusses the building related finishes. Include topics that relate to base standards, life safety, sustainable design issues, aesthetics, durability and maintainability, discuss the development and features as they relate to the occupants requirements and the building design.

2.1.2. Interior Color Boards

Identify and key each item on the color boards to the contract documents to provide a clear indication of how and where each item will be used. Arrange finish samples to the maximum extent possible by room type in order to illustrate room color coordination. Label all samples on the color boards with the manufacturer's name, patterns and colors name and number. Key or code samples to match key code system used on contract drawings.

Material and finish samples shall indicate true pattern, color and texture. Provide photographs or colored photocopies of materials or fabrics to show large overall patterns in conjunction with actual samples to show the actual colors. Finish samples must be large enough to show a complete pattern or design where practical.

Color boards shall include but not be limited to original color samples of the following:

All walls finishes and ceiling finishes, including corner guards, acrylic wainscoting and wall guards/chair rail finishes

All tile information, including tile grout color and tile patterns.

- All flooring finishes, including patterns.
- All door, door frame finishes and door hardware finishes
- All signage, wall base, toilet partitions, locker finishes and operable/folding partitions and trim

- All millwork materials and finishes (cabinets, counter tops, etc.)
- All window frame finishes and window treatments (sills, blinds, etc.)

Color board samples shall reflect all actual finish textures, patterns and colors required as specified. Patterned samples shall be of sufficient size to adequately show pattern and its repeat if a repeat occurs.

2.1.3. Exterior Color Boards

Prepare exterior finishes color boards in similar format as the interior finishes color boards, for presentation to the reviewers during an interim design conference. Provide original color samples of all exterior finishes including but not limited to the following:

- All Roof Finishes
- All Brick and Cast Stone Samples
- All Exterior Insulation and Finish Samples
- All Glass Color Samples
- All Exterior Metals Finishes
- All Window & Door Frame Finishes
- All Specialty Item Finishes, including trim

Identify each item on the exterior finishes color boards and key to the building elevations to provide a clear indication of how and where each item will be used.

2.2. STRUCTURAL INTERIOR DESIGN DOCUMENTS

2.2.1. General

Structural interior design related drawings must indicate the placement of extents of SID material, finishes and colors and must be sufficiently detailed to define all interior work. The following is a list of minimum requirements:

2.2.2. Finish Color Schedule

Provide finish color schedule(s) in the contract documents. Provide a finish code, material type, manufacturer, series, and color designations. Key the finish code to the color board samples and drawings.

2.2.3. Interior Finish Plans

Indicate wall and floor patterns and color placement, material transitions and extents of interior finishes.

2.2.4. Furniture Footprint Plans

Provide furniture footprint plans showing the outline of all freestanding and systems furniture for coordination of all other disciplines.

2.2.5. Interior Signage

Include interior signage plans or schedules showing location and quantities of all interior signage. Key each interior sign to a quantitative list indicating size, quantity of each type and signage text.

2.2.6. Interior Elevations, Sections and Details

Indicate material, color and finish placement.

**ATTACHMENT B
FURNITURE, FIXTURES & EQUIPMENT (FF&E) REQUIREMENTS**

1.0 FF&E REQUIREMENTS FOR THE INTERIM AND FINAL DESIGN SUBMITTALS

1.1. FORMAT AND SCHEDULE

Prepare and submit for approval a comprehensive FF&E scheme for an interim design submittal. The Contractor's interior designer, not a furniture dealer, shall develop the design. FF&E is the selection, layout, specification and documentation of furniture includes but is not limited to workstations, seating, tables, storage and shelving, filing, trash receptacles, clocks, framed artwork, artificial plants, and other accessories. Contract documentation is required to facilitate pricing, procurement and installation. The FF&E package is based on the furniture footprint developed in the Structural Interior Design (SID) portion of the interior design. Develop the FF&E package concurrently with the building design to ensure that there is coordination between the electrical outlets, switches, J-boxes, communication outlets and connections, and lighting as appropriate. In addition, coordinate layout with other building features such as architectural elements, thermostats, location of TV's, GF/GI equipment (for example computers, printers, copiers, shredders, faxes), etc. Locate furniture in front of windows only if the top of the item falls below the window and unless otherwise noted, do not attach furniture including furniture systems to the building. If project has SIPRNET and/or NIPRNET, coordinate furniture layout with SIPRNET and NIPRNET separation requirements. Verify that access required by DOIM for SIPRNET box and conduit is provided. The DOR shall interview appropriate Government personnel to determine FF&E requirements for furniture and furnishings prior to preparation of the scheme to be presented. Determine FFE items and quantities by, but not limited to: (1) the number of personnel to occupy the building, (2) job functions and related furniture/office equipment to support the job function, (3) room functions, (4) rank and grade. Present original sets of the scheme to reviewers at an interim design conference upon completion of the interim architectural submittal or three months prior to the submittal of the final FF&E package (whichever comes first).

Design may proceed to final with the FF&E scheme presented at the conclusion of the interim phase, after resolutions to the comments have been agreed upon between DOR and Government reviewers.

Provide six copies of the electronic versions of all documents upon completion of the final architectural submittal or ten months prior to the contract completion date (whichever comes first), to ensure adequate time for furniture acquisition. Provide unbound, electronic drawings in CAD and BIM. Provide all files needed to view complete drawings. Submit all text documents in Microsoft Word or Excel..

Submit four copies of the final and complete FF&E information and samples in 8 1/2" x 11" format using three ring binders with pockets on the inside of the cover upon completion of the final architectural submittal or ten months prior to the contract completion date (whichever comes first). Use more than one binder when there are numerous pages with thick samples. Large D-ring binders are preferred to O-ring binders. Use page protectors that are strong enough to keep pages from tearing out for upholstery and finish boards. Anchor large or heavy samples with mechanical fasteners, Velcro, or double-faced foam tape rather than rubber cement or glue. Fold out items must have a maximum spread of 25 1/2". Provide cover and spine inserts sheets identifying the document as "Furniture, Fixtures & Equipment" package and include the project title and location, project number, Contractor/A/E name and phone number(s), submittal stage and date.

Provide electronic copies of all documents upon completion of the final architectural submittal or ten months prior to the contract completion date (whichever comes first), to ensure adequate time for furniture acquisition. Provide six compact disks with all drawings files needed to view the complete drawings unbound and in the latest version AutoCAD. Provide six additional compact disks of all text documents in Microsoft Word or Excel.

Design submittal requirements include, but are not limited to:

1.1.1. Narrative of Interior Design Objectives

Provide a narrative description of the furniture, to include functional, safety and ergonomic considerations, durability, sustainability, aesthetics, and compatibility with the building design.

1.1.2. Furniture Order Form

Prepare one Furnishings Order Form for each item specified in the design. This form identifies all information required to order each individual item. In addition to the project name and location, project number, and submittal phase, the order form must include:

- (a) Furniture item illustration and code
- (b) Furniture item name
- (c) Job name, location, and date
- (d) General Services Administration (GSA) FSC Group, part, and section
- (e) Manufacturer, Product name and Product model number or National Stock Number (NSN)
- (f) Finish name and number (code to finish samples)
- (g) Fabric name and number, minimum Wyzenbeek Abrasion Test double rubs (code to fabric samples)
- (h) Dimensions
- (i) Item location by room number and room name
- (j) Quantity per room
- (k) Total quantity
- (l) Special instructions for procurement ordering and/or installation (if applicable)
- (m) Written Product Description: include a non-proprietary paragraph listing the salient features of the item to include but not limited to:
 - (1) required features and characteristics
 - (2) ergonomic requirements
 - (3) functional requirements
 - (4) testing requirements
 - (5) furniture style
 - (6) construction materials
 - (7) minimum warranty

The following is an example for "m" features and characteristics, ergonomic requirements and functional requirements:

Chair Description:

- (1) Mid-Back Ergonomic Task Chair
- (2) Pneumatic Gaslift; Five Star Base
- (3) Mesh Back; Upholstered Seat
- (4) Height and Width Adjustable Task Arms:
 - a. Arm Height: 6" - 11" (+-1/2")
 - b. Arm Width: 2" - 4" adjustment
- (5) Height Adjustable Lumbar Support
- (6) Adjustable Seat Height 16"-21" (+- 1")
- (7) Sliding Seat Depth Adjustment 15"-18" (+-1")
- (8) Standard Hard Casters (for carpeted areas)
- (9) Overall Measurements:
 - a. Overall width: 25" - 27"
 - b. Overall depth: 25" - 28"

- (10) Must have a minimum of the following adjustments (In addition to the above):
- a. 360 Degree Swivel
 - b. Knee-Tilt with Tilt Tension
 - c. Back angle
 - d. Forward Tilt
 - e. Forward Tilt and Upright Tilt Lock

For projects with systems furniture, also provide a written description of the following minimum requirements:

- (1) Type furniture systems (panel, stacking panels, spine wall, desk based system, or a combination)
- (2) Minimum noise reduction coefficient (NRC)
- (3) Minimum sound transfer coefficient (STC)
- (4) Minimum flame spread and smoke development
- (5) UL testing for task lighting and electrical system
- (6) Panel widths and heights and their locations (this may be done on the drawings) Worksurface types and sizes (this may be done on the drawings)
- (7) Worksurface edge type
- (8) Varying panel/cover finish materials and locations (locations may be shown on the drawings)
- (9) Storage requirements
- (10) Keyboard requirements
- (11) Lock and keying requirements
- (12) Accessory components (examples: tack boards, marker boards, paper management)
- (13) Electrical and communication raceway requirement; type, capacity and location (base, bellline, below and/or above bellline)
- (14) Locations of communication cables (base, bellline, below and/or above bellline, top channel)
- (15) Types of electrical outlets
- (16) Types of communication jacks; provided and installed by others
- (17) Locations of electrical outlets and communication jacks (this may be done on the drawings)
- (18) Type of cable (examples: Cat. 5, Cat. 6, fiber optic; UTP or STP, etc.) system needs to support; provided and installed by others

1.1.3. Alternate Manufacturer List

Provide a table consisting of major furniture items that lists the manufacturers products specified on the Order Form and two alternate manufacturers. Major furniture items include, but are not limited to, casegoods, furniture systems, seating, and tables. Organize matrix by item code and item name. Supply alternates that are available on GSA Schedule and meet the requirements of the Furniture Order Form. One of the two alternates must be from UNICOR if possible. Provide manufacturer name address, telephone number, product series and product name for each alternate manufacturer.

1.1.4. FF&E Procurement List

Provide a table that lists all FF&E furniture, mission unique equipment and building Contractor Furnished/Contractor Installed (CF/CI) items. Give each item a code and name and designate whether item will be procured as part of the FF&E furniture, mission unique equipment or the building construction contract. Use the item code to key all FF&E documents including location plans, color boards, data sheets, cost estimate, etc.

1.1.5. Points of Contact (POCs)

Provide a comprehensive list of POCs needed to implement the FF&E package. This would include but not be limited to appropriate project team members, using activity contacts, interior design representatives, construction contractors and installers involved in the project. In addition to name, address, phone, fax and email, include each contact's job function. Divide the FF&E package into different sections based on this listing, applies to order forms and cost estimates.

1.1.6. Color Boards

Provide color boards for all finishes and fabrics for all FF&E items. Finishes to be included but not limited to paint, laminate, wood finish, fabric, etc.

1.1.7. Itemized Furniture Cost Estimate

Provide an itemized cost estimate of furnishings keyed to the plans and specifications of products included in the package. This cost estimate should be based on GSA price schedules. The cost estimate must include separate line items for general contingency, installation, electrical hook-up for systems furniture or other furniture requiring hardwiring by a licensed electrician, freight charges and any other related costs. Installation and freight quotes from vendors should be use in lieu of a percentage allowance when available. Include a written statement that the pricing is based on GSA schedules. An estimate developed by a furniture dealership may be provided as support information for the estimate, but must be separate from the contractor provided estimate.

1.2. INTERIOR DESIGN DOCUMENTS

1.2.1. Overall Furniture and Area Plans

Provide floor Plans showing locations and quantities of all freestanding, and workstation furniture proposed for each floor of the building. Key each room to a large scale Furniture Placement Plan showing the furniture configuration, of all furniture. Provide enlarged area plans with a key plan identifying the area in which the building is located. Key all the items on the drawings by furniture item code. Do not provide manufacturer specific information such as product names and numbers on drawings, Drawings shall be non-proprietary. This is typical for FFE on all plans, including those mentioned below.

1.2.2. Workstation Plans

Show each typical workstation configuration in plan view, elevations or isometric view. Drawings shall illustrate panels and all major components for each typical workstation configuration. Identify workstations using the same numbering system as shown on the project drawings. Key components to a legend on each sheet which identifies and describes the components along with dimensions. Provide the plan, elevations and isometric of each typical workstation together on the same drawing sheet.

1.2.3. Panel Plans

Show panel locations and critical dimensions from finished face of walls, columns, panels including clearances and aisle widths. Key panel assemblies to a legend which shall include width, height, configuration of frames, panel fabric and finishes (if there are different selections existing within a project), powered or non-powered panel and wall mount locations.

1.2.4. Desk Plans

Provide typical free standing desk configurations in plan view, elevation or isometric view and identify components to clearly represent each desk configuration.

1.2.5. Reflected Ceiling Plans

Provide typical plans showing ceiling finishes and heights, lighting fixtures, heating ventilation and air conditioning supply and return, and sprinkler head placement for coordination of furniture.

1.2.6. Electrical and Telecommunication Plans

Show power provisions including type and locations of feeder components, activated outlets and other electrical components. Show locations and quantities of outlets for workstations. Clearly identify different outlets, i.e. electrical, LAN and telecommunication receptacles indicating each type proposed. Show wiring configuration, (circuiting, switching, internal and external connections) and provide as applicable.

1.2.7. Artwork Placement Plans

Provide an Artwork Placement Plan to show location of artwork, assign an artwork item code to each piece of artwork. As an alternative, artwork can be located on the Furniture Plans. Provide a schedule that identifies each piece by room name and number. Provide installation instructions; include mounting height.

1.2.8. Window Drapery Plans

Provide Interior Window Drapery Plans. Key each drapery treatment to a schedule showing color, pattern, material, drapery size and type, draw direction, location and quantities.

1.3. FURNITURE SELECTION

1.3.1. Select furniture from the GSA Schedules. Specify furniture available open market when an item is not available on the GSA Schedules. Provide justification for items not available on the GSA Schedules.

1.3.2. To the greatest extent possible when specifying furniture work within a manufacturer's family of furniture for selections, example: Steelcase, Turnstone, Brayton International, Metro, and Vecta are all Steelcase companies. Each alternate should also be specified from a manufacturer's family of furniture, example: first set of alternates would be specified from Knoll's family of furniture and the second from Herman Miller family of furniture. It may be necessary to make some selections from other than a manufacturer's family of furniture if costs are not reasonable for particular items, some items are not available or appropriate for the facility or the items are not on GSA Schedule. If this occurs, consider specifying product from an open line that is accessible by numerous dealerships. Select office furniture including case goods, tables, storage, seating, etc. that is compatible in style, finish and color. Select furniture that complies with ANSI/BIFMA and from manufacturer's standard product line as shown in the most recent published price list and/or amendment and not custom product.

1.4. CONSTRUCTION

1.4.1. Provide knee space at workstations and tables that is not obstructed by panels/legs that interfere with knee space of seated person and specify modesty panels at walls to be of a height or be hinged to allow access to building wall electrical outlets and communication jacks. Provide desks, storage and tables with leveling devices to compensate for uneven floors.

1.4.2. Specify workstations and storage of steel construction. Provide worksurface tops constructed to prevent warpage. Provide user friendly features such as radius edges. Do not use sharp edges and exposed connections and ensure the underside of desks, tables and worksurfaces are completely and smoothly finished. Provide abutting worksurfaces that mate closely and are of equal heights when used in side-by-side configurations in order to provide a continuous and level worksurface.

1.4.3. Drawers shall stay securely closed when in the closed position and protect wires from damage during drawer operation. Include a safety catch to prevent accidental removal when fully open

1.4.4. Unless otherwise noted, provide lockable desks and workstations, filing cabinets and storage. Key all locks within a one person office the same; key all one person offices within a building differently. If an office or open office area has more than one workstation, key all the workstations differently, but key all locks within an individual workstation the same. Use tempered glass glazing when glazing is required. Use light-emitting diode (LED)/solid state lighting where task lighting is required in furniture.

1.5. FINISHES AND UPHOLSTERY

1.5.1. Specify neutral colors for casegoods, furniture systems, storage and tables. Specify desk worksurfaces and table tops that are not too light or too dark in color and have a pattern to help hide soiling. Accent colors are

allowed in break and lounge areas. Keep placement of furniture systems panel fabric accent colors to a minimum. All finishes shall be cleanable with ordinary household cleaning solutions.

1.5.2. Use manufacturer's standard fabrics; including textile manufacturers fabrics that have been graded into the furniture manufactures fabric grades and are available through their GSA Schedule. Customers Own Material (COM) can be used in headquarter buildings in command suites with executive furniture. Coordinate specific locations with Corps of Engineers Interior Designer.

1.5.3. Specify seating upholstery that meets Wyzenbeek Abrasion Test, 55,000 minimum rubs. Specify a soil retardant finish for woven fabrics if Crypton or vinyl upholstery is not provided for seating in dining areas. Use manufacturer's standard fabrics. This includes textile manufacturers fabrics that have been graded into the furniture manufactures fabric grades and are available through their GSA Schedule. Specify upholstery and finish colors and patterns that help hide soiling. Specify finishes that can be cleaned with ordinary household cleaning solutions.

1.6. ACCESSORIES

1.6.1. Specify all accessories required for completely finished furniture installation. Provide filing cabinets and storage for office supplies. Provide tack surfaces at workstations with overhead storage. Provide tackable surfaces at workstations with overhead storage.

1.6.2. Not Used.

1.6.3. Workstations are to be equipped with stable keyboard trays that have height adjustability, tilting capability, including negative tilt, have a mouse pad at same height as the keyboard tray that can accommodate both left and right handed users, and retractable under worksurface.

1.7. MISSION UNIQUE EQUIPMENT

Funding for FF&E furniture items and mission unique equipment (MUE) items are from two different sources. Separate the designs and procurement documentation for FFE items and MUE. MUE includes, but is not limited to, items such as industrial shelving, workbenches, appliances, fitness equipment, IT equipment and supporting carts. The User will purchase and install mission unique equipment items, unless otherwise noted. Identify locations of known MUE items such as industrial shelving, workbenches, appliances, etc. for space planning purposes.

1.8. SUSTAINABILITY

1.8.1. For all designs provided regardless of facility type, make every effort to implement all aspects of sustainability to the greatest extent possible for all the selections made in the FF&E package. This includes but is not limited to the selection of products that consider: **Material Chemistry and Safety of Inputs** (What chemicals are used in the construction of the selections?); **Recyclability** (Do the selections contain recycled content?); **Disassembly** (Can the selections be disassembled at the end of their useful life to recycle their materials?).

1.8.2. Make selections to the greatest extent possible of products that possess current McDonough Braungart Design Chemistry ([MBDC](#)) certification or other "third-party" certified Cradle to Cradle program, Forest Stewardship Council (FSC) certification, GREENGAURD certification or similar "third-party" certified products consisting of low-emitting materials.

1.9. FURNITURE SYSTEMS

1.9.1. General.

Where appropriate, design furniture systems in open office areas. Coordinate style and color of furniture systems with other storage, seating, etc. in open office areas. Minimize the number of workstation typicals and the parts and pieces required for the design to assist in future reconfiguration and inventorying.

1.9.2. Connector Systems.

Specify a connector system that allows removal of a single panel or spine wall within a typical workstation configuration without requiring disassembly of the workstation or removal of adjacent panels. Specify connector

system with tight connections and continuous visual seals. When Acoustical panels are used, provide connector system with continuous acoustical seals. Specify concealed clips, screws, and other construction elements, where possible.

1.9.3. Panels and Spine Walls

Specify panels and spine walls with hinged or removable covers that permit easy access to the raceway when required but are securely mounted and cannot be accidentally dislodged under normal conditions. Panels shall be capable of structurally supporting more than 1 fully loaded component per panel per side. Raceways are to be an integral part of the panel and must be able to support lay-in cabling and have a large capacity for electrical and IT. Do not thread cables through the frame.

1.9.4. Electrical And Information/Technology (IT)

Design furniture with electrical systems that meets requirements of UL 1286 when powered panels are required and UL approved task lights that meet requirements of NFPA 70. Dependent on user requirements and Section 01 10 00, paragraph 3 requirements, it is recommended that workstation electrical and IT wiring entry come from the building walls to eliminate the use of power poles and access at the floor. Design electrical and IT systems that are easily accessed in the spine wall and panels without having to move return panels and components. Electrical and IT management will be easily accessible by removable wall covers which can be removed while workstation components are still attached. Specify connector system that has continuation of electrical and IT wiring within workstations and workstation to workstation.

1.9.5. Pedestals

Specify pedestals that are interchangeable from left to right, and right to left, and retain pedestal locking system capability.

1.10. EXECUTIVE FURNITURE

1.10.1. Design for executive furniture in command areas, coordinate specific locations with Corps of Engineers Interior Designer. Use upgraded furniture, upholsteries and finishes in command suites. This includes but is not limited to wood casegoods, seating and tables. Select executive furniture casegoods from a single manufacturer and style line, to include workstations, credenzas, filing, and storage, etc.

1.10.2. Specify furniture with wood veneer finish (except worksurfaces) with mitered solid wood edge of same wood type. Provide worksurface plastic laminate that closely matches adjacent wood veneer. Other executive office furniture such as seating, tables, executive conference room furniture, etc. shall be compatible in style, finish and color with executive furniture casegoods.

1.11. SEATING

1.11.1. General

Specify appropriate chair casters and glides for the floor finish where the seating is located. Universal casters that are appropriate for both hard surface flooring and carpet are preferred. All seating shall support up to a minimum of 250 lbs.

1.11.2. Desk and Guest Seating

Select ergonomic desk chairs with casters, non-upholstered adjustable arms, waterfall front, swivel, tilt, variable back lock, adjustable back height or adjustable lumbar support, pneumatic seat height adjustment, and padded, contoured upholstered seat and back. Desk and guest chair backs may be other than upholstered such as mesh fabric if it is ergonomically designed, forms to back and is comfortable. Depending on scale of desk chair provide seat pan forward and back adjustment to increase or decrease depth of seat pan. All desk chairs shall have an adjustable seat height range of 4 1/2", range to include 16 1/2-20". Select guest chairs that are compatible in style, finish and color with the desk chairs.

1.11.3. Conference Room Seating

At tables, select ergonomic conference seating with casters, non-upholstered arms, waterfall front, swivel, tilt, pneumatic seat height adjustment, and padded, contoured seat and back, unless otherwise noted. Select arm height and/or design that allows seating to be moved up closely to the table top. Conference chair backs may be other than upholstered such as mesh fabric if it is ergonomically designed, forms to back and is comfortable. Perimeter conference chairs shall be compatible in style, finish and color with conference seating at the tables.

1.11.4. Lounge, Waiting and Reception Area Seating

Select seating with arms and cushioned, upholstered seat and back. In heavy use areas, arms shall be easily cleaned such as non-upholstered arms or upholstered arms with wood arm caps unless otherwise noted.

1.11.5. Break Room Seating

Select stackable seating that is easily cleaned. Seating shall be appropriate for table and counter heights as applicable with non-upholstered arms if arms are required. Chairs shall have metal legs and composite materials for seats.

1.11.6. Lounge, Waiting and Reception Furniture.

Design for end and coffee tables with plastic laminate tops that are compatible in style finish and color with the seating.

1.12. FILING AND STORAGE.

Select storage and shelving units that meet customer's functional load requirements for stored items. Specify counterweights for filing cabinets when required by the manufacturer for stability. File drawers shall allow only one drawer to be opened at a time. Provide heavy duty storage and shelving if information is not available.

1.13. TRAINING TABLES.

Don't use plastic laminate self edge. Training tables shall be reconfigurable, moveable and storable; lighter weight folding with dollies or casters as necessary. Specify dollies if required.

1.14. FURNITURE WARRANTIES.

Specify manufacturer's performance guarantees or warranties that include parts, labor and transportation as follows:

- Furniture System, unless otherwise noted – 10 year minimum
- Furniture System Task Lights – 2 year minimum, excluding bulbs
- Furniture System Fabric – 3 year minimum
- Desks - 10 year minimum
- Seating, unless otherwise noted - 10 year minimum
- Seating Mechanisms and Pneumatic Cylinders - 10 years
- Fabric - 3 years minimum
- Filing and Storage - 10 year minimum
- Tables, unless otherwise noted - 10 year minimum
- Table Mechanisms – 5 year
- Table Ganging Device - 1 year
- Items not listed above - 1 year minimum

ATTACHMENT C TRACKING COMMENTS IN DRCHECKS

1.0 General

The Government and DB Contractor shall set up the project in Dr Checks. Throughout the design process, the parties shall enter, track, and back-check comments using the DrChecks system. Government reviewers enter design review comments into DrChecks. Designers of Record shall annotate comments timely and specifically to indicate exactly what action will be taken or why the action is not required. Comments considered critical by the conference participants shall be flagged as such.

2.0 DrChecks Review Comments

The Contractor and the Government shall monitor DrChecks to assure all comments are annotated and agreed to by the designers and reviewers prior to the next submittal. The DrChecks comments and responses shall be printed and included in the design analysis for record.

2.1. Conference participants (reviewers) will expect coordination between Design Analysis calculations and the submitted design. Reviewers will also focus on the design submittal's satisfaction of the contract requirements.

2.2. The Designers of Record shall answer each comment in DrChecks with a formal response prior to the next submittal, clearly indicating what action will be taken and what drawing/spec will change. Designers of Record are encouraged to directly contact reviewers to discuss and agree to the formal comment responses rather than relying only on DrChecks and review meetings to discuss comments. With the next design conference, reviewers will back-check answers to the comments against the submittal, in addition to reviewing additional design work.

2.3. Comments that, in the DB Contractor's opinion, require effort outside the scope of the contract shall be clearly indicated as such in DrChecks. The DB Contractor shall not proceed with work outside the contract until a modification to the contract is properly executed, if one is necessary.

3.0 DrChecks Initial Account Set-Up

To initialize an office's use of DrChecks, choose a contact person within the office to call the DrChecks Help Desk at 800-428-HELP, M-F, 8AM-5PM, Central time. This POC will be given an office password to distribute to others in the office. Individuals can then go to the hyperlink at <http://www.projnet.org> and register as a first time user. Upon registration, each user will be given a personal password to the DrChecks system.

3.1. Once the office and individuals are registered, the COE's project manager or lead reviewer will assign the individuals and/or offices to the specific project for review. At this point, persons assigned can make comments, annotate comments, and close comments, depending on their particular assignment.

4.0 DrChecks Reviewer Role

The Contractor is the technical reviewer and the Government is the compliance reviewer of the DB designers design documents. Each reviewer enters their own comments into the Dr Checks system. To enter comments:

4.1. Log into DrChecks.

4.2. Click on the appropriate project.

4.3. Click on the appropriate review conference. An Add comment screen will appear.

4.4. Select or fill out the appropriate sections (particularly comment discipline and type of document for sorting) of the comment form and enter the comment in the space provided.

4.5. Click the Add Comment button. The comment will be added to the database and a fresh screen will appear for the next comment you have.

4.6. Once comments are all entered, exit DrChecks by choosing “My Account” and then Logout.

5.0 DrChecks Comment Evaluation

The role of the designers of record is to evaluate and respond to the comments entered by the Government reviewers and by the DB Contractor. To respond to comments:

5.1. Log into DrChecks.

5.2. Click on the appropriate project.

5.3. Under “Evaluate” click on the number under “Pending”.

5.4. Locate the comments that require your evaluation. (Note: If you know the comment number you can use the Quick Pick window on your home page in DrChecks; enter the number and click on go.)

5.5. Select the appropriate evaluation (concur, non-concur, for information only, or check and resolve) and add the response.

5.6. Click on the Add button. The evaluation will be added to the database and a fresh screen will appear with the next comment.

5.7. Once evaluations are all entered, exit DrChecks by choosing “My Account” and then Logout.

6.0 DrChecks Back-check

At the following design conference, participants will back-check comment annotations against newly presented documents to verify that the designers' responses are acceptable and completed. The Contractor and Government reviewers shall either enter additional back-check comments, as necessary or close those that are resolved as a result of the design conferences:

6.1. Log into DrChecks.

6.2. Click on the appropriate project.

6.3. Under “My Backcheck” click on the number under “Pending”.

6.4. If you agree with the designer's response select “Close Comment” and add a closing response if desired.

6.5. If you do not agree with the designer's response or the submittal does not reflect the response given, select “Issue Open”, enter additional information.

6.6. Click on the Add button. The back-check will be added to the database and a fresh screen will appear with the next comment.

6.7. Once back-checks are all entered, exit DrChecks by choosing “My Account” and then Logout. The design is completed and final when there are no pending comments to be evaluated and there are no pending or open comments under back-check.

**ATTACHMENT D
SAMPLE FIRE PROTECTION AND LIFE SAFETY CODE REVIEW**

Instructions: Use the information outlined in this document to provide the minimum requirement for development of Fire Protection and Life Safety Code submittals for all building projects. Additional and supplemental information may be used to further develop the code review. Insert N/A after criteria, which may be "not applicable".

1.0 SAMPLE FIRE PROTECTION AND LIFE SAFETY CODE REVIEW

- 1.1. Project Name (insert name and location)
- 1.2. Applicable Codes and Standards
 - 1.2.1. Unified Facilities Criteria (UFC): 3-600-01, Design: Fire Protection Engineering For Facilities
 - 1.2.2. International Building Code (IBC) for fire resistance requirements, allowable floor area, building height limitations and building separation distance requirements, except as modified by UFC 3-600-01.
 - 1.2.3. National Fire Protection Association (NFPA) 101 Life Safety Code (latest edition), for building egress and life safety and applicable criteria in UFC 3-600-01.
 - 1.2.4. ADA and ABA Accessiblity Guidelines. For Buildings and Facilities See Section 01 10 00, Paragraph 3 for facility specific criteria.
- 1.3. Occupancy Classification
IBC chapters 3 and 4
- 1.4. Construction Type
IBC chapter 6
- 1.5. Area Limitations
IBC chapter 5, table 503
- 1.6. Allowable Floor Areas
IBC section 503, 505
- 1.7. Allowable area increases
IBC section 506, 507
- 1.8. Maximum Height of Buildings
IBC section 504
- 1.9. Fire-resistive substitution
- 1.10. Occupancy Separations
IBC table 302.3.2
- 1.11. Fire Resistive Requirements
 - 1.11.1. Exterior Walls - [] hour rating, IBC table 601, 602
 - 1.11.2. Interior Bearing walls - [] hour rating
 - 1.11.3. Structural frame - [] hour rating
 - 1.11.4. Permanent partitions - [] hour rating

- 1.11.5. Shaft enclosures - [] hour rating
- 1.11.6. Floors & Floor-Ceilings - [] hour rating
- 1.11.7. Roofs and Roof Ceilings - [] hour rating
- 1.12. Automatic Sprinklers and others used to determine the need for automatic Extinguishing Equipment, Extinguishing Systems, Foam Systems, Standpipe
- 1.12.1. UFC 3-600-01, chapters 4 and 6 systems, wet chemical systems, etc. State which systems are required and to what criteria they will be designed.
- 1.12.2. UFC 3-600-01, Appendix B Occupancy Classification. Note the classification for each room. This may be accomplished by classifying the entire building and noting exceptions for rooms that differ (E.g. The entire building is Light Hazard except boiler room and storage rooms which are [], etc.)
- 1.12.3. UFC 3-600-01, Chapter 3 Sprinkler Design Density, Sprinkler Design Area, Water Demand for Hose Streams (supply pressure and source requirements).
- 1.12.4. UFC 3-600-01, Chapter 4 Coverage per sprinkler head. Extended coverage sprinkler heads are not permitted.
- 1.12.5. Available Water Supply. Provide the results of the water flow tests showing the available water supply static pressure and residual pressure at flow. Based on this data and the estimated flow and pressure required for the sprinkler system, determine the need for a fire pump.
- 1.12.6. NFPA 13, Para. 8.16.4.6.1. Provide backflow preventer valves as required by the local municipality, authority, or water purveyor. Provide a test valve located downstream of the backflow preventer for flow testing the backflow preventer at full system demand flow. Route the discharge to an appropriate location outside the building.
- 1.13. Kitchen Cooking Exhaust Equipment
Describe when kitchen cooking exhaust equipment is provided for the project. Type of extinguishing systems for the equipment should be provided. per NFPA 96. Show all interlocks with manual release switches, fuel shutoff valves, electrical shunt trips, exhaust fans, and building alarms.
- 1.14. Portable Fire Extinguishers, fire classification and travel distance. per NFPA 10
- 1.15. Enclosure Protection and Penetration Requirements. - Opening Protectives and Through Penetrations
- 1.15.1. IBC Section 712, 715 and Table 715.3. Mechanical rooms, exit stairways, storage rooms, janitor [] hour rating. IBC Table 302.1.1
- 1.15.2. Fire Blocks, Draft Stops, Through Penetrations and Opening Protectives
- 1.16. Fire Dampers. Describe where fire dampers and smoke dampers are to be used (IBC Section 716 and NFPA 90A). State whether isolation smoke dampers are required at the air handler.
- 1.17. Detection Alarm and Communication. UFC 3-600-01, (Chapter 5); NFPA 101 para. 3.4 (chapters 12-42); NFPA 72
- 1.18. Mass Notification. Describe building/facility mass notification system (UFC 4-021-01) type and type of base-wide mass notification/communication system. State whether the visible notification appliances will be combined with the fire alarm system or kept separate. (Note: Navy has taken position to combine visible notification appliances with fire alarm).
- 1.19. Interior Finishes (classification). NFPA 101.10.2.3 and NFPA 101.7.1.4
- 1.20. Means of Egress

- 1.20.1. Separation of Means of Egress, NFPA 101 chapters 7 and 12-42; NFPA101.7.1.3
- 1.20.2. Occupant Load, NFPA101.7.3.1 and chapters 12-42.
- 1.20.3. Egress Capacity (stairs, corridors, ramps and doors) NFPA101.7.3.3
- 1.20.4. Number of Means of Egress, NFPA101.7.4 and chapters 12-42.
- 1.20.5. Dead end limits and Common Path of Travel, NFPA 101.7.5.1.6 and chapters 12-42.
- 1.20.6. Accessible Means of Egress (for accessible buildings), NFPA101.7.5.4
- 1.20.7. Measurement of Travel Distance to Exits, NFPA101.7.6 and chapters 12-42.
- 1.20.8. Discharge from Exits, NFPA101.7.7.2
- 1.20.9. Illumination of Means of Egress, NFPA101.7.8
- 1.20.10. Emergency Lighting, NFPA101.7.9
- 1.20.11. Marking of Means of Egress, NFPA101.7.10
- 1.21. Elevators, UFC 3-600-01, Chapter 6; IBC and ASME A17.1 - 2000,(Safety Code for Elevators and Escalators)
- 1.22. Accessibility Requirements, ADA and ABA Accessibility Guidelines for Buildings and Facilities
- 1.23. Certification of Fire Protection and Life Safety Code Requirements. (Note: Edit the Fire team membership if necessary). Preparers of this document certify the accuracy and completeness of the Fire Protection and Life Safety features for this project in accordance with the attached completed form(s).
- 1.24. Designer of Record. Certification of Fire protection and Life Safety Code Requirements. (Note: Edit the Fire team members if necessary). Preparers of this document certify the accuracy and completeness of the Fire Protection and Life Safety features of this project.

Fire Protection Engineer of Record:

Signature and Stamp

Date

OR

Architect of Record:

Signature and Stamp

Date

Mechanical Engineer of Record:

Signature and Stamp

Date

Electrical Engineer of Record:

Signature/Date

**ATTACHMENT E
LEED SUBMITTALS**

LEED Credit Paragraph	Contractor Check Here if Credit is Claimed	LEED-NC v3 Submittals (OCT09)	Provide for Credit Audit Only	REQUIRED DOCUMENTATION	Date Submitted (to be filled in by Contractor)	Government Reviewer's Use
PAR		FEATURE	DUE AT		DATE	REV
GENERAL						
		GENERAL - All calculations shall be in accordance with LEED 2009 Reference Guide.				
		GENERAL: Obtain excel version of this spreadsheet at http://en.sas.usace.army.mil/enWeb , "Engineering Criteria".				
		GENERAL - For all credits, narrative/comments may be added to describe special circumstances or considerations regarding the project's credit approach.				
		GENERAL - Include all required LEED drawings indicated below in contract drawings with applicable discipline drawings, labeled For Reference Only.				
		NOTE: Each submittal indicated with "****" differs from LEED certified project submittals by either having a different due date or being an added submittal not required by GBCI.				
		NOTE: Projects seeking LEED certification need only submit to GBCI whatever documentation is acceptable to GBCI (for example, licensed professional certifications). This checklist identifies what must be submitted to the Government for internal review purposes. Government review of LEED documentation in no way supercedes or modifies the requirements and rulings of GBCI for purposes of compliance with project requirement to obtain LEED certification.				
		GENERAL - Audit documentation may include but is not limited to what is indicated in this table.				
			Closeout	List of all Final Design submittals revised after final design to reflect actual closeout conditions. Revised Final Design submittals. - OR - Statement confirming that no changes have been made since final design that effect final design submittal documents.		Proj Engr (PE)
CATEGORY 1 - SUSTAINABLE SITES						
SSPR1		Construction Activity Pollution Prevention (PREREQUISITE)	**Final Design	List of drawings and specifications that address the erosion control, particulate/dust control and sedimentation control measures to be implemented.		CIV
			**Final Design	Delineation and labeling of "LEED Project site boundary" on site plan.		CIV
			**Final Design	Narrative that indicates which compliance path was used (NPDES or Local standards) and describes the measures to be implemented on the project. If a local standard was followed, provide specific information to demonstrate that the local standard is equal to or more stringent than the NPDES program.		CIV
SS1		Site Selection	Final Design	Statement confirming that project does not meet any of the prohibited criteria.		CIV
			**Final Design	Delineation and labeling of "LEED Project site boundary" on site plan.		CIV
			Final Design	X LEED Site plan drawing that shows all proposed development, line depicting boundary of all bodies of water and/or wetlands within 100 feet of project boundary and a line depicting 5' elevation above 100 year flood line that falls within project boundary. Not required if neither condition applies.		CIV
SS2		Development Density & Community Connectivity	Final Design	Option 1: LEED Site vicinity plan showing project site and surrounding development. Show density boundary or note drawing scale.		CIV
			**Final Design	Delineation and labeling of "LEED Project site boundary" on site plan.		CIV
			Final Design	Option 1: Table indicating, for project site and all surrounding sites within density radius (keyed to site vicinity plan), site area and building area. Project development density calculation. Density radius calculation. Development density calculation within density radius.		CIV
			Final Design	Option 2: LEED Site vicinity plan showing project site, the 1/2 mile community radius, pedestrian walkways and the locations of the residential development(s) and Basic Services surrounding the project site.		CIV
			Final Design	Option 2: List (including business name and type) of all Basic Services facilities within the 1/2 mile radius, keyed to site vicinity plan.		CIV
SS3		Brownfield Redevelopment	Final Design	Narrative describing contamination and the remediation activities included in project. Include statement indicating how site was determined to be a brownfield.		CIV
			**Final Design	Delineation and labeling of "LEED Project site boundary" on site plan.		CIV
SS4.1		Alternative Transportation: Public Transportation Access	Final Design	Statement indicating which option for compliance applies. State whether public transportation is existing or proposed and, if proposed, cite source of this information.		CIV
			**Final Design	Delineation and labeling of "LEED Project site boundary" on site plan.		CIV
			Final Design	Option 1: LEED Site vicinity plan showing project site, mass transit stops and pedestrian path to them with path distance noted.		CIV
			Final Design	Option 2: LEED Site vicinity plan showing project site, bus stops and pedestrian path to them with path distance noted.		CIV
SS4.2		Alternative Transportation: Bicycle Storage & Changing Rooms	Final Design	FTE calculation. Bicycle storage spaces calculation. Shower/changing facilities calculation.		CIV
			Final Design	List of drawings that show the location(s) of bicycle storage areas. Statement indicating distance from building entrance.		CIV
			Final Design	List of drawings that show the location(s) of shower/changing facilities and, if located outside the building, statement indicating distance from building entrance.		CIV

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PAR		FEATURE	DUE AT		DATE	REV
SS4.3		Alternative Transportation: Low Emitting & Fuel Efficient Vehicles	Final Design	Statement indicating which option for compliance applies. FTE calculation. Statement indicating total parking capacity of site.		CIV
			**Final Design	Delineation and labeling of "LEED Project site boundary" on site plan.		CIV
			Final Design	Option 1: Low-emission & fuel-efficient vehicle calculation.		CIV
			Final Design	Option 1: List of drawings and specification references that show location and number of preferred parking spaces for low-emission & fuel-efficient vehicles and signage.		CIV
			Final Design	Option 1: Statement indicating quantity, make, model and manufacturer of low-emission & fuel-efficient vehicles to be provided. Statement confirming vehicles are zero-emission or indicating ACEEE vehicle scores.		CIV
			Final Design	Option 2: Low-emission & fuel-efficient vehicle parking calculation.		CIV
			Final Design	Option 2: List of drawings and specification references that show location and number of preferred parking spaces and signage.		CIV
			Final Design	Option 3: Low-emission & fuel-efficient vehicle refueling station calculation.		CIV
			Final Design	Option 3: List of drawings and specifications indicating location and number of refueling stations, fuel type and fueling capacity for each station for an 8-hour period.		CIV
			Closeout	X Option 3: Construction product submittals indicating what was provided and confirming compliance with respect to fuel type and fueling capacity for each station for an 8-hour period.		CIV
SS4.4		Alternative Transportation: Parking Capacity	Final Design	Statement indicating which option for compliance applies.		CIV
			**Final Design	Delineation and labeling of "LEED Project site boundary" on site plan.		CIV
			Final Design	Option 1: Preferred parking calculation including number of spaces required, total provided, preferred spaces provided and percentage.		CIV
			Final Design	Option 2: FTE calculation. Preferred parking calculation including number of spaces provided, preferred spaces provided and percentage.		CIV
			Final Design	Options 1 and 2: List of drawings and specification references that show location and number of preferred parking spaces and signage.		CIV
			Final Design	Option 3: Narrative indicating number of spaces required and provided and describing infrastructure and support programs with description of project features to support them.		CIV
SS5.1		Site Development: Protect or Restore Habitat	**Final Design	Option 1: List of drawing and specification references that convey site disturbance limits.		CIV
			**Final Design	Delineation and labeling of "LEED Project site boundary" on site plan.		CIV
			**Final Design	Option 2: LEED site plan drawing that delineates boundaries of each preserved and restored habitat area with area (sf) noted for each.		CIV
			**Final Design	Option 2: Percentage calculation of restored/preserved habitat to total site area. List of drawings and specification references that convey restoration planting requirements.		CIV
SS5.2		Site Development: Maximize Open Space	Final Design	Option 2: LEED site plan drawing delineating boundary of vegetated open space adjacent to building with areas of building footprint and designated open space noted.		CIV
			**Final Design	Delineation and labeling of "LEED Project site boundary" on site plan.		CIV
SS6.1		Stormwater Design: Quantity Control	Final Design	Statement indicating which option for compliance applies.		CIV
			**Final Design	Delineation and labeling of "LEED Project site boundary" on site plan.		CIV
			Final Design	Option 1: Indicate pre-development and post-development runoff rate(cfs) and runoff quantity (cf) -OR - Narrative describing site conditions, measures and controls to be implemented to prevent excessive stream velocities and erosion.		CIV
			Final Design	Option 2: Indicate pre-development and post-development runoff rate(cfs) and runoff quantity (cf). Indicate percent reduction in each.		CIV
SS6.2		Stormwater Design: Quality Control	Final Design	For non-structural controls, list all BMPs used and, for each, describe the function of the BMP and indicate the percent annual rainfall treated. List all structural controls and, for each, describe the pollutant removal and indicate the percent annual rainfall treated.		CIV
			**Final Design	Delineation and labeling of "LEED Project site boundary" on site plan.		CIV
SS7.1		Heat Island Effect: Non-Roof	**Final Design	LEED site plan drawing indicating locations and quantities of each paving type, including areas of shaded pavement. Percentage calculation indicating percentage of reflective/shaded/open grid area.		CIV
			**Final Design	Delineation and labeling of "LEED Project site boundary" on site plan.		CIV

Thursday, November 04, 2010

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SS7.2		Heat Island Effect: Roof	Final Design	Option 1: Percentage calculation indicating percentage of SRI compliant roof area. List of drawings and specification references that convey SRI requirements and roof slopes.		ARC
			Final Design	Option 1: List of specified roof materials indicating, for each, type, manufacturer, product name and identification if known, SRI value and roof slope.		ARC
			**Closeout	Option 1: List of installed roof materials indicating, for each, manufacturer, product name and identification, SRI value and roof slope.		PE
			Closeout	X Option 1: Manufacturer published product data or certification confirming SRI		PE
			Final Design	Option 2: Percentage calculation indicating percentage of vegetated roof area.		ARC
			Final Design	Option 3: Combined reflective and green roof calculation.		ARC
			Final Design	Option 3: List of specified roof materials indicating, for each, type, manufacturer, product name and identification if known, SRI value and roof slope.		ARC
			**Closeout	Option 3: List of installed roof materials indicating, for each, manufacturer, product name and identification, SRI value and roof slope.		PE
			Closeout	X Option 3: Manufacturer published product data or certification confirming SRI		PE
SS8		Light Pollution Reduction	Final Design	Interior Lighting: List of drawings and specification references that convey interior lighting requirements (location and type of all installed interior lighting, location of non-opaque exterior envelope surfaces, allowing confirmation that maximum candela value from interior fixtures does not intersect non-opaque building envelope surfaces). - OR - List of drawings and specification references that show automatic lighting controls compliance with credit requirement.		ELEC
			**Final Design	Delineation and labeling of "LEED Project site boundary" on site plan.		ELEC
			Final Design	Exterior Lighting: List of drawings and specification references that convey exterior lighting requirements (location and type of all site lighting and building facade/landscape lighting).		ELEC
			Final Design	Exterior Site Lighting Power Density (LPD): Tabulation for exterior site lighting indicating, for each location identification or description, units of measure, area or distance of the location, actual LPD using units consistent with ASHRAE 90.1, and the ASHRAE allowable LPD for that type of location. Percentage calculation of actual versus allowable LPD for all site lighting.		ELEC
			Final Design	Exterior Building Facade/Landscape Lighting Power Density (LPD): Tabulation for exterior building facade/landscape lighting indicating, for each location identification or description, units of measure, area or distance of the location, actual LPD using units consistent with ASHRAE 90.1, and the ASHRAE allowable LPD for that type of location. Percentage calculation of actual versus allowable LPD for all building facade/landscape lighting.		ELEC
			Final Design	Exterior Lighting IESNA Zone: Indicate which IESNA zone is applicable to the project.		ELEC
			Final Design	Exterior Lighting Site Lumen table indicating, for each fixture type, quantity installed, initial lamp lumens per luminaire, initial lamp lumens above 90 degrees from Nadir, total lamp lumens and total lamp lumens above 90 degrees. Percentage of site lamp lumens above 90 degrees from nadir to total lamp lumens.		ELEC
			Final Design	Exterior Lighting Narrative describing analysis used for addressing requirements for light trespass at site boundary and beyond.		ELEC
CATEGORY 2 – WATER EFFICIENCY						
WEPR1		Water Use Reduction: 20% Reduction	Final Design	Statement confirming which occupancy breakdown applies (default or special). For special occupancy breakdown, indicate source and explanation for ratio.		MEC
			Final Design	Occupancy calculation including male/female numbers for FTEs, visitors, students, customers, residential and other type occupants/users		MEC
			Final Design	Statement indicating percent of male restrooms with urinals. Statement indicating annual days of operation.		MEC

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				Baseline flush fixture calculation spreadsheet indicating, for each fixture type, gender, flush rate, daily uses per person for each occupant type identified in occupancy calculation and annual baseline flush fixture water usage.		MEC
				Design case flush fixture calculation spreadsheet indicating, for each fixture type, gender, fixture manufacturer, fixture model number, flush rate, percent of occupants using this fixture type, daily uses per person for each occupant type identified in occupancy calculation and annual design case flush fixture water usage.		MEC
			Closeout	X Manufacturer published product data or certification confirming fixture water usage.		PE
WE1.1		Water Efficient Landscaping: Reduce by 50%	Final Design	Statement indicating which option for compliance applies.		CIV
			**Final Design	Delineation and labeling of "LEED Project site boundary" on site plan.		CIV
			Final Design	Calculation indicating, for baseline and design case, total water applied, total potable water applied, total non-potable water applied. Design case percent potable water reduction. If nonpotable water is used, indicate source of nonpotable water.		CIV
			Final Design	List of landscape plan drawings.		CIV
			Final Design	Narrative describing landscaping and irrigation design strategies, including water use calculation methodology used to determine savings and, if non-potable water is used, specific information about source and available quantity.		CIV
WE1.2		Water Efficient Landscaping: No Potable Water Use or No Irrigation	Same as WE1.1	Same as WE1.1		CIV
WE2		Innovative Wastewater Technologies	Final Design	Statement confirming which option for compliance applies.		MEC
			Final Design	Statement confirming which occupancy breakdown applies (default or special). For special occupancy breakdown, indicate source and explanation for ratio.		MEC
			Final Design	Occupancy calculation including male/female numbers for FTEs, visitors, students, customers, residential and other type occupants/users		MEC
			Final Design	Statement indicating percent of male restrooms with urinals. Statement indicating annual days of operation.		MEC
			Final Design	Baseline flush fixture calculation spreadsheet indicating, for each fixture type, gender, flush rate, daily uses per person for each occupant type identified in occupancy calculation and annual baseline flush fixture water usage.		MEC
			Final Design	Design case flush fixture calculation spreadsheet indicating, for each fixture type, gender, fixture manufacturer, fixture model number, flush rate, percent of occupants using this fixture type, daily uses per person for each occupant type identified in occupancy calculation and annual design case flush fixture water usage.		MEC
			Final Design	Option 1: If onsite non-potable water is used, identify source(s), indicate annual quantity from each source and indicate total annual quantity from all onsite non-potable water sources.		MEC
			Final Design	Option 1: Summary calculation indicating baseline annual water consumption, design case annual water consumption, non-potable annual water consumption and total percentage annual water savings.		MEC
			Final Design	Option 2: Statement confirming on-site treatment of all generated wastewater to tertiary standards and all treated wastewater is either infiltrated or used on-site.		MEC
			Final Design	Option 2: List of drawing and specification references that convey design of on-site wastewater treatment features.		CIV
			Final Design	Option 2: On-site water treatment quantity calculation indicating all on-site wastewater source(s), annual quantity treated, annual quantity infiltrated and annual quantity re-used on site from each source and totals for annual quantity treated, annual quantity infiltrated and annual quantity re-used on site from all sources.		CIV
			Final Design	Option 2: Wastewater summary calculation indicating design case annual flush fixture water usage, annual on-site water treatment and percentage sewage conveyance reduction.		MEC
			Final Design	Narrative describing project strategy for reduction of potable water use for sewage conveyance, including specific information on reclaimed water usage and treated wastewater usage.		MEC
WE3		Water Use Reduction: 30% - 40% Reduction	Same as WEPR1	Same as WEPR1		MEC

CATEGORY 3 – ENERGY AND ATMOSPHERE

LEED Credit Paragraph	Contractor Check Here if Credit is Claimed	LEED-NC v3 Submittals (OCT09)	Provide for Credit Audit Only	REQUIRED DOCUMENTATION	DATE	REV
PAR		FEATURE	DUE AT			
EAPR1		Fundamental Commissioning of the Building Energy Systems (PREREQUISITE)	**Final Design	**Owner's Project Requirements document		ALL
			**Final Design	**Basis of Design document for commissioned systems		MEC, ELEC
			**Final Design	**Commissioning Plan		MEC, ELEC
			Closeout	Statement confirming all commissioning requirements have been incorporated into construction documents.		PE
			Closeout	Commissioning Report		PE
EAPR2		Minimum Energy Performance (PREREQUISITE)	Final Design	Statement listing the mandatory provisions of ASHRAE 90.1 that project meets relative to compliance with this prerequisite and indicating which compliance path was used.		MEC ELEC ARC
			Final Design	Statement indicating which compliance path option applies.		MEC
			Final Design	Option 1: Statement confirming simulation software capabilities and confirming assumptions and methodology.		MEC
			Final Design	Option 1: General information including simulation program, principal heating source, percent new construction and renovation, weather file, climate zone and Energy Star Target Finder score.		MEC
			Final Design	Option 1: Space summary listing, for each building use, the conditioned area, unconditioned area and total area and include total area for each category		MEC
			Final Design	Option 1: List of all simulation output advisory message data and show difference between baseline and proposed design		MEC
			Final Design	Option 1: Comparison summary for energy model inputs including description of baseline and design case energy model inputs, showing both by element type		MEC
			Final Design	Option 1: Energy type summary listing, for each energy type, utility rate description, units of energy and units of demand		MEC
			Final Design	Option 1: Statement indicating whether project uses on-site renewable energy. If yes, list all sources and indicate, for each source, backup energy type, annual energy generated, rated capacity and renewable energy cost		MEC
			Final Design	Option 1: If analysis includes exceptional calculation methods, statement describing how exceptional calculation measure cost savings is determined		MEC
			Final Design	Option 1: If analysis includes exceptional calculation methods, for each exceptional calculation method indicate energy types and, for each energy type, annual energy savings, annual cost savings, and brief descriptive narrative		MEC
			Final Design	Option 1: Baseline performance rating compliance report table indicating, for each energy end use, whether it is a process load, energy type, annual and peak energy demand for all four orientations. For each orientation indicate total annual energy use for each orientation and total annual process energy use.		MEC
			Final Design	Option 1: Baseline energy cost table indicating, for each energy type, annual cost for all four orientations and building total energy cost.		MEC
			Final Design	Option 1: Proposed Design performance rating compliance report table indicating, for each energy end use, whether it is a process load, energy type, annual and peak energy demand, baseline annual and peak energy demand and percent savings. Indicate total annual energy use and total annual process energy use for both proposed design and baseline and percent savings.		MEC
			Final Design	Option 1: Proposed Design energy cost table indicating, for each energy type, annual cost for all four orientations and building total energy cost.		MEC
			Final Design	Option 1: Energy cost and consumption by energy type report indicating, for each energy type, proposed design and baseline annual use and annual cost, percent savings annual use and annual cost. Indicate for renewable energy annual energy generated and annual cost. Indicate exceptional calculations annual energy savings and annual cost savings. Indicate building total annual energy use, annual energy cost for proposed design and baseline and indicate percent savings annual energy use and annual energy cost.		MEC

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			Final Design	Option 1: Compliance summaries from energy simulation software. If software does not produce compliance summaries provide output summaries and example input summaries for baseline and proposed design supporting data in the tables. Output summaries must include simulated energy consumption by end use and total energy use and cost by energy type. Example input summaries should represent most common systems and must include occupancy, use pattern, assumed envelope component sizes and descriptive features and assumed mechanical equipment types and descriptive features		MEC
			Final Design	Option 1: Energy rate tariff from project energy providers (only if not using LEED Reference Guide default rates)		MEC
EAPR3		Fundamental Refrigerant Management (PREREQUISITE)	Final Design	Statement indicating which option for compliance applies.		MEC
			Final Design	Option 2: Narrative describing phase out plan, including specific information on phase out dates and refrigerant quantities.		MEC
EA1		Optimize Energy Performance	Final Design	Statement indicating which compliance path option applies.		MEC
			Final Design	Option 1: Statement confirming simulation software capabilities and confirming assumptions and methodology.		MEC
			Final Design	Option 1: General information including simulation program, principal heating source, percent new construction and renovation, weather file, climate zone and Energy Star Target Finder score.		MEC
			Final Design	Option 1: Space summary listing, for each building use, the conditioned area, unconditioned area and total area and include total area for each category		MEC
			Final Design	Option 1: List of all simulation output advisory message data and show difference between baseline and proposed design		MEC
			Final Design	Option 1: Comparison summary for energy model inputs including description of baseline and design case energy model inputs, showing both by element type		MEC
			Final Design	Option 1: Energy type summary listing, for each energy type, utility rate description, units of energy and units of demand		MEC
			Final Design	Option 1: Statement indicating whether project uses on-site renewable energy. If yes, list all sources and indicate, for each source, backup energy type, annual energy generated, rated capacity and renewable energy cost		MEC
			Final Design	Option 1: If analysis includes exceptional calculation methods, statement describing how exceptional calculation measure cost savings is determined		MEC
			Final Design	Option 1: If analysis includes exceptional calculation methods, for each exceptional calculation method indicate energy types and, for each energy type, annual energy savings, annual cost savings, and brief descriptive narrative		MEC
			Final Design	Option 1: Baseline performance rating compliance report table indicating, for each energy end use, whether it is a process load, energy type, annual and peak energy demand for all four orientations. For each orientation indicate total annual energy use for each orientation and total annual process energy use.		MEC
			Final Design	Option 1: Baseline energy cost table indicating, for each energy type, annual cost for all four orientations and building total energy cost.		MEC
			Final Design	Option 1: Proposed Design performance rating compliance report table indicating, for each energy end use, whether it is a process load, energy type, annual and peak energy demand, baseline annual and peak energy demand and percent savings. Indicate total annual energy use and total annual process energy use for both proposed design and baseline and percent savings.		MEC
			Final Design	Option 1: Proposed Design energy cost table indicating, for each energy type, annual cost for all four orientations and building total energy cost.		MEC
			Final Design	Option 1: Energy cost and consumption by energy type report indicating, for each energy type, proposed design and baseline annual use and annual cost, percent savings annual use and annual cost. Indicate for renewable energy annual energy generated and annual cost. Indicate exceptional calculations annual energy savings and annual cost savings. Indicate building total annual energy use, annual energy cost for proposed design and baseline and indicate percent savings annual energy use and annual energy cost.		MEC

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			Final Design	Option 1: Compliance summaries from energy simulation software. If software does not produce compliance summaries provide output summaries and example input summaries for baseline and proposed design supporting data in the tables. Output summaries must include simulated energy consumption by end use and total energy use and cost by energy type. Example input summaries should represent most common systems and must include occupancy, use pattern, assumed envelope component sizes and descriptive features and assumed mechanical equipment types and descriptive features		MEC
			Final Design	Option 1: Energy rate tariff from project energy providers (only if not using LEED Reference Guide default rates)		MEC
EA2.1		On-Site Renewable Energy	Final Design	Statement indicating which compliance path option applies.		ELEC
			Final Design	List all on-site renewable energy sources and indicate, for each source, backup energy type, annual energy generated, rated capacity and renewable energy cost. Indicate total annual energy use (all sources), total annual energy cost (all sources) and percent renewable energy cost.		ELEC MEC
			Final Design	Option 1: Indicate, for renewable energy, proposed design total annual energy generated and annual cost.		ELEC MEC
			Final Design	Option 2: Indicate CBECS building type and building gross area. Provide the following CBECS data: median annual electrical intensity, median annual non-electrical fuel intensity, average electric energy cost, average non-electric fuel cost, annual electric energy use and cost, annual non-electric fuel use and cost.		ELEC MEC
			Final Design	Option 2: Narrative describing renewable systems and explaining calculation method used to estimate annual energy generated, including factors influencing performance.		ELEC MEC
EA2.2		On-Site Renewable Energy	Same as EA2.1	Same as EA2.1		ELEC MEC
EA2.3		On-Site Renewable Energy	Same as EA2.1	Same as EA2.1		ELEC MEC
EA3		Enhanced Commissioning	**Final Design	**Owner's Project Requirements document (OPR)		ALL
			**Final Design	**Basis of Design document for commissioned systems (BOD)		ELEC MEC
			**Final Design	**Commissioning Plan		ELEC MEC
			Closeout	Statement confirming all commissioning requirements have been incorporated into construction documents.		PE
			Closeout	**Commissioning Report		PE
			**Final Design	Statement by CxA confirming Commissioning Design Review		
			Closeout	Statement by CxA confirming review of Contractor submittals for compliance with OPR and BOD		PE
			Closeout	**Systems Manual		PE
			Closeout	Statement by CxA confirming completion of O&M staff and occupant training		PE
			Closeout	**Scope of work for post-occupancy review of building operation, including plan for resolution of outstanding issues		PE
			**Predesign	Statement confirming CxA qualifications and contractual relationships relative to work on this project, demonstrating that CxA is an independent third party.		MEC
EA4		Enhanced Refrigerant Management	Final Design	Refrigerant impact calculation table with all building data and calculation values as shown in LEED 2009 Reference Guide Example Calculations		MEC
			Final Design	Narrative describing any special circumstances or explanatory remarks		
			Closeout	X Cut sheets highlighting refrigerant data for all HVAC components.		PE
EA5		Measurement & Verification	Closeout	Statement indicating which compliance path option applies.		PE
			Closeout	Measurement and Verification Plan including Corrective Action Plan		PE
			Closeout	**Scope of work for post-occupancy implementation of M&V plan including corrective action plan.		PE
EA6		Green Power	Closeout	Statement indicating which compliance path option applies.		PE
			Closeout	Option 1: Indicate proposed design total annual electric energy usage		PE
			Closeout	Option 2: Indicate actual total annual electric energy usage		PE
			Closeout	Option 3: Calculation indicating building type, total gross area, median electrical intensity and annual electric energy use		PE

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			Closeout	Green power provider summary table indicating, for each purchase type, provider name, annual quantity green power purchased and contract term. Indicate total annual green power use and indicate percent green power		PE
			Closeout	Narrative describing how Green Power or Green Tags are purchased		PE
CATEGORY 4 – MATERIALS AND RESOURCES						
MRPR1		Storage & Collection of Recyclables (PREREQUISITE)	Final Design	Statement confirming that recycling area will accommodate recycling of plastic, metal, paper, cardboard and glass. Narrative indicating any other materials addressed and coordination with pickup.		ARC
MR1.1		Building Reuse: Maintain 55% of Existing Walls, Floors & Roof	**Final Design	If project includes a building addition, confirm that area of building addition does not exceed 2x the area of the existing building.		ARC
			**Final Design	Spreadsheet listing, for each building structural/envelope element, the existing area and reused area. Total percent reused.		ARC
MR1.2		Building Reuse: Maintain 75% of Existing Walls, Floors & Roof	Same as MR1.1	Same as MR1.1		ARC
MR1.3		Building Reuse: Maintain 95% of Existing Walls, Floors & Roof	Same as MR1.1	Same as MR1.1		ARC
MR1.4		Building Reuse: Maintain 50% of Interior Non-Structural Elements	**Final Design	If project includes a building addition, confirm that area of building addition does not exceed 2x the area of the existing building.		ARC
			**Final Design	Spreadsheet listing, for each building interior non-structural element, the existing area and reused area. Total percent reused.		ARC
MR2.1		Construction Waste Management: Divert 50% From Disposal	**Preconstruction	Waste Management Plan		PE
			**Construction Quarterly and Closeout	Spreadsheet calculations indicating material description, disposal/diversion location (or recycling hauler), weight, total waste generated, total waste diverted, diversion percentage		PE
			**Construction Quarterly and Closeout	Receipts/tickets for all items on spreadsheet		PE
MR2.2		Construction Waste Management: Divert 75% From Disposal	Same as MR2.1	Same as MR2.1		PE
MR3.1		Materials Reuse: 5%	Closeout	Statement indicating total materials value and whether default or actual.		PE
			Closeout	Spreadsheet calculations indicating, for each reused/salvaged material, material description, source or vendor, cost. Total reused/salvaged materials percentage.		PE
MR3.2		Materials Reuse: 10%	Same as MR3.1	Same as MR3.1		PE
MR4.1		Recycled Content: 10% (post-consumer + 1/2 pre-consumer)	Closeout	Statement indicating total materials value and whether default or actual.		PE
			Closeout	Spreadsheet calculations indicating, for each recycled content material, material name/description, manufacturer, cost, post-consumer recycled content percent, pre-consumer recycled content percent, source of recycled content data. Total post-consumer content materials cost, total pre-consumer content materials cost, total combined recycled content materials cost, recycled content materials percentage.		PE
			Final Design or NLT Preconstruction	**Purchasing Plan consisting of spreadsheet indicated above, filled in with estimated quantities to show strategy for achieving goal.		PE
			Closeout	Manufacturer published product data or certification, confirming recycled content percentages in spreadsheet		PE
MR4.2		Recycled Content: 20% (post-consumer + 1/2 pre-consumer)	Same as MR4.1	Same as MR4.1		PE
MR5.1		Regional Materials: 10% Extracted, Processed & Manufactured Regionally	Closeout	Statement indicating total materials value and whether default or actual.		PE
			Closeout	Spreadsheet calculations indicating, for each regional material, material name/description, manufacturer, cost, percent compliant, harvest distance, manufacture distance, source of manufacture and harvest location data. Total regional materials cost, regional materials percentage.		PE
			Preconstruction	**Purchasing Plan consisting of spreadsheet indicated above, filled in with estimated quantities to show strategy for achieving goal.		PE
			Closeout	Manufacturer published product data or certification confirming regional material percentages in spreadsheet		PE

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MR5.2		Regional Materials:20% Extracted, Processed & Manufactured Regionally	Same as MR5.1	Same as MR5.1		PE
MR6		Rapidly Renewable Materials	Closeout	Statement indicating total materials value and whether default or actual.		PE
			Closeout	Spreadsheet calculations indicating, for each rapidly renewable material, material name/description, manufacturer, cost, rapidly renewable content percent, rapidly renewable product value. Total rapidly renewable product value, rapidly renewable materials percentage.		PE
			Final Design	**Purchasing Plan consisting of spreadsheet indicated above, filled in with estimated quantities to show strategy for achieving goal.		ARC
			Closeout	X Manufacturer published product data or certification confirming rapidly renewable material percentages in spreadsheet		PE
MR7		Certified Wood	Closeout	Statement indicating total materials value and whether default or actual.		PE
			Closeout	Spreadsheet calculations indicating, for each certified wood material, material name/description, vendor, cost, wood component percent, certified wood percent of wood component, FSC chain of custody certificate number. Total certified wood product value, certified wood materials percentage.		PE
			Final Design or NLT Preconstruction	**Purchasing Plan consisting of spreadsheet indicated above, filled in with estimated quantities to show strategy for achieving goal.		PE
			Closeout	X Vendor invoices, FSC chain of custody certificates and manufacturer published product data or certification confirming all certified wood materials percentages in spreadsheet.		PE
INDOOR ENVIRONMENTAL QUALITY						
EQPR1		Minimum IAQ Performance (PREREQUISITE)	Final Design	Statement indicating which option for compliance applies, stating applicable criteria/requirement, and confirming that project has been designed to meet the applicable requirements.		MEC
			Final Design	Narrative describing the project's ventilation design, including specifics about fresh air intake volumes and special considerations.		MEC
EQPR2		Environmental Tobacco Smoke (ETS) Control (PREREQUISITE)	Final Design	Statement indicating which option for compliance applies, stating applicable criteria/requirement, and confirming that project has been designed to meet the applicable requirements.		ARC
			Final Design	List of drawing and specification references that convey conformance to applicable requirements (signage, exhaust system, room separation details, etc).		ARC
EQ1		Outdoor Air Delivery Monitoring	Final Design	Statement indicating which option for compliance applies and confirming that project has been designed to meet the applicable requirements.		MEC
			Final Design	List of drawing and specification references that convey conformance to applicable requirements.		MEC
			Final Design	Narrative describing the project's ventilation design and CO2 monitoring system, including specifics about monitors, operational parameters and setpoints.		MEC
			Closeout	X Cut sheets for CO2 monitoring system.		PE
EQ2		Increased Ventilation	Final Design	Statement indicating which option for compliance applies and confirming that project has been designed to meet the applicable requirements.		MEC
			Final Design	Narrative describing the project's ventilation design, including specifics about zone fresh air intake volumes and demonstrating compliance.		MEC
			Final Design	Option 2: Narrative describing design method used for determining natural ventilation design, including calculation methodology/model results and demonstrating compliance.		MEC
			Final Design	List of drawing and specification references that convey conformance to applicable requirements.		MEC
EQ3.1		Construction IAQ Management Plan: During Construction	**Preconstruction	Construction IAQ Management Plan		PE
			Closeout	Statement confirming whether air handling units were operated during construction		PE
			Closeout	Dated jobsite photos showing examples of IAQ management plan practices being implemented. Label photos to indicate which practice they demonstrate. Minimum one photo of each practice at each building.		PE

LEED Credit Paragraph	Contractor Check Here if Credit is Claimed	LEED-NC v3 Submittals (OCT09)	Provide for Credit Audit Only	REQUIRED DOCUMENTATION	DATE	REV
PAR		FEATURE	DUE AT			
			Closeout	Spreadsheet indicating, for each filter installed during construction, the manufacturer, model number, MERV rating, location installed, and if it was replaced immediately prior to occupancy.		PE
EQ3.2		Construction IAQ Management Plan: Before Occupancy	**Preconstruction	Construction IAQ Management Plan		PE
			Closeout	Statement indicating which option for compliance applies and confirming that required activities have occurred that meet the applicable requirements.		PE
			Closeout	Option 1a: Narrative describing the project's flushout process, including specifics about temperature, airflow and duration, special considerations (if any) and demonstrating compliance.		PE
			Closeout	Option 1b: Narrative describing the project's pre-occupancy and post-occupancy flushout processes, including specifics about temperature, airflow and duration, special considerations (if any) and demonstrating compliance.		PE
			Closeout	Option 2: Narrative describing the project's IAQ testing process, including specifics about contaminants tested for, locations, remaining work at time of test, retest parameters and special considerations (if any).		PE
			Closeout	Option 2: IAQ testing report demonstrating compliance.		PE
EQ4.1		Low Emitting Materials: Adhesives & Sealants	Closeout	Spreadsheet indicating, for each applicable indoor adhesive, sealant and sealant primer used, the manufacturer, product name/model number, VOC content, LEED VOC limit, and source of VOC data.		PE
			Closeout	Spreadsheet indicating, for each applicable indoor aerosol adhesive, the manufacturer, product name/model number, VOC content, LEED VOC limit, and source of VOC data - OR - Statement confirming no indoor aerosol adhesives were used for the project.		PE
			Closeout	Manufacturer published product data or certification confirming material VOCs in spreadsheet	X	PE
EQ4.2		Low Emitting Materials: Paints & Coatings	Closeout	Spreadsheet indicating, for each applicable indoor paint and coating used, the manufacturer, product name/model number, VOC content, LEED VOC limit, and source of VOC data.		PE
			Closeout	Spreadsheet indicating, for each applicable indoor anti-corrosive/anti-rust paint and coating used, the manufacturer, product name/model number, VOC content, LEED VOC limit, and source of VOC data - OR - Statement confirming no indoor anti-corrosive/anti-rust paints were used for the project .		PE
			Closeout	Manufacturer published product data or certification confirming material VOCs in spreadsheet	X	PE
EQ4.3		Low Emitting Materials: Flooring Systems	Closeout	Spreadsheet indicating, for each indoor flooring system used, the manufacturer, product name/model number, if it meets LEED requirement (yes/no) and source of LEED compliance data.		PE
			Closeout	Spreadsheet indicating, for each indoor carpet cushion used, the manufacturer, product name/model number, if it meets LEED requirement (yes/no) and source of LEED compliance data - OR - Statement confirming no indoor carpet cushion was used for the project.		PE
			Closeout	Manufacturer published product data or certification confirming material compliance label in spreadsheet	X	PE
EQ4.4		Low Emitting Materials: Composite Wood & Agrifiber Products	Closeout	Spreadsheet indicating, for each indoor composite wood and agrifiber product used, the manufacturer, product name/model number, if it contains added urea formaldehyde (yes/no) and source of LEED compliance data.		PE
			Closeout	Manufacturer published product data or certification confirming material urea formaldehyde in spreadsheet	X	PE
EQ5		Indoor Chemical & Pollutant Source Control	Closeout	Spreadsheet indicating, for each permanent entryway system used, the manufacturer, product name/model number and description of system.		PE
			Final Design	List of drawing and specification references that convey locations and installation methods for entryway systems.		ARC
			Final Design	Spreadsheet indicating, for each chemical use area, the room number, room name, description of room separation features (walls, floor/ceilings, openings) and pressure differential from surrounding spaces with doors closed - OR - Statement confirming that project includes no chemical use areas and that no hazardous cleaning materials are needed for building maintenance.		ARC MEC
			Final Design	If project includes chemical use areas: List of drawing and specification references that convey locations of chemical use areas, room separation features and exhaust system.		ARC

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PAR		FEATURE	DUE AT					
			Final Design	If project includes places where water and chemical concentrate mixing occurs: List of drawing and specification references that convey provisions for containment of hazardous liquid wastes OR - Statement confirming that project includes no places where water and chemical concentrate mixing occurs.				ARC MEC
			Closeout	If project includes chemical use areas: Spreadsheet indicating, for AHUs/mechanical ventilation equipment serving occupied areas, the manufacturer, model number, MERV rating, location installed, and if it was replaced immediately prior to occupancy (yes/no) - OR - Statement confirming that project does not use mechanical equipment for ventilation of occupied areas.				PE
EQ6.1		Controllability of Systems: Lighting	Final Design	Calculation indicating total number of individual workstations, number of workstations with individual lighting controls and the percentage of workstations with individual lighting controls.				ELEC
			Final Design	For each shared multi-occupant space, provide a brief description of lighting controls.				ELEC
			Final Design	Narrative describing lighting control strategy, including type and location of individual controls and type and location of controls in shared multi-occupant spaces.				ELEC
EQ6.2		Controllability of Systems: Thermal Comfort	Final Design	Calculation indicating total number of individual workstations, number of workstations with individual thermal comfort controls and the percentage of workstations with individual thermal comfort controls.				MEC
			Final Design	For each shared multi-occupant space, provide a brief description of thermal comfort controls.				MEC
			Final Design	Narrative describing thermal comfort control strategy, including type and location of individual and shared multi-occupant controls.				MEC
EQ7.1		Thermal Comfort: Design	Final Design	Design criteria spreadsheet indicating, for spring, summer, fall and winter, maximum indoor space design temperature, minimum indoor space design temperature and maximum indoor space design humidity.				MEC
			Final Design	Narrative describing method used to establish thermal comfort control conditions and how systems design addresses the design criteria, including compliance with the referenced standard.				MEC
EQ7.2		Thermal Comfort: Verification	Final Design	Narrative describing the scope of work for the thermal comfort survey, including corrective action plan development				MEC
			Final Design	List of drawing and specification references that convey permanent monitoring system.				MEC
EQ8.1		Daylight & Views: Daylight 75% of Spaces	Final Design	Option 2: Table indicating all regularly occupied spaces with space area and space area with compliant daylight zone. Sum of regularly occupied areas and regularly occupied areas with compliant daylight zone. Percentage calculation of areas with compliant daylight zone to total regularly occupied areas.				ARC
			Final Design	Option 1: Simulation model method, software and output data				ELEC
			Final Design	Option 1: Table indicating all regularly occupied spaces with space area, space area with minimum 25 footcandles daylighting illumination, and method of providing glare control. Sum of regularly occupied areas and regularly occupied areas with 25 fc daylighting. Percentage calculation of areas with 25 fc daylighting to total regularly occupied areas.				ELEC
			Final Design	For all occupied spaces excluded from the calculation, provide narrative indicating reasons for excluding the space.				ARC
			Final Design	List of drawing and specification references that convey exterior glazed opening head and sill heights, glazing performance properties and glare control/sunlight redirection devices.				ARC
			Closeout	X Manufacturer published product data or certification confirming glazing Tvis in spreadsheet				PE
EQ8.2		Daylight & Views: Views for 90% of Spaces	Final Design	Table indicating all regularly occupied spaces with space area and space area with access to views. Sum of regularly occupied areas and regularly occupied areas with access to views. Percentage calculation of areas with views to total regularly occupied areas.				ARC
			Final Design	For all occupied spaces excluded from the calculation, provide narrative indicating reasons for excluding the space.				ARC
			Final Design	LEED Floor plan drawings showing line of sight diagramming of views areas in each regularly occupied space. List of drawing/specification references that convey exterior glazed opening head and sill heights.				ARC

INNOVATION & DESIGN PROCESS

LEED Credit Paragraph	Contractor Check Here if Credit is Claimed	LEED-NC v3 Submittals (OCT09)	Provide for Credit Audit Only		Date Submitted (to be filled in by Contractor)	Government Reviewer's Use
PAR		FEATURE	DUE AT	REQUIRED DOCUMENTATION	DATE	REV
IDc1.1		Innovation in Design	Final Design	Narrative describing intent, requirement for credit, project approach to the credit. List of drawings and specification references that convey implementation of credit. All other documentation that validates claimed credit.		
IDc1.2		Innovation in Design	Final Design			
IDc1.3		Innovation in Design	Final Design			
IDc1.4		Innovation in Design	Final Design			
IDc2		LEED Accredited Professional	Final Design	Narrative indicating name of LEED AP, company name of LEED AP, description of LEED AP's role and responsibilities in the project.		ARC

ATTACHMENT F
Version 07-07-2010

BUILDING INFORMATION MODELING REQUIREMENTS

1.0 Section 1 - Submittal Format

1.1. Design Deliverables. Develop all designs using Building Information Modeling (BIM) and Computer Aided Design (CAD) software. Design submittal drawings shall be ANSI D size, suitable for half-size scaled reproduction.

2.0 Section 2 – Design Requirements

2.1. BIM Model and Facility Data. Contractor shall use BIM application(s) and software(s) to develop project designs. "Facility Data" is defined as associated intelligent attribute data. The "Model" is defined as 3D graphics that includes Facility Data and output as described in the paragraph 'Output' below. Contractors will use the Model to produce accurate Construction Documents. For each Center of Standardization (CoS) facility type included in this project, all BIM Models and associated Facility Data shall be submitted in Bentley Systems BIM 08.05.02.55 with associated USACE Bentley BIM Workspace (which includes specific standard BIM libraries and definitions). This Workspace can be downloaded from the CAD/BIM Technology Center. [Where available, the workspace will be specific to this CoS Facility Standard Design. The Contractor will be provided a baseline multi-discipline BIM Project Model for the CoS Facility Standard Design type, where such a model exists (for the purposes of site adaptation).] The USACE Bentley BIM Workspace is dependent on specific versions of the Bentley BIM suite of products and only the versions of the software that are listed in the Contractor instructions included with the USACE BIM Workspace are permitted to be used.

2.1.1. Reference. Refer to ERDC TR-06-10, "U.S. Army Corps of Engineers Building Information Modeling Road Map" from the CAD/BIM Technology Center website for more information on the USACE BIM implementation goals.

2.2. Drawings. Deliver CAD files used for the creation of the Construction Documents Drawings per requirements in Section 01 33 16, the criteria of the USACE Norfolk District, and as noted herein. Specification of a CAD file format for these Drawings does not limit which BIM application(s) or software(s) may be used for project development and execution.

2.2.1. IFC Support. The Contractor's selected BIM application(s) and software(s) must support the IFC (Industry Foundation Class - see www.iai-tech.org). Submit any deviations from or additions to the IFC property sets for any new spaces, systems, and equipment for Government approval.

2.2.2. Submittal Requirements. BIM submittals shall be fully interoperable, compatible, and editable with the Bentley BIM tools. Use the specified version of the USACE Bentley BIM Workspace and conform to the requirements of **Sections 3 and 4 below**.

2.2.3. BIM Project Execution Plan.

2.2.3.1. Develop a BIM Project Execution Plan ("Plan" or "PxP") documenting the BIM and analysis technologies selected for the Project Model (integrated with the AEC CAD Standard) from concept development through As-Builts as a design, production, coordination, construction, and documentation tool and the collaborative process by which it shall be executed. See Section 7 for additional guidance on developing the Plan.

2.2.4. BIM Requirements..

2.2.4.1. Facility Data. Develop the Facility Data consisting of a set of intelligent elements for the Model (e.g., doors, air handlers, electrical panels). This Facility Data shall include all material definitions and attributes that are necessary for the Project facility design and construction. Additional data in support of Section 6 Contractor Electives is encouraged.

2.2.4.2. Model Content. The Model and Facility Data shall include, at a minimum, the requirements of Section 4 below.

2.2.4.3. Model Granularity. Models may vary in level of detail for individual elements within a model, but at a minimum must include all features that would be included on a quarter inch (1/4" = 1'0") scaled drawing (e.g. at least 1/16th, 1/8th and 1/4th), or appropriately scaled civil drawings.

2.2.4.4. Output. Submitted CAD drawings (e.g., plans, elevations, sections, schedules, details, etc.) shall be derived (commonly known as extractions, views or sheets) and maintained from the submitted Model and Facility Data.

2.3. Quality Control. Implement quality control (QC) parameters for the Model, including:

2.3.1. Model Standards Checks. QC validation used to ensure that the Project Facility Data set has no undefined, incorrectly defined or duplicated elements. Report non-compliant elements and corrective action plan to correct non-compliant elements. Provide the government with detailed justification and request government approval for any non-compliant element which the contractor proposes to be allowed to remain in the Model.

2.3.2. CAD Standards Checks. QC checking performed to ensure that the fonts, dimensions, line styles, levels and other construction document formatting issues are followed per the A/E/C CADD Standard.

2.3.3. Other Parameters. Develop such other QC parameters as Contractor deems appropriate for the Project and provide to the Government for concurrence.

2.4. Design and Construction Reviews. Perform design and construction reviews at each submittal stage under Section 3 to test the Model, including:

2.4.1. Visual Checks. Checking to ensure the design intent has been followed and that there are no unintended elements in the Model.

2.4.2. Interference Management Checks. Locate conflicting spatial data in the Model where two elements are occupying the same space. Log hard interferences (e.g., mechanical vs. structural or mechanical vs. mechanical overlaps in the same location) and soft interferences, (e.g., conflicts regarding equipment clearance, service access, fireproofing, insulation) in a written report and resolve.

2.4.3. IFC Coordination View. Provide an IFC Coordination View in IFC Express format for all deliverables. Provide exported property set data for all IFC supported named building elements.

2.4.4. Other Parameters. Develop such other Review parameters as the Contractor deems appropriate for the Project and provide to the Government for concurrence..

3.0 Section 3 – Design Stage Submittal Requirements

3.1. General Submittal Requirements.

3.1.1. Provide submittals in compliance with BIM Project Execution Plan deliverables at stages as described hereinafter.

3.1.2. At each Stage in Paragraphs 3.3 through 3.6, provide a Contractor-certified written report confirming that consistency checks as identified in Paragraphs 2.3 and 2.4 have been completed. This report shall be discussed as part of the review process and shall address cross-discipline interferences, if any.

3.1.3. At each Stage in Paragraphs 3.3 through 3.6, provide the Government with:

- The Model, Facility Data, Workspace and CAD Data files in native Bentley BIM/CAD.

- A 3-D interactive review format of the Model in Bentley Navigator, Autodesk Navisworks, Adobe 3D PDF 7.0 (or later), Google Earth KMZ or other format per Plan requirements. The file format for reviews can change between submittals.

- A list of all submitted files. The list should include a description, directory, and file name for each file submitted. For all CAD sheets, include the sheet title and sheet number. Identify files that have been produced from the submitted Model and Facility Data.

3.1.4. The Government will confirm acceptability of all submittals identified in Section 3 in coordination with the USACE Norfolk BIM Manager

3.2. Initial Design Conference Submittal.

3.2.1. Submit a digital copy of the Plan where, in addition to Paragraph 3.1.4, the USACE Geographic District BIM Manager will coordinate with the USACE CoS BIM Manager to confirm acceptability of the Plan or advise as to additional processes or activities necessary to be incorporated.

3.2.2. Within thirty (30) days after the approval of the Plan, conduct a demonstration to review the Plan for clarification, and to verify the functionality of Model technology workflow and processes. If modifications are required, the Contractor shall complete the modifications and resubmit the Plan and perform subsequent demonstration for Government acceptance. There will be no payment for design or construction until the Plan is acceptable to the Government. The Government may also withhold payment for design and construction for unacceptable performance in executing the approved Plan.

3.3. Interim Design Submittals.

3.3.1. BIM and CAD Data. The Model shall include the requirements identified in Paragraph 2.2.4 as applicable to the Interim Design package(s).

3.4. Final Design Submissions and Design Complete Submittals.

3.4.1. BIM and CAD Data. The Model shall include the requirements identified in Paragraph 2.2.4. Acceptance according to Paragraph 3.1.4 is required before commencement of construction, as described in Paragraph 3.7.6 of Section 01 33 16.

3.5. Construction Submittals – Over-The-Shoulder Progress Reviews. Periodic quality control meetings or construction progress review meetings shall include quality control reviews on the implementation and use of the Model, including interference management and design change tracking information.

3.6. Final As-Builts BIM and CAD Data Submittal. Submit the final Model, Facility Data, and CAD files reflecting as-built conditions for Government Approval, as specified in Section 01 78 02.00 10, PROJECT CLOSEOUT.

4.0 Section 4 – BIM Model Minimum Requirements and Output

4.1. General Provisions. The deliverable Model shall be developed to include the systems described below as they would be built and the processes of installing them, and to reflect final as-built conditions. The deliverable model at the interim design stage and at the final design stage (“released for construction”) shall be developed to include as many of the systems described below as are necessary and appropriate at that design stage.

4.2. Architectural/Interior Design. The Architectural systems Model may vary in level of detail for individual elements, but at a minimum must include all features that would be included on a quarter inch (1/4”=1’0”) scaled drawing. Additional minimum Model requirements include:

4.2.1. Spaces. The Model shall include spaces defining accurate net square footage and net volume, and holding data for the room finish schedule for including room names and numbers. Include Programmatic Information provided by the Government or validated program to verify design space against programmed space, using this information to validate area quantities.

4.2.2. Walls and Curtain Walls. Each wall shall be depicted to the exact height, length, width and ratings (thermal, acoustic, fire) to properly reflect wall types. The Model shall include all walls, both interior and exterior, and the necessary intelligence to produce accurate plans, sections and elevations depicting these design elements.

- 4.2.3. Doors, Windows and Louvers. Doors, windows and louvers shall be depicted to represent their actual size, type and location. Doors and windows shall be modeled with the necessary intelligence to produce accurate window and door schedules.
- 4.2.4. Roof. The Model shall include the roof configuration, drainage system, penetrations, specialties, and the necessary intelligence to produce accurate plans, building sections and generic wall sections where roof design elements are depicted.
- 4.2.5. Floors. The floor slab shall be developed in the structural Model and then referenced by the architectural Model for each floor of the Project building.
- 4.2.6. Ceilings. All heights and other dimensions of ceilings, including soffits, ceiling materials, or other special conditions shall be depicted in the Model with the necessary intelligence to produce accurate plans, building sections and generic wall sections where ceiling design elements are depicted.
- 4.2.7. Vertical Circulation. All continuous vertical components (i.e., non-structural shafts, architectural stairs, handrails and guardrails) shall be accurately depicted and shall include the necessary intelligence to produce accurate plans, elevations and sections in which such design elements are referenced.
- 4.2.8. Architectural Specialties and Woodwork. All architectural specialties (i.e., toilet room accessories, toilet partitions, grab bars, lockers, and display cases) and woodwork (i.e., cabinetry and counters) shall be accurately depicted with the necessary intelligence to produce accurate plans, elevations and sections in which such design elements are referenced.
- 4.2.9. Signage. The Model shall include all signage and the necessary intelligence to produce accurate plans and schedules.
- 4.2.10. Schedules. Provide door, window, hardware sets using BHMA designations, flooring, wall finish, and signage schedules from the Model, indicating the type, materials and finishes used in the design.
- 4.3. Furniture. The furniture systems Model may vary in level of detail for individual elements within a Model, but at a minimum must include all features that would be included on a quarter inch (1/4"=1'0") scaled drawing, and have necessary intelligence to produce accurate plans. Representation of furniture elements is to be 2D. Contractor may provide a minimal number of 3D representations as examples. Examples of furniture include, but are not limited to, desks, furniture systems, seating, tables, and office storage.
- 4.3.1. Furniture Coordination. Furniture that makes use of electrical, data or other features shall include the necessary intelligence to produce coordinated documents and data.
- 4.4. Equipment. The Model may vary in level of detail for individual elements within a Model. Equipment shall be depicted to meet layout requirements with the necessary intelligence to produce accurate plans and minimum schedules depicting their configuration. Examples of equipment include but are not limited to copiers, printers, refrigerators, ice machines and microwaves.
- 4.4.1. Schedules. Provide furniture and equipment schedules from the model indicating the materials, finishes, mechanical, and electrical requirements.
- 4.5. Structural. The structural systems Model may vary in level of detail for individual elements, but at a minimum must include all features that would be included on a quarter inch (1/4"=1'0") scaled drawing. Additional minimum Model requirements include:
- 4.5.1. Foundations. All necessary foundation and/or footing elements, with necessary intelligence to produce accurate plans and elevations
- 4.5.2. Floor Slabs. Structural floor slabs shall be depicted, including all necessary recesses, curbs, pads, closure pours, and major penetrations accurately depicted.

- 4.5.3. Structural Steel. All steel columns, primary and secondary framing members, and steel bracing for the roof and floor systems (including decks), including all necessary intelligence to produce accurate structural steel framing plans and related building/wall sections.
- 4.5.4. Cast-in-Place Concrete. All walls, columns, and beams, including necessary intelligence to produce accurate plans and building/wall sections depicting cast-in-place concrete elements.
- 4.5.5. Expansion/Contraction Joints. Joints shall be accurately depicted.
- 4.5.6. Stairs. The structural Model shall include all necessary openings and framing members for stair systems, including necessary intelligence to produce accurate plans and building/wall sections depicting stair design elements.
- 4.5.7. Shafts and Pits. The structural Model shall include all necessary shafts, pits, and openings, including necessary intelligence to produce accurate plans and building/wall sections depicting these design elements.
- 4.6. Mechanical. The mechanical systems Model may vary in level of detail for individual elements, but at a minimum must include all features that would be included on a quarter inch (1/4"=1'0") scaled drawing. Small diameter (less than 1-1/2" NPS) field-routed piping is not required in the model. Additional minimum Model requirements include:
- 4.6.1. HVAC. All necessary heating, ventilating, air-conditioning and specialty equipment, including air distribution ducts for supply, return, and ventilation and exhaust ducts, including control system, registers, diffusers, grills and hydronic baseboards with necessary intelligence to produce accurate plans, elevations, building/wall sections and schedules.
- 4.6.1.1. Mechanical Piping. All necessary piping and fixture layouts, and related equipment, including necessary intelligence to produce accurate plans, elevations, building/wall sections, and schedules.
- 4.6.2. Plumbing. All necessary plumbing piping and fixture layouts, floor and area drains, and related equipment, including necessary intelligence to produce accurate plans, elevations, building/wall sections, riser diagrams, and schedules.
- 4.6.3. Equipment Clearances. All HVAC and Plumbing equipment clearances shall be modeled for use in interference management and maintenance access requirements.
- 4.6.4. Elevator Equipment. The Model shall include the necessary equipment and control system, including necessary intelligence to produce accurate plans, sections and elevations depicting these design elements.
- 4.7. Electrical/Telecommunications. The electrical systems Model may vary in level of detail for individual elements, but at a minimum must include all features that would be included on a quarter inch (1/4"=1'0") scaled drawing. Small diameter (less than 1-1/2"Ø) field-routed conduit is not required in the model. Additional minimum Model requirements include:
- 4.7.1. Interior Electrical Power and Lighting. All necessary interior electrical components (i.e., lighting, receptacles, special and general purpose power receptacles, lighting fixtures, panelboards, cable trays and control systems), including necessary intelligence to produce accurate plans, details and schedules. Lighting and power built into furniture/equipment shall be modeled.
- 4.7.2. Special Electrical Systems. All necessary special electrical components (i.e., security, Mass Notification, Public Address, nurse call and other special occupancies, and control systems), including necessary intelligence to produce accurate plans, details and schedules.
- 4.7.3. Grounding Systems. Grounding Systems. All necessary grounding components (i.e., lightning protection systems, static grounding systems, communications grounding systems, bonding), including necessary intelligence to produce accurate plans, details and schedules.

4.7.4. Communications. All existing and new communications service controls and connections, both above ground and underground with necessary intelligence to produce accurate plans, details and schedules. Cable tray routing shall be modeled without detail of cable contents.

4.7.5. Exterior Building Lighting. All necessary exterior lighting with necessary intelligence to produce accurate plans, elevations and schedules. The exterior building lighting Model shall include all necessary lighting, relevant existing and proposed support utility lines and equipment required with necessary intelligence to produce accurate plans, details and schedules.

4.7.6. Equipment Clearances. The model shall incorporate and define all electrical and communications working spaces, clearances, and required access

4.8. Fire Protection. The fire protection system Model may vary in level of detail for individual elements, but at a minimum must include all features that would be included on a quarter inch (1/4"=1'0") scaled drawing. Additional minimum Model requirements include:

4.8.1. Fire Protection System. All relevant fire protection components (i.e., branch piping, sprinkler heads, fittings, drains, pumps, tanks, sensors, control panels) with necessary intelligence to produce accurate plans, elevations, building/wall sections, riser diagrams, and schedules. All fire protection piping shall be modeled.

4.8.2. Fire Alarms. Fire alarm/mass notification devices and detection system shall be indicated with necessary intelligence to produce accurate plans depicting them.

4.9. Civil. The civil Model may vary in level of detail for individual elements, but at a minimum must include all features that would be included on a one inch (1"=100') scaled drawing. Additional minimum Model requirements include:

4.9.1. Terrain (DTM). All relevant site conditions and proposed grading, including necessary intelligence to produce accurate Project site topographical plans and cross sections.

4.9.2. Drainage. All existing and new drainage piping, including upgrades thereto, including necessary intelligence to produce accurate plans and profiles for the Project site.

4.9.3. Storm Water and Sanitary Sewers. All existing and new sewer structures and piping, including upgrades thereto, on the Project site with necessary connections to mains or other distribution points as appropriate, including necessary intelligence to produce accurate plans and profiles for the Project site.

4.9.4. Utilities. All necessary new utilities connections from the Project building(s) to the existing or newly-created utilities, and all existing above ground and underground utility conduits, including necessary intelligence to produce accurate plans and site-sections.

4.9.5. Roads and Parking. All necessary roadways and parking lots or parking structures, including necessary intelligence to produce accurate plans, profiles and cross-sections.

5.0 Section 5 - Ownership and Rights in Data

5.1. Ownership. The Government has ownership of and rights at the date of Closeout Submittal to all CAD files, BIM Model, and Facility Data developed for the Project in accordance with FAR Part 27, clauses incorporated in Section 00 72 00, Contract Clauses and Special Contract Requirement 1.14 GOVERNMENT RE-USE OF DESIGN (Section 00 73 00). The Government may make use of this data following any deliverable.

6.0 Section 6 – Contractor Electives

6.1. Applicable Criteria. If the Contractor elected to include one or more of the following features as an elective in its accepted contract proposal for additional credit during the source selection, as described in the proposal submission requirements and evaluation criteria, the following criteria are requirements, as applicable to those elective feature(s).

6.2. COBIE Compliance. The Model and Facility Data for the Project shall fulfill Construction Operations Building Information Exchange (COBIE) requirements as defined by the Whole Building Design Guide organization, including all requirements for the indexing and submission of Portable Document Format (PDF) and other appropriate file formats that would otherwise be printed and submitted in compliance with Project operations and maintenance handover requirements.

6.3. Project Scheduling using the Model. In the BIM Execution Plan and during the Preliminary BIM Execution Plan Review, provide an overview of the use of BIM in the development and support of the project construction schedule.

6.3.1. Submittal Requirements. During the Submittal stages, the Contractor shall deliver the construction schedule with information derived from the Model.

6.3.1.1. Construction Submittals – Over-The-Shoulder Progress Reviews. Periodic quality control meetings or construction progress review meetings shall include quality control reviews on the implementation and use of the Model for project scheduling.

6.4. Cost Estimating. In the BIM Execution Plan and during the Preliminary BIM Execution Plan Review, provide an overview of the use of BIM in the development and support of cost estimating requirements, or other applications such as cost analysis and estimate validation.

6.4.1. Submittal Requirements. During the Submittal stages, the Contractor shall deliver cost estimating information derived from the Model.

6.4.2. Project completion. At project completion, the Contractor shall provide an MII (Micro Computer Aided Cost Estimating System Generation II) Cost Estimate which follows the USACE Cost Engineering Military Work Breakdown System (WBS), a modified Unifomat, to at least the sub-systems level and uses quantity information supplied directly from BIM output to the maximum extent possible, though other "Gap" quantity information will be included as necessary for a complete and accurate cost estimate.

6.4.2.1. Sub system level extracted quantities from the BIM for use within the estimate shall be provided according to how detailed line items or tasks should be installed/built so that accurate costs can be developed and/or reflected. Therefore, when developing a BIM, the designer shall be cognizant of what tasks need to be separated appropriately at the beginning stages of model development, such as tasks done on the first floor versus the same task on higher floors that will be more labor intensive and therefore need to have a separate quantity and be priced differently. Tasks and their extracted quantities from the BIM shall be broken down by their location (proximity in the structure) as well as the complexity of its installation.

6.4.2.2. At all design stages it shall be understood that BIM output as described in this document will not generate all quantities that are necessary in order to develop a complete and accurate cost estimate of the project based on the design. An example of this would be plumbing that is less than 1.5" diameter and therefore not expected to be modeled due to granularity; this information is commonly referred to as The Gap. Quantities from The Gap and their associated costs shall be included in the final project actual cost estimates as well.

6.5. Other Analyses and Reports. Structural, energy and efficiency, EPACT 2005 & EISA 2007, lighting design, daylighting, electrical power, psychrometric processing, shading, programming, LEED, fire protection, code compliance, Life Cycle Cost, acoustic, plumbing.

7.0 Section 7 – BIM Project Execution Plan Template

7.1. Contractors will utilize the latest version of the USACE BIM PROJECT EXECUTION PLAN (USACE PxP) Template to develop an acceptable Plan. The template can be downloaded from the CAD/BIM Technology Center website.

ATTACHMENT G**DESIGN SUBMITTAL DIRECTORY AND SUBDIRECTORY FILE ARRANGEMENT**

Organize electronic design submittal files in a subdirectory/file structure in accordance with the following table. The Contractor may suggest a slightly different structure, subject to the discretion of the government.

Design Submittal Directory and Subdirectory File Arrangement.

Directory	Sub-Directory	Sub-Directory or Files	Files
Submittal/Package Name	Narratives	PDF file or files with updated design narrative for each applicable design discipline	
	Drawings	PDF (subdirectory)	Single PDF file with all applicable drawing sheets - bookmarked by sheet number and name
		BIM (subdirectory) See Attachment F.	BIM project folder (with files) per the USACE Workspace. Include an Excel drawing index file with each drawing sheet listed by sheet #, name and corresponding dgn file name (Final Design & Design Complete only)
	Design Analysis & Calculations	Individual PDF files containing design analysis and calculations for each discipline applicable to the submittal	
		PDF file with Fire Protection and Life Safety Code Review checklist	
	LEED	PDF file with updated Leed Check List	
		PDF file or files with LEED Templates for each point with applicable documentation included in each file.	
		LEED SUBMITTALS	
	Energy Analysis	PDF with baseline energy consumption analysis	
		PDF with actual building energy consumption analysis	
	Specifications	Single PDF file with table of contents and all applicable specifications sections.	
		Submittal Register (Final Design & Design Complete submittal only)	
	Design Quality Control	PDF file or files with DQC checklist(s) and/or statements	
	Building Rendering(s)	PDF file of rendering for each building type included in contract (Final Design & Design Complete).	

**SECTION 01 45 01.10
QUALITY CONTROL SYSTEM (QCS)**

1.0 GENERAL

- 1.1. CORRESPONDENCE AND ELECTRONIC COMMUNICATIONS
- 1.2. QCS SOFTWARE
- 1.3. SYSTEM REQUIREMENTS
- 1.4. RELATED INFORMATION
- 1.5. CONTRACT DATABASE
- 1.6. DATABASE MAINTENANCE
- 1.7. IMPLEMENTATION
- 1.8. DATA SUBMISSION VIA COMPUTER DISKETTE OR CD-ROM
- 1.9. MONTHLY COORDINATION MEETING
- 1.10. NOTIFICATION OF NONCOMPLIANCE

1.0 GENERAL

The Government will use the Resident Management System for Windows (RMS) to assist in its monitoring and administration of this contract. The Contractor shall use the Government-furnished Construction Contractor Module of RMS, referred to as QCS, to record, maintain, and submit various information throughout the contract period. The Contractor module, user manuals, updates, and training information can be downloaded from the RMS web site. This joint Government-Contractor use of RMS and QCS will facilitate electronic exchange of information and overall management of the contract. QCS provides the means for the Contractor to input, track, and electronically share information with the Government in the following areas:

- Administration
- Finances
- Quality Control
- Submittal Monitoring
- Scheduling
- Import/Export of Data
- Request for Information
- Accident Reporting
- Safety Exposure Manhours

1.1. CORRESPONDENCE AND ELECTRONIC COMMUNICATIONS

For ease and speed of communications, both Government and Contractor will exchange correspondence and other documents in electronic format. Correspondence, pay requests and other documents comprising the official contract record shall also be provided in paper format, with signatures and dates where necessary. Paper documents will govern, in the event of discrepancy with the electronic version.

1.2. OTHER FACTORS

Particular attention is directed to Contract Clause, "Schedules for Construction Contracts", Contract Clause, "Payments", Section 01 32 01.00 10, PROJECT SCHEDULE, Section 01 33 00, SUBMITTAL PROCEDURES, and Section 01 45 04.00 10, CONTRACTOR QUALITY CONTROL, which have a direct relationship to the reporting to be accomplished through QCS. Also, there is no separate payment for establishing and maintaining the QCS database; all costs associated therewith shall be included in the contract pricing for the work.

1.3. QCS SOFTWARE

QCS is a Windows-based program that can be run on a stand-alone personal computer or on a network. The Government will make available the QCS software to the Contractor after award of the construction contract. Prior to the Pre-Construction Conference, the Contractor shall be responsible to download, install and use the latest version of the QCS software from the Government's RMS Internet Website. Upon specific justification and request by the Contractor, the Government can provide QCS on CD-ROM. Any program updates of QCS will be made available to the Contractor via the Government RMS Website as they become available.

1.4. SYSTEM REQUIREMENTS

The following listed hardware and software is the minimum system configuration that the Contractor shall have to run QCS:

- (a) Hardware
- IBM-compatible PC with 1000 MHz Pentium or higher processor
 - 256 MB RAM for workstation / 512+ MB RAM for server
 - 1 GB hard drive disk space for sole use by the QCS system
 - Compact disk (CD) Reader, 8x speed or higher
 - SVGA or higher resolution monitor (1024 x 768, 256 colors)
 - Mouse or other pointing device
 - Windows compatible printer (Laser printer must have 4+ MB of RAM)
 - Connection to the Internet, minimum 56K BPS

(b) Software

- MS Windows 2000 or higher
- MS Word 2000 or newer
- Latest version of : Netscape Navigator, Microsoft Internet Explorer, or other browser that supports HTML 4.0 or higher
- Electronic mail (E-mail), MAPI compatible
- Virus protection software that is regularly upgraded with all issued manufacturer's updates

1.5. RELATED INFORMATION

1.5.1. QCS USER GUIDE

After contract award, the Contractor shall download instructions for the installation and use of QCS from the Government RMS Internet Website. In case of justifiable difficulties, the Government will provide the Contractor with a CD-ROM containing these instructions.

1.5.2. CONTRACTOR QUALITY CONTROL (CQC) TRAINING

The use of QCS will be discussed with the Contractor's QC System Manager during the mandatory CQC Training class.

1.6. CONTRACT DATABASE

Prior to the pre-construction conference, the Government will provide the Contractor with basic contract award data to use for QCS. The Government will provide data updates to the Contractor as needed, generally by using the government's SFTP repository built into QCS import/export function. These updates will generally consist of submittal reviews, correspondence status, QA comments, and other administrative and QA data.

1.7. DATABASE MAINTENANCE

The Contractor shall establish, maintain, and update data for the contract in the QCS database throughout the duration of the contract. The Contractor shall establish and maintain the QCS database at the Contractor's site office. Data updates to the Government, e.g., daily reports, submittals, RFI's, schedule updates, payment requests, etc. shall be submitted using the government's SFTP repository built into QCS export function. If permitted by the Contracting Officer, email or CD-ROM may be used instead (see Paragraph DATA SUBMISSION VIA CD-ROM). The QCS database typically shall include current data on the following items:

1.7.1. ADMINISTRATION

1.7.1.1. Contractor Information

The database shall contain the Contractor's name, address, telephone numbers, management staff, and other required items. Within 14 calendar days of receipt of QCS software from the Government, the Contractor shall deliver Contractor administrative data in electronic format.

1.7.1.2. Subcontractor Information

The database shall contain the name, trade, address, phone numbers, and other required information for all subcontractors. A subcontractor must be listed separately for each trade to be performed. Each subcontractor/trade shall be assigned a unique Responsibility Code, provided in QCS. Within 14 calendar days of receipt of QCS software from the Government, the Contractor shall deliver subcontractor administrative data in electronic format.

1.7.1.3. Correspondence

All Contractor correspondence to the Government shall be identified with a serial number. Correspondence initiated by the Contractor's site office shall be prefixed with "S". Letters initiated by the Contractor's home (main)

office shall be prefixed with "H". Letters shall be numbered starting from 0001. (e.g., H-0001 or S-0001). The Government's letters to the Contractor will be prefixed with "C".

All Requests For Information (RFI) shall be exchanged using the Built-in RFI generator and tracker in QCS.

1.7.1.4. Equipment

The Contractor's QCS database shall contain a current list of equipment planned for use or being used on the jobsite, including the most recent and planned equipment inspection dates.

1.7.1.5. Management Reporting

QCS includes a number of reports that Contractor management can use to track the status of the project. The value of these reports is reflective of the quality of the data input, and is maintained in the various sections of QCS. Among these reports are: Progress Payment Request worksheet, QA/QC comments, Submittal Register Status, Three-Phase Inspection checklists.

1.7.2. FINANCES

1.7.2.1. Pay Activity Data

The QCS database shall include a list of pay activities that the Contractor shall develop in conjunction with the design and construction schedule. The sum of all pay activities shall be equal to the total contract amount, including modifications. Pay activities shall be grouped by Contract Line Item Number (CLIN), and the sum of the activities shall equal the amount of each CLIN. The total of all CLINs equals the Contract Amount.

1.7.2.2. Payment Requests

All progress payment requests shall be prepared using QCS. The Contractor shall complete the payment request worksheet prompt payment certification, and payment invoice in QCS. The work completed under the contract, measured as percent or as specific quantities, shall be updated at least monthly. After the update, the Contractor shall generate a payment request report using QCS. The Contractor shall submit the payment request, prompt payment certification, and payment invoice with supporting data by using the government's SFTP repository built into QCS export function. If permitted by the Contracting Officer, E-mail or a CD-ROM may be used. A signed paper copy of the approved payment request is also required, which shall govern in the event of discrepancy with the electronic version.

1.7.3. Quality Control (QC)

QCS provides a means to track implementation of the 3-phase QC Control System, prepare daily reports, identify and track deficiencies, document progress of work, and support other contractor QC requirements. The Contractor shall maintain this data on a daily basis. Entered data will automatically output to the QCS generated daily report. The Contractor shall provide the Government a Contractor Quality Control (CQC) Plan within the time required in Section 01 45 04.00 10, CONTRACTOR QUALITY CONTROL. Within seven calendar days of Government acceptance, the Contractor shall submit a QCS update reflecting the information contained in the accepted CQC Plan: schedule, pay activities, features of work, submittal register, QC requirements, and equipment list.

1.7.3.1. Daily Contractor Quality Control (CQC) Reports

QCS includes the means to produce the Daily CQC Report. The Contractor may use other formats to record basic QC data. However, the Daily CQC Report generated by QCS shall be the Contractor's official report. Data from any supplemental reports by the Contractor shall be summarized and consolidated onto the QCS-generated Daily CQC Report. Daily CQC Reports shall be submitted as required by Section 01 45 04.00 10, CONTRACTOR QUALITY CONTROL. Reports shall be submitted electronically to the Government within 24 hours after the date covered by the report. The Contractor shall also provide the Government a signed, printed copy of the daily CQC report.

1.7.3.2. Deficiency Tracking

The Contractor shall use QCS to track deficiencies. Deficiencies identified by the Contractor will be numerically tracked using QC punch list items. The Contractor shall maintain a current log of its QC punch list items in the QCS database. The Government will log the deficiencies it has identified using its QA punch list items. The Government's QA punch list items will be included in its export file to the Contractor. The Contractor shall regularly update the correction status of both QC and QA punch list items.

1.7.3.3. QC Requirements

The Contractor shall develop and maintain a complete list of QC testing and required structural and life safety special inspections required by the International Code Council (ICC), transferred and installed property, and user training requirements in QCS. The Contractor shall update all data on these QC requirements as work progresses, and shall promptly provide this information to the Government via QCS.

1.7.3.4. Three-Phase Control Meetings

The Contractor shall maintain scheduled and actual dates and times of preparatory and initial control meetings in QCS.

1.7.3.5. Labor and Equipment Hours

The Contractor shall log labor and equipment exposure hours on a daily basis. This data will be rolled up into a monthly exposure report.

1.7.3.6. Accident/Safety Tracking Reporting

The Government will issue safety comments, directions, or guidance whenever safety deficiencies are observed. The Government's safety comments will be included in its export file to the Contractor. The Contractor shall regularly update the correction status of the safety comments. In addition, the Contractor shall utilize QCS to advise the Government of any accidents occurring on the jobsite. This supplemental entry is not to be considered as a substitute for completion of mandatory notification and reports, e.g., ENG Form 3394 and OSHA Form 300.

1.7.3.7. Features of Work

The Contractor shall include a complete list of the features of work in the QCS database. A feature of work may be associated with multiple pay activities. However, each pay activity (see subparagraph "Pay Activity Data" of paragraph "Finances") will only be linked to a single feature of work.

1.7.3.8. Hazard Analysis

The Contractor shall use QCS to develop a hazard analysis for each feature of work included in its CQC Plan. The hazard analysis shall address any hazards, or potential hazards, that may be associated with the work

1.7.4. Submittal Management

The Government will provide the submittal register form, ENG Form 4288, SUBMITTAL REGISTER, in electronic format. The Contractor and Designer of Record (DOR) shall develop and maintain a complete list of all submittals, including completion of all data columns and shall manage all submittals. Dates on which submittals are received and returned by the Government will be included in its export file to the Contractor. The Contractor shall use QCS to track and transmit all submittals. ENG Form 4025, submittal transmittal form, and the submittal register update, ENG Form 4288, shall be produced using QCS. QCS and RMS will be used to update, store and exchange submittal registers and transmittals, but will not be used for storage of actual submittals.

1.7.5. Schedule

The Contractor shall develop a design and construction schedule consisting of pay activities, in accordance with Section 01 32 01.00 10, PROJECT SCHEDULE, as applicable. This schedule shall be input and maintained in the QCS database either manually or by using the Standard Data Exchange Format (SDEF) (see Section 01 32 01.00 10 PROJECT SCHEDULE). The updated schedule data shall be included with each pay request submitted by the Contractor.

1.7.5.1. Import/Export of Data

QCS includes the ability to export Contractor data to the Government and to import submittal register and other Government-provided data from RMS, and schedule data using SDEF.

1.8. IMPLEMENTATION

Contractor use of QCS as described in the preceding paragraphs is mandatory. The Contractor shall ensure that sufficient resources are available to maintain its QCS database, and to provide the Government with regular database updates. QCS shall be an integral part of the Contractor's management of quality control.

1.9. DATA SUBMISSION VIA COMPUTER DISKETTE OR CD-ROM

The Government-preferred method for Contractor's submission of QCS data is by using the government's SFTP repository built into QCS export function.. Other data should be submitted using E-mail with file attachment(s). For locations where this is not feasible, the Contracting Officer may permit use of CD-ROM for data transfer. Data on CDs shall be exported using the QCS built-in export function. If used, CD-ROMs will be submitted in accordance with the following:

1.9.1. File Medium

The Contractor shall submit required data on CD-ROMs. They shall conform to industry standards used in the United States. All data shall be provided in English.

1.9.2. Disk Or Cd-Rom Labels

The Contractor shall affix a permanent exterior label to each diskette and CD-ROM submitted. The label shall indicate in English, the QCS file name, full contract number, contract name, project location, data date, name and telephone number of person responsible for the data.

1.9.3. File Names

The files will be automatically named by the QCS software. The naming convention established by the QCS software shall not be altered in any way by the Contractor.

1.10. MONTHLY COORDINATION MEETING

The Contractor shall update the QCS database each workday. At least monthly, the Contractor shall generate and submit an export file to the Government with schedule update and progress payment request. As required in Contract Clause "Payments", at least one week prior to submittal, the Contractor shall meet with the Government representative to review the planned progress payment data submission for errors and omissions.

The Contractor shall make all required corrections prior to Government acceptance of the export file and progress payment request. Payment requests accompanied by incomplete or incorrect data submittals will be returned. The Government will not process progress payments until an acceptable QCS export file is received.

1.11. NOTIFICATION OF NONCOMPLIANCE

The Contracting Officer will notify the Contractor of any detected noncompliance with the requirements of this specification. The Contractor shall take immediate corrective action after receipt of such notice. Such notice, when delivered to the Contractor at the work site, shall be deemed sufficient for the purpose of notification.

End of Section 01 45 01.10

**SECTION 01 45 04.00 10
CONTRACTOR QUALITY CONTROL**

1.0 GENERAL

1.1. REFERENCES

1.2. PAYMENT

2.0 PRODUCTS (NOT APPLICABLE)

3.0 EXECUTION

3.1. GENERAL REQUIREMENTS

3.2. QUALITY CONTROL PLAN

3.3. COORDINATION MEETING

3.4. QUALITY CONTROL ORGANIZATION

3.5. SUBMITTALS AND DELIVERABLES

3.6. CONTROL

3.7. TESTS

3.8. COMPLETION INSPECTION

3.9. DOCUMENTATION

3.10. NOTIFICATION OF NONCOMPLIANCE

1.0 GENERAL

1.1. REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only. Refer to the latest edition, as of the date of the contract solicitation.

- ASTM INTERNATIONAL (ASTM)
- ASTM D 3740 Minimum Requirements for Agencies
Engaged in the Testing and/or Inspection
of Soil and Rock as Used in Engineering
Design and Construction
- ASTM E 329 Agencies Engaged in the Testing
and/or Inspection of Materials Used in
Construction
- U.S. ARMY CORPS OF ENGINEERS (USACE)
ER 1110-1-12 Quality Management

1.2. PAYMENT

There will be no separate payment for providing and maintaining an effective Quality Control program. Include all costs associated therewith in the applicable unit prices or lump-sum prices contained in the Contract Line Item Schedule.

2.0 PRODUCTS (Not Applicable)

3.0 EXECUTION

3.1. GENERAL REQUIREMENTS

The Contractor is responsible for quality control and shall establish and maintain an effective quality control system in compliance with the Contract Clause titled "Inspection of Construction." The quality control system shall consist of plans, procedures, and organization necessary to produce an end product, which complies with the contract requirements. The system shall cover all design and construction operations, both onsite and offsite, and shall be keyed to the proposed design and construction sequence. The site project superintendent is responsible for the quality of work on the job and is subject to removal by the Contracting Officer for non-compliance with the quality requirements specified in the contract. The site project superintendent in this context shall be the highest level manager responsible for the overall construction activities at the site, including quality and production. The site project superintendent shall maintain a physical presence at the site at all times, except as otherwise acceptable to the Contracting Officer, and shall be responsible for all construction and construction related activities at the site.

3.2. QUALITY CONTROL PLAN

Furnish for Government review, not later than 30 days after receipt of notice to proceed, the Contractor Quality Control (CQC) Plan proposed to implement the requirements of the Contract Clause titled "Inspection of Construction." The plan shall identify personnel, procedures, control, instructions, tests, records, and forms to be used. The Government will consider an interim plan for the first 30 days of operation. Design and construction may begin only after acceptance of the CQC Plan or acceptance of an interim plan applicable to the particular feature of work to be started. The Government will not permit work outside of the features of work included in an accepted interim plan to begin until acceptance of a CQC Plan or another interim plan containing the additional features of work to be started. Where the applicable Code issued by the International Code Council calls for an inspection by the Building Official, the Contractor shall include the inspections in the Quality Control Plan and shall perform the inspections. The Designer of Record shall develop a program for any special inspections required by the applicable International Codes and the Contractor shall perform these inspections, using qualified inspectors. Include the special inspection plan in the QC Plan.

3.2.1. Content of the CQC Plan

The CQC Plan shall include, as a minimum, the following to cover all design and construction operations, both onsite and offsite, including work by subcontractors, fabricators, suppliers, and purchasing agents subcontractors, designers of record, consultants, architect/engineers (AE), fabricators, suppliers, and purchasing agents:

3.2.1.1. A description of the quality control organization. Include a chart showing lines of authority and an acknowledgment that the CQC staff shall implement the three phase control system for all aspects of the work specified. A CQC System Manager shall report to the project superintendent or someone higher in the contractor's organization.

3.2.1.2. The name, qualifications (in resume format), duties, responsibilities, and authorities of each person assigned a CQC function. Also include those responsible for performing and documenting the inspections required by the International Codes and the special inspection program developed by the designer of record.

3.2.1.3. A copy of the letter to the CQC System Manager, signed by an authorized official of the firm, which describes the responsibilities and delegates sufficient authorities to adequately perform the functions of the CQC System Manager, including authority to stop work which is not in compliance with the contract. The CQC System Manager shall issue letters of direction to all other various quality control representatives outlining duties, authorities, and responsibilities. Furnish copies of these letters.

3.2.1.4. Procedures for scheduling, reviewing, certifying, and managing submittals, including those of subcontractors, offsite fabricators, suppliers, and purchasing agents subcontractors, designers of record, consultants, architect engineers (AE), offsite fabricators, suppliers, and purchasing agents. These procedures shall be in accordance with Section 01 33 00 SUBMITTAL PROCEDURES.

3.2.1.5. Control, verification, and acceptance testing procedures for each specific test to include the test name, specification paragraph requiring test, feature of work to be tested, test frequency, and person responsible for each test. Use only Government approved Laboratory facilities.

3.2.1.6. Procedures for tracking preparatory, initial, and follow-up control phases and control, verification, and acceptance tests including documentation.

3.2.1.7. Procedures for tracking design and construction deficiencies from identification through acceptable corrective action. These procedures shall establish verification that identified deficiencies have been corrected.

3.2.1.8. Reporting procedures, including proposed reporting formats.

3.2.1.9. A list of the definable features of work. A definable feature of work is a task, which is separate and distinct from other tasks, has separate control requirements, and may be identified by different trades or disciplines, or it may be work by the same trade in a different environment. Although each section of the specifications may generally be considered as a definable feature of work, there are frequently more than one definable feature under a particular section. This list will be agreed upon during the coordination meeting.

3.2.1.10. A list of all inspections required by the International Codes and the special inspection program required by the code and this contract.

3.2.2. Additional Requirements for Design Quality Control (DQC) Plan

The following additional requirements apply to the Design Quality Control (DQC) plan:

3.2.2.1. The Contractor's QCP Plan shall provide and maintain a Design Quality Control (DQC) Plan as an effective quality control program which will assure that all services required by this design-build contract are performed and provided in a manner that meets professional architectural and engineering quality standards. As a minimum, competent, independent reviewers identified in the DQC Plan shall review all documents. Use personnel who were not involved in the design effort to produce the design to perform the independent technical review (ITR). The ITR is intended as a quality control check of the design. Include, at least, but not necessarily limited to, a review of the contract requirements (the accepted contract or task order proposal and amended RFP), the basis of design, design calculations, the design configuration management documentation and check the design documents for

errors, omissions, and for coordination and design integration. The ITR team is not required to examine, compare or comment concerning alternate design solutions but should concentrate on ensuring that the design meets the contract requirements. Correct errors and deficiencies in the design documents prior to submitting them to the Government.

3.2.2.2. Include in the DQC Plan the discipline-specific checklists to be used during the design and quality control of each submittal. Submit these completed checklists at each design phase as part of the project documentation.

3.2.2.3. A Design Quality Control Manager, who has the responsibility of being cognizant of and assuring that all documents on the project have been coordinated, shall implement the DQC Plan. This individual shall be a person who has verifiable engineering or architectural design experience and is a registered professional engineer or architect. Notify the Government, in writing, of the name of the individual, and the name of an alternate person assigned to the position.

3.2.3. Acceptance of Plan

Government acceptance of the Contractor's plan is required prior to the start of design and construction. Acceptance is conditional and will be predicated on satisfactory performance during the design and construction. The Government reserves the right to require the Contractor to make changes in his CQC Plan and operations including removal of personnel, as necessary, to obtain the quality specified.

3.2.4. Notification of Changes

After acceptance of the CQC Plan, notify the Government in writing of any proposed change. Proposed changes are subject to Government acceptance.

3.3. COORDINATION MEETING

After the Postaward Conference, before start of design or construction, and prior to acceptance by the Government of the CQC Plan, the Contractor and the Government shall meet and discuss the Contractor's quality control system. Submit the CQC Plan for review a minimum of 7 calendar days prior to the Coordination Meeting. During the meeting, a mutual understanding of the system details shall be developed, including the forms for recording the CQC operations, design activities, control activities, testing, administration of the system for both onsite and offsite work, and the interrelationship of Contractor's Management and control with the Government's Quality Assurance. The Government will prepare minutes of the meeting for signature by both parties. . The minutes shall become a part of the contract file. There may be occasions when either party will call for subsequent conferences to reconfirm mutual understandings and/or address deficiencies in the CQC system or procedures which may require corrective action by the Contractor.

3.4. QUALITY CONTROL ORGANIZATION

3.4.1. Personnel Requirements

The requirements for the CQC organization are a CQC System Manager, a Design Quality Manager, and sufficient number of additional qualified personnel to ensure contract compliance. The CQC organization shall also include personnel identified in the technical provisions as requiring specialized skills to assure the required work is being performed properly. The Contractor's CQC staff shall maintain a presence at the site at all times during progress of the work and have complete authority and responsibility to take any action necessary to ensure contract compliance. The CQC staff shall be subject to acceptance by the Contracting Officer. Provide adequate office space, filing systems and other resources as necessary to maintain an effective and fully functional CQC organization. Promptly furnish complete records of all letters, material submittals, shop drawing submittals, schedules and all other project documentation to the CQC organization. The CQC organization shall be responsible to maintain these documents and records at the site at all times, except as otherwise acceptable to the Contracting Officer.

3.4.2. CQC System Manager

Identify as CQC System Manager an individual within the onsite work organization who shall be responsible for overall management of CQC and have the authority to act in all CQC matters for the Contractor. The CQC System

Manager shall be a graduate engineer, graduate architect, or a BA/BS graduate of an ACCE accredited construction management college program. The CQC system Manager may alternately be an engineering technician with at least 2 years of college and an ICC certification as a Commercial Building Inspector (Residential Building Inspector certification will be required for Military Family Housing projects). In addition, the CQC system manager shall have a minimum of 5 years construction experience on construction similar to this contract. The CQC System Manager shall be on the site at all times during construction and shall be employed by the prime Contractor. Assign the CQC System Manager no other duties (except may also serve as Safety and Health Officer, if qualified and if allowed by Section 00 73 00). Identify an alternate for the CQC System Manager in the plan to serve in the event of the System Manager's absence. The requirements for the alternate shall be the same as for the designated CQC System Manager but the alternate may have other duties in addition to serving in a temporary capacity as the acting QC manager.

3.4.3. CQC Personnel

3.4.3.1. In addition to CQC personnel specified elsewhere in the contract provide specialized CQC personnel to assist the CQC System Manager in accordance with paragraph titled Area Qualifications.

3.4.3.2. These individuals may be employees of the prime or subcontractor; be responsible to the CQC System Manager; **are not intended to be full time, but must be physically present at the construction site during work on their areas of responsibility**; have the necessary education and/or experience in accordance with the experience matrix listed herein. These individuals may perform other duties but must be allowed sufficient time to perform their assigned quality control duties as described in the Quality Control Plan. **One person may cover more than one area, provided that they are qualified to perform QC activities for the designated areas below and provided that they have adequate time to perform their duties:**

3.4.4. Experience Matrix

3.4.4.1. Area Qualifications

3.4.4.1.1. Civil - Graduate Civil Engineer or (BA/BS) graduate in construction management with 4 years experience in the type of work being performed on this project or engineering technician with 5 yrs related experience.

3.4.4.1.2. Mechanical - Graduate Mechanical Engineer or (BA/BS) graduate in construction management with 4 yrs related experience or engineering technician with an ICC certification as a Commercial Mechanical Inspector with 5 yrs related experience.

3.4.4.1.3. Electrical - Graduate Electrical Engineer or (BA/BS) graduate in construction management with 4 yrs related experience or engineering technician with an ICC certification as a Commercial Electrical Inspector with 5 yrs related experience.

3.4.4.1.4. Structural - Graduate Structural Engineer or (BA/BS) graduate in construction management with 4 yrs related experience or person with an ICC certification as a Reinforced Concrete Special Inspector and Structural Steel and Bolting Special Inspector (as applicable to the type of construction involved) with 5 yrs related experience.

3.4.4.1.5. Plumbing - Graduate Mechanical Engineer or (BA/BS) graduate in construction management with 4 yrs related experience, or person with an ICC certification as a Commercial Plumbing Inspector with 5 yrs related experience.

3.4.4.1.6. Concrete, Pavements and Soils Materials Technician (present while performing tests) with 2 yrs experience for the appropriate area

3.4.4.1.7. Testing, Adjusting and Balancing Specialist must be a member (TAB) Personnel of AABC or an experienced technician of the firm certified by the NEBB (present while testing, adjusting, balancing).

3.4.4.1.8. Design Quality Control Manager Registered Architect or Professional Engineer (not required on the construction site)

3.4.4.1.9. Registered Fire Protection Engineer with 4 years related experience or engineering technician with 5 yrs related experience (but see requirements for Fire Protection Engineer of Record to witness final testing in Section 01 10 00, paragraph 5.10, Fire Protection).

3.4.4.1.10. QC personnel assigned to the installation of the telecommunication system or any of its components shall be Building Industry Consulting Services International (BICSI) Registered Cabling Installers, Technician Level. Submit documentation of current BICSI certification. In lieu of BICSI certification, QC personnel shall have a minimum of 5 years experience in the installation of the specified copper and fiber optic cable and components. They shall have factory or factory approved certification from each equipment manufacturer indicating that they are qualified to install and test the provided products. QC personnel shall witness and certify the testing of telecommunications cabling and equipment.

3.4.5. Additional Requirement

In addition to the above experience and/or education requirements the CQC System Manager shall have completed the course entitled "Construction Quality Management for Contractors". This course is periodically offered at [Not Supplied - ConstructionReqQC : COURSE_LOCATION]. Inquire of the District or Division sponsoring the course for fees and other expenses involved, if any, for attendance at this course.

3.4.6. Organizational Changes

When it is necessary to make changes to the CQC staff, the Contractor shall revise the CQC Plan to reflect the changes and submit the changes to the Contracting Officer for acceptance.

3.5. SUBMITTALS AND DELIVERABLES

Make submittals as specified in Section 01 33 00 **SUBMITTAL PROCEDURES**. The CQC organization shall certify that all submittals and deliverables are in compliance with the contract requirements.

3.6. CONTROL

Contractor Quality Control is the means by which the Contractor ensures that the construction, to include that of subcontractors and suppliers, complies with the requirements of the contract. The CQC organization shall conduct at least three phases of control for each definable feature of the construction work as follows:

3.6.1. Preparatory Phase

Perform this phase prior to beginning work on each definable feature of work, after all required plans/documents/materials are approved/accepted, and after copies are at the work site. This phase shall include:

3.6.1.1. A review of each paragraph of applicable specifications, reference codes, and standards. Make a copy of those sections of referenced codes and standards applicable to that portion of the work to be accomplished in the field at the preparatory inspection. Maintain these copies in the field, available for use by Government personnel until final acceptance of the work.

3.6.1.2. A review of the contract drawings.

3.6.1.3. A check to assure that all materials and/or equipment have been tested, submitted, and approved.

3.6.1.4. Review of provisions that have been made to provide required control inspection and testing.

3.6.1.5. Examination of the work area to assure that all required preliminary work has been completed and is in compliance with the contract.

3.6.1.6. A physical examination of required materials, equipment, and sample work to assure that they are on hand, conform to approved shop drawings or submitted data, and are properly stored.

3.6.1.7. A review of the appropriate activity hazard analysis to assure safety requirements are met.

3.6.1.8. Discussion of procedures for controlling quality of the work including repetitive deficiencies. Document construction tolerances and workmanship standards for that feature of work.

3.6.1.9. A check to ensure that the portion of the plan for the work to be performed has been accepted by the Contracting Officer.

3.6.1.10. Discussion of the initial control phase.

3.6.1.11. Notify the Government at least 24 hours in advance of beginning the preparatory control phase. This phase shall include a meeting conducted by the CQC System Manager and attended by the superintendent, other CQC personnel (as applicable), and the foreman responsible for the definable feature. Document the results of the preparatory phase actions by separate minutes prepared by the CQC System Manager and attached to the daily CQC report. The Contractor shall instruct applicable workers as to the acceptable level of workmanship required in order to meet contract specifications.

3.6.2. Initial Phase

Accomplish this phase at the beginning of a definable feature of work. Include the following actions:

3.6.2.1. Check work to ensure that it is in full compliance with contract requirements. Review minutes of the preparatory meeting.

3.6.2.2. Verify adequacy of controls to ensure full contract compliance. Verify required control inspection and testing.

3.6.2.3. Establish level of workmanship and verify that it meets minimum acceptable workmanship standards. Compare with required sample panels as appropriate.

3.6.2.4. Resolve all differences.

3.6.2.5. Check safety to include compliance with and upgrading of the Accident Prevention plan and activity hazard analysis. Review the activity analysis with each worker.

3.6.2.6. Notify the Government at least 24 hours in advance of beginning the initial phase. The CQC System Manager shall prepare and attach to the daily CQC report separate minutes of this phase. Indicate exact location of initial phase for future reference and comparison with follow-up phases.

3.6.2.7. Repeat the initial phase any time acceptable specified quality standards are not being met.

3.6.3. Follow-up Phase

Perform daily checks to assure control activities, including control testing, are providing continued compliance with contract requirements, until completion of the particular feature of work. The checks shall be made a matter of record in the CQC documentation. Conduct final follow-up checks and correct deficiencies prior to the start of additional features of work which may be affected by the deficient work. Do not build upon nor conceal non-conforming work.

3.6.4. Additional Preparatory and Initial Phases

Conduct additional preparatory and initial phases on the same definable features of work if: the quality of on-going work is unacceptable; if there are changes in the applicable CQC staff, onsite production supervision or work crew; if work on a definable feature is resumed after a substantial period of inactivity; or if other problems develop.

3.7. TESTS

3.7.1. Testing Procedure

Perform specified or required tests to verify that control measures are adequate to provide a product which conforms to contract requirements and project design documents. Upon request, furnish to the Government

duplicate samples of test specimens for possible testing by the Government. Testing includes operation and/or acceptance tests when specified. The Contractor shall procure the services of a Corps of Engineers approved testing laboratory, or establish an approved testing laboratory at the project site. The Contractor may elect to use a laboratory certified and accredited by the Concrete and cement Reference Laboratory (CCRL) or by AASHTO Materials Reference Laboratory (AMRL) for testing procedures that those organizations certify. The Contractor shall perform the following activities and record and provide the following data:

3.7.1.1. Verify that testing procedures comply with contract requirements and project design documents.

3.7.1.2. Verify that facilities and testing equipment are available and comply with testing standards.

3.7.1.3. Check test instrument calibration data against certified standards.

3.7.1.4. Verify that recording forms and test identification control number system, including all of the test documentation requirements, have been prepared.

3.7.1.5. Include results of all tests taken, both passing and failing tests, recorded on the CQC report for the date taken. Include specification paragraph reference, location where tests were taken, and the sequential control number identifying the test. If approved by the Contracting Officer, actual test reports may be submitted later with a reference to the test number and date taken. Provide an information copy of tests performed by an offsite or commercial test facility directly to the Contracting Officer. Failure to submit timely test reports as stated may result in nonpayment for related work performed and disapproval of the test facility for this contract.

3.7.2. Testing Laboratories

3.7.2.1. Capability Check

The Government reserves the right to check laboratory equipment in the proposed laboratory for compliance with the standards set forth in the contract specifications and to check the laboratory technician's testing procedures and techniques. Laboratories utilized for testing soils, concrete, asphalt, and steel shall meet criteria detailed in ASTM D 3740 and ASTM E 329.

3.7.2.2. Capability Recheck

If the selected laboratory fails the capability check, the Government will assess the Contractor a charge of \$1,375 to reimburse the Government for each succeeding recheck of the laboratory or the checking of a subsequently selected laboratory. Such costs will be deducted from the contract amount due the Contractor.

3.7.3. Onsite Laboratory

The Government reserves the right to utilize the Contractor's control testing laboratory and equipment to make assurance tests, and to check the Contractor's testing procedures, techniques, and test results at no additional cost to the Government.

3.7.4. Furnishing or Transportation of Samples for Government Quality Assurance Testing

The Contractor is responsible for costs incidental to the transportation of samples or materials. Deliver samples of materials for test verification and acceptance testing by the Government to the Corps of Engineers Laboratory, f.o.b., at the following address:

- For delivery by mail:
[Not Supplied - ConstructionReqQC : LAB_NAME]
.
.
.
- For other deliveries:
[Not Supplied - ConstructionReqQC : LAB_NAME_OTHER]

The area or resident office will coordinate, exact delivery location, and dates for each specific test.

3.8. COMPLETION INSPECTION

3.8.1. Punch-Out Inspection

Near the end of the work, or any increment of the work established by a time stated in the SPECIAL CONTRACT REQUIREMENTS Clause, "Commencement, Prosecution, and Completion of Work", or by the specifications, the CQC Manager shall conduct an inspection of the work. Prepare a punch list of items which do not conform to the approved drawings and specifications and include in the CQC documentation, as required by paragraph DOCUMENTATION. The list of deficiencies shall include the estimated date by which the deficiencies will be corrected. The CQC System Manager or staff shall make a second inspection to ascertain that all deficiencies have been corrected. Once this is accomplished, the Contractor shall notify the Government that the facility is ready for the Government Pre-Final inspection.

3.8.2. Pre-Final Inspection

As soon as practicable after the notification above, the Government will perform the pre-final inspection to verify that the facility is complete and ready to be occupied. A Government Pre-Final Punch List may be developed as a result of this inspection. The Contractor's CQC System Manager shall ensure that all items on this list have been corrected before notifying the Government, so that a Final inspection with the customer can be scheduled. Correct any items noted on the Pre-Final inspection in a timely manner. Accomplish these inspections and any deficiency corrections required by this paragraph within the time slated for completion of the entire work or any particular increment of the work if the project is divided into increments by separate completion dates.

3.8.3. Final Acceptance Inspection

The Contractor's Quality Control Inspection personnel, plus the superintendent or other primary management person, and the Contracting Officer's Representative shall attend the final acceptance inspection. Additional Government personnel including, but not limited to, those from Base/Post Civil Facility Engineer user groups and major commands may also attend. The Government will formally schedule the final acceptance inspection based upon results of the Pre-Final inspection. Provide notice to the Government at least 14 days prior to the final acceptance inspection and include the Contractor's assurance that all specific items previously identified to the Contractor as being unacceptable, along with all remaining work performed under the contract, will be complete and acceptable by the date scheduled for the final acceptance inspection. Failure of the Contractor to have all contract work acceptably complete for this inspection will be cause for the Contracting Officer to bill the Contractor for the Government's additional inspection cost in accordance with the contract clause titled "Inspection of Construction".

3.9. DOCUMENTATION

3.9.1. Maintain current records providing factual evidence that required quality control activities and/or tests have been performed. These records shall include the work of subcontractors and suppliers using government-provided software, QCS (see Section 01 45 01.10). The report includes, as a minimum, the following information:

3.9.1.1. Contractor/subcontractor and their area of responsibility.

3.9.1.2. Operating plant/equipment with hours worked, idle, or down for repair.

3.9.1.3. Work performed each day, giving location, description, and by whom. When Network Analysis (NAS) is used, identify each phase of work performed each day by NAS activity number.

- 3.9.1.4. Test and/or control activities performed with results and references to specifications/drawings requirements. Identify the applicable control phase (Preparatory, Initial, Follow-up). List deficiencies noted, along with corrective action.
- 3.9.1.5. Quantity of materials received at the site with statement as to acceptability, storage, and reference to specifications/drawings requirements.
- 3.9.1.6. Submittals and deliverables reviewed, with contract reference, by whom, and action taken.
- 3.9.1.7. Offsite surveillance activities, including actions taken.
- 3.9.1.8. Job safety evaluations stating what was checked, results, and instructions or corrective actions.
- 3.9.1.9. Instructions given/received and conflicts in plans and/or specifications.
- 3.9.1.10. Provide documentation of design quality control activities. For independent design reviews, provide, as a minimum, identity of the ITR team, the ITR review comments, responses and the record of resolution of the comments.
- 3.9.2. Contractor's verification statement.

These records shall indicate a description of trades working on the project; the number of personnel working; weather conditions encountered; and any delays encountered. These records shall cover both conforming and deficient features and shall include a statement that equipment and materials incorporated in the work and workmanship comply with the contract. Furnish the original and one copy of these records in report form to the Government daily within 24 hours after the date covered by the report, except that reports need not be submitted for days on which no work is performed. As a minimum, submit one report for every 7 days of no work and on the last day of a no work period. Account for all calendar days throughout the life of the contract. The first report following a day of no work shall be for that day only. The CQC System Manager shall sign and date reports. The report shall include copies of test reports and copies of reports prepared by all subordinate quality control personnel. The Contractor may submit these forms electronically, in lieu of hard copy.

3.10. NOTIFICATION OF NONCOMPLIANCE

The Contracting Officer will notify the Contractor of any detected noncompliance with the foregoing requirements. The Contractor shall take immediate corrective action after receipt of such notice. Such notice, when delivered to the Contractor at the work site, shall be deemed sufficient for the purpose of notification. If the Contractor fails or refuses to comply promptly, the Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No part of the time lost due to such stop orders shall be made the subject of claim for extension of time or for excess costs or damages by the Contractor.

End of Section 01 45 04.00 10

**SECTION 01 50 02
TEMPORARY CONSTRUCTION FACILITIES**

1.0 OVERVIEW

1.1. GENERAL REQUIREMENTS

1.2. AVAILABILITY AND USE OF UTILITY SERVICES

1.3. BULLETIN BOARD, PROJECT SIGN, AND PROJECT SAFETY SIGN

1.4. PROTECTION AND MAINTENANCE OF TRAFFIC

1.5. MAINTENANCE OF CONSTRUCTION SITE

1.0 OVERVIEW

1.1. GENERAL REQUIREMENTS

1.1.1. Site Plan

Prepare a site plan indicating the proposed location and dimensions of any area to be fenced and used by the Contractor, the number of trailers to be used, avenues of ingress/egress to the fenced area and details of the fence installation. Identify any areas which may have to be graveled to prevent the tracking of mud. Also indicate if the use of a supplemental or other staging area is desired.

1.2. AVAILABILITY AND USE OF UTILITY SERVICES

1.2.1. See Section 00 72 00, Contract Clauses and Section 00 73 00, Special Contract Requirements, for Utility Availability requirements.

1.2.2. Sanitation

Provide and maintain within the construction area minimum field-type sanitary facilities approved by the Contracting Officer. Government toilet facilities will not be available to Contractor's personnel.

1.2.3. Telephone

Make arrangements and pay all costs for desired telephone facilities.

1.3. BULLETIN BOARD, PROJECT SIGN, AND PROJECT SAFETY SIGN

1.3.1. Bulletin Board

Immediately upon beginning of onsite work, provide a weatherproof glass-covered bulletin board not less than 36 by 48 inches in size for displaying the Equal Employment Opportunity poster, a copy of the wage decision contained in the contract, Wage Rate Information poster, and other information approved by the Contracting Officer. Locate the bulletin board at the project site in a conspicuous place easily accessible to all employees, as approved by the Contracting Officer. Display legible copies of the aforementioned data until work is completed. Remove the bulletin board from the site upon completion of the project.

1.3.2. Project and Safety Signs

Erect a project sign and a site safety sign with informational details as provided by the Government at the Post award conference, within 15 days prior to any work activity on project site. Update the safety sign data daily, with light colored metallic or non-metallic numerals. Remove the signs from the site upon completion of the project. Engineer Pamphlet EP 310-1-6a contains the standardized layout and construction details for the signs. It can be found through a GOOGLE Search or try <http://www.usace.army.mil/publications/eng-pamphlets/ep310-1-6a/s-16.pdf>.

1.4. PROTECTION AND MAINTENANCE OF TRAFFIC

Provide access and temporary relocated roads as necessary to maintain traffic. Maintain and protect traffic on all affected roads during the construction period except as otherwise specifically directed by the Contracting Officer. Take measures for the protection and diversion of traffic, including the provision of watchmen and flagmen, erection of barricades, placing of lights around and in front of equipment and the work, and the erection and maintenance of adequate warning, danger, and direction signs, as required by the State and local authorities having jurisdiction. Protect the traveling public from damage to person and property.

The Contractor's traffic on roads selected for hauling material to and from the site shall interfere as little as possible with public traffic. Investigate the adequacy of existing roads and the allowable load limit on these roads. Repair any damage to roads caused by construction operations.

1.4.1. Haul Roads

The Contractor shall, at its own expense, construct access and haul roads necessary for proper prosecution of the work under this contract. Construct haul roads with suitable grades and widths. Avoid sharp curves, blind corners, and dangerous cross traffic. Provide necessary lighting, signs, barricades, and distinctive markings for the safe movement of traffic. The method of dust control, although optional, shall be adequate to ensure safe operation at all times. Location, grade, width, and alignment of construction and hauling roads shall be subject to approval by the Contracting Officer. Provide adequate lighting to assure full and clear visibility for full width of haul road and work areas during any night work operations. Remove haul roads designated by the Contracting Officer upon completion of the work and restore those areas.

1.4.2. Barricades

Erect and maintain temporary barricades to limit public access to hazardous areas. Barricades shall be required whenever safe public access to paved areas such as roads, parking areas or sidewalks is prevented by construction activities or as otherwise necessary to ensure the safety of both pedestrian and vehicular traffic. Securely place barricades clearly visible with adequate illumination to provide sufficient visual warning of the hazard during both day and night.

1.5. MAINTENANCE OF CONSTRUCTION SITE

Mow grass and vegetation located within the boundaries of the construction site for the duration of the project, from NTP to contract completion. Edge or neatly trim grass and vegetation along fences, buildings, under trailers, and in areas not accessible to mowers from NTP to contract completion.

End of Section 01 50 02

**SECTION 01 57 20.00 10
ENVIRONMENTAL PROTECTION**

1.0 GENERAL REQUIREMENTS

- 1.1. SUBCONTRACTORS
- 1.2. ENVIRONMENTAL PROTECTION PLAN
- 1.3. PROTECTION FEATURES
- 1.4. ENVIRONMENTAL ASSESSMENT OF CONTRACT DEVIATIONS
- 1.5. NOTIFICATION

2.0 PRODUCTS (NOT USED)

3.0 EXECUTION

- 3.1. LAND RESOURCES
- 3.2. WATER RESOURCES
- 3.3. AIR RESOURCES
- 3.4. CHEMICAL MATERIALS MANAGEMENT AND WASTE DISPOSAL
- 3.5. RECYCLING AND WASTE MINIMIZATION
- 3.6. HISTORICAL, ARCHAEOLOGICAL, AND CULTURAL RESOURCES
- 3.7. BIOLOGICAL RESOURCES
- 3.8. INTEGRATED PEST MANAGEMENT
- 3.9. PREVIOUSLY USED EQUIPMENT
- 3.10. MILITARY MUNITIONS
- 3.11. TRAINING OF CONTRACTOR PERSONNEL
- 3.12. POST CONSTRUCTION CLEANUP

1.0 GENERAL REQUIREMENTS

Minimize environmental pollution and damage that may occur as the result of construction operations. Protect the environmental resources within the project boundaries and those affected outside the limits of permanent work during the entire duration of this contract. Comply with all applicable environmental Federal, State, and local laws and regulations. The Contractor shall be responsible for any delays resulting from failure to comply with environmental laws and regulations

1.1. SUBCONTRACTORS

Ensure compliance with this section by subcontractors.

1.2. ENVIRONMENTAL PROTECTION PLAN

1.2.1. The purpose of the Environmental Protection Plan is to present a comprehensive overview of known or potential environmental issues which the Contractor must address during construction. Define issues of concern within the Environmental Protection Plan as outlined in this section. Address each topic in the plan at a level of detail commensurate with the environmental issue and required construction task(s). Identify and discuss topics or issues which are not identified in this section, but which the Contractor considers necessary, after those items formally identified in this section. Prior to commencing construction activities or delivery of materials to the site, submit the Plan for review and Government approval. The Contractor shall meet with the Government prior to implementation of the Environmental Protection Plan, for the purpose of discussing the implementation of the initial plan; possible subsequent additions and revisions to the plan including any reporting requirements; and methods for administration of the Contractor's Environmental Plans. Maintain and keep the Environmental Protection Plan current onsite.

1.2.2. Compliance

No requirement in this Section shall be construed as relieving the Contractor of any applicable Federal, State, and local environmental protection laws and regulations. During Construction, the Contractor shall be responsible for identifying, implementing, and submitting for approval any additional requirements to be included in the Environmental Protection Plan.

1.2.3. Contents

The plan shall include, but shall not be limited to, the following:

1.2.3.1. Name(s) of person(s) within the Contractor's organization who is(are) responsible for ensuring adherence to the Environmental Protection Plan.

1.2.3.2. Name(s) and qualifications of person(s) responsible for manifesting hazardous waste to be removed from the site, if applicable

1.2.3.3. Name(s) and qualifications of person(s) responsible for training the Contractor's environmental protection personnel

1.2.3.4. Description of the Contractor's environmental protection personnel training program

1.2.3.5. An erosion and sediment control plan which identifies the type and location of the erosion and sediment controls to be provided. Include monitoring and reporting requirements to assure that the control measures are in compliance with the erosion and sediment control plan, Federal, State, and local laws and regulations. A Storm Water Pollution Prevention Plan (SWPPP) may be substituted for this plan.

1.2.3.6. Drawings showing locations of proposed temporary excavations or embankments for haul roads, stream crossings, material storage areas, structures, sanitary facilities, and stockpiles of excess or spoil materials including methods to control runoff and to contain materials on the site

1.2.3.7. Traffic control plans including measures to reduce erosion of temporary roadbeds by construction traffic, especially during wet weather. Include measures to minimize the amount of mud transported onto paved public roads by vehicles or runoff.

1.2.3.8. Work area plan showing the proposed activity in each portion of the area and identifying the areas of limited use or nonuse. Include measures for marking the limits of use areas including methods for protection of features to be preserved within authorized work areas.

1.2.3.9. Drawing showing the location of on-installation borrow areas.

1.2.3.10. A spill control plan shall include the procedures, instructions, and reports to be used in the event of an unforeseen spill of a substance regulated by 40 CFR 68, 40 CFR 302, 40 CFR 355, and/or regulated under State or Local laws and regulations. The spill control plan supplements the requirements of EM 385-1-1. This plan shall include as a minimum:

(a) The name of the individual who will report any spills or hazardous substance releases and who will follow up with complete documentation. This individual shall immediately notify the Government and the local Fire Department in addition to the legally required Federal, State, and local reporting channels (including the National Response Center 1-800-424-8802) if a reportable quantity is released to the environment. The plan shall contain a list of the required reporting channels and telephone numbers.

(b) The name and qualifications of the individual who will be responsible for implementing and supervising the containment and cleanup

(c) Training requirements for Contractor's personnel and methods of accomplishing the training

(d) A list of materials and equipment to be immediately available at the job site, tailored to cleanup work of the potential hazard(s) identified.

(e) The names and locations of suppliers of containment materials and locations of additional fuel oil recovery, cleanup, restoration, and material-placement equipment available in case of an unforeseen spill emergency

(f) The methods and procedures to be used for expeditious contaminant cleanup

1.2.3.11. A solid waste management plan identifying waste minimization, collection, and disposals methods, waste streams (type and quantity), and locations for solid waste diversion/disposal including clearing debris and C&D waste that is diverted (salvaged, reused, or recycled). Detail the contractor's actions to comply with, and to participate in, Federal, state, regional, local government, and installation sponsored recycling programs to reduce the volume of solid waste at the source. Identify any subcontractors responsible for the transportation, salvage and disposal of solid waste. Submit licenses or permits for solid waste disposal sites that are not a commercial operating facility. Attach evidence of the facility's ability to accept the solid waste to this plan. A construction and demolition waste management plan, similar to the plan specified in the UFGS 01 74 19 (formerly 01572) may be used as the non-hazardous solid waste management plan. Provide a Non-Hazardous Solid Waste Diversion Report. Submit the report on the first working day after the first quarter that non-hazardous solid waste has been disposed and/or diverted and each quarter thereafter (e.g. the first working day of January, April, July, and October) until the end of the project. Additionally, a summary report, with all data fields, is required at the end of the project. The report shall indicate the total type and amount of waste generated, total type and amount of waste diverted, type and amount of waste sent to waste-to-energy facility and alternative daily cover, in tons along with the percent that was diverted. Maintain, track and report construction and demolition waste data in a manner such that the installation can enter the data into the Army SWAR database, which separates data by type of material. A cumulative report in LEED Letter Template format may be used but must be modified to include the date disposed of/diverted and include the above stated diversion data. NOTE: The Solid Waste Diversion Reports are separate documentation than the LEED documentation.

1.2.3.12. DELETED.

1.2.3.13. An air pollution control plan detailing provisions to assure that dust, debris, materials, trash, etc., do not become air borne and travel off the project site.

1.2.3.14. A contaminant prevention plan that: identifies potentially hazardous substances to be used on the job site; identifies the intended actions to prevent introduction of such materials into the air, water, or ground; and details provisions for compliance with Federal, State, and local laws and regulations for storage and handling of

these materials. In accordance with EM 385-1-1, include a copy of the Material Safety Data Sheets (MSDS) and the maximum quantity of each hazardous material to be on site at any given time in the contaminant prevention plan. Update the plan as new hazardous materials are brought on site or removed from the site. Reference this plan in the storm water pollution prevention plan, as applicable.

1.2.3.15. A waste water management plan that identifies the methods and procedures for management and/or discharge of waste waters which are directly derived from construction activities, such as concrete curing water, clean-up water, dewatering of ground water, disinfection water, hydrostatic test water, and water used in flushing of lines. If a settling/retention pond is required, include the design of the pond including drawings, removal plan, and testing requirements for possible pollutants. If land application will be the method of disposal for the waste water, include a sketch showing the location for land application along with a description of the pretreatment methods to be implemented and any required permits. If surface discharge will be the method of disposal, include a copy of the permit and associated documents as an attachment prior to discharging the waste water. If disposal is to a sanitary sewer, include documentation that the waste water treatment plant Operator has approved the flow rate, volume, and type of discharge.

1.2.3.16. A historical, archaeological, cultural resources biological resources and wetlands plan that defines procedures for identifying and protecting historical, archaeological, cultural resources, biological resources and wetlands known to be on the project site: and/or identifies procedures to be followed if historical archaeological, cultural resources, biological resources and wetlands not previously known to be onsite or in the area are discovered during construction. Include methods to assure the protection of known or discovered resources and shall identify lines of communication between Contractor personnel and the Government.

1.2.3.17. A pesticide treatment plan, updated, as information becomes available. Include: sequence of treatment, dates, times, locations, pesticide trade name, EPA registration numbers, authorized uses, chemical composition, formulation, original and applied concentration, application rates of active ingredient (i.e. pounds of active ingredient applied), equipment used for application and calibration of equipment. The Contractor is responsible for Federal, State, Regional and Local pest management record keeping and reporting requirements as well as any additional Installation specific requirements. Follow AR 200-1, Chapter 5, Pest Management, Section 5-4, "Program Requirements" for data required to be reported to the Installation.

1.3. PROTECTION FEATURES

This paragraph supplements the Contract Clause PROTECTION OF EXISTING VEGETATION, STRUCTURES, EQUIPMENT, UTILITIES AND IMPROVEMENTS. Prior to start of any onsite construction activities, the Contractor and the Government shall make a joint condition survey. Immediately following the survey, the Contractor shall prepare a brief report including a plan describing the features requiring protection under the provisions of the Contract Clauses, which are not specifically identified on the drawings as environmental features requiring protection along with the condition of trees, shrubs and grassed areas immediately adjacent to the site of work and adjacent to the Contractor's assigned storage area and access route(s), as applicable. Both the Contractor and the Government will sign this survey, upon mutual agreement as to its accuracy and completeness. The Contractor develop a plan that depicts how it will protect those environmental features included in the survey report and any indicated on the drawings, regardless of interference which their preservation may cause to the Contractor's work under the contract.

1.4. ENVIRONMENTAL ASSESSMENT OF CONTRACT DEVIATIONS

Any deviations, requested by the Contractor, from the drawings, plans and specifications which may have an environmental impact will be subject to approval by the Government and may require an extended review, processing, and approval time. The Government reserves the right to disapprove alternate methods, even if they are more cost effective, if the Government determines that the proposed alternate method will have an adverse environmental impact.

1.5. NOTIFICATION

The Government will notify the Contractor in writing of any observed noncompliance with Federal, State or local environmental laws or regulations, permits, and other elements of the Contractor's Environmental Protection plan. The Contractor shall, after receipt of such notice, inform the Government of the proposed corrective action and take such action when approved by the Government. The Government may issue an order stopping all or part of the

work until satisfactory corrective action has been taken. No time extensions shall be granted or equitable adjustments allowed to the Contractor for any such suspensions. This is in addition to any other actions the Government may take under the contract, or in accordance with the Federal Acquisition Regulation or Federal Law.

2.0 PRODUCTS (NOT USED)

3.0 EXECUTION

3.1. LAND RESOURCES

Confine all activities to areas defined by the drawings and specifications. Prior to the beginning of any construction, identify any land resources to be preserved within the work area. Except in areas indicated on the drawings or specified to be cleared, do not remove, cut, deface, injure, or destroy land resources including trees, shrubs, vines, grasses, topsoil, and land forms without approval. Do not attach or fasten any ropes, cables, or guys to any trees for anchorage unless specifically authorized. Provide effective protection for land and vegetation resources at all times as defined in the following subparagraphs. Remove all stone, soil, or other materials displaced into uncleared areas..

3.1.1. Work Area Limits

Prior to commencing construction activities, mark the areas that need not be disturbed under this contract. Mark or fence isolated areas within the general work area which are not to be disturbed. Protect monuments and markers before construction operations commence. Where construction operations are to be conducted during darkness, any markers shall be visible in the dark. Personnel shall be knowledgeable of the purpose for marking and/or protecting particular objects.

3.1.2. Landscape

Clearly identify trees, shrubs, vines, grasses, land forms and other landscape features indicated and defined on the drawings to be preserved by marking, fencing, or wrapping with boards, or any other approved techniques. Restore landscape features damaged or destroyed during construction operations outside the limits of the approved work area.

3.1.3. Erosion and Sediment Controls

Provide erosion and sediment control measures in accordance with Federal, State, and local laws and regulations. Coordinate with approving authorities (federal, state, etc.) for specific requirements to be included in the plan. The erosion and sediment controls selected and maintained by the Contractor shall be such that water quality standards are not violated as a result of the Contractor's construction activities. Keep the area of bare soil exposed at any one time by construction operations to a minimum necessary. Construct or install temporary and permanent erosion and sediment control best management practices (BMPs). BMPs may include, but not be limited to, vegetation cover, stream bank stabilization, slope stabilization, silt fences, construction of terraces, interceptor channels, sediment traps, inlet and outfall protection, diversion channels, and sedimentation basins. Remove any temporary measures after the area has been stabilized.

3.1.4. Contractor Facilities and Work Areas

Place field offices, staging areas, stockpile storage, and temporary buildings in areas designated on the drawings or as directed by the Government. Make only approved temporary movement or relocation of Contractor facilities. Provide erosion and sediment controls for on-site borrow and spoil areas to prevent sediment from entering nearby waters. Control temporary excavation and embankments for plant and/or work areas to protect adjacent areas.

3.2. WATER RESOURCES

Monitor construction activities to prevent pollution of surface and ground waters. Do not apply toxic or hazardous chemicals to soil or vegetation unless otherwise indicated. Monitor all water areas affected by construction activities. For construction activities immediately adjacent to impaired surface waters, the Contractor shall be capable of quantifying sediment or pollutant loading to that surface water when required by state or federally issued Clean Water Act permits.

3.2.1. Stream Crossings

Stream crossings shall allow movement of materials or equipment without violating water pollution control standards of the Federal, State, and local governments or impede state-designated flows.

3.2.2. Wetlands

Do not enter, disturb, destroy, or allow discharge of contaminants into any wetlands.

3.3. AIR RESOURCES

Comply with all Federal and State air emission and performance laws and standards for equipment operation, activities, or processes.

3.3.1. Particulates

Control dust particles; aerosols and gaseous by-products from construction activities; and processing and preparation of materials, such as from asphaltic batch plants, including weekends, holidays and hours when work is not in progress. Maintain excavations, stockpiles, haul roads, permanent and temporary access roads, plant sites, spoil areas, borrow areas, and other work areas within or outside the project boundaries free from particulates which would cause the Federal, State, and local air pollution standards to be exceeded or which would cause a hazard or a nuisance. Sprinkling, chemical treatment of an approved type, baghouse, scrubbers, electrostatic precipitators or other methods are permitted to control particulates in the work area. Sprinkling, to be efficient, must be repeated to keep the disturbed area damp at all times. Provide sufficient, competent equipment available to accomplish these tasks. Perform particulate control as the work proceeds and whenever a particulate nuisance or hazard occurs. Comply with all State and local visibility regulations.

3.3.2. Odors

Control odors from construction activities at all times. Odors shall not cause a health hazard and shall be in compliance with State regulations and/or local ordinances.

3.3.3. Sound Intrusions

Keep construction activities under surveillance and control to minimize environment damage by noise. Comply with the provisions of the state and Installation rules.

3.3.4. Burning

Burning is not allowed on the project site unless specified in other sections of the specifications or by written authorization. Specific times, locations, and manners of burning shall be subject to approval.

3.4. CHEMICAL MATERIALS MANAGEMENT AND WASTE DISPOSAL

Disposal of wastes shall be as directed below, unless otherwise specified in other sections and/or shown on the drawings.

3.4.1. Solid Wastes

Place solid wastes (excluding clearing debris) in containers which are emptied on a regular schedule. Conduct handling, storage, and disposal to prevent contamination. Employ segregation measures so that no hazardous or toxic waste will become co-mingled with solid waste. Transport solid waste off Government property and dispose of it in compliance with Federal, State, and local requirements for solid waste disposal. The minimum acceptable off-site solid waste disposal option is a Subtitle D RCRA permitted landfill. Verify that the selected transporters and disposal facilities have the necessary permits and licenses to operate. Comply with Federal, State, and local laws and regulations pertaining to the use of landfill areas.

3.4.2. Chemicals and Chemical Wastes

Dispense chemicals, ensuring no spillage to the ground or water. Perform and document periodic inspections of dispensing areas to identify leakage and initiate corrective action. The Government may periodically review this documentation. Collect chemical waste in corrosion resistant, compatible containers. Monitor and remove collection drums to a staging or storage area when contents are within 6 inches of the top. Classify, manage, store, and dispose of wastes in accordance with Federal, State, and local laws and regulations.

3.4.3. Contractor Generated Hazardous Wastes/Excess Hazardous Materials

Hazardous wastes are defined in 40 CFR 261, or are as defined by applicable state and local regulations. Hazardous materials are defined in 49 CFR 171 - 178. At a minimum, manage and store hazardous waste in compliance with 40 CFR 262. Take sufficient measures to prevent spillage of hazardous and toxic materials during dispensing. Segregate hazardous waste from other materials and wastes; protect it from the weather by placing it in a safe covered location and take precautionary measures, such as berming or other appropriate measures, against accidental spillage. Store, describe, package, label, mark, and placard hazardous waste and hazardous material in accordance with 49 CFR 171 - 178, state, and local laws and regulations. Transport Contractor generated hazardous waste off Government property in accordance with the Environmental Protection Agency and the Department of Transportation laws and regulations. Dispose of hazardous waste in compliance with Federal, State and local laws and regulations. Immediately report spills of hazardous or toxic materials to the Government and the Facility Environmental Office. Contractor will be responsible for cleanup and cleanup costs due to spills. Contractor is responsible for the disposition of Contractor generated hazardous waste and excess hazardous materials.

3.4.4. Fuel and Lubricants

Conduct storage, fueling and lubrication of equipment and motor vehicles in a manner that affords the maximum protection against spill and evaporation. Manage and store fuel, lubricants and oil in accordance with all Federal, State, Regional, and local laws and regulations.

3.5. RECYCLING AND WASTE MINIMIZATION

Participate in State and local government sponsored recycling programs. The Contractor is further encouraged to minimize solid waste generation throughout the duration of the project. Line and berm fueling areas and establish storm water control structures at discharge points for site run-off. Keep a liquid containment clean-up kit available at the fueling area.

3.6. HISTORICAL, ARCHAEOLOGICAL, AND CULTURAL RESOURCES

Existing historical, archaeological, and cultural resources within the Contractor's work area are shown on the drawings. Protect and preserve these resources during the life of the Contract. Temporarily suspend all activities that may damage or alter such resources, if any previously unidentified or unanticipated historical, archaeological, and cultural resources are discovered or found during excavation or other construction activities. Resources covered by this paragraph include but are not limited to: any human skeletal remains or burials; artifacts; shell, midden, bone, charcoal, or other deposits; rock or coral alignments, pavings, wall, or other constructed features; and any indication of agricultural or other human activities. Upon such discovery or find, notify the Government so that the appropriate authorities may be notified and a determination made as to their significance and what, if any, special disposition of the finds should be made. Cease all activities that may result in impact to or the destruction of these resources. Secure the area and prevent employees or other persons from trespassing on, removing, or otherwise disturbing such resources.

3.7. BIOLOGICAL RESOURCES

Minimize interference with, disturbance to, and damage to fish, wildlife, and plants, including their habitat. Protect threatened and endangered animal and plant species including their habitat in accordance with Federal, State, Regional, and local laws and regulations.

3.8. INTEGRATED PEST MANAGEMENT

Coordinate, through the Government, with the Installation Pest Management Coordinator (IPMC) at the earliest possible time prior to pesticide application, in order to minimize impacts to existing fauna and flora. Discuss

integrated pest management strategies with the IPMC and receive concurrence from the IPMC, through the COR, prior to the application of any pesticide associated with these specifications. Give IMPC personnel the opportunity to be present at all meetings concerning treatment measures for pest or disease control and during application of the pesticide. The use and management of pesticides are regulated under 40 CFR 152 - 186.

3.8.1. Pesticide Delivery and Storage

Deliver pesticides, approved for use on the Installation, to the site in the original, unopened containers bearing legible labels indicating the EPA registration number and the manufacturer's registered uses.

3.8.2. Qualifications

Use the services of a subcontractor for pesticide application whose principal business is pest control. The subcontractor shall be licensed and certified in the state where the work is to be performed.

3.8.3. Pesticide Handling Requirements

Formulate, treat with, and dispose of pesticides and associated containers in accordance with label directions.

3.8.4. Application

A state certified pesticide applicator shall apply pesticides in accordance with EPA label restrictions and recommendations.

3.9. PREVIOUSLY USED EQUIPMENT

Clean all previously used construction equipment prior to bringing it onto the project site. Ensure that the equipment is free from soil residuals, egg deposits from plant pests, noxious weeds, and plant seeds. Consult with the USDA jurisdictional office for additional cleaning requirements.

3.10. MILITARY MUNITIONS

Immediately stop work in that area and immediately inform the Government, in the event military munitions, as defined in 40 CFR 260, are discovered or uncovered.

3.11. TRAINING OF CONTRACTOR PERSONNEL

Train personnel in all phases of environmental protection and pollution control. Conduct environmental protection/pollution control meetings for all Contractor personnel prior to commencing construction activities. Conduct additional meetings for new personnel and when site conditions change. The training and meeting agenda shall include methods of detecting and avoiding pollution; familiarization with statutory and contractual pollution standards; installation and care of devices, vegetative covers, and instruments required for monitoring purposes to ensure adequate and continuous environmental protection/pollution control; anticipated hazardous or toxic chemicals or wastes, and other regulated contaminants; recognition and protection of archaeological sites, artifacts, wetlands, and endangered species and their habitat that are known to be in the area.

3.12. POST CONSTRUCTION CLEANUP

Clean up all areas used for construction in accordance with Contract Clause: "Cleaning Up". Unless otherwise instructed in writing, obliterate all signs of temporary construction facilities such as haul roads, work area, structures, foundations of temporary structures, stockpiles of excess or waste materials, and other vestiges of construction prior to final acceptance of the work. Grade, fill and seed the entire disturbed area, unless otherwise indicated.

**SECTION 01 62 35
RECYCLED/RECOVERED MATERIAL**

1.0 GENERAL

1.1. REFERENCES

1.2. OBJECTIVES

1.3. EPA DESIGNATED ITEMS INCORPORATED IN THE WORK

1.4. EPA PROPOSED ITEMS INCORPORATED IN THE WORK

1.5. EPA LISTED ITEMS USED IN CONDUCT OF THE WORK BUT NOT INCORPORATED IN THE WORK

1.0 GENERAL

1.1. REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

- U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)
- 40 CFR 247 Comprehensive Procurement Guideline for Products Containing Recovered Materials

1.2. OBJECTIVES

Government procurement policy is to acquire, in a cost effective manner, items containing the highest percentage of recycled and recovered materials practicable consistent with maintaining a satisfactory level of competition without adversely affecting performance requirements or exposing suppliers' employees to undue hazards from the recovered materials. The Environmental Protection Agency (EPA) has designated certain items which must contain a specified percent range of recovered or recycled materials. The Contractor shall make all reasonable efforts to use recycled and recovered materials in providing the EPA designated products and in otherwise utilizing recycled and recovered materials in the execution of the work.

1.3. EPA DESIGNATED ITEMS INCORPORATED IN THE WORK

Materials that have been designated by EPA as being products which are or can be made with recovered or recycled materials, when incorporated into the work under this contract, shall contain at least the minimum percentage of recycled or recovered materials indicated by EPA unless adequate justification (non-availability) for non-use is provided. When a designated item is specified as an option to a non-designated item, the designated item requirements apply only if the designated item is used in the work.

1.4. EPA PROPOSED ITEMS INCORPORATED IN THE WORK

Products other than those designated by EPA are still being researched and are being considered for future Comprehensive Procurement Guideline (CPG) designation. It is recommended that these items, when incorporated in the work under this contract, contain the highest practicable percentage of recycled or recovered materials, provided specified requirements are also met.

1.5. EPA LISTED ITEMS USED IN CONDUCT OF THE WORK BUT NOT INCORPORATED IN THE WORK

There are many products listed in 40 CFR 247 which have been designated or proposed by EPA to include recycled or recovered materials that may be use by the Contractor in performing the work but will not be incorporated into the work. These products include office products, temporary traffic control products, and pallets. It is recommended that these non-construction products, when used in the conduct of the work, contain the highest practicable percentage of recycled or recovered materials and that these products be recycled when no longer needed.

End of Section 01 62 35

**SECTION 01 78 02.00 10
CLOSEOUT SUBMITTALS**

1.0 OVERVIEW

1.1. SUBMITTALS

1.2. PROJECT RECORD DOCUMENTS

1.3. EQUIPMENT DATA

1.4. CONSTRUCTION WARRANTY MANAGEMENT

1.5. MECHANICAL TESTING, ADJUSTING, BALANCING, AND COMMISSIONING

1.6. OPERATION AND MAINTENANCE MANUALS

1.7. FIELD TRAINING

1.8. PRICING OF CONTRACTOR-FURNISHED AND INSTALLED PROPERTY AND GOVERNMENT-FURNISHED CONTRACTOR-INSTALLED PROPERTY

1.9. LEED REVIEW MEETINGS

1.10. RED ZONE MEETING

1.11. FINAL CLEANING

1.12. INTERIM FORM DD1354 "TRANSFER AND ACCEPTANCE OF MILITARY REAL PROPERTY

EXHIBIT 1 SAMPLE RED ZONE MEETING CHECKLIST

1.0 OVERVIEW

1.1. SUBMITTALS

Government approval is required for any submittals with a "G" designation; submittals not having a "G" designation are for Designer of Record approval or for information only. Submit the following in accordance with Section 01 33 00 submittals:

SD-02 Shop Drawings

- As-Built Drawings - G
 - Drawings showing final as-built conditions of the project. Provide electronic drawing files as specified in Section 01 33 16, 3 sets of blue-line prints and one set of the approved working as-built drawings.

SD-03 Product Data

- As-Built Record of Equipment and Materials
 - Two copies of the record listing the as-built materials and equipment incorporated into the construction of the project.
- Construction Warranty Management Plan
 - Three sets of the construction warranty management plan containing information relevant to the warranty of materials and equipment incorporated into the construction project, including the starting date of warranty of construction. Furnish with each warranty the name, address, and telephone number of each of the guarantor's representatives nearest to the project location.
- Warranty Tags
 - Two record copies of the warranty tags showing the layout and design.
- Final Cleaning
 - Two copies of the listing of completed final clean-up items.

1.2. PROJECT RECORD DOCUMENTS

1.2.1. As-Built Drawings – G

An as-built drawing is a construction drawing revised to reflect the final as-built conditions of the project as a result of modifications and corrections to the project design required during construction. The final as-built drawings shall not have the appearance of marked up drawings, but that of professionally prepared drawings as if they were the "as designed" drawings.

1.2.2. Maintenance of As-Built Drawings

1.2.2.1. The Configuration Management Plan shall describe how the Contractor will maintain up-to-date drawings, how it will control and designate revisions to the drawings and specifications (In accordance with Special Contract Requirement: ***Deviating from the Accepted Design*** and Section 01 33 16: ***Design after Award***, the Designer of Record's approval is necessary for any revisions to the accepted design).

1.2.2.2. Make timely updates, carefully maintaining a record set of working as-built drawings at the job site, marked in red, of all changes and corrections from the construction drawings. Enter changes and corrections on drawings promptly to reflect "Current Construction". Perform this update no less frequently than weekly for the blue line drawings and update no less frequently than quarterly for the CADD/CAD and BIM files, which were prepared previously in accordance with Section 01 33 16. Include a confirmation that the as-builts are up to date with the submission of the monthly project schedule.

1.2.2.3. If the DB Contractor fails to maintain the as-built drawings as required herein, the Government will retain from the monthly progress payment, an amount representing the estimated monthly cost of maintaining the as-built drawings. Final payment with respect to separately priced facilities or the contract as a whole will be withheld until the Contractor submits acceptable as-built drawings and the Government approves them.

1.2.2.4. The marked-up set of drawings shall reflect any changes, alterations, adjustments or modifications. Changes must be reflected on all sheets affected by the change. Changes shall include marking the drawings to reflect structural details, foundation layouts, equipment sizes, and other extensions of design.

1.2.2.5. Typically, room numbers shown on the drawings are selected for design convenience and do not represent the actual numbers intended for use by the end user. Final as-built drawings shall reflect actual room numbers adopted by the end user.

1.2.2.6. If there is no separate contract line item (CLIN) for as-built drawings, the Government will withhold the amount of \$35,000, or 1% of the present construction value, whichever is the greater, until the final as-built drawing submittal has been approved by the Government.

1.2.3. Underground Utilities

The drawings shall indicate, in addition to all changes and corrections, the actual location, kinds and sizes of all sub-surface utility lines. In order that the location of these lines and appurtenances may be determined in the event the surface openings or indicators become covered over or obscured, the as-built drawings shall show, by offset dimensions to two permanently fixed surface features, the end of each run including each change in direction. Locate Valves, splice boxes and similar appurtenances by dimensioning along the utility run from a reference point. Record average elevation of the top of each run or underground structure..

1.2.4. Partial Occupancy

For projects where portions of construction are to be occupied or activated before overall project completion, including portions of utility systems, supply as-built drawings for those portions of the facility being occupied or activated at the time the facility is occupied or activated. Show this same as-built information previously furnished on the final set of as-built drawings.

1.2.5. As-Built Conditions That are Different From the construction Drawings

Accurately reflect all as-built conditions that are different, such as dimensions, road alignments and grades, and drainage and elevations, from the construction drawings on each drawing. If the as-built condition is accurately reflected on a shop drawing, then furnish that shop drawing in CADD format. Reference the final as-built construction drawing the shop drawing file that includes the as-built information. In turn, the shop drawing shall reference the applicable construction as-built drawing. Delete any options shown on drawings and not selected clearly reflect options selected on final as-built drawings.

1.2.6. Additional As-Built Information that Exceeds the Detail Shown on the construction Drawings:

These as-built conditions include those that reflect structural details, foundation layouts, equipment, sizes, mechanical and electrical room layouts and other extensions of design, that were not shown in the project design documents because the exact details were not known until after the time of approved shop drawings. It is recognized that these shop drawing submittals (revised showing as-built conditions) will serve as the as-built record without actual incorporation into the construction drawings, piping, and equipment drawings. Include locations of all explorations, logs of all explorations, and results of all laboratory testing, including those provided by the Government. Furnish all such shop drawings in CADD /CADformat. Include fire protection details, such as wiring, performed for the design of the project.

1.2.7. Final As-Built Drawings

Submit final as-built CADD/CAD and BIM Model(s) and Facility Data files at the time of Beneficial Occupancy of the project or at a designated phase of the project. In the event the Contractor accomplishes additional work after this submittal, which changes the as-built conditions, submit a new DVD with all drawing sheets and three blue-line copies of affected sheets which depict additional changes.

1.2.8. Title Blocks

In accordance with the configuration management plan, clearly mark title blocks to indicate final as-built drawings.

1.2.9. Other As-Built Documents

Provide scans of all other documents such as design analysis, catalog cuts, certification documents that are not available in native electronic format in an organized manner in Adobe.pdf format.

1.2.9.1. LEED Documentation

Update LEED documentation on at least a monthly basis and have it available for review by the Government on the jobsite at all times during construction. Submit the final LEED Project Checklist(s), final LEED submittals checklist and complete project documentation, verifying the final LEED score and establishing the final rating. Provide full support to the validation review process, including credit audits. See also the LEED documentation requirements in Section 01 33 16, DESIGN AFTER AWARD.

1.2.9.2. GIS Documentation

Provide final geo-referenced GIS database of the new building footprint along with any changes made to exterior of the building. The intent of capturing the final building footprint and exterior modifications in a GIS database is to provide the installation with a data set of the comprehensive changes made to the landscape as a result of the construction project. The Government will incorporate this data set into the installations existing GIS MasterPlan or Enterprise GIS system. The GIS database deliverable shall follow a standard template provided to the Contractor by the Government, adhere to detailed specifications outlined in ECB No 2006-15, and be documented using the Federal Geographic Data Committee (FGDC) metadata standard.

1.3. EQUIPMENT DATA

1.3.1. Real Property Equipment

Provide an Equipment-in-Place list of all installed equipment furnished under this contract. Include all information usually listed on manufacturer's name plate. Include the cost of each piece of installed property F.O.B. construction site. For each of the items which is specified herein to be guaranteed for a specified period from the date of acceptance thereof, provide the following information: The name, serial and model number address of equipment supplier, or manufacturer originating the guaranteed item. The Contractor's guarantee to the Government of these items will not be limited by the terms of any manufacturer's guarantee to the Contractor. Furnish the list as one (1) reproducible and three (3) copies thirty (30) calendar days before completion of any segment of the contract work which has an incremental completion date.

1.3.2. Maintenance and Parts Data

Furnish a brochure, catalog cut, parts list, manufacturer's data sheet or other publication showing detailed parts data on all other equipment subject to repair and maintenance procedures not otherwise required in Operations and Maintenance Manuals specified elsewhere in this contract. Distribution of directives shall follow the same requirements as listed in paragraph above.

1.3.3. Construction Specifications

Furnish permanent electronic files of final as-built construction specifications, including modifications thereto, with the as-built drawings.

1.4. CONSTRUCTION WARRANTY MANAGEMENT

1.4.1. Prior to the end of the one year warranty, the Government may conduct an infrared roof survey on any project involving a membrane roofing system. This survey will be conducted in accordance with ASTM C1153-90, "Standard Practice for Location of Wet Insulation in Roofing Systems Using Infrared Imaging". The Contractor shall replace all damaged materials and locate and repair sources of moisture penetration.

1.4.2. Management

1.4.2.1. Warranty Management Plan

Develop a warranty management plan containing information relevant to the clause **Warranty of Construction** in FAR 52.246-21. Submit the warranty management plan for Government approval at least 30 days before the planned pre-warranty conference. In the event of phased turn-over of the contract, update the Warranty Management Plan as necessary to include latest information required. Include all required actions and documents to assure that the Government receives all warranties to which it is entitled. The plan shall be in narrative form and contain sufficient detail to render it suitable for use by future maintenance and repair personnel, whether tradesmen, or of engineering background, not necessarily familiar with this contract. The term "status" as indicated below shall include due date and whether item has been submitted or was accomplished. Submit warranty information made available during the construction phase prior to each monthly pay estimate. Assemble information in a binder and turn over to the Government upon acceptance of the work. The construction warranty period shall begin on the date of project acceptance and shall continue for the full product warranty period. The Contractor, Government, including the Customer Representative shall jointly conduct warranty inspections, 4 months and 9 months, after acceptance. The warranty management plan shall include, but shall not be limited to, the following information:

- (1) Roles and responsibilities of all personnel associated with the warranty process, including points of contact and telephone numbers within the organizations of the contractors, subcontractors, manufacturers or suppliers involved.
- (2) Listing and status of delivery of all Certificates of Warranty for extended warranty items, to include roofs, HVAC balancing, pumps, motors, transformers, and for all commissioned systems such as fire protection and alarm systems, sprinkler systems, lightning protection systems, etc.
- (3) A list for each warranted equipment, item, feature of construction or system indicating:
 - (i) Name of item.
 - (ii) Model and serial numbers.
 - (iii) Location where installed.
 - (iv) Name and phone numbers of manufacturers or suppliers.
 - (v) Names, addresses and telephone numbers of sources of spare parts.
 - (vi) Warranties and terms of warranty. Include one-year overall warranty of construction. Indicate those items, which have extended warranties with separate warranty expiration dates.
 - (vii) Cross-reference to warranty certificates as applicable.
 - (viii) Starting point and duration of warranty period.
 - (ix) Summary of maintenance procedures required to continue the warranty in force.
 - (x) Cross-reference to specific pertinent Operation and Maintenance manuals.
 - (xi) Organization, names and phone numbers of persons to call for warranty service.
 - (xii) Typical response time and repair time expected for various warranted equipment.
- (4) The Contractor's plans for attendance at the 4 and 9 month post-construction warranty inspections conducted by the Government.
- (5) Procedure and status of tagging of all equipment covered by extended warranties.
- (6) Copies of instructions to be posted near selected pieces of equipment where operation is critical for warranty and/or safety reasons.

1.4.3. Performance Bond

1.4.3.1. The Contractor's Performance Bond will remain effective throughout the construction warranty period.

1.4.3.2. In the event the Contractor or his designated representative(s) fails to commence and diligently pursue any work required under this clause, and in a manner pursuant to the requirements thereof, the Government shall have

a right to demand that said work be performed under the Performance Bond by making written notice on the surety. If the surety fails or refuses to perform the obligation it assumed under the Performance Bond, the Government shall have the work performed by others, and after completion of the work, may make demand for reimbursement of any or all expenses incurred by the Government while performing the work, including, but not limited to administrative expenses.

1.4.3.3. In the event sufficient funds are not available to cover the construction warranty work performed by the Government at the Contractor's expense, the Government will have the right to recoup expenses from the bonding company.

1.4.3.4. Following oral or written notification of required warranty repair work, the Contractor will respond as dictated by para. 1.4.5. Written verification will follow oral instructions. Failure of the Contractor to respond will be cause for the Government to proceed against the Contractor as outlined in the paragraph 1.4.5.5 and/or above.

1.4.4. Pre-Warranty Conference

Prior to contract completion, or completion of any phase or portion of contract to be turned over, and at a time designated by the Contracting Officer, the Contractor shall meet with the Government to develop a mutual understanding with respect to the requirements of this clause. Communication procedures for Contractor notification of warranty defects, priorities with respect to the type of defect, reasonable time required for Contractor response, and other details deemed necessary by the Government for the execution of the construction warranty shall be established/reviewed at this meeting. In connection with these requirements and at the time of the Contractor's quality control completion inspection, the Contractor will furnish the name, telephone number and address of a licensed and bonded company which is authorized to initiate and pursue warranty work action on behalf of the Contractor. This point of contact will be located within the local service area of the warranted construction, will be continuously available, and will be responsive to Government inquiry on warranty work action and status. This requirement does not relieve the Contractor of any of his responsibilities in connection with other portions of this provision.

1.4.5. Contractor's Response to Warranty Service Requirements.

Following Government oral or written notification, which may include authorized installation maintenance personnel, the Contractor shall respond to warranty service requirements in accordance with the "Warranty Service Priority List" and the three categories of priorities listed below. Submit a report on any warranty item that has been repaired during the warranty period. The report shall include the cause of the problem, date reported, corrective action taken, and when the repair was completed. If the Contractor does not perform the construction warranty within the timeframe specified, the Government will perform the work and backcharge the construction warranty payment item established.

1.4.5.1. First Priority Code 1 Perform onsite inspection to evaluate situation, and determine course of action within 4 hours, initiate work within 6 hours and work continuously to completion or relief.

1.4.5.2. Second Priority Code 2 Perform onsite inspection to evaluate situation, and determine course of action within 8 hours, initiate work within 24 hours and work continuously to completion or relief.

1.4.5.3. Third Priority Code 3 All other work to be initiated within 3 work days and work continuously to completion or relief.

1.4.5.4. The "Warranty Service Priority List" is as follows:

- Code 1 - Air Conditioning System
 - (a) Buildings with computer equipment.
 - (b) Barracks, mess halls (entire building down).
- Code 2 - Air Conditioning Systems
 - (a) Recreational support.
 - (b) Air conditioning leak in part of building, if causing damage.
 - (c) Air conditioning system not cooling properly

- (d) Admin buildings with Automated Data Processing (ADP) equipment not on priority list.
 - Code 1 - Doors
- (a) Overhead doors not operational.
 - Code 1 - Electrical
- (a) Power failure (entire area or any building operational after 1600 hours).
- (b) Traffic control devices.
- (c) Security lights.
- (d) Smoke detectors and fire alarm systems
- (e) Power or lighting failure to an area, facility, portion of a facility, which may adversely impact health, safety, security, or the installation's mission requirement, or which may result in damage to property.
 - Code 2 - Electrical
- (a) Power failure (no power) for unoccupied buildings or portions thereof or branch circuits within occupied buildings, not listed as Code 1.
- (a) Receptacle and lights, not listed as code 1.
 - Code 3 - Electrical
- (a) Street, parking area lights
 - Code 1 - Gas
- (a) Leaks and breaks.
- (b) No gas to cantonment area.
 - Code 1 - Heat
- (a) Area power failure affecting heat.
- (b) Heater in unit not working.
 - Code 2 Heat
- (a) All heating system failures not listed as Code 1.
 - Code 3 - Interior
- (a) Floor damage
- (b) Paint chipping or peeling
 - Code 1 - Intrusion Detection Systems - N/A.
 - Code 2 - Intrusion Detection Systems other than those listed under Code 1
 - Code 1 - Kitchen Equipment
- (a) Dishwasher.
- (b) All other equipment hampering preparation of a meal.
 - Code 2 - Kitchen Equipment
- (a) All other equipment not listed under Code 1.
 - Code 2 - Plumbing
- (a) Flush valves not operating properly
- (b) Fixture drain, supply line commode, or water pipe leaking.
- (c) Commode leaking at base.
 - Code 3 - Plumbing
- (a) Leaking faucets

- Code 1 - Refrigeration
 - (a) Mess Hall.
 - (b) Medical storage.
- Code 2 - Refrigeration
 - (a) Mess hall - other than walk-in refrigerators and freezers.
- Code 1 - Roof Leaks
 - (a) Temporary repairs will be made where major damage to property is occurring.
- Code 2 - Roof Leaks
 - (a) Where major damage to property is not occurring, check for location of leak during rain and complete repairs on a Code 2 basis.
- Code 1 - Sprinkler System
 - (a) All sprinkler systems, valves, manholes, deluge systems, and air systems to sprinklers.
- Code 1 - Tank Wash Racks (Bird Baths)
 - (a) All systems which prevent tank wash.
- Code 1 - Water (Exterior)
 - (a) Normal operation of water pump station.
- Code 2 - Water (Exterior)
 - (a) No water to facility.
- Code 1 - Water, Hot (and Steam)
 - (a) Barracks (entire building).
- Code 2 - Water, Hot
 - (a) No hot water in portion of building listed under Code 1

1.4.5.5. Should parts be required to complete the work and the parts are not immediately available, the Contractor shall have a maximum of 12 hours after arrival at the job site to provide the Government, with firm written proposals for emergency alternatives and temporary repairs for Government participation with the Contractor to provide emergency relief until the required parts are available on site for the Contractor to perform permanent warranty repair. The Contractor's proposals shall include a firm date and time that the required parts shall be available on site to complete the permanent warranty repair. The Government will evaluate the proposed alternatives and negotiate the alternative considered to be in the best interest of the Government to reduce the impact of the emergency condition. Alternatives considered by the Government will include the alternative for the Contractor to "Do Nothing" while waiting until the required parts are available to perform permanent warranty repair. Negotiating a proposal which will require Government participation and the expenditure of Government funds shall constitute a separate procurement action by the using service.

1.4.6. Equipment Warranty Identification Tags

1.4.6.1. Provide warranty identification tags at the time of installation and prior to substantial completion shall provide warranty identification tags on all Contractor and Government furnished equipment which the Contractor has installed.

- (a) The tags shall be suitable for interior and exterior locations, resistant to solvents, abrasion, and to fading caused by sunlight, precipitation, etc. These tags shall have a permanent pressure-sensitive adhesive back, and they shall be installed in a position that is easily (or most easily) noticeable. Tag each component of contractor furnished equipment that has differing warranties on its components.
- (b) Submit sample tags, representing how the other tags will look, for Government review and approval.
- (c) Tags for Warranted Equipment: The tag for this equipment shall be similar to the following: Exact format and size will be as approved.

EQUIPMENT WARRANTY - CONTRACTOR FURNISHED EQUIPMENT

MFG NAME

MODEL NO.

SERIAL NO.

CONTRACT NO.

CONTRACTOR NAME

CONTRACTOR WARRANTY EXPIRES

MFG WARRANTY(IES) EXPIRE

EQUIPMENT WARRANTY - GOVERNMENT FURNISHED EQUIPMENT

MFG NAME

MODEL NO.

SERIAL NO.

CONTRACT NO.

DATE EQUIP PLACED IN SERVICE

MFG WARRANTY(IES) EXPIRE

(d) If the manufacturer's name (MFG), model number and serial number are on the manufacturer's equipment data plate and this data plate is easily found and fully legible, this information need not be duplicated on the equipment warranty tag

1.4.6.2. Execution: Complete the required information on each tag and install these tags on the equipment by the time of and as a condition of final acceptance of the equipment.

1.5. MECHANICAL TESTING, ADJUSTING, BALANCING, AND COMMISSIONING

Submit; all reports, statements, certificates, and completed checklists for testing, adjusting, balancing, and commissioning of mechanical systems prior to final inspection and transfer of the completed facility for approval, as specified in applicable technical specification sections.

1.6. OPERATION AND MAINTENANCE MANUALS

1.6.1. General Requirements

1.6.1.1. Inasmuch as the operations and maintenance manuals are required to operate and maintain the facility, the operations and maintenance (O&M) manuals will be considered a requirement prior to substantial completion of any facility to be turned over to the Government. Beneficial occupancy of all or portions of a facility prior to substantial completion will not relieve the Contractor of liquidated damages, if substantial completion exceeds the required completion date.

1.6.1.2. Provide one permanent electronic copy on CD-ROM and 2 hard copies of the Equipment Operating, Maintenance, and Repair Manuals. Provide separate manuals for each utility system as defined hereinafter. Submit Operations and Maintenance manuals for approval before field training or 90 days before substantial completion (whichever occurs earlier). If there is no separate CLIN for O&M Manuals, the Government will withhold an amount representing \$20,000, as non-progressed work, until submittal and approval of all O&M manuals are complete.

1.6.2. Definitions

1.6.2.1. Equipment

A single piece of equipment operating alone or in conjunction with other equipment to accomplish a system function.

1.6.2.2. System

A combination of one or more pieces of equipment which function together to accomplish an intended purpose (i.e. HVAC system is composed of many individual pieces of equipment such as fans, motors, compressors, valves, sensors, relays, etc.)

1.6.3. Hard Cover Binders

The manuals shall be hard cover with posts, or 3-ring binders, so sheets may be easily substituted. Print the following identification on the cover: the words "EQUIPMENT OPERATING, MAINTENANCE, AND REPAIR MANUALS," the project name, building number, and an indication of utility or systems covered, the name of the Contractor, and the Contract number. Manuals shall be approximately 8-1/2 by 11-inches with large sheets folded in and capable of being easily pulled out for reference. All manuals for the project must be similar in appearance, and be of professional quality.

1.6.4. Warning Page

Provide a warning page to warn of potential dangers (if they exist, such as high voltage, toxic chemicals, flammable liquids, explosive materials, carcinogens, high pressures, etc.). Place the warning page inside the front cover and in front of the title page. Include any necessary Material Safety Data Sheets (MSDS) here.

1.6.5. Title Page

The title page shall include the same information shown on the cover and show the name of the preparing firm and the date of publication.

1.6.6. Table of Contents

Each volume of the set of manuals for this project shall include a table of contents, for the entire set, broken down by volume.

1.6.7. GENERAL

Organize manuals according to the following format, and include information for each item of equipment. Submit a draft outline and table of contents for approval at 50% contract completion.

TABLE OF CONTENTS

PART I: Introduction

- Equipment Description
- Functional Description
- Installation Description

PART II: Operating Principles

PART III: Safety

PART IV: Preventive Maintenance

- Preventive Maintenance Checklist, Lubrication
- Charts and Diagrams

PART V: Spare Parts Lists

- Troubleshooting Guide
- Adjustments
- Common Repairs and Parts Replacement

PART VI: Illustrations

1.6.7.1. Part I-Introduction

Part I shall provide an introduction, equipment or system description, functional description and theory of operation, and installation instructions for each piece of equipment. Include complete instructions for uncrating, assembly, connection to the power source and pre-operating lubrication in the installation instructions as applicable. Illustrations, including wiring and cabling diagrams, are required as appropriate in this section. Include halftone pictures of the equipment in the introduction and equipment description, as well as system layout drawings with each item of equipment located and marked. Do not use copies of previously submitted shop drawings in these manuals.

1.6.7.2. Part II-Operating Principles

Part II shall provide complete instructions for operating the system, and each piece of equipment. Illustrations, halftone pictures, tables, charts, procedures, and diagrams are required when applicable. This will include step-by-step procedures for start-up and shutdown of both the system and each component piece of equipments, as well as adjustments required to obtain optimum equipment performance, and corrective actions for malfunctions. Show performance sheets and graphs showing capacity data, efficiencies, electrical characteristics, pressure drops, and flow rates here, also. Marked-up catalogs or catalog pages do not satisfy this requirement. Present performance information as concisely as possible with only data pertaining to equipment actually installed. Include actual test data collected for Contractor performance here.

1.6.7.3. Part III-Safety

Part III shall contain the general and specific safety requirements peculiar to each item of equipment. Repeat safety information as notes cautions and warnings in other sections where appropriate to operations described.

1.6.7.4. Part IV-Preventive Maintenance

Part IV shall contain a troubleshooting guide, including detailed instructions for all common adjustments and alignment procedures, including a detailed maintenance schedule. Also include a diagnostic chart showing symptoms and solutions to problems. Include test hookups to determine the cause, special tools and test equipment, and methods for returning the equipment to operating conditions. Information may be in chart form or in tabular format with appropriate headings. Include instructions for the removal, disassembly, repair, reassembly, and replacement of parts and assemblies where applicable and the task is not obvious.

1.6.7.5. Part V-Spare Parts List

Part V shall contain a tabulation of description data and parts location illustrations for all mechanical and electrical parts. The heading of the parts list shall clearly identify the supplier, purchase order number, and equipment. Include the unit price for each part. List parts by major assemblies, and arrange the listing in columnar form. Include names and addresses of the nearest manufacturer's representatives, as well as any special warranty information. Provide a list of spare parts that are recommended to be kept in stock by the Government installation.

1.6.7.6. Part VI-Illustrations

Part VI shall contain assembly drawings for the complete equipment or system and for all major components. Include complete wiring diagrams and schematics. Other illustrations, such as exploded views, block diagrams, and cutaway drawings, are required as appropriate.

1.6.8. Framed Instructions

Post framed instructions are required for substantial completion. Post framed instructions under glass or in laminated plastic, including wiring and control diagrams showing the complete layout of the entire system, including equipment, ductwork, piping valves, dampers, and control sequence at a location near the equipment described. Prepare condensed operating instructions explaining preventive maintenance procedures methods of checking the system for normal safe operation, valve schedule and procedures for safely starting and stopping the system in type form, framed as specified above for the wiring and control diagrams and posted beside the diagrams. Submit proposed diagrams, instructions, and other sheets prior to posting. Post the framed instructions before field training.

1.6.9. (Reserved. See 1.7 for Field Training)

1.6.10. System/Equipment Requirements

1.6.10.1. Facility Heating System

Provide information on the following equipment: boilers, water treatment, chemical feed pumps and tanks, converters, heat exchangers, pumps, unit heaters, fin-tube radiation, air handling units (both heating only and heating and cooling), and valves (associated with heating systems).

1.6.10.2. Air-Conditioning Systems

Provide information in chillers, packaged air-conditioning equipment, towers, water treatment, chemical feed pumps and tanks, air-cooled condensers, pumps, compressors, air handling units, and valves (associated with air-conditioning systems).

1.6.10.3. Temperature Control and HVAC Distribution Systems

Provide all information described for the following equipment: valves, fans, air handling units, pumps, boilers, converters and heat exchangers, chillers, water cooled condensers, cooling towers, and fin-tube radiation, control air compressors, control components (sensors, controllers, adapters and actuators), and flow measuring equipment.

1.6.10.4. Central Heating Plants

Provide the information described for the following equipment: boilers, converters, heat exchangers, pumps, fans, steam traps, pollution control equipment, chemical feed equipment, control systems, fuel handling equipment, de-aerators, tanks (flash, expansion, return waters, etc.), water softeners, and valves.

1.6.10.5. Heating Distribution Systems

Provide the information described for the following equipment: valves, fans, pumps, converters and heat exchangers, steam traps, tanks (expansion, flash, etc.), and piping systems.

1.6.10.6. Exterior Electrical Systems

Provide information on the following equipment: power transformers, relays, reclosers, breakers, and capacitor bank controls.

1.6.10.7. Interior Electrical Systems

Provide information on the following equipment: relays, motor control centers, switchgear, solid state circuit breakers, motor controller, EPS lighting systems, wiring diagrams and troubleshooting flow chart on control systems, and special grounding systems.

1.6.10.8. Energy Monitoring and Control Systems

The maintenance manual shall include descriptions of maintenance for all equipment, including inspection, periodic preventative maintenance, fault diagnosis, and repair or replacement of defective components.

1.6.10.9. Domestic Water Systems

Provide the identified information on the following equipment: tanks, unit process equipment, pumps, motors, control and monitoring instrumentation, laboratory test equipment, chemical feeders, valves, switching gear, and automatic controls.

1.6.10.10. Wastewater Treatment Systems

Provide the identified information on the following equipment: tanks, unit process equipment, pumps, motors, control and monitoring instrumentations, laboratory test equipment chemical feeders, valves, scrapers, skimmers, comminutors, blowers, switching gear, and automatic controls.

1.6.10.11. Fire Protection Systems

Provide information on the following equipment: alarm valves, manual valves, regulators, foam and gas storage tanks, piping materials, sprinkler heads, nozzles, pumps, and pump drivers.

1.6.10.12. Fire Alarm and Detection Systems

- (1) The maintenance manual shall include description of maintenance for all equipment, including inspection, periodic preventive maintenance, fault diagnosis, and repair or replacement of defective components.
- (2) Provide all software; database with complete identification of programmable portions of system equipment and devices, and all other system programming data on all modes of the system; connecting cables; and proprietary equipment necessary for the operation, maintenance, testing, repair and programming, etc. of the system and that may be required for implementation of future changes to the fire system (additional and/or relocated initiating devices, notification devices, etc.
- (3) Provide all system and equipment technical data and computer software with the requisite rights to Government use, in accordance with the applicable contract clauses.
- (4) Training shall include software and programming required for the effective operation, maintenance, testing, diagnostics and expansion of the system.

1.6.10.13. Plumbing Systems

Provide information on the following equipment: water heaters, valves, pressure regulators backflow preventors, piping materials, and plumbing fixtures.

1.6.10.14. Liquid Fuels Systems

Provide information on the following equipment: tanks, automatic valves manual valves, filter separators, pumps, mechanical loading arms, nozzles, meters, electronic controls, electrical switch gear, and fluidic controls.

1.6.10.15. Cathodic Protection Systems

Provide information on the following material and equipment: rectifiers, meters, anodes, anode backfill, anode lead wire, insulation material and wire size, automatic controls (if any), rheostats, switches, fuses and circuit breakers, type and size of rectifying elements, type of oil in oil-immersed rectifiers, and rating of shunts.

1.6.10.16. Generator Installations

Provide information on the following equipment: generator sets, automatic transfer panels, governors, exciters, regulators starting systems, switchgear, and protective devices.

1.6.10.17. Miscellaneous Systems

Provide information on the following: communication and ADP systems, security and intrusion alarm, elevators, material handling, active solar, photovoltaic, nurse call, paging, intercom, closed circuit TV, irrigation, sound and material delivery systems, kitchen, refrigeration, disposal, ice making equipment, and other similar type special systems not otherwise specified.

1.6.10.18. Laboratory, Environmental and Pollution Control Systems

Provide information on the following equipment: wet scrubbers, quench chambers, scrub tanks, liquid oil separators, and fume hoods.

1.7. FIELD TRAINING

Field Training is a requirement for substantial completion. Conduct a training course for the operating staff for each particular system. Conduct the training is to be conducted during hours of normal working time after the system is functionally complete. The field instructions shall cover all of the items contained in the Equipment Operating, Maintenance and Repair Manuals. The training will include both classroom and "hands-on" training. Submit a lesson plan outlining the information to be discussed during training periods. Submit this lesson plan for approval 90 days before contract completion before the field training occurs. Record training on DVD and furnish to the Government within ten (10) days following training. Document all training and furnish a list of all attendees.

1.8. PRICING OF CONTRACTOR-FURNISHED AND INSTALLED PROPERTY AND GOVERNMENT-FURNISHED CONTRACTOR-INSTALLED PROPERTY

Promptly furnish and require any sub-contractor or supplier to furnish, in like manner, unit prices and descriptive data required by the Government for Property Record purposes of fixtures and equipment furnished and/or installed by the Contractor or sub-contractor, except prices do not need to be provided for Government-Furnished Property.

1.9. LEED REVIEW MEETINGS

1.9.1. Pre-Closeout Meeting. Approximately 30 days before submittal of LEED closeout documentation, the Contractor and the Government's project delivery team (including Installation representative) will meet to review the documentation, determine which, if any, credits will be audited and identify any corrections/missing items prior to the closeout LEED documentation submittal.

1.9.2. Approximately 14 days after submittal of LEED closeout documentation, the Contractor and the Government's project delivery team (including Installation representative) will meet to review the LEED closeout

documentation. The review conference will include discussion of and resolution of all review comments to ensure consensus on achievement of credits and satisfactory documentation. At the review conference a final score will be determined and endorsed in writing by all parties.

1.10. RED ZONE MEETING

At approximately 80% of contract completion or 60 days before the anticipated Beneficial Occupancy Date (BOD), whichever occurs first, the Contractor and the Government's project delivery team will conduct what is known as the Red Zone Meeting to discuss the close-out process, to schedule the events and review responsibilities for actions necessary to produce a timely physical, as well as fiscal, project close-out. The Red Zone meeting derives its name from the football term used to describe the team effort to move the ball the last 20 yards into the end zone. The close-out of a construction project sometimes can be equally as hard and most definitely requires the whole team's efforts. The ACO will chair the meeting. If not already provided, shortly before the meeting, the Contractor shall provide an electronic copy or access to the CADD as-built drawings, completed commensurate with the amount of work completed at the time of the Red Zone Meeting, as an indicator of the Contractors' understanding of and ability to meet the USACE CADD Standards and to ensure that the Contractor is making progress with CADD As-Built requirements. EXHIBIT 1 is a generic meeting checklist.

1.11. FINAL CLEANING

Clean the premises in accordance with FAR clause 52.236-12 and additional requirements stated here. Remove stains, foreign substances, and temporary labels from surfaces. Vacuum carpet and soft surfaces. Clean equipment and fixtures to a sanitary condition. Clean or replace filters of operating equipment if cleaning isn't possible or practicable. Remove debris from roofs, drainage systems, gutters, and downspouts. Sweep paved areas and rake clean landscaped areas. Remove waste, surplus materials, and rubbish from the site. Remove all temporary structures, barricades, project signs, fences and construction facilities. Submit a list of completed clean-up items on the day of final inspection.

1.12. INTERIM FORM DD1354 "TRANSFER AND ACCEPTANCE OF MILITARY REAL PROPERTY

Near the completion of Project, but a minimum of 60 days prior to final acceptance of the work, complete, update draft provided with the final design package(s) (see Section 01 33 16, paragraph 3.7.5) and submit an accounting of all installed property on Interim Form DD1354 "Transfer and Acceptance of Military Real Property." Include any additional assets/improvements/alterations and cost updates from the Draft DD Form 1354. Contact the COR for any project specific information necessary to complete the DD Form 1354. This form will be a topic for the Red Zone Meeting discussed above. For information purposes, a blank DD Form 1354 (fill-able) in ADOBE (PDF) may be obtained at the following web site: <http://www.dtic.mil/whs/directives/infomgt/forms/eforms/dd1354.pdf> Submit the completed Checklist for Form DD1354 of Government-Furnished and Contractor-Furnished/Contractor Installed items. Attach this list to the updated DD Form 1354. Instructions for completing the form and a blank checklist (fill-able) in ADOBE (PDF) may be obtained at the following web site: http://www.wbdg.org/ccb/DOD/UFC/ufc_1_300_08.pdf

EXHIBIT 1

SAMPLE

Red Zone Meeting Checklist

Date: _____

Contract No.	
Description / Location	
Contractor	
Contracting Officer	

Action	Completion Milestone	√
Inspections		
Fire		
Safety		
Pre-final		
Mechanical Test & Balance		
Commissioning		
Landscaping Complete		
Erosion Control		
Beneficial Occupancy Date (BOD)		
Furniture Installation		
Comm Installation		
As-Built Drawings		
Provide all O&M manuals, tools, shop drawings, spare parts, etc. to customer		
Training of O&M Personnel		
Provide Warranty documents to Customer		
Contract completion		

Ribbon cutting		
Payroll Clearances		
DD Form 2626 - Construction Contractor Performance Evaluation		
DD Form 2631 – A-E Performance Rated after Construction		
Status of Pending Mods and REA's/Claims		
Final Payment Completed		
Release of Claims		
Return of Unobligated Funds		
Move Project from CIP to General Ledger		
Financial completion		

End of Section 01 78 02.00 10

**SECTION 01 10 00.0001
TASK ORDER STATEMENT OF WORK**

1.0 PROJECT OBJECTIVES

1.1. SECTION ORGANIZATION

2.0 SCOPE

2.1. Training Range or Training Range Facility

2.2. SITE

2.3. GOVERNMENT-FURNISHED GOVERNMENT INSTALL EQUIPMENT (GFGI)

2.4. FURNITURE REQUIREMENTS

3.0 Training Range or Training Range Facility

3.1. GENERAL REQUIREMENTS

3.2. FUNCTIONAL AND AREA REQUIREMENTS

4.0 APPLICABLE CRITERIA

4.1. INDUSTRY CRITERIA

4.2. MILITARY CRITERIA

5.0 GENERAL TECHNICAL REQUIREMENTS

5.1. SITE PLANNING AND DESIGN

5.2. SITE ENGINEERING

5.3. ARCHITECTURE AND INTERIOR DESIGN

5.4. STRUCTURAL DESIGN

5.5. THERMAL PERFORMANCE

5.6. PLUMBING

5.7. ELECTRICAL AND TELECOMMUNICATIONS SYSTEMS

5.8. HEATING, VENTILATING AND AIR CONDITIONING

5.9. ENERGY CONSERVATION

5.10. FIRE PROTECTION

5.11. SUSTAINABLE DESIGN

5.12. CONSTRUCTION AND DEMOLITION (C&D) WASTE MANAGEMENT

5.13. SECURITY (ANTI-TERRORISM STANDARDS)

6.0 PROJECT SPECIFIC REQUIREMENTS

- 6.1. GENERAL
- 6.2. APPROVED DEVIATIONS
- 6.3. SITE PLANNING AND DESIGN
- 6.4. SITE ENGINEERING
- 6.5. ARCHITECTURE
- 6.6. STRUCTURAL DESIGN
- 6.7. THERMAL PERFORMANCE
- 6.8. PLUMBING
- 6.9. SITE ELECTRICAL AND TELECOMMUNICATIONS SYSTEMS
- 6.10. FACILITY ELECTRICAL AND TELECOMMUNICATIONS SYSTEMS
- 6.11. HEATING, VENTILATING AND AIR CONDITIONING
- 6.12. ENERGY CONSERVATION
- 6.13. FIRE PROTECTION
- 6.14. SUSTAINABLE DESIGN
- 6.15. ENVIRONMENTAL
- 6.16. PERMITS
- 6.17. DEMOLITION
- 6.18. ADDITIONAL FACILITIES

1.0 PROJECT OBJECTIVES

The project objective is to design and construct facilities for the military that are consistent with the design and construction practices used for civilian sector projects that perform similar functions to the military projects. For example, a Company Operations Facility has the similar function as an office/warehouse in the civilian sector; therefore the design and construction practices for a company operations facility should be consistent with the design and construction of an office/warehouse building.

Comparison of Military Facilities to Civilian Facilities

Military Facility	Civilian Facility
Training Range or Training Range Facility	Firing Range

It is the Army's objective that these buildings will have a 25-year useful design life before a possible re-use/re-purpose or renovation requirement, to include normal sustainment, restoration, modernization activities and a 50-year building replacement life. Therefore, the design and construction should provide an appropriate level of quality to ensure the continued use of the facility over that time period with the application of reasonable preventive maintenance and repairs that would be industry-acceptable to a major civilian sector project OWNER. The site infrastructure will have at least a 50-year life expectancy with industry-accepted maintenance and repair cycles.

The project site should be developed for efficiency and to convey a sense of unity or connectivity with the adjacent buildings and with the Installation as a whole.

Requirements stated in this contract are minimums. Innovative, creative, and life cycle cost effective solutions, which meet or exceed these requirements are encouraged. Further, the OFFEROR is encouraged to seek solutions that will expedite construction (panelization, pre-engineered, etc.) and shorten the schedule. **The intent of the Government is to emphasize the placement of funds into functional/operational requirements. Materials and methods should reflect this by choosing the lowest Type of Construction allowed by code for this occupancy/project allowing the funding to be reflected in the quality of interior/exterior finishes and systems selected.**

1.1. SECTION ORGANIZATION

This Section is organized under 6 major "paragraphs".

- (1) Paragraph 1 is intended to define the project objectives and to provide a comparison between the military facility(ies) and comparable "civilian" type buildings.
- (2) Paragraph 2 describes the scope of the project.
- (3) Paragraph 3 provides the functional, operational and facility specific design criteria for the specific facility type(s) included in this contract or task order.
- (4) Paragraph 4 lists applicable industry and government design criteria, generally applicable to all facility types, unless otherwise indicated in the Section. It is not intended to be all-inclusive. Other industry and government standards may also be used, where necessary to produce professional designs, unless they conflict with those listed.
- (5) Paragraph 5 contains Army Standard Design Criteria, generally applicable to all facility types, unless otherwise indicated in the Section.
- (6) Paragraph 6 contains installation and project specific criteria supplementing the other 5 paragraphs.

2.0 SCOPE

2.1. TRAINING SUPPORT CENTER

Provide a Training Support Center (TSC) to fabricate, maintain, store and issue training devices. The facility contains warehouse space, classrooms and administrative space for management staff.

Size of Facility: Small

Number of BCT Sets: 1

Number of building stories: 1

Device Fabrication: Local fabrication only

Proposed space allocation below:

Training Support Facility Program	
Description	Maximum Allowable Gross Square Footage
Administration Area	
Administration Area - twelve people	1620
Customer Receiving - four people	60
Break room - twelve people	150
Shop Area	
Warehouse *	15000
Device Fabrication	1000
Device Maintenance	500
Secure	600
Shipping - two bays	1200
Training Area	
One Simulation/Class combo w/divider capabilities *	2320
Simulation Classroom *	2320
Simulation Classroom *	2320
Support Spaces	
Mechanical	1445
Electrical	180
Communication	180
Retail/Library	250
Latrines—twelve people	297
Janitor	20
Fire Pump	220
Total Gross SF	29682

Note: Support spaces such as Janitor, Mech/Elec, and Communication rooms need to be resized/enlarged for proper function of the facility.

Note: Mech/Elec can share a combined total maximum up to 1820 Gross SF

Note: 1391 states the maximum allowable Gross Square Footage can not exceed 29,682

Note: Square Footages are based on the Maximum Allowable Gross Square Footage based on the TSC criteria for a small facility type.

Note: Current Square Footages are based on the on the TSC criteria for a small facility type and concept design floor plan.

*** Simulation classrooms and warehouse must remain at the maximum Allowable Gross Square Footage.**

2.2. SITE:

Provide all site improvements necessary to support the new building facilities. Refer to Paragraph 6.

Approximate area available 3.60 acres

2.3. GOVERNMENT-FURNISHED GOVERNMENT-INSTALLED EQUIPMENT (GFGI)

Coordinate with Government on GFGI item requirements and provide suitable structural support, brackets for projectors/VCRs/TVs, all utility connections and space with required clearances for all GFGI items. Fire extinguishers are GF/GI personal property, while fire extinguisher brackets and cabinets are Contractor furnished and installed CF/CI. All Computers and related hardware, copiers, faxes, printers, video projectors, VCRs and TVs are GFGI.

The following are also GFGI items: See Appendix GG

2.4. FURNITURE REQUIREMENTS

Provide furniture design for all spaces listed in Chapter 3 and including any existing furniture and equipment to be re-used. Coordinate with the user to define requirements for furniture systems, movable furniture, storage systems, equipment, any existing items to be reused, etc. Early coordination of furniture design is required for a complete and usable facility.

The procurement and installation of furniture is NOT included in this contract. Furniture will be provided and installed under a separate furniture vendor/installer contract. The general contractor shall accommodate that effort with allowance for entry of the furniture vendor/installer onto this project site at the appropriate time to permit completion of the furniture installation for a complete and usable facility to coincide with the Beneficial Occupancy Date (BOD) of this project. The furniture vendor/installer contract will include all electrical pre-wiring and the whips for final connection to the building electrical systems however; the general contractor shall make the final connections to the building electrical systems under this contract. Furthermore, the general contractor shall provide all Information/Technology (IT) wiring (i.e. LAN, phone, etc.) up to and including the face plate of all freestanding and/or systems furniture desk tops as applicable, the services to install the cable and face plates in the furniture, the coordination with the furniture vendor/installer to accomplish the installation at the appropriate time, and all the final IT connections to the building systems under this contract.

The Government reserves the right to change the method for procurement of and installation of furniture to Contractor Furnished/Contractor Installed (CF/CI). CF/CI furniture will require competitive open market procurement by the Contractor using the Furniture, Fixtures and Equipment (FF&E) package.

2.5. NOT USED

3.0 TRAINING SUPPORT CENTER

3.1. FUNCTIONAL/OPERATIONAL REQUIREMENTS

The Training Support Center Facility (TSC) is composed of five main types of functional areas: Training Space, Classroom; Administrative Spaces (Customer Waiting Area, Administration Offices, Device Maintenance and Repair Area); Warehousing and Storage (Shipping/Receiving Loading Dock, Device Fabrication, Warehouse/Storage Area, Hazardous Materials Storage Area); Special Functional Use Areas (Latrines, Student/Staff Break Areas, Secure Operations Storage, Retail Device Storage); and Support Spaces (Janitor Closet, Mechanical/Electrical Space). Refer to the attached plan for the functional layout.

3.1.1. ACCESSIBILITY REQUIREMENTS. The Uniform Federal Accessibility Standards (UFAS) established by public law requires any DoD building, except those specifically occupied only by able-bodied personnel, be accessible to the disabled. Therefore the TSC interior design as well as the exterior site circulation considerations will meet the standards of the Architectural Barriers Act (ABA) and the UFAS standards.

3.1.1.1. Site Plan Design and Construction:

- (a) Provide ADA compliance access from the parking lot to the building.
- (b) Provide at least two ADA compliant vehicle parking stalls for the facility.
- (c) Provide handicapped vehicle parking signage and pavement markings.

3.1.1.2. Facility Design and Construction:

- (a) Designed per applicable code, shall be handicapped accessible. Electronic exterior door push buttons are not required.
- (b) Provide ADA clearances and door accesses throughout the building.
- (c) Provide handicapped accessible drinking fountains.
- (d) Provide handicapped accessible public toilet(s).

3.1.2. FUNCTIONAL AREAS

3.1.4.1 Training Space. General instruction rooms are space that includes primarily classroom space for multipurpose training instruction. These general purpose rooms are intended for use by organizations which serve a large population for classroom and device simulation instruction. The primary method used for sizing classrooms is the Engagement Skills Trainer (EST) simulation device. Two 20 x 40 foot lanes per Brigade Combat Team (total is 40' x 40' plus 45% for circulation).

3.1.4.2 Administrative Spaces.

3.1.4.2.1 Customer Waiting Area. Customers factored based on 4 personnel for each Brigade Combat Team MILES Set authorized.

3.1.4.2.2 Administration Offices. Space for building operations, budget, scheduling, technical support, contracting officer representative, program and training administration.

3.1.4.2.3 Device Maintenance and Repair Area. Device set-up, storage, maintenance and repair. Provide work bench, storage, tools storage and repair parts storage areas. Contract maintenance assumes 2 technicians for each Brigade MILES Set. Actual number of contract personnel must be used to factor actual requirement.

3.1.4.3 Warehousing and Storage.

- 3.1.4.3.1 Shipping/Receiving Loading Dock. A loading dock is important for new stand-alone facilities. It should be remote from the customer entrance and collocated with supply/storage area. A 20 ft x 20 ft bay sized for staging MILES containers and other training devices is needed to support issue and turn-in functions.
- 3.1.4.3.2 Device Fabrication. Training aids are fabricated using woodworking tools, bench fabrication, tools used are saws, drills, sanders, routers.
- 3.1.4.3.3 Warehouse/Storage Area. General Purpose Warehouse requirement based on physical measurement of standard BCT MILES Set, average of 5,000 components, containerized and stored on racks ~~four~~three tiers high.
- 3.1.4.4 Special Functional Use Areas
- 3.1.4.4.1 Latrines. Male and female latrines with standard fixtures.
- 3.1.4.4.2 Student/Staff Break Areas. Refrigerator, Sink, microwave, vending, phones, television. Lounge type furniture with tables and with seating for personnel.
- 3.1.4.4.3 Secure Operations Storage. Secure storage area for sensitive devices and other sensitive communication and automation components.
- 3.1.4.4.4 Retail Device Storage. Retail space derived as a percentage (10%) of General Warehouse/Storage Category Code 44220 requirement. 10% factor derived from physical measurement of related and support components for standard BCT MILES Set and all other Training Aide devices.
- 3.1.4.4.5 Hazardous Material Storage Areas: Hazardous materials used by the training support center include, but not limited to, propane, polyurethane, and oxygen. Storage area will be in compliance with existing government safety regulations. This storage area will ~~not~~ be included in the square footage of the training support center facility. A facility separate from the TSC structure is required for this storage area.
- 3.1.4.5 Support Spaces
- 3.1.4.5.1 Janitor Closet.
- 3.1.4.5.2 Mechanical/Electrical Communication Space. Dedicated interior spaces and exterior areas for plumbing, fire protection, communication and HVAC equipment.
- 3.1.5 BETTERMENTS
- 3.1.5.1 Exterior of the building finished in brick.
- 3.1.5.2 Structural standing seam metal roof (SSMR)
- 3.1.5.3 Provide roof and roof top free of HVAC equipment. Rooftop air handling units and chillers are not desired.
- 3.1.5.4 Provide a floor radiant heating element at the Warehouse/Storage area in colder climates.
- 3.1.5.5 Provide carpet flooring for Customer Waiting area, Administration areas and Conference rooms.
- 3.2 SITE PLANNING AND DESIGN

The TSC is located in close proximity to other training facilities; classroom and simulations. Components of land requirements are: primary facility; site egress and ingress; utility access; POV parking; and force protection stand-off distances. ~~Future expansion needs should factor a minimum of a 100% expansion of the warehouse component.~~

Organize the site to be compatible with the site planning and style of adjacent existing structures. Locate the building to reflect local climatic conditions. For example, provide protection from prevailing winds, snow load, glare, and orient operable windows to take advantage of summer breezes. Locate the building to take advantage of passive solar heating and day lighting.

- 3.2.1 Environmental. Develop the facility site to result in the minimal disturbance to the existing topography, vegetation and drainage patterns and reduce negative impact on the environment.
- 3.2.2 Soils Testing. Retain a qualified geo-technical engineer, licensed in the state of the location for the TSC, to take borings on the site, perform necessary soils testing and to recommend adequate foundation and pavement systems for site specific environmental, soil, rock and water conditions. Document any problematic surface or subsurface conditions such as soil, water, wind, manmade features, or seismic conditions that may affect the design and construction of the TSC in the resultant soils analysis report.
- 3.2.3 Groundwater and Runoff. The control of water flow around the site, site runoff and below grade ground water is critical to ensuring proper long term drainage around the building(s) and the parking areas. The minimum recommended requirements for most soil conditions involve the incorporation of foundation drains. Consideration should include minimizing roof runoff onto grade. Certain soil types may require the piping of roof and site runoff into a controlled storm drainage system.
- 3.2.4 Landscape Design Considerations. Use sustainable landscape features where possible. Utilize plant material to improve the physical appearance of the TSC site and the surrounding community. Where possible preserve trees and planting to enhance the overall visual quality of the facility and the installation. Submit landscape plans to ensure quality and promote design consistency with the architectural theme of the building.
- 3.2.5 Warehouse Hardstand: Design pavement for the appropriate vehicle size being used at the installation.
- 3.2.6 Exterior Lighting. Provide exterior area lighting systems for facility aprons, open storage areas, and parking areas. Provide illumination levels of 50 lux for areas adjacent to the primary facility and 5 lux for parking areas.
- 3.2.7 Perimeter Security Lighting. Provide protective lighting systems in response to project specific requirements to deter trespassers and make them visible to guards. Conform levels of exterior lighting for protected areas to the requirements in the IES Lighting Handbook. Control lighting with a photoelectric cell with manual override.
- 3.2.8 Storm Water Management. Site storm water management may require controls on the peak flow that can be discharged. Installations are required to have a storm water pollution prevention plan. Implement the applicable portions of this plan using best management practices. Segregate drainage from areas likely to be contaminated (e.g., fueling area). Provide treatment for contaminated water prior to its discharge. Maintenance should not be performed outside the primary facility.
- 3.2.9 Parking and Other Access Drives. Provide 35 parking spaces. Locate parking areas so they do not dominate the main entrance and public image of the facility. Comply with UFC 4-010-01 DOD Minimum Antiterrorist Standards for Buildings.
- 3.3 ARCHITECTURE
 - 3.3.1 Architectural Theme. Utilize the architectural style, materials and colors indigenous to the region. Consider historical and cultural influences of the installation and region.
 - 3.3.2 Architectural Planning. The architectural plan shall accommodate the functional and spatial relationships required for a functionally efficient TSC. Building layouts shall recognize the contrasting operational, administrative and shipping functional requirements and the facility will be designed for the appropriate accomplishment of each function.
 - 3.3.3 Circulation Design Considerations. The interior functional arrangement shall allow for ease of circulation and movement and shall consider the safety, health and operational efficiency of the occupants.

- 3.3.7 Building Exterior. Select exterior materials to be attractive, economical, and durable and low maintenance. Pre-engineered metal building systems are preferred for their factory finished metal siding and roof panels. Masonry walls are preferred at the ground floor level.
- 3.3.7.1 The TSC shall present a cohesive architectural image. Comply with Command and Installation architectural standards. Also, consider the local geographical and cultural environment. Use durable and low-maintenance exterior finishes.
- 3.3.7.2 Ensure that the main entrance is clearly identifiable to discourage visitors from entering the facility Warehouse and Storage area. In cold climates, provide a canopy (or a recess) at required egress doors to ensure that doors can completely open without obstruction from snow and ice. Comply with NFPA 80 Standard.
- 3.3.8 Building Interior.
- 3.3.8.1 Construction and finishes (walls, floor, and ceiling) shall support the cohesive image and theme of the facility.
- 3.3.8.2 Durability is extremely important when specifying materials for interior construction and finishes. Heavy equipment is regularly handled throughout the facility. These conditions will lead to greater interior damage being incurred compared too many other facility types.
- i. Casework: Provide counters, casework, and cabinets of high-quality and durable construction with Premium ~~or Custom~~ finishes in accordance with current AWI Quality Standards. At a minimum use plastic laminate doors, drawers, and casework faces. Where no water source is present, countertops shall be plastic laminate as a minimum. Where a water source is present, countertops shall be solid surface/solid composite plastics only.
 - ii. Interior Finishes: Finishes must take into account the intended uses, be highly durable, and meet the requirements listed in NFPA 101 Life Safety Code.
- 3.3.9 Floors. Provide highly durable and easily maintained flooring in the warehousing area, fabrication area, device maintenance/repair area, mechanical, electrical and storage areas. As a minimum provide resilient flooring in other areas.
- 3.3.10 Natural Lighting. Provide as much natural lighting as feasibly possible throughout the building. Natural lighting must be capable of being totally blocked from the Simulation Classrooms.
- 3.3.11 Warehouse Doors. Provide electrically manually operated doors ~~with provision for manual chain operation~~.
- i. Locking. Provide overhead doors that are operable from the interior only. Coordinate door locking requirements with the using service.
 - ii. Serviceability. Design doors to meet heavy duty loads and high frequency of operation. Conduct testing of deflection and operation of the doors prior to acceptance during construction. Doors shall be provided and installed by a commercial door company having not less than five years of experience in manufacturing, installing, and servicing the size and type of doors provided.
 - iii. Insulated Doors. Preference will be given to proposals that include insulated doors for thermal resistance and noise control.
- 3.3.12 Personnel Doors. Provide exterior personnel doors in the ends of central corridor maintenance areas and in the circulation bays as shown in the functional area adjacency diagram in Appendix J. Provide steel doors with vision panels, except at storage, janitorial, and latrine areas. Minimum size for personnel doors is 3 feet wide by 7 feet high.
- 3.3.13 Special Acoustical Requirements

Typical sound rated partitions shall have a minimum Sound Transmission Coefficient (STC) of 45 in accordance with ASTM E 90 or ASTM E 413 for frequency data. Due to the noise generated by the simulators in the Classrooms the minimum rating for all Classrooms shall be an STC of 62.

3.3.14 Finishes

3.3.14.1 Paint

- i. All paints used shall be listed on the "Approved product list" of the Master Painters Institute, (MPI). Application criteria shall be as recommended by Master Painters Institute (MPI) guide specifications for the substrate to be painted and the environmental conditions existing at the project site.
- ii. Exterior surfaces, except factory pre-finished material or exterior surfaces receiving other finishes shall be painted a minimum of one prime coat and two finish coats. Paints having a lead content over 0.06 percent by weight of nonvolatile content are unacceptable. Paints containing zinc-chromate, strontium-chromate, mercury or mercury compounds, confirmed or suspected human carcinogens shall not be used on this project. Exterior paints and coating products shall be classified as containing low volatile organic compounds (VOCs) in accordance with MPI criteria. Application criteria shall be as recommended by MPI guide specifications. Provide an MPI Gloss Level 5 Finish (Semi-gloss), unless otherwise specified.
- iii. Interior surfaces, except factory pre-finished material or interior surfaces receiving other finishes shall be painted a minimum of one prime coat and two finish coats. Paints having a lead content over 0.06 percent by weight of nonvolatile content are unacceptable. Paints containing zinc-chromate, strontium-chromate, mercury or mercury compounds, confirmed or suspected human carcinogens shall not be used on this project. Interior paints and coating products shall contain a maximum level of 150 g/l (grams per liter) of volatile organic compounds (VOCs) for non-flat coatings and 50 g/l of VOCs for flat coatings. Provide an MPI Gloss Level 5 Finish (Semi-gloss) in wet areas and a flat finish in all other areas.

3.3.14.2 Minimum Interior Finishes

- i. Designers are not limited to finishes listed in this section and are encouraged to offer higher quality finishes.
- ii. Wall, ceiling and floor finishes and movable partitions shall conform to the requirements of the IBC, NFPA and UFC 3-600-01. Where code requirements conflict, the most stringent code requirement shall apply.
- iii. Resilient and ceramic flooring are preferred. If selected, vinyl composition tile (VCT) shall be a minimum 1/8 inch thick, conforming to ASTM F 1066, Class 2, through-pattern tile, Composition 1, asbestos free, with color and pattern uniformly distributed throughout the thickness of the tile.
- iv. Walls: All wall finish shall be painted gypsum board, except where stated otherwise. Use impact resistant gypsum board in corridors and the centralized laundry, if provided.
- v. All ceiling finishes shall be painted gypsum board, except where stated otherwise.

3.4 STRUCTURAL REQUIREMENTS

Design and construct as a complete system in accordance with APPLICABLE CRITERIA.

3.5 MECHANICAL REQUIREMENTS

- 3.5.1 Fire Protection. Design the system in accordance with applicable criteria and code. Base warehouse sprinkler protection on Class IV commodities, as defined by NFPA 13, unless a more severe class of storage is anticipated, also base on maximum potential height of storage.

3.5.2 Plumbing. Provide facilities with a fully functional plumbing system that complies with the International Plumbing Code (IPC). Provide hose bibs or wall hydrants for the facility. A Philadelphia (one pipe), air admittance valve system, engineered vent system, or a sovent (aerator) type system will not be permitted.

3.5.3 Heating, Ventilating and Air-Conditioning (HVAC)

Provide facilities with a HVAC system that is automatically controlled by a Building Automation System (BAS). Air conditioning is prohibited in the warehouse and storage areas; however, these spaces are to be heated..

3.6 ELECTRICAL REQUIREMENTS

Electrical power, lighting and telecommunications shall be provided to the facility as specified below, in accordance with APPLICABLE CRITERIA, GENERAL TECHNICAL REQUIREMENTS, all IEEE Standards (including Recommended Practice) where the scope is applicable to this design effort, all UL Standards where the UL scope is applicable to this design effort, and where itemized in the combined interdisciplinary areas cited.

(a) Perform a short circuit study as an integral part of selecting and sizing electrical distribution components (all equipment shall be fully rated; that is, do not use series-combination rated equipment).

(b) Perform a coordination study to ensure that protective device settings are appropriate for the expected range of conditions (depending on the design and construction schedule, it is acceptable to design adequate protective devices with adjustable features, followed by a coordination study required during construction to specify the correct settings.)

(c) Circuit breakers, disconnect switches, and other devices that meet the OSHA definition of energy-isolating device must be lockable.

(d) Do not exceed 5 percent combined voltage drop on feeders and branch circuits if the transformer providing service is located within the facility. If the transformer is located exterior to the facility, limit the combined voltage drop for service conductors, feeders, and branch circuits to 5 percent. Individual voltage drop on branch circuits should not exceed 3 percent. Branch circuits supplying sensitive circuits should be limited to 1 percent voltage drop.

(e) In general, to minimize sound transmission, do not install "back-to-back" outlet boxes.

(f) Locate electrical distribution equipment installed within the facility, including dry-type transformers and electrical panels, within dedicated electrical rooms/closets.

3.6.1 Interior Electrical Power: When facility electrical design includes a 480/277V power distribution system, mechanical systems and lighting systems shall generally be fed from the available 480/277V power distribution system.

3.6.1.1. Receptacle Placement: In accordance with applicable codes, standards, referenced UFCs, and the attachments to this section. In general, provide wall duplex outlets, not less than 10 feet on center. Provide not less than one duplex outlet per wall on walls less than 9 feet long. Locate outlets to eliminate the need for extension cords. Above counter receptacles shall be mounted in the vertical wall space above the counter-top. Data, CATV, and CCTV outlets shall each be provided with an associated duplex receptacle.

3.6.1.2. Mounting Height: In accordance with applicable codes, standards, referenced UFCs, and the attachments to this section. Unless indicated otherwise, mount general use receptacles 18 inches above finished floor.

3.6.1.3 Special Power Requirements:

3.6.1.3.1. Simulation Classrooms: Each Simulation Classroom will be provided with dedicated circuits to support the number of Engagement Skills Trainer (EST) subsystems required. It is possible that one, two, or three 5-lane EST subsystems will be required in a simulation classroom.

a. Each CONUS/60 Hz EST subsystem requires: One dedicated 120V, 60 Hz, 15 Amp circuit with duplex receptacle located within 20 ft of the Instructor/Operator Station (IOS). One dedicated 120V, 60 Hz, 20 Amp circuit with duplex receptacle located within 8 ft of EST subsystem air compressor.

b. Each EST subsystem in OCONUS location with 50 Hz power distribution requires: One dedicated 220V, 50 Hz, 7.5 Amp circuit with duplex receptacle located within 20 ft of the Instructor/Operator Station (IOS). One dedicated 220V, 50 Hz, 10 Amp circuit with duplex receptacle located within 8 ft of EST subsystem air compressor.

3.6.2 Interior Lighting

3.6.2.1. General Lighting: In accordance with applicable codes, standards, referenced UFCs, and the attachments to this section. Lighting design shall consider ease of facility maintenance and minimize the lamp types and wattages used throughout the facility. Provide emergency lighting in all areas required by NFPA 101. Whenever possible, unless otherwise noted, incorporate the emergency lighting into the normally provided lighting fixtures. When natural lighting is provided in a space, the artificial lighting design shall consider and use daylighting control systems whenever it is feasible to reduce energy usage when the natural lighting is available.

3.6.2.2. Dimming and Switching: In accordance with applicable codes, standards, referenced UFCs, and the attachments to this section. Where dimmer controls are used, provide lighting fixtures that do not oscillate visibly at low intensities. Provide Three-Way/ Four-Way Switching for rooms/areas with more than one entrance.

3.6.3 Special Lighting Requirements

3.6.3.1 Simulation Classrooms: Provide zoned lighting schemes. Two lighting schemes are required for this classroom. First lighting scheme provides lighting for the space to be used for training with the Engagement Skills Trainer. Second lighting scheme provides lighting for the space to be used as a multipurpose classroom.

3.6.3.1.1 Lighting when used for training with Engagement Skills Trainer (EST): All natural lighting must be blocked/blacked out for training with EST. Provide lighting over firing line only. Provide fully dimmable lighting over the firing line from 0 to 30 fc. Lighting over the firing line shall be designed so that it is not directed at and does not interfere with the EST projection screen(s).

3.6.3.1.2 Lighting when used for multipurpose classroom: Natural lighting is allowed. Provide fully dimmable general space ambient lighting from 0 to 50 fc. Assure fixture selected minimizes possible interference with use of the room for training with EST (for example, because of the lasers used during training open type specular reflectors or highly reflective exposed surfaces would not be appropriate). Fixtures shall be mounted so that bottom of fixture is no less than 8 feet above finished floor.

3.6.4 Mass Notification. Provide a Mass Notification System (MNS) in accordance with UFC 4-021-01 that interfaces with the installation MNS to provide emergency notifications of an area, regional or national nature. The MNS may be combined with the Fire Alarm System to prevent duplication of devices and maintenance depending on the Authority Having Jurisdiction (AHJ) at the installation.

3.7 TELECOMMUNICATIONS REQUIREMENTS

Provide all telecommunications in accordance with the Technical Criteria for Installation Information Infrastructure Architecture (I3A). Telecommunications provide access to post voice and data systems. Interior telecommunications provided voice and data services, wireless (as needed) and primary facility intercom system connectivity.

3.7.1 Service: Coordinate service with local NEC personnel.

3.7.2 System: Provide a fully operational system from the demarcation point to each outlet. In addition to the requirements of the I3A, provide a telecommunications outlet, with a minimum of one voice jack and one data jack, at the left rear of each classroom.

3.7.3 Outside Plant Telecommunications: Provide outside plant cabling and support facilities as required by the local NEC.

3.8 CABLE TV (CATV) REQUIREMENTS

Install CATV outlets in waiting, break, conference room and director's office. All CATV outlet boxes, connectors, cabling, and cabinets shall conform to the I3A Technical Guide unless noted otherwise. All horizontal cabling shall be homerun from the CATV outlet to the nearest telecommunications room.

3.9 FIRE ALARM REQUIREMENTS

Provide a complete addressable Fire Alarm System for the facility. The system may be combined with MNS and consider incorporating PA system to reduce device and maintenance costs. This system shall consist of a control panel, a communications device, initiating devices, notification devices and associated wiring and pathways. Provide a Class A addressable system in accordance with UFC 3-600-01.

3.10 PHYSICAL SECURITY REQUIREMENTS

3.10.1 Electronic Security System (ESS): An Intrusion Detection System (IDS) is required for the arms secure storage room and shall comply with Army Regulation 190-11, **Physical Security of Arms, Ammunition, and Explosives**, Provide dedicated infrastructure, power and communication within the appropriate regulatory conveyance inside of the protected area with connectivity to the central security monitoring station.

3.10.2 Security Lighting. The lighting will be sufficient to allow guards (or individuals responsible for maintaining surveillance) to see illegal acts such as forced entry, or the unauthorized removal of arms during hours of reduced visibility. Lighting will provide a minimum of 0.2 foot-candles (2lux) illumination measured on the horizontal plane at ground level. Interior and exterior lighting will be provided for all buildings in which arms storage rooms are located and arms storage rooms.

3.11 ATTACHMENTS

- a. Adjacency Diagram

4.0 APPLICABLE CRITERIA

Unless a specific document version or date is indicated, use criteria from the most current references as of the date of issue of the contract or task order, including any applicable addenda, unless otherwise stated in the task order. In the event of conflict between References and/or Applicable Military Criteria, apply the most stringent requirement, unless otherwise specifically noted in the contract or task order.

4.1. INDUSTRY CRITERIA

Applicable design and construction criteria references are listed in Table 1 below. This list is not intended to include all criteria that may apply or to restrict design and construction to only those references listed. See also Paragraph 3 for additional facility-specific applicable criteria.

Table 1: Industry Criteria

Air Conditioning and Refrigeration Institute (ARI)	
ARI 310/380	Packaged Terminal Air-Conditioners and Heat Pumps
ARI 440	Room Fan-Coil and Unit Ventilator
ANSI/ARI 430-99	Central Station Air Handling Units
ARI 445	Room Air-Induction Units
ARI 880	Air Terminals
Air Movement and Control Association (AMCA)	
AMCA 210	Laboratory Methods of Testing Fans for Rating
American Architectural Manufacturers Association (AAMA)	
AAMA 605	Voluntary Specification Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels
AAMA 607.1	Voluntary Guide Specifications and Inspection Methods for Clear Anodic Finishes for Architectural Aluminum
AAMA 1503	Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors, and Glazed Wall Sections
American Association of State Highway and Transportation Officials (AASHTO)	
	Roadside Design Guide [guardrails, roadside safety devices]
	Standard Specifications for Transportation Materials and Methods of Sampling and Testing [Road Construction Materials]

	Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals
	Guide for Design of Pavement Structures, Volumes 1 and 2 [pavement design guide]
	A Policy of Geometric Design of Highways and Streets
American Bearing Manufacturers Association (AFBMA)	
AFBMA Std. 9	Load Ratings and Fatigue Life for Ball Bearings
AFBMA Std. 11	Load Ratings and Fatigue Life for Roller Bearings
American Boiler Manufacturers Association (ABMA)	
ABMA ISEI	Industry Standards and Engineering Information
American Concrete Institute	
ACI 302.2R	Guide for Concrete Slabs that Receive Moisture-Sensitive Flooring Materials
ACI 318	Building Code Requirements for Structural Concrete
ACI SP-66	ACI Detailing Manual
ACI 530	Building Code Requirements for Masonry Structures
ADA Standards for Accessible Design	
See US Access Board	ADA and ABA Accessibility Guidelines for Buildings and Facilities, Chapters 3-10.
American Institute of Steel Construction (AISC)	
	Manual of Steel Construction – 13 th Edition (or latest version)
American Iron and Steel Institute	
AISI S100	North American Specification for the Design of Cold-Formed Steel Structural Members
American National Standards Institute 11 (ANSI)	

ANSI Z21.10.1	Gas Water Heaters Vol. 1, Storage water Heaters with Input Ratings of 75,000 Btu per Hour or less
ANSI Z124.3	American National Standard for Plastic Lavatories
ANSI Z124.6	Plastic Sinks
ANSI Z21.45	Flexible Connectors of Other Than All-Metal Construction for Gas Appliances
ANSI/IEEE C2-2007	National Electrical Safety Code
ANSI/AF&PA NDS-2001	National Design Specification for Wood Construction
American Society of Civil Engineers (ASCE)	
ASCE 7	Minimum Design Loads for Buildings and Other Structures
ASCE 37	Design and Construction of Sanitary and Storm Sewers, Manuals and Reports on Engineering Practice [sanitary sewer and storm drain design criteria]
ASCE/SEI 31-03	Seismic Evaluation of Existing Buildings [Existing Building Alteration/Renovation]
ASCE/SEI 41-06	Seismic Rehabilitation of Existing Buildings [Existing Building Alteration/Renovation]
American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE)	
ASHRAE 90.1	ANSI/ASHRAE/IESNA 90.1, Energy Standard for Buildings Except Low-Rise Residential Buildings
ASHRAE Guideline 0	The Commissioning Process
ASHRAE Guideline 1.1	The HVAC Commissioning Process
ASHRAE Handbooks	Fundamentals, HVAC Applications, Systems and Equipment, Refrigeration (Applicable, except as otherwise specified)
ASHRAE Standard 15	Safety Standard for Refrigeration Systems
ASHRAE Standard 62.1	Ventilation for Acceptable Indoor Air Quality
ASHRAE Standard 55	Thermal Environmental Conditions for Human Occupancy (Design portion is applicable, except where precluded by other project requirements.)

American Society of Mechanical Engineers International (ASME)	
ASME BPVC SEC VII	Boiler and Pressure Vessel Code: Section VII Recommended Guidelines for the Care of Power Boilers
ASME A17.1	Safety Code for Elevators and Escalators
ASME B 31 (Series)	Piping Codes
American Water Works Association (AWWA)	
	Standards [standards for water line materials and construction]
American Welding Society	
	Welding Handbook
	Welding Codes and Specifications (as applicable to application, see International Building Code for example)
Architectural Woodwork Institute (AWI)	
Version 1.2	AWI Quality Standards 7th Edition
Associated Air Balance Council (AABC)	
AABC MN-1	National Standards for Testing and Balancing Heating, Ventilating, and Air Conditioning Systems
	AABC Associated Air Balance Council Testing and Balance Procedures
ASTM International	
ASTM C1060-90(1997)	Standard Practice for Thermographic Inspection of Insulation Installations in Envelope Cavities of Frame Buildings
ASTM E 779 (2003)	Standard Test Method for Determining Air Leakage Rate by Fan Pressurization
ASTM E1827-96(2002)	Standard Test Methods for Determining Airtightness of Buildings Using an Orifice Blower Door
Builders Hardware Manufacturers Association (BHMA)	
ANSI/BHMA	American National Standards for Builders Hardware

Building Industry Consulting Service International	
	Telecommunications Distribution Methods Manual (TDMM)
	Customer-Owned Outside Plant Design Manual (CO-OSP)
Code of Federal Regulations (CFR)	
49 CFR 192	Transportation of Natural and Other Gas by Pipeline: Minimum Federal Safety Standards
10 CFR 430	Energy Conservation Program for Consumer Products
Consumer Electronics Association	
CEA 709.1B	Control Network Protocol Specification
CEA 709.3	Free-Topology Twisted-Pair Channel Specification
CEA 852	Tunneling Component Network Protocols Over Internet Protocol Channels
Electronic Industries Association (EIA)	
ANSI/EIA/TIA 568	Structured Cabling Series
ANSI/EIA/TIA 569	Commercial Building Standard for Telecommunications Pathways and Spaces (includes ADDENDA)
ANSI/TIA/EIA-606	Administrative Standard for the Telecommunications Infrastructure of Commercial Buildings
J-STD EIA/TIA 607	Commercial Building Grounding and Bonding Requirements for Telecommunications
Federal Highway Administration (FHWA)	
	Manual on Uniform Traffic Control Devices for Streets and Highways [signage and pavement markings for streets and highways]
FHWA-NHI-01-021	Hydraulic Engineering Circular No. 22, Second Edition, URBAN DRAINAGE DESIGN MANUAL
Illuminating Engineering Society of North America (IESNA)	
IESNA RP-1	Office Lighting

IESNA RP-8	Roadway Lighting
IESNA Lighting Handbook	Reference and Application
Institute of Electrical and Electronics Engineers Inc. (IEEE)	
	Standard for Use of the International System of Units (SI): the Modern Metric System
Standard 1100	Recommended Practice for Powering and Grounding Sensitive Electronic Equipment
International Code Council (ICC)	
IBC	<p>International Building Code</p> <p>Note: All references in the International Building Code to the International Electrical Code shall be considered to be references to NFPA 70.</p> <p>All references in the International Building Code to the International Fuel Gas Code shall be considered to be references to NFPA 54 and NFPA 58.</p> <p>All references in the International Building Code to the International Fire Code and Chapter 9 shall be considered to be references to Unified Facilities Criteria (UFC) 3-600-01.</p>
IMC	<p>International Mechanical Code –</p> <p>Note: For all references to “HEATING AND COOLING LOAD CALCULATIONS”, follow ASHRAE 90.1</p> <p>Note: For all references to “VENTILATION”, follow ASHRAE 62.1</p>
IRC	International Residential Code
IPC	International Plumbing Code
IEC	Energy Conservation Code (IEC) –Applicable only to the extent specifically referenced herein. Refer to Paragraph 5, ENERGY CONSERVATION requirements.
IGC	International Gas Code - not applicable. Follow NFPA 54, National Fuel Gas Code and NFPA 58, Liquefied Petroleum Gas Code.
International Organization for Standardization (ISO)	
ISO 6781:1983	Qualitative detection of thermal irregularities in building envelopes –

	infrared method
LonMark International (LonMark)	
LonMark Interoperability Guidelines	(available at www.lonmark.org), including: Application Layer Guidelines, Layer 1-6 Guidelines, and External Interface File (XIF) Reference Guide
LonMark Resource Files	(available at www.lonmark.org), including Standard Network Variable Type (SNVT) definitions
Metal Building Manufacturers Association (MBMA)	
	Metal Building Systems Manual
Midwest Insulation Contractors Association (MICA)	
	National Commercial and Industrial Insulation Standards Manual
National Association of Corrosion Engineers International (NACE)	
NACE RP0169	Control of External Corrosion on Underground or Submerged Metallic Piping Systems
NACE RP0185	Extruded, Polyolefin Resin Coating Systems with Adhesives for Underground or Submerged Pipe
NACE RP0285	Corrosion Control of Underground Storage Tank Systems by Cathodic Protection
NACE RP0286	Electrical Isolation of Cathodically Protected Pipelines
National Electrical Manufacturers Association (NEMA)	
National Environmental Balancing Bureau (NEBB)	
	Procedural Standards Procedural Standards for Testing Adjusting Balancing of Environmental Systems
National Fire Protection Association (NFPA)	
NFPA 10	Standard for Portable Fire Extinguishers
NFPA 13	Installation of Sprinkler Systems
NFPA 13R	Residential Occupancies up to and Including Four Stories in Height Sprinkler Systems

NFPA 14	Standard for the Installation of Standpipes and Hose Systems
NFPA 20	Installation of Centrifugal Fire Pumps
NFPA 24 NFPA 25	Standard for the Installation of Private Fire Service Mains and Their Appurtenances [underground fire protection system design] Inspection, Testing And Maintenance Of Water-Based Fire Protection Systems
NFPA 30	Flammable and Combustible Liquids Code
NFPA 30A	Motor Fuel Dispensing Facilities and Repair Garages
NFPA 31	Installation of Oil Burning Equipment
NFPA 54	National Fuel Gas Code
NFPA 58	Liquefied Petroleum Gas Code
NFPA 70	National Electrical Code
NFPA 72	National Fire Alarm Code
NFPA 76	Fire Protection of Telecommunications Facilities
NFPA 80	Standard for Fire Doors and Fire Windows
NFPA 90a	Installation of Air Conditioning and Ventilating Systems
NFPA 96	Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations
NFPA 101	Life Safety Code
NFPA 780	Standard for the Installation of Lightning Protection Systems
National Roofing Contractor's Association (NRCA)	
	Roofing and Waterproofing Manual
National Sanitation Foundation, International	
NSF/ANSI Std. 2, 3, 4, 5, 6, 7, 8, 12, 13, 18, 20, 21, 25, 29, 35, 36, 37, 51, 52, 59,	Food Equipment Standards

169	
ANSI/UL Std. 73, 197, 471, 621, 763	Food Equipment Standards
CSA Std. C22.2 No. 109, 120, 195	Food Equipment Standards
Occupational Safety and Health Administration (OSHA)	
Title 29, Part 1926	OSHA Construction Industry Standards, Title 29, Code of Federal Regulations, Part 1926, Safety and Health Regulations for Construction
Plumbing and Drainage Institute (PDI)	
PDI G 101	Testing and Rating Procedure for Grease Interceptors with Appendix of Sizing and Installation Data
PDI WH201	Water Hammer Arrestors
Precast Concrete Institute	
PCI Design Handbook	Precast and Prestressed Concrete
Sheet Metal and Air Conditioning Contractor's National Association (SMACNA)	
SMACNA HVAC Duct Construction Standards	HVAC Duct Construction Standards - Metal and Flexible
SMACNA Architectural Manual	Architectural Sheet Metal Manual
SMACNA HVAC TAB	HVAC Systems - Testing, Adjusting and Balancing
State/Local Regulations	
	State Department of Transportation Standard Specifications for Highway and Bridge Construction
	Sedimentation and Erosion Control Design Requirements
	Environmental Control Requirements
	Storm Water Management Requirements
Steel Door Institute (SDI)	

ANSI A250.8/SDI 100	Standard Steel Doors and Frames
Steel Deck Institute	
	SDI Diaphragm Design Manual
Steel Joist Institute	
	Catalog of Standard Specifications and Load Tables for Steel Joists and Joist Girders
Underwriters Laboratories (UL)	
UL 96A	Installation Requirements for Lightning Protection Systems
UL 300	Standard for Safety for Fire Testing of Fire Extinguishing Systems for Protection of Restaurant Cooking Areas
UNITED STATES ACCESS BOARD: U.S. ARCHITECTURAL AND TRANSPORTATION BARRIERS COMPLIANCE BOARD	
ADA and ABA Accessibility Guidelines for Buildings and Facilities	<p>ABA Accessibility Standard for DoD Facilities</p> <p>Derived from the ADA and ABA Accessibility Guidelines: Specifically includes: ABA Chapters 1 and 2 and Chapters 3 through 10.</p> <p>Use this reference in lieu of IBC Chapter 11.</p> <p>Excluded are:</p> <p>(a) Facilities, or portions of facilities, on a military installation that are designed and constructed for use exclusively by able-bodied military personnel (See Paragraph 3 for any reference to this exclusion).</p> <p>(b) Reserve and National Guard facilities, or portions of such facilities, owned by or under the control of the Department of Defense, that are designed and constructed for use exclusively by able-bodied military personnel. (See paragraph 3 for any reference to this exclusion).</p>
U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES	
	FDA National Food Code
U.S. GREEN BUILDING COUNCIL (USGBC)	
LEED-NC	Green Building Rating System for New Construction & Major Renovations
	Application Guide for Multiple Buildings and On-Campus Building Projects

4.2. MILITARY CRITERIA

The project shall conform to the following criteria. Certain design impacts and features due to these criteria are noted for the benefit of the offeror. However, all requirements of the referenced criteria will be applicable, whether noted or not, unless otherwise specified herein.

- 4.2.1. Energy Policy Act of 2005 (Public Law 109-58) (applies only to the extent specifically implemented in the contract, which may or may not directly cite or reference EPACT)
- 4.2.2. Executive Order 12770: Metric Usage In Federal Government
- (a) Metric design and construction is required except when it increases construction cost. Offeror to determine most cost efficient system of measurement to be used for the project.
- 4.2.3. TB MED 530: Occupational and Environmental Health Food Sanitation
- 4.2.4. Unified Facilities Criteria (UFC) 3-410-01FA: Heating, Ventilating, and Air Conditioning - applicable only to the extent specified in paragraph 5, herein.
- 4.2.5. Deleted.
- 4.2.6. UFC 3-600-01 Design: Fire Protection Engineering for Facilities. Use the latest edition of the IBC in coordination with this UFC. Use Chapters 3, 6, 7, 33 and UFC 3-600-01. If any conflict occurs between these Chapters and UFC 3-600-01, the requirements of UFC 3-600-01 take precedence. Use UFC 3-600-01 in lieu of IBC Chapters 4, 8,9,10.
- 4.2.7. UFC 4-010-01 DoD Minimum Antiterrorism Standards for Buildings
- 4.2.8. UFC 4-023-03 Design of Buildings to Resist Progressive Collapse (Use most recent version, regardless of references thereto in other publications)
- (a) Note the option to use tie force method or alternate path design for Occupancy Category II.
- 4.2.9. UFC 4-021-01 Design and O&M: Mass Notification Systems
- 4.2.10. Technical Criteria for Installation Information Infrastructure Architecture (I3A)
- (a) Email: DetrickSECI3Aguide@conus.army.mil
- 4.2.11. U.S. Army Information Systems Engineering Command (USAISEC) TG for the Integration of SECRET Internet Protocol (IP) Router Network (SIPRNET). See Paragraph 3 for applicability to specific facility type. May not apply to every facility. This is mandatory criteria for those facilities with SIPRNET.

5.0 GENERAL TECHNICAL REQUIREMENTS

This paragraph contains technical requirements with general applicability to Army facilities. See also Paragraph 3 for facility type-specific operational, functional and technical requirements. Residential or similar grade finishes and materials are not acceptable for inclusion in these buildings, unless otherwise specifically allowed.

5.1. SITE PLANNING AND DESIGN

5.1.1. STANDARDS AND CODES: The site planning and design shall conform to APPLICABLE CRITERIA and to paragraph 6, PROJECT SPECIFIC REQUIREMENTS.

5.1.2. SITE PLANNING OBJECTIVES: Group buildings in configurations that create a sense of community and promote pedestrian use. See paragraph 3 for additional site planning requirements relating to building functions.

5.1.2.1. Provide enclosures and or visual screening devices for Outdoor Utility such as dumpsters, emergency generators, transformers, heating, ventilation, and air conditioning units from streetscape and courtyard views to limit visual impact. Enclosures shall be compatible with the building they serve and accessible by vehicle. The location of dumpsters can have a significant visual impact and should be addressed as part of an overall building design and incorporated in site planning.

5.1.2.2. Where included in the project, dumpster pads shall be concrete (minimum of 8 inches thick on 4 inch base course, unless site conditions dictate more conservative requirements) and directly accessible by way of a paved service drive or parking lot with adequate overhead clearance for collection vehicles. Provide space at dumpster areas for recycling receptacles. Coordinate with Installation on recycling receptacle types, sizes and access requirements and provide space at dumpster areas to accommodate them.

5.1.2.3. Vehicular Circulation. Apply design vehicle templates provided by the American Association of State Highway and Transportation Officials (AASHTO) to the site design. The passenger car class includes passenger cars and light trucks, such as vans and pick-ups. The passenger car template is equivalent to the non-organizational – privately owned vehicle (POV). The truck class template includes single-unit trucks, recreation vehicles, buses, truck tractor-semi-trailer combinations, and trucks or truck tractors with semi-trailers in combination with full trailers. Provide vehicle clearances required to meet traffic safety for emergency vehicles, service vehicles, and moving vans. Provide required traffic control signage Site entrances and site drive aisles shall maximize spacing between drives, incorporate right-angle turns, and limit points of conflict between traffic. Design Services Drives to restrict access to unauthorized vehicles by removable bollards, gates, or other barriers to meet Anti-Terrorism/Force Protection (ATFP) requirements. Orient service drives to building entrances other than the primary pedestrian entry at the front of the building.

5.1.2.4. Provide Emergency Vehicle Access around the facility and shall be in accordance with AT/FP requirements. Maintain a 33-foot clear zone buffer for emergency vehicles, designed to prevent other vehicles from entering the AT/FP standoff to the building.

5.1.2.5. Clear and grub all trees and vegetation necessary for construction; but, save as many trees as possible. Protect trees to be saved during the construction process from equipment.

5.1.2.6. Stormwater Management. Employ design and construction strategies (Best Management Practices) that reduce stormwater runoff, reduce discharges of polluted water offsite and maintain or restore predevelopment hydrology with respect to temperature, rate, volume and duration of flow to the maximum extent practicable. See paragraph 6, PROJECT SPECIFIC requirements for additional information.

5.1.3. EXTERIOR SIGNAGE: Provide exterior signage in accordance with Appendix H, Exterior Signage. Provide exterior NO SMOKING signage that conveys building and grounds smoking policy.

5.1.4. EXISTING UTILITIES: Base utilities maps and capacities for this site are included as part of this RFP. See paragraph 6 for more detailed information.

5.2. SITE ENGINEERING

5.2.1. STANDARDS AND CODES: The site engineering shall conform to APPLICABLE CRITERIA.

5.2.2. SOILS:

5.2.2.1. A report has been prepared to characterize the subsurface conditions at the project site and is **appended to these specifications**. The report provides a general overview of the soil and geologic conditions with detailed descriptions at discrete boring locations. The Contractor's team shall include a licensed geotechnical engineer to interpret the report and develop earthwork and foundation recommendations and design parameters in which to base the contractor's design. If any additional subsurface investigation or laboratory analysis is required to better characterize the site or develop the final design, the Contractor shall perform it under the direction of a licensed geotechnical engineer. There will be no separate payment for the cost of additional tests. If differences between the Contractor's additional subsurface investigation and the government provided soils report or the reasonably expected conditions require material revisions in the design, an equitable adjustment may be made, in accordance with the provisions of the Differing Site Conditions clause. The basis for the adjustment would be the design and construction appropriate for the conditions described in the Government furnished report or the reasonably expected conditions, in comparison with any changes required by material differences in the actual conditions encountered, in accordance with the terms of contract clause Differing Site Conditions.

5.2.2.2. The contractor's licensed geotechnical engineer shall prepare a final geotechnical evaluation report, to be submitted along with the first foundation design submittal, as described in Section 01 33 16, *Design After Award*.

5.2.3. VEHICLE PAVEMENTS: (as applicable to the project)

5.2.3.1. Design procedures and materials shall conform to one of the following: 1) the USACE Pavement Transportation Computer Assisted Structural Engineering (PCASE) program, 2) American Association of State Highway and Transportation Officials (AASHTO) or, 3) the applicable state Department of Transportation standards in which the project is located. See paragraph 5.2.2.2 and Section 01 33 16 for required information for the Contractor's geotechnical evaluation report. The minimum flexible pavement section shall consist of 2 inches of asphalt and 6 inches of base or as required by the pavement design, whichever is greater, unless specifically identified by the Government to be a gravel road. Design roads and parking areas for a life expectancy of 25 years with normal maintenance. Parking area for tactical vehicles (as applicable to the project) shall be Portland Cement Concrete (PCC) rigid pavement design. For concrete pavements, submit joint layout plan for review and concurrence. Design pavements for military tracked vehicles (as applicable to the project) IAW USACE PCASE. Traffic estimates for each roadway area will be as shown on the drawings or listed in Section 01 10 00 Paragraph 6.4.4. Pavement markings and traffic signage shall comply with the Installation requirements and with the Manual on Uniform Traffic Control Devices.

5.2.3.2. Parking Requirements.

- (a) All handicap POV parking lots (where applicable in the facility specific requirements) shall meet the ADA and ABA Accessibility Guidelines for accessible parking spaces.
- (b) Design POV parking spaces for the type of vehicles anticipated, but shall be a minimum of 9 ft by 18 ft for POVs, except for two wheel vehicles.

5.2.3.3. Sidewalks. Design the network of walks throughout the complex (where applicable) to facilitate pedestrian traffic among facilities, and minimize the need to use vehicles. Incorporate sidewalks to enhance the appearance of the site development, while creating a sense of entry at the primary patron entrances to the buildings. Minimum sidewalk requirements are in Paragraph 3, where applicable and/or paragraph 6 and/or site plans, where applicable..

5.2.4. CATHODIC PROTECTION: Provide cathodic protection systems for all underground metallic systems and metallic fittings/portions of non-metallic, underground systems, both inside and outside the building 5 foot line that are subject to corrosion. Coordinate final solutions with the installation to insure an approach that is consistent with installation cathodic protection programs.

5.2.5. UTILITIES: See paragraph 6.4.6 for specific information on ownership of utilities and utility requirements. Meter all utilities (gas, water, and electric, as applicable) to each facility. For Government owned utilities, install meters that are wireless data transmission capable as well as have a continuous manual reading option. All meters will be capable of at least hourly data logging and transmission and provide consumption data for gas, water, and

electricity. Gas and electric meters will also provide demand readings based on consumption over a maximum of any 15 minute period. Configure all meters to transmit at least daily even if no receiver for the data is currently available at the time of project acceptance. For privatized utilities, coordinate with the privatization utility(ies) for the proper meter base and meter installation.

5.2.6. PERMITS: The CONTRACTOR shall be responsible for obtaining all permits (local, state and federal) required for design and construction of all site features and utilities.

5.2.7. IRRIGATION. Landscape irrigation systems, if provided, shall comply with the following:

5.2.7.1. Irrigation Potable Water Use Reduction. Reduce irrigation potable water use by 100 percent using LEED credit WE1.1 baseline (no potable water used for irrigation), except where precluded by other project requirements.

5.2.8. EPA WaterSense Products and Contractors. Except where precluded by other project requirements, use EPA WaterSense labeled products and irrigation contractors that are certified through a WaterSense labeled program where available.

5.3. ARCHITECTURE AND INTERIOR DESIGN:

This element will be evaluated per APPLICABLE CRITERIA under the quality focus.

5.3.1. STANDARDS AND CODES: The architecture and interior design shall conform to APPLICABLE CRITERIA.

5.3.2. GENERAL: Overall architectural goal is to provide a functional, quality, visually appealing facility that is a source of pride for the installation and delivered within the available budget and schedule.

5.3.3. COMPUTATION OF AREAS: See APPENDIX Q for how to compute gross and net areas of the facility(ies).

5.3.4. BUILDING EXTERIOR: Design buildings to enhance or compliment the visual environment of the Installation. Where appropriate, reflect a human scale to the facility. Building entrance should be architecturally defined and easily seen. When practical, exterior materials, roof forms, and detailing shall be compatible with the surrounding development and adjacent buildings on the Installation and follow locally established architectural themes. Use durable materials that are easy to maintain. Exterior colors shall conform to the Installation requirements. See paragraph 6.

5.3.4.1. Building Numbers: Permanently attach exterior signage on two faces of each building indicating the assigned building number or address. Building number signage details and locations shall conform to Appendix H, Exterior Signage.

5.3.5. BUILDING INTERIOR

5.3.5.1. Space Configuration: Arrange spaces in an efficient and functional manner in accordance with area adjacency matrices.

5.3.5.2. Surfaces: Appearance retention is the top priority for building and furniture related finishes. Provide low maintenance, easily cleaned room finishes that are commercially standard for the facility occupancy specified, unless noted otherwise.

5.3.5.3. Color: The color, texture and pattern selections for the finishes of the building shall provide an aesthetically pleasing, comfortable, easily maintainable and functional environment for the occupants. Coordinate the building colors and finishes for a cohesive design. Select colors appropriate for the building type. Use color, texture and pattern to path or way find through the building. Trendy colors that will become dated shall be limited to non-permanent finishes such as carpet and paint. Select finishes with regards to aesthetics, maintenance, durability, life safety and image. Limit the number of similar colors for each material. Use medium range colors for ceramic and porcelain tile grout to help hide soiling. Plastic laminate and solid surface materials shall have patterns that are mottled, flecked or speckled. Coordinate finish colors of fire extinguisher cabinets, receptacle bodies and plates, fire alarms / warning lights, emergency lighting, and other miscellaneous items with the building interior. Match color of equipment items on ceilings (speakers, smoke detectors, grills, etc.) the ceiling color.

5.3.5.4. Circulation: Circulation schemes must support easy way finding within the building.

5.3.5.5. Signage: Provide interior signage for overall way finding and life safety requirements. A comprehensive interior plan shall be from one manufacturer. Include the following sign types: (1) Lobby Directory, (2) Directional Signs; (3) Room Identification Signs; (4) Building Service Signs; (5) Regulatory Signs; (6) Official and Unofficial Signs (7) Visual Communication Boards (8) NO SMOKING signage that conveys building smoking policy. Use of emblems or logos may also be incorporated into the signage plan.

5.3.5.6. Window Treatment: Provide interior window treatments with adjustable control in all exterior window locations for control of day light coming in windows or privacy at night. Maintain uniformity of treatment color and material to the maximum extent possible within a building.

5.3.6. COMPREHENSIVE INTERIOR DESIGN

5.3.6.1. Comprehensive Interior Design includes the integration of a Structural Interior Design (SID) and a Furniture, Fixtures and Equipment (FF&E) design and package. SID requires the design, selection and coordination of interior finish materials that are integral to or attached to the building structure. Completion of a SID involves the selection and specification of applied finishes for the building's interior features including, but not limited to, walls, floors, ceilings, trims, doors, windows, window treatments, built-in furnishings and installed equipment, lighting, and signage. The SID package includes finish schedules, finish samples and any supporting interior elevations, details or plans necessary to communicate the building finish design and build out. The SID also provides basic space planning for the anticipated FF&E requirements in conjunction with the functional layout of the building and design issues such as life safety, privacy, acoustics, lighting, ventilation, and accessibility. See Section 01 33 16 for SID design procedures.

5.3.6.2. The FF&E design and package includes the design, selection, color coordination and of the required furnishing items necessary to meet the functional, operational, sustainability, and aesthetic needs of the facility coordinated with the interior finish materials in the SID. The FF&E package includes the specification, procurement documentation, placement plans, ordering and finish information on all freestanding furnishings and accessories, and a cost estimate. Coordinate the selection of furniture style, function and configuration with the defined requirements. Examples of FF&E items include, but are not limited to workstations, seating, files, tables, beds, wardrobes, draperies and accessories as well as marker boards, tack boards, and presentation screens. Criteria for furniture selection include function and ergonomics, maintenance, durability, sustainability, comfort and cost. See Section 01 33 16 for FFE design procedures.

5.4. STRUCTURAL DESIGN

5.4.1. STANDARDS AND CODES: The structural design shall conform to APPLICABLE CRITERIA.

5.4.2. GENERAL: The structural system must be compatible with the intended functions and components that allows for future flexibility and reconfigurations of the interior space. Do not locate columns, for instance, in rooms requiring visibility, circulation or open space, including, but not limited to entries, hallways, common areas, classrooms, etc. Select an economical structural system based upon facility size, projected load requirements and local availability of materials and labor. Base the structural design on accurate, site specific geotechnical information and anticipated loads for the building types and geographical location. Consider climate conditions, high humidity, industrial atmosphere, saltwater exposure, or other adverse conditions when selecting the type of cement and admixtures used in concrete, the concrete cover on reinforcing steel, the coatings on structural members, expansion joints, the level of corrosion protection, and the structural systems. Analyze, design and detail each building as a complete structural system. Design structural elements to preclude damage to finishes, partitions and other frangible, non-structural elements to prevent impaired operability of moveable components; and to prevent cladding leakage and roof ponding. Limit deflections of structural members to the allowable of the applicable material standard, e.g., ACI, AISC, Brick Industry Association, etc. When modular units or other pre-fabricated construction is used or combined with stick-built construction, fully coordinate and integrate the overall structural design between the two different or interfacing construction types. If the state that the project is located in requires separate, specific licensing for structural engineers (for instance, such as in Florida, California and others), then the structural engineer designer of record must be registered in that state.

5.4.3. LOADS: See paragraph 3 for facility specific (if applicable) and paragraph 6 for site and project specific structural loading criteria. Unless otherwise specified in paragraph 6, use Exposure Category C for wind. If not

specified, use Category C unless the Designer of Record can satisfactorily justify another Exposure Category in its design analysis based on the facility Master Plan. Submit such exceptions for approval as early as possible and prior to the Interim Design Submittal in Section "Design After Award". Design the ancillary building items, e.g. doors, window jambs and connections, overhead architectural features, systems and equipment bracing, ducting, piping, etc. for gravity, seismic, lateral loads and for the requirements of UFC 4-010-01, DOD Minimum Antiterrorism Standards for Buildings. Ensure and document that the design of glazed items includes, but is not limited to, the following items under the design loads prescribed in UFC 4-010-01:

- (a) Supporting members of glazed elements, e.g. window jamb, sill, header
- (b) Connections of glazed element to supporting members, e.g. window to header
- (c) Connections of supporting members to each other, e.g. header to jamb
- (d) Connections of supporting members to structural system, e.g. jamb to foundation.

5.4.4. TERMITE TREATMENT: (Except Alaska) Provide termite prevention treatment in accordance with Installation and local building code requirements, using licensed chemicals and licensed applicator firm.

5.5. THERMAL PERFORMANCE

5.5.1. STANDARDS AND CODES: Building construction and thermal insulation for mechanical systems shall conform to APPLICABLE CRITERIA.

5.5.2. BUILDING ENVELOPE SEALING PERFORMANCE REQUIREMENT. Design and construct the building envelope for office buildings, office portions of mixed office and open space (e.g., company operations facilities), dining, barracks and instructional/training facilities with a continuous air barrier to control air leakage into, or out of, the conditioned space. Clearly identify all air barrier components of each envelope assembly on construction documents and detail the joints, interconnections and penetrations of the air barrier components. Clearly identify the boundary limits of the building air barriers, and of the zone or zones to be tested for building air tightness on the drawings. Pending the publication of the 2010 version of ASHRAE 90.1, the use of painted interior walls is not an acceptable air barrier method.

5.5.2.1. Trace a continuous plane of air-tightness throughout the building envelope and make flexible and seal all moving joints.

5.5.2.2. The air barrier material(s) must have an air permeance not to exceed 0.004 cfm / sf at 0.3" wg (0.02 L/s.m2 @ 75 Pa) when tested in accordance with ASTM E 2178

5.5.2.3. Join and seal the air barrier material of each assembly in a flexible manner to the air barrier material of adjacent assemblies, allowing for the relative movement of these assemblies and components.

5.5.2.4. Support the air barrier so as to withstand the maximum positive and negative air pressure to be placed on the building without displacement, or damage, and transfer the load to the structure.

5.5.2.5. Seal all penetrations of the air barrier. If any unavoidable penetrations of the air barrier by electrical boxes, plumbing fixture boxes, and other assemblies are not airtight, make them airtight by sealing the assembly and the interface between the assembly and the air barrier or by extending the air barrier over the assembly.

5.5.2.6. The air barrier must be durable to last the anticipated service life of the assembly.

5.5.2.7. Do not install lighting fixtures with ventilation holes through the air barrier

5.5.2.8. Provide a motorized damper in the closed position and connected to the fire alarm system to open on call and fail in the open position for any fixed open louvers such as at elevator shafts.

5.5.2.9. Damper and control to close all ventilation or make-up air intakes and exhausts, atrium smoke exhausts and intakes, etc when leakage can occur during inactive periods.

5.5.2.10. Compartmentalize garages under buildings by providing air-tight vestibules at building access points.

5.5.2.11. Compartmentalize spaces under negative pressure such as boiler rooms and provide make-up air for combustion.

5.5.2.12. Performance Criteria and Substantiation: Submit the qualifications and experience of the testing entity for approval. Demonstrate performance of the continuous air barrier for the opaque building envelope by the following tests:

(a) Test the completed building and demonstrate that the air leakage rate of the building envelope does not exceed 0.25cfm/ft² at a pressure differential of 0.3" w.g.(75 Pa) in accordance with ASTM's E 779 (2003) or E-1827-96 (2002). Accomplish tests using either pressurization or depressurization or both. Divide the volume of air leakage in cfm @ 0.3" w.g. (L/s @ 75 Pa) by the area of the pressure boundary of the building, including roof or ceiling, walls and floor to produce the air leakage rate in cfm/ft² @ 0.3" w.g. (L/s.m² @ 75 Pa). Do not test the building until verifying that the continuous air barrier is in place and installed without failures in accordance with installation instructions so that repairs to the continuous air barrier, if needed to comply with the required air leakage rate, can be done in a timely manner.

(b) Test the completed building using Infrared Thermography testing. Use infrared cameras with a resolution of 0.1deg C or better. Perform testing on the building envelope in accordance with ISO 6781:1983 and ASTM C1060-90(1997). Determine air leakage pathways using ASTM E 1186-03 Standard Practices for Air Leakage Site Detection in Building Envelopes and Air Barrier Systems, and perform corrective work as necessary to achieve the whole building air leakage rate specified in (a) above.

(c) Notify the Government at least three working days prior to the tests to provide the Government the opportunity to witness the tests. Provide the Government written test results confirming the results of all tests.

5.6. PLUMBING

5.6.1. STANDARDS AND CODES: The plumbing system shall conform to APPLICABLE CRITERIA.

5.6.2. PRECAUTIONS FOR EXPANSIVE SOILS: Where expansive soils are present, include design features for underslab piping systems and underground piping serving chillers, cooling towers, etc, to control forces resulting from soil heave. Some possible solutions include, but are not necessarily limited to, features such as flexible expansion joints, slip joints, horizontal offsets with ball joints, or multiple bell and spigot gasketed fittings. For structurally supported slabs, suspend piping from the structure with adequate space provided below the pipe for the anticipated soil movement.

5.6.3. HOT WATER SYSTEMS: For Hot Water heating and supply, provide a minimum temp of 140 Deg F in the storage tank and a maximum of 110 Deg F at the fixture, unless specific appliances or equipment specifically require higher temperature water supply.

5.6.4. SIZING HOT WATER SYSTEMS: Unless otherwise specified or directed in paragraph 3, design in accordance with ASHRAE Handbook Series (appropriate Chapters), ASHRAE Standard 90.1, and the energy conservation requirements of the contract. Size and place equipment so that it is easily accessible and removable for repair or replacement.

5.6.5. JANITOR CLOSETS: In janitor spaces/room/closets, provide at minimum, a service sink with heavy duty shelf and wall hung mop and broom rack(s).

5.6.6. FLOOR DRAINS: As a minimum, provide floor drains in mechanical rooms and areas, janitor spaces/rooms/closets and any other area that requires drainage from fixtures or equipment, drain downs, condensate, as necessary.

5.6.7. URINALS: Urinals shall be vitreous china, wall-mounted, wall outlet, non-water using, with integral drain line connection, and with sealed replaceable cartridge or integral liquid seal trap. Either type shall use a biodegradable liquid to provide the seal and maintain a sanitary and odor-free environment. Install, test and maintain in accordance with manufacturer's recommendations. Slope the sanitary sewer branch line for non-water use urinals a minimum of 1/4 inch per foot. Do not use copper tube or pipe for drain lines that connect to the urinal. Manufacturer shall provide an operating manual and on-site training to installation operations personnel for the proper care and maintenance of the urinal. For complexes, non-water using urinals are not required for barracks type spaces.

5.6.8. BUILDING WATER USE REDUCTION. Reduce building potable water use in each building 30 percent using IPC fixture performance requirements baseline.

5.6.9. Do not use engineered vent or Sovent® type drainage systems.

5.6.10. Where the seasonal design temperature of the cold water entering a building is below the seasonal design dew point of the indoor ambient air, and where condensate drip will cause damage or create a hazard, insulate plumbing piping with a vapor barrier type of insulation to prevent condensation. Do not locate water or drainage piping over electrical wiring or equipment unless adequate protection against water (including condensation) damage is provided. Insulation alone is not adequate protection against condensation. Follow ASHRAE Fundamentals Chapter 23, Insulation for Mechanical Systems, IMC paragraph 1107 and International Energy Conservation Code for pipe insulation requirements.

5.7. ELECTRICAL AND TELECOMMUNICATIONS SYSTEMS

5.7.1. STANDARDS AND CODES: The electrical systems for all facilities shall conform to APPLICABLE CRITERIA.

5.7.2. MATERIALS AND EQUIPMENT: Materials, equipment and devices shall, as a minimum, meet the requirements of Underwriters Laboratories (UL) where UL standards are established for those items. Wiring for branch circuits shall be copper. Motors larger than one-half horsepower shall be three phase. All electrical systems shall be pre-wired and fully operational unless otherwise indicated. Wall mounted electrical devices (power receptacles, communication outlets and CATV outlets) shall have matching colors, mounting heights and faceplates.

5.7.3. POWER SERVICE: Primary service from the base electrical distribution system to the pad-mounted transformer and secondary service from the transformer to the building service electrical equipment room shall be underground. See paragraph 6 for additional site electrical requirements.

5.7.3.1. Spare Capacity: Provide 10% space for future circuit breakers in all panelboards serving residential areas of buildings and 15% spaces in all other panelboards.

5.7.4. TELECOMMUNICATION SERVICE: Connect the project's facilities to the Installation telecommunications (voice and data) system through the outside plant (OSP) telecommunications underground infrastructure cabling system per the I3A Criteria. Connect to the OSP cabling system from each facility main cross connect located in the telecommunications room.

5.7.5. LIGHTING: Comply with the recommendations of the Illumination Engineering Society of North America (IESNA), the National Energy Policy Act and Energy Star requirements for lighting products..

5.7.5.1. Interior Lighting:

(a) Reflective Surfaces: Coordinate interior architectural space surfaces and colors with the lighting systems to provide the most energy-efficient workable combinations.

(b) High Efficiency Fluorescent Lighting: Utilize NEMA premium electronic ballasts and energy efficient fluorescent lamps with a Correlated Color Temperature (CCT) of 4100K. Linear fluorescent and compact fluorescent fixtures shall have a Color Rendering Index of (CRI) of 87 or higher. Fluorescent lamps shall be the low mercury type qualifying as non-hazardous waste upon disposal. Do not use surface mounted fixtures on acoustical tile ceilings. Provide an un-switched fixture with emergency ballast shall be provided at each entrance to the building.

(c) Solid State Lighting: Fixtures shall provide lighting with a minimum Correlated Color Temperature (CCT) of 4100K and shall have a Color Rendering Index of (CRI) of 75 or higher. Verify performance of the light producing solid state components by a test report in compliance with the requirements of IESNA LM 80. Verify performance of the solid state light fixtures by a test report in compliance with the requirements of IESNA LM 79. Provide lab results by a NVLAP certified laboratory. The light producing solid state components and drivers shall have a life expectancy of 50,000 operating hours while maintaining at least 70% of original illumination level. Provide a complete five year warranty for fixtures.

- (d) Metal Halide Lighting (where applicable): Metal Halide lamp fixtures in the range of 150-500 Watts shall be pulse start type and have a minimum efficiency rating of 88%.
- (e) Lighting Controls: ANSI/ASHRAE/IESNA 90.1 has specific lighting controls requirements. Provide a high level of lighting system control by individual occupants or by specific groups in multi-occupant spaces (classrooms, conference rooms) to promote the productivity, comfort and well being of the building occupants. In office spaces, the preferred lighting should be a 30 FC ambient lighting level with occupancy sensor controlled task lighting in the work spaces to provide a composite lighting level of 50 FC on the working surfaces. Consider incorporating daylighting techniques for the benefit of reducing lighting energy requirements while improving the quality of the indoor spaces. If daylight strategies are used, additional coordination is required with the architect and mechanical engineer. Additionally, incorporate electric lighting controls to take advantage of the potential energy savings.
- (f) Exterior Lighting: See paragraph 6.9 for site specific information, if any, on exterior lighting systems. Minimize light pollution and light trespass by not over lighting and use cut-off type exterior luminaries.

5.7.6. TELECOMMUNICATION SYSTEM: Building telecommunications cabling systems (BCS) and OSP telecommunications cabling system shall conform to APPLICABLE CRITERIA, including but not limited to I3A Technical Criteria. An acceptable BCS encompasses, but is not limited to, copper and fiber optic (FO) entrance cable, termination equipment, copper and fiber backbone cable, copper and fiber horizontal distribution cable, workstation outlets, racks, cable management, patch panels, cable tray, cable ladder, conduits, grounding, and labeling.. Items included under OSP infrastructure encompass, but are not limited to, manhole and duct infrastructure, copper cable, fiber optic cable, cross connects, terminations, cable vaults, and copper and FO entrance cable.

5.7.6.1. Design, install, label and test all telecommunications systems in accordance with the I3A Criteria and ANSI/TIA/EIA 568, 569, and 606 standards. A Building Industry Consulting Services International (BICSI) Registered Communications Distribution Designer (RCDD) with at least 2 yrs related experience shall develop and stamp telecommunications design, and prepare the test plan. See paragraph 5.8.2.5 for design of environmental systems for Telecommunications Rooms.

5.7.6.2. The installers assigned to the installation of the telecommunications system or any of its components shall be regularly and professionally engaged in the business of the application, installation and testing of the specified telecommunications systems and equipment. Key personnel; i.e., supervisors and lead installers assigned to the installation of this system or any of its components shall be BICSI Registered Cabling Installers, Technician Level. Submit documentation of current BICSI certification for each of the key personnel. In lieu of BICSI certification, supervisors and installers shall have a minimum of 5 years experience in the installation of the specified copper and fiber optic cable and components. They shall have factory or factory approved certification from each equipment manufacturer indicating that they are qualified to install and test the provided products.

5.7.6.3. Perform a comprehensive end to end test of all circuits to include all copper and fiber optic cables upon completion of the BCS and prior to acceptance of the facility. Provide adequate advanced notification to the COR to allow COR and Installation personnel attendance The BCS circuits include but are not limited to all copper and fiber optic(FO) entrance cables, termination equipment, copper and fiber backbone cable, copper and fiber horizontal distribution cable, and workstation outlets. Test in accordance with ANSI/EIA/TIA 568 standards. Use test instrumentation that meets or exceeds the standard. Submit the official test report to include test procedures, parameters tested, values, discrepancies and corrective actions in electronic format. Test and accomplish all necessary corrective actions to ensure that the government receives a fully operational, standards based, code compliant telecommunications system.

5.7.7. LIGHTNING PROTECTION SYSTEM: Provide a lightning protection system where recommended by the Lightning Risk Assessment of NFPA 780, Annex L.

5.8. HEATING, VENTILATING, AND AIR CONDITIONING

5.8.1. STANDARDS AND CODES: The HVAC system shall conform to APPLICABLE CRITERIA.

5.8.2. DESIGN CONDITIONS.

5.8.2.1. Outdoor and indoor design conditions shall be in accordance with UFC 3-410-01FA. Outdoor air and exhaust ventilation requirements for indoor air quality shall be in accordance with ASHRAE 62.1. All Buildings with

minimum LEED Silver requirement (or better) will earn LEED Credit EQ 7.1, Thermal Comfort-Design., except where precluded by other project requirements. Where the contract specifies indoor design temperature , airflow, humidity conditions, etc., use those parameters.

5.8.2.2. High Humidity Areas: Design HVAC systems in geographical areas meeting the definition for high humidity in UFC 3-410-01FA to comply with the special criteria therein for humid areas.

5.8.2.3. Cooling equipment may be oversized by up to 15 percent to account for recovery from night setback. Heating equipment may be oversized by up to 30 percent to account for recovery from night setback. Design single zone systems and multi-zone systems to maintain an indoor design condition of 50% relative humidity for cooling only. For heating only where the indoor relative humidity is expected to fall below 20% for extended periods, add humidification to increase the indoor relative humidity to 30%. Provide ventilation air from a separate dedicated air handling unit (DOAU) for facilities using multiple single zone fan-coil type HVAC systems. Do not condition outside air through fan coil units. Avoid the use of direct expansion cooling coils in air handling units with constant running fans that handle outside air.

5.8.2.4. Locate all equipment so that service, adjustment and replacement of controls or internal components are readily accessible for easy maintenance.

5.8.2.5. Environmental Requirements for Telecommunications Rooms,(including SIPRNET ROOMS, where applicable for specific facility type). Comply with ANSI/EIA/TIA 569 and the I3A.

5.8.2.6. Fire dampers: dynamic type with a dynamic rating suitable for the maximum air velocity and pressure differential to which the damper is subjected. Test each fire damper with the air handling and distribution system running.

5.8.3. BUILDING AUTOMATION SYSTEM. Provide a Building Automation System consisting of a building control network , and integrate the building control network into the UMCS as specified.

The building control network shall be a single complete non-proprietary Direct Digital Control (DDC) system for control of the heating, ventilating and air conditioning (HVAC) systems as specified herein. The building control network shall be an Open implementation of LONWORKS® technology using ANSI/EIA 709.1B as the only communications protocol and use only LonMark Standard Network Variable Types (SNVTs), as defined in the LonMark® Resource Files, for communication between DDC Hardware devices to allow multi-vendor interoperability.

5.8.3.1. The building automation system shall be open in that it is designed and installed such that the Government or its agents are able to perform repair, replacement, upgrades, and expansions of the system without further dependence on the original Contractor. This includes, but is not limited to the following:

- (a) Install hardware such that individual control equipment can be replaced by similar control equipment from other equipment manufacturers with no loss of system functionality.
- (b) Necessary documentation (including rights to documentation and data), configuration information, configuration tools, programs, drivers, and other software shall be licensed to and otherwise remain with the Government such that the Government or its agents are able to perform repair, replacement, upgrades, and expansions of the system without subsequent or future dependence on the Contractor.

5.8.3.2. All DDC Hardware shall:

- (a) Be connected to a TP/FT-10 ANSI/EIA 709.3 control network.
- (b) Communicate over the control network via ANSI/EIA 709.1B exclusively.
- (c) Communicate with other DDC hardware using only SNVTs
- (d) Conform to the LonMark® Interoperability Guidelines.
- (e) Be locally powered; link power (over the control network) is not acceptable.
- (f) Be fully configurable via standard or user-defined configuration parameter types (SCPT or UCPT), standard network variable type (SNVT) network configuration inputs (*nci*), or hardware settings on the controller itself to support the application. All settings and parameters used by the application shall be configurable via standard or

user-defined configuration parameter types (SCPT or UCPT), standard network variable type (SNVT) network configuration inputs (*nci*), or hardware settings on the controller itself

(g) Provide input and output SNVTs required to support monitoring and control (including but not limited to scheduling, alarming, trending and overrides) of the application. Required SNVTs include but are not limited to: SNVT outputs for all hardware I/O, SNVT outputs for all setpoints and SNVT inputs for override of setpoints.

(h) To the greatest extent practical, not rely on the control network to perform the application..

5.8.3.3. Controllers shall be Application Specific Controllers whenever an ASC suitable for the application exists. When an ASC suitable for the application does not exist use programmable controllers or multiple application specific controllers.

5.8.3.4. Application Specific Controllers shall be LonMark Certified whenever a LonMark Certified ASC suitable for the application exists. For example, VAV controllers must be LonMark certified.

5.8.3.5. Application Specific Controllers (ASCs) shall be configurable via an LNS plug-in whenever t an ASC with an LNS plug-in suitable for the application exists.

5.8.3.6. Each scheduled system shall accept a network variable of type SNVT_occupancy and shall use this network variable to determine the occupancy mode. If the system has not received a value to this network variable for more than 60 minutes it shall default to a configured occupancy schedule.

5.8.3.7. Gateways may be used provided that each gateway communicates with and performs protocol translation for control hardware controlling one and only one package unit.

5.8.3.8. Not Used

5.8.3.9. Perform all necessary actions needed to fully integrate the building control system. These actions include but are not limited to:

- Configure M&C Software functionality including: graphical pages for System Graphic Displays including overrides, alarm handling, scheduling, trends for critical values needing long-term or permanent monitoring via trends, and demand limiting.
- Install IP routers or ANSI/CEA-852 routers as needed to connect the building control network to the UMCS IP network. Routers shall be capable of configuration via DHCP and use of an ANSI/CEA-852 configuration server but shall not rely on these services for configuration. All communication between the UMCS and building networks shall be via the ANSI/CEA-709.1B protocol over the IP network in accordance with ANSI/CEA-852.

5.8.3.10. Provide the following to the Government for review prior to acceptance of the system:

- The latest version of all software and user manuals required to program, configure and operate the system.
- Points Schedule drawing that shows every DDC Hardware device. The Points Schedule shall contain the following information as a minimum:
 - Device address and NodeID.
 - Input and Output SNVTs including SNVT Name, Type and Description.
 - Hardware I/O, including Type (AI, AO, BI, BO) and Description.
 - Alarm information including alarm limits and SNVT information.
 - Supervisory control information including SNVTs for trending and overrides.
 - Configuration parameters (for devices without LNS plug-ins) Example Points Schedules are available at <https://eko.usace.army.mil/fa/besc/>
- Riser diagram of the network showing all network cabling and hardware. Label hardware with ANSI.CEA-709.1 addresses, IP addresses, and network names.
- Control System Schematic diagram and Sequence of Operation for each HVAC system.
- Operation and Maintenance Instructions including procedures for system start-up, operation and shut-down, a routine maintenance checklist, and a qualified service organization list.
- LONWORKS® Network Services (LNS®) database for the completed system.
- Quality Control (QC) checklist (below) completed by the Contractor's Chief Quality Control (QC) Representative

Table 5-1: QC Checklist

5.8.3.11. Perform a Performance Verification Test (PVT) under Government supervision prior to system acceptance. During the PVT demonstrate that the system performs as specified, including but not limited to demonstrating that the system is Open and correctly performs the Sequences of Operation.

5.8.3.12. Provide a 1 year unconditional warranty on the installed system and on all service call work. The warranty shall include labor and material necessary to restore the equipment involved in the initial service call to a fully operable condition.

5.8.3.13. Provide training at the project site on the installed building system. Upon completion of this training each student, using appropriate documentation, should be able to start the system, operate the system, recover the system after a failure, perform routine maintenance and describe the specific hardware, architecture and operation of the system.

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5.8.4. TESTING, ADJUSTING AND BALANCING. Test and balance air and hydronic systems, using a firm certified for testing and balancing by the Associated Air Balance Council (AABC), National Environmental Balancing Bureau (NEBB), or the Testing Adjusting, and Balancing Bureau (TABB). The prime contractor shall hire the TAB firm directly, not through a subcontractor. Perform TAB in accordance with the requirements of the standard under which the TAB Firm's qualifications are approved, i.e., AABC MN-1, NEBB TABES, or SMACNA HVACTAB unless otherwise specified herein. All recommendations and suggested practices contained in the TAB Standard shall be considered mandatory. Use the provisions of the TAB Standard, including checklists, report forms, etc., as nearly as practicable to satisfy the Contract requirements. Use the TAB Standard for all aspects of TAB, including qualifications for the TAB Firm and Specialist and calibration of TAB instruments. Where the instrument manufacturer calibration recommendations are more stringent than those listed in the TAB Standard, adhere to the manufacturer's recommendations. All quality assurance provisions of the TAB Standard such as performance guarantees shall be part of this contract. For systems or system components not covered in the TAB Standard, the TAB Specialist shall develop TAB procedures. Where new procedures, requirements, etc., applicable to the Contract requirements have been published or adopted by the body responsible for the TAB Standard used (AABC, NEBB, or TABB), the requirements and recommendations contained in these procedures and requirements are mandatory.

5.8.5. COMMISSIONING: Commission all HVAC systems and equipment, including controls, and all systems requiring commissioning for LEED Enhanced commissioning, in accordance with ASHRAE Guideline 1.1, ASHRAE Guideline 0 and LEED. Do not use the sampling techniques discussed in ASHRAE Guideline 1.1 and in ASHRAE Guideline 0. Commission 100% of the HVAC controls and equipment. Hire the Commissioning Authority (CA), certified as a CA by AABC, NEBB, or TABB, as described in Guideline 1.1. The CA will be an independent subcontractor and not an employee of the Contractor nor an employee or subcontractor of any other subcontractor on this project, including the design professionals (i.e., the DOR or their firm(s)). The CA will communicate and report directly to the Government in execution of commissioning activities. The Contracting Officer's Representative will act as the Owner's representative in performance of duties spelled out under OWNER in Annex F of ASHRAE Guideline 0. All buildings with Minimum LEED Silver (or better) requirement will earn LEED Credit EA3 Enhanced Commissioning.

5.9. ENERGY CONSERVATION

5.9.1. The building including the building envelope, HVAC systems, service water heating, power, and lighting systems shall meet the Mandatory Provisions and the Prescriptive Path requirements of ASHRAE 90.1. Substantiation requirements are defined in Section 01 33 16, Design After Award.

5.9.2. Design all building systems and elements to meet the minimum requirements of ANSI/ASHRAE/IESNA 90.1. Design the buildings, including the building envelope, HVAC systems, service water heating, power, and lighting systems to achieve an energy consumption that is at least 40% below the consumption of a baseline building meeting the minimum requirements of ANSI/ASHRAE/IESNA Standard 90.1. Energy calculation methodologies and substantiation requirements are defined in Section 01 33 16, Design After Award.

5.9.3. Purchase Energy Star products, except use FEMP designated products where FEMP is applicable to the type product. The term "Energy Star product" means a product that is rated for energy efficiency under an Energy Star program. The term "FEMP designated product" means a product that is designated under the Federal Energy Management Program of the Department of Energy as being among the highest 25 percent of equivalent products

for energy efficiency. When selecting integral sized electric motors, choose NEMA PREMIUM type motors that conform to NEMA MG 1, minimum Class F insulation system. Motors with efficiencies lower than the NEMA PREMIUM standard may only be used in unique applications that require a high constant torque speed ratio (e.g., inverter duty or vector duty type motors that conform to NEMA MG 1, Part 30 or Part 31).

5.9.4. Solar Hot Water Heating. Provide at least 30% of the domestic hot water requirements through solar heating methodologies, unless the results of a Life Cycle Cost Analysis (LCCA) developed utilizing the Building Life Cycle Cost Program (BLCC) which demonstrates that the solar hot water system is not life cycle cost effective in comparison with other hot water heating systems. The type of system will be established during the contract or task order competition and award phase, including submission of an LCCA for government evaluation to justify non-selection of solar hot water heating. The LCCA uses a study period of 25 years and the Appendix K utility cost information. The LCCA shall include life cycle cost comparisons to a baseline system to provide domestic hot water without solar components, analyzing at least two different methodologies for providing solar hot water to compare against the baseline system.

5.9.5. Process Water Conservation. When potable water is used to improve a building's energy efficiency, employ lifecycle cost effective water conservation measures, except where precluded by other project requirements.

5.9.6. Renewable Energy Features. The Government's goal is to implement on-site renewable energy generation for Government use when lifecycle cost effective. See Paragraph 6, PROJECT SPECIFIC REQUIREMENTS for renewable energy requirements for this project.

5.10. FIRE PROTECTION

5.10.1. STANDARDS AND CODES Provide the fire protection system conforming to APPLICABLE CRITERIA.

5.10.2. Inspect and test all fire suppression equipment and systems, fire pumps, fire alarm and detection systems and mass notification systems in accordance with the applicable NFPA standards. The fire protection engineer of record shall witness final tests. The fire protection engineer of record shall certify that the equipment and systems are fully operational and meet the contract requirements. Two weeks prior to each final test, the contractor shall notify, in writing, the installation fire department and the installation public work representative of the test and invite them to witness the test.

5.10.3. Fire Extinguisher Cabinets: Provide fire extinguisher cabinets and locations for hanging portable fire extinguishers in accordance with NFPA 10 Standard for Portable Fire Extinguishers. The Government will furnish and install portable fire extinguishers, which are personal property, not real property installed equipment.

5.10.4. Fire alarm and detection system: Required fire alarm and detection systems shall be the addressable type. Fire alarm initiating devices, such as smoke detectors, heat detectors and manual pull stations shall be addressable. When the system is in alarm condition, the system shall annunciate the type and location of each alarm initiating device. Sprinkler water flow alarms shall be zoned by building and by floor. Supervisory alarm initiating devices, such as valve supervisory switches, fire pump running alarm, low-air pressure on dry sprinkler system, etc. shall be zoned by type and by room location.

5.10.5. Roof Access: Paragraph 2-9 of UFC 3-600-01 Fire Protection for Facilities will be modified in the next update to that UFC. Pending revision, comply with roof access and stairway requirements in accordance with the International Building Code. Where roof access is required by the IBC or other criteria, comply with UFC 4-010-01, Anti-Terrorist Force Protection, Standard 14. "Roof Access".

5.10.6. Fire Protection Engineer Qualifications: In accordance with UFC 3-600-01, FIRE PROTECTION ENGINEERING FOR FACILITIES, the fire protection engineer of record shall be a registered professional engineer (P.E.) who has passed the fire protection engineering written examination administered by the National Council of Examiners for Engineering and Surveys (NCEES), or a registered P.E. in a related engineering discipline with a minimum of 5 years experience, dedicated to fire protection engineering that can be verified with documentation.

5.11. SUSTAINABLE DESIGN

5.11.1. STANDARDS AND CODES: Sustainable design shall conform to APPLICABLE CRITERIA. See paragraph 6, PROJECT-SPECIFIC REQUIREMENTS for which version of LEED applies to this project. The LEED-NC

Application Guide for Multiple Buildings and On-Campus Building Projects (AGMBC) applies to all projects. Averaging may be used for LEED compliance as permitted by the AGMBC but is restricted to only those buildings included in this project. Each building must individually comply with the requirements of paragraphs ENERGY CONSERVATION and BUILDING WATER USE REDUCTION.

5.11.2. LEED RATING, REGISTRATION, VALIDATION AND CERTIFICATION: See Paragraph PROJECT-SPECIFIC REQUIREMENTS for project minimum LEED rating/achievement level, for facilities that are exempt from the minimum LEED rating, for LEED registration and LEED certification requirements and for other project-specific information and requirements.

5.11.2.1. Innovation and Design Credits. LEED Innovation and Design (ID) credits are acceptable only if they are supported by formal written approval by GBCI (either published in USGBC Innovation and Design Credit Catalog or accompanied by a formal ruling from GBCI). LEED ID credits that require any Owner actions or commitments are acceptable only when Owner commitment is indicated in paragraph PROJECT-SPECIFIC REQUIREMENTS or Appendix LEED Project Credit Guidance

5.11.3. OPTIMIZE ENERGY PERFORMANCE. : Project must earn, as a minimum, the points associated with compliance with paragraph ENERGY CONSERVATION. LEED documentation differs from documentation requirements for paragraph ENERGY CONSERVATION and both must be provided. For LEED-NC v2.2 projects you may substitute ASHRAE 90.1 2007 Appendix G in its entirety for ASHRAE 90.1 2004 in accordance with USGBC Credit Interpretation Ruling dated 4/23/2008.

5.11.4. COMMISSIONING. See paragraph 5.8.5 COMMISSIONING for commissioning requirements. USACE templates for the required Basis of Design document and Commissioning Plan documents are available at <http://en.sas.usace.army.mil> (click on Engineering Criteria) and may be used at Contractor's option.

5.11.5. DAYLIGHTING. Except where precluded by other project requirements, do the following in at least 75 percent of all spaces occupied for critical visual tasks: achieve a 2 percent glazing factor (calculated in accordance with LEED credit EQ8.1) OR earn LEED Daylighting credit, provide appropriate glare control and provide either automatic dimming controls or occupant-accessible manual lighting controls.

5.11.6. LOW-EMITTING MATERIALS. Except where precluded by other project requirements, use materials with low pollutant emissions, including but not limited to composite wood products, adhesives, sealants, interior paints and finishes, carpet systems and furnishings,

5.11.7. CONSTRUCTION INDOOR AIR QUALITY MANAGEMENT. Except where precluded by other project requirements, earn LEED credit EQ 3.1 Construction IAQ Management Plan, During Construction and credit EQ 3.2 Construction IAQ Management Plan, Before Occupancy.

5.11.8. RECYCLED CONTENT. In addition to complying with section RECYCLED/RECOVERED MATERIALS, earn LEED credit MR4.1, Recycled Content, 10 percent except where precluded by other project requirements.

5.11.9. BIOBASED AND ENVIRONMENTALLY PREFERABLE PRODUCTS. Except where precluded by other project requirements, use materials with biobased content, materials with rapidly renewable content, FSC certified wood products and products that have a lesser or reduced effect on human health and the environment over their lifecycle to the maximum extent practicable.

5.11.10. FEDERAL BIOBASED PRODUCTS PREFERRED PROCUREMENT PROGRAM (FB4P). The Farm Security and Rural Investment Act (FSRIA) of 2002 required the U.S. Department of Agriculture (USDA) to create procurement preferences for biobased products that are applicable to all federal procurement (to designate products for biobased content). For all designated products that are used in this project, meet USDA biobased content rules for them except use of a designated product with USDA biobased content is not required if the biobased product (a) is not available within a reasonable time, (b) fails to meet performance standard or (c) is available only at an unreasonable price. For biobased content product designations, see <http://www.biopreferred.gov/ProposedAndFinalItemDesignations.aspx>.

5.12. CONSTRUCTION AND DEMOLITION (C&D) WASTE MANAGEMENT: Achievement of 50% diversion, by weight, of all non-hazardous C&D waste debris is required. Reuse of excess soils, recycling of vegetation, alternative daily cover, and wood to energy are not considered diversion in this context, however the Contractor

must tracked and report it. A waste management plan and waste diversion reports are required, as detailed in Section 01 57 20.00 10, ENVIRONMENTAL PROTECTION.

5.13. SECURITY (ANTI-TERRORISM STANDARDS): Unless otherwise specified in Project Specific Requirements, only the minimum protective measures as specified by the current Department of Defense Minimum Antiterrorism Standards for Buildings, UFC 4-010-01, are required for this project. The element of those standards that has the most significant impact on project planning is providing protection against explosives effects. That protection can either be achieved using conventional construction (including specific window requirements) in conjunction with establishing relatively large standoff distances to parking, roadways, and installation perimeters or through building hardening, which will allow lesser standoff distances. Even with the latter, the minimum standoff distances cannot be encroached upon. These setbacks will establish the maximum buildable area. All standards in Appendix B of UFC 4-010-01 must be followed and as many of the recommendations in Appendix C that can reasonably be accommodated should be included. The facility requirements listed in these specifications assume that the minimum standoff distances can be met, permitting conventional construction. Lesser standoff distances (with specific minimums) are not desired, however can be provided, but will require structural hardening for the building. See Project Specific Requirements for project specific siting constraints. The following list highlights the major points but the detailed requirements as presented in Appendix B of UFC 4-010-01 must be followed.

- (a) Standoff distance from roads, parking and installation perimeter; and/or structural blast mitigation
- (b) Blast resistant windows and skylights, including glazing, frames, anchors, and supports
- (c) Progressive collapse resistance for all facilities 3 stories or higher. Unless determined otherwise by the Installation and noted in paragraphs 3 or 6, the building shall be considered to have areas of uncontrolled public access when designing for progressive collapse.
- (d) Mass notification system (shall also conform to UFC 4-021-01, Mass Notification Systems)
- (e) For facilities with mailrooms (see paragraph 3 for applicability) – mailrooms have separate HVAC systems and are sealed from rest of building

End of Section 01 11 00

6.0 PROJECT SPECIFIC REQUIREMENTS

6.1. GENERAL

The requirements of this paragraph augment the requirements indicated in Paragraphs 3 through 5.

6.2. APPROVED DEVIATIONS

The following are approved deviations from the requirements stated in Paragraphs 3 through 5 that only apply to this project.

1. Section 01 45 04.00 10 Paragraph 3.7.4 to be revised as follows 'The Contractor is responsible for obtaining the services of an approved material testing laboratory as specified 01 45 04.00 10 Paragraph 3.7 Tests. The testing laboratory is responsible for all cost associated with obtaining, delivering and testing of material samples specified.'

2. Section 01 45 04.00 10 Paragraph 3.4.2 delete '(except may also serve as Safety and Health Officer, if qualified and if allowed by Section 00 73 00)' This individual is required per Section 01 10 00 Paragraph 6.19

6.3. SITE PLANNING AND DESIGN

6.3.1. General:

Not Used

6.3.2. Site Structures and Amenities

The proposed site is located on sloping terrain and is bounded by Buildings 1107 and 1108, 1st Street, and a Resource Protection Area (RPA) boundary. There is an existing parking lot and a six inch diameter water line located where the proposed parking lot is sited. A sand volleyball court, concrete walkway, several wooden benches, and existing utilities currently occupy the proposed building footprint. Numerous mature trees are sparsely located throughout the site. Wetlands and an RPA boundary are located to the rear of the proposed facility and will not be impacted by this project.

The proposed Training Support Center (TSC) shall be oriented to face 1st Street. The TSC shall be positioned to meet the thirty-three (33) foot AT standoff from all roadways and parking lots. The site shall include 35 parking spaces lot, a separate truck entrance from B Avenue through a parking lot of Building 1110, a dumpster pad with enclosure, a cover storage area with six (6) foot chain link fence are located to the rear of the building by the loading dock and access steps to loading area. Due to the existing structures, wetlands and RPA boundary, the site is restricted in the location of the building. See Appendix J for suggested location of the building and parking; it is up to the contractor to determine the site design.

6.3.2.2 Site Structure and Amenities

Site development shall include, but not be limited to:

(a) Where applicable, handicap parking stalls, ramps, and signage must be provided and must meet the requirements of criteria listed in Paragraph 4.

(b) A concrete dumpster pad shall be provided and shall extend a minimum of 20 feet in front of dumpster to accommodate the trash truck front wheels. Dumpster screen wall enclosures will be provided. The screen wall enclosures will visually match or be constructed of materials to match the new facility exterior walls. The color will match the new facility exterior wall. A gate keeper, capable of holding the gates in an open position, and a locking mechanism will be integrated into the gate design. Gates will have a minimum width of 12 feet. Dumpster locations will comply with criteria listed in Paragraph 4. Refer to the RFP drawings, included in Appendix J, for suggested locations of proposed dumpster pads and enclosures.

(c) Recycling space shall be incorporated into the site designs. Contractor to provide concrete pad for placement of recyclable material collection bin in the same location as the dumpster pads and enclosed with the dumpsters.

- (d) Provide exterior signage, building numbers (provided by the DOL/DPW Real Property Office to the USACE Project Manager), parking, and street signs in accordance with Appendix H.
- (e) Walks: Exterior concrete pavement walks will be constructed as needed to accommodate the final project layout and will be shown on the site plan. Building entrances, main and secondary, shall be provided with a concrete pad and connecting walk.
- (f) Building Aprons and Parking Areas: Pavement design for parking lots and roadways will be designed in accordance with UFC 3-250-01FA and geotechnical study. Concrete pavements shall be in accordance with UFC 3-250-04FA.
- (g) The construction site will be enclosed by fencing throughout the duration of work to warn people passing near or trying to pass through the site. Barricades and signs shall be posted at project areas while work is in progress to ensure safety of personnel entering or working in the area. Upon completion of construction, all construction area and safety fence, barricades and signs will be removed from the Installation by the Contractor.
- (h) Fire Access Lanes: The Contractor shall provide fire access roads in accordance with UFC 3-600-01 and NFPA 1.

6.3.3. Site Functional Requirements:

6.3.3.1. Stormwater Management (SWM) Systems.

For Training Support Center (TSC) site drainage from this project shall be collected and detained as required by the Commonwealth of Virginia for new projects and facilities. Runoff will flow to yard inlets and outfall to stormwater management facilities located between the proposed parking lot and 1st Street, and southeast of the TSC between the building and the existing parking lot. Roof drains will be conveyed into a stormwater management facility or outfall to an adequate channel. The Contractor shall design a new storm drainage system (utilizing low impact development to the extent practicable and best management principals) to adequately collect, detain and discharge storm water into existing storm drainage system for the site.

The Contractor shall also be responsible for connecting roof drain systems to the underground system where applicable. The storm drainage system on Fort Lee is owned and operated/maintained by Fort Lee, Directorate of Logistics/Directorate Public Works (DPW). All costs associated with the design, installation and construction of the new storm drainage (including detention) system shall be the responsibility of the Contractor.

- (a) During the design of the site, Fort Lee's storm water management measures are to be taken into consideration per Virginia Pollution Discharge Elimination System (VPDES). The site design is to incorporate strategies including a combination of structural practices, standards, and specifications that are appropriate for the site. The design shall consider long-term operation and maintenance of BMP's. Water quality protection will be considered in accordance with the Federal Clean Water Act, Virginia Code §§ 62.1-44.15 through 44.30, and Virginia Administrative Code 9 VAC 25-30-10 et seq.
- (b) The DB Contractor shall ensure that work does not interrupt the flow of storm water nor interfere with the daily operations of the Installation.
- (c) Fort Lee DPW is developing comprehensive storm water management policies that include, among other things, the following requirements:
1. Site designs shall minimize the generation of storm water and maximize pervious areas for storm water treatment. Structural and nonstructural infiltration BMPs shall be encouraged to provide storm water quality and quantity control and groundwater recharge.
 2. Natural channel characteristics shall be preserved to the maximum extent practicable.
 3. The use of low-impact development (LID) site planning and integrated management practices shall be strongly encouraged to control storm water runoff at the source and more closely approximate predevelopment runoff conditions.
- (d) State and Federal design manuals that address proper storm water management design techniques, including the following:
1. Virginia Stormwater Management Handbook, Volumes I and II, prepared by the Virginia Department of Conservation and Recreation dated 1999, as amended.
 2. VDOT Drainage Manual, prepared by the Hydraulics Section of the Virginia Department of Transportation dated 2002, as amended.
 3. Virginia Erosion and Sediment Control Handbook, prepared by the Virginia Department of Conservation and Recreation dated 1992, as amended.
 4. Low Impact Development Design Strategies: An Integrated Design Approach, United States Environmental Protection Agency, Office of Water, EPA 841-B-00-003 dated June 1999, as amended.
 5. Low Impact Development Hydrologic Analysis, United States Environmental Protection Agency, Office of Water, EPA 841-B-00-002 dated June 1999, as amended.

The manuals referenced here should be used by designers to ensure that standard, acceptable design practices are used to develop their storm water management designs. Additional storm water management design requirements are included in Appendix CC.

6.3.3.1 A Storm Water Pollution Prevention Plan that uses BMP's for erosion and sediment control will be developed in accordance with the Virginia Stormwater Management Handbook and Fort Lee's integrated stormwater pollution prevention plan. (Refer to paragraph 1.6 of Appendix E for requirements of Stormwater Pollution Prevention Plan and Permit requirements.)

Contractor shall install stabilized construction entrances in accordance with the Virginia Erosion and Sediment Control Handbook. Contractor shall also minimize tracking soil onto adjacent roadways. Contractor shall sweep roadways as necessary to remove tracked soil and dust.

Stormwater drainage shall meet the requirements of Energy Independence and Security Act: Section 438 and Low Impact Drainage Design Implementation.

6.3.3.2. Erosion and Sediment Control

Erosion and sediment control shall be provided in accordance with the Virginia Erosion and Sediment Control Handbook (latest edition).

6.3.3.3. Vehicular Circulation.

Refer to the Site Plan (See Appendix J) for proposed locations of improvements to the existing vehicle circulation to be included under this Scope of Work.

6.4. SITE ENGINEERING

6.4.1. Existing Topographical Conditions

See Appendix J for topographic survey and site layout plan drawings. Information shown is approximate. Contractor will field verify surface and utility elevations. Bring any discrepancies which may be found in the furnished surveys or drawings to the immediate attention of the Government for clarification.

6.4.2. Existing Geotechnical conditions: See Appendix A for a preliminary geotechnical report.

A Preliminary Geotechnical Report has been prepared and is included in Appendix A. For further information regarding the included geotechnical report and the Contractors requirements for completing a post-award final geotechnical evaluation report see Paragraph 5.2.2.1 and Section 01 33 16, *Design After Award*, Paragraph 3.5.3.

If the information on the existing geotechnical conditions provided herein is not consistent with the conditions encountered during the final geotechnical exploration, it is the responsibility of the Contractor to establish a meeting with the Government to outline the differences and the potential impact.

6.4.3. Fire Flow Tests See Appendix D for results of fire flow tests to use for basis of design for fire flow and domestic water supply requirements.

See Appendix D (*will be provided for FINAL RFP*) for results of preliminary fire flow tests to use for basis of design for fire flow and domestic water supply requirements. The Contractor shall conduct fire flow tests to be used for the final design and construction of the fire protection system.

6.4.4. Pavement Engineering and Traffic Estimates:

Building Aprons and Parking Areas: Pavement design for parking lots and roadways will be designed in accordance with UFC 3-250-01FA and geotechnical study. Concrete pavements shall be in accordance with UFC 3-250-04FA.

Pavement Design

Proposed pavement for this project includes asphalt, concrete, and pervious pavers. A parking lot is proposed between the TSC and 1st Street. The drive aisles of the lot will be constructed of asphalt and the parking stalls of pervious pavers. The lot will provide 35 parking spaces. An unknown number of existing parking spaces will be eliminated with this project, because the spaces are not marked.

Concrete walkways are provided between the parking lot and the facility, and tie-in to existing sidewalks. Concrete equipment pads are provided for the condensing unit, transformer, covered storage area, and dumpsters. Roller compacted concrete is provided for the loading dock area.

- (a) Organizational vehicle traffic areas will support tracked vehicles and other organizational vehicle traffic. Non-organizational vehicle traffic areas include streets and parking lots for privately owned passenger vehicles and standard truck traffic. The Design Build Contractor's geotechnical report will contain flexible and rigid pavement designs, including design California Bearing Ratio (CBR) and the modulus of subgrade reaction and the required compaction effort for subgrades. Pavements for non organizational traffic areas will be designed for the anticipated vehicle traffic of the heaviest wheeled vehicle and in accordance with UFC 3-250-01FA and using the PCASE program. The pavement design will be based on a minimum of 20 years of projected traffic.
- (b) Materials and construction will conform to the most recent edition of the VDOT Road and Bridge Specifications book.
- (c) The subgrade will be prepared and compacted in accordance with the geotechnical report and the most recent edition of the VDOT Road and Bridge Specifications book. The geotechnical report contained within Appendix A is for information only. The Contractor shall provide a final geotechnical report for the basis of design.
- (d) Pavement joint construction and design will conform to UFC 3-250-01FA and the most recent edition of the VDOT Road and Bridge Specifications book.
- (e) The Contractor's geotechnical report shall provide design for pavement under-drain system, if needed.

6.4.5. Traffic Signage and Pavement Markings

Traffic signage and striping will be provided for all new parking areas. Signage and striping will be designed in accordance with Manual on Uniform Traffic Control Devices for Streets and Highways.

6.4.6. Base Utility Information

6.4.6.1 EXISTING UTILITY LOCATIONS

Existing utilities must be located before doing any digging work on the Facility. The Contractor shall be responsible to contact Miss Utilities, obtain all existing utility locations which may be necessary to accomplish his work, and mark any utility lines in the immediate vicinity of his work. It shall be the responsibility of the Contractor to contact Miss Utilities at 1-800-552-7110 for locating commercial utilities 48 hours prior to digging operations.

6.4.6.2 UTILITY CONNECTIONS

- (a) Connections to existing or extended utilities shall be coordinated with Fort Lee DPW and the privatized utility companies.
- (b) The Contractor shall schedule the work so as to cause as little interruption of utility services as possible during normal work day hours, 0700 to 1630 hours Monday through Friday. **ALL** utility interruptions shall be coordinated with the Contracting Officer. The Contractor shall provide no less than 15 days notice of intended utility interruption to the Contracting Officer. Water and electrical services shall be terminated only as necessary, and shall be restored at the end of each working day. Temporary water and electrical services shall be coordinated with VAW and DVP.

6.4.6.3 SANITARY SEWER SYSTEM

- (a) Old Dominion Utility Services (ODUS) has obtained full ownership of all wastewater collection facilities at Fort Lee. All wastewater system modifications to the points of contractual demarcation including demolition, adjustments, new install, maintenance, etc. shall be performed by ODUS and/or ODUS's designated subcontractors. The point of demarcation shall be 5' from the face of the building.
- (b) The design and construction of the modifications to existing wastewater facilities shall be performed by ODUS.

(c) Prior to ODUS performing modifications, a Request for Proposal (RFP) shall be prepared by the entity requesting a modification. This RFP is not the same as the Design Build Request for Proposal often prepared by the USACE. This RFP is a typically a one page document that can be obtained from ODUS's Contracting Officer Representative (COR) Leroy Good with the Fort Lee DPWL. Mr. Good's contact information is 804-734-5092 or HYPERLINK "<mailto:leroy.good@us.army.mil>" leroy.good@us.army.mil. Costs or fees assessed by ODUS for the design and construction of or connection to the sanitary sewer system shall be paid to ODUS by the Government from construction funds for this project.

(d) All modifications shall meet the requirements of ODUS's standards and specifications and the Virginia Department of Environmental Quality (VDEQ) Sewage Collection and Treatment (SCAT) regulations. Where conflicts exist, the more stringent specification shall apply. Please contact Brandon LoGioco with ODUS for the ODUS standards and specifications at 757-888-0485 or HYPERLINK "<mailto:blogioco@odus.asusinc.com>" blogioco@odus.asusinc.com. Only the standards and specifications received from the ODUS office will be acceptable.

(e) For new install or replacement of sewer services to buildings, ODUS will install a cleanout five (5) feet outside of the face of the building and make the connection to the building's internal plumbing if available. If the building's internal plumbing has not been installed the plumber shall make the connection to the backside of the wye for the cleanout.

(f) In order to protect the integrity of the system, ODUS will repair all wastewater systems damaged during the course of construction. The party responsible for the damage, in accordance with MISS Utility procedures, will be responsible to pay for correcting the damages.

(g) Only wastewater from grease traps, oil-water separators, and sanitary waste is permitted to enter the sanitary sewer system. The contractor cannot connect 'non-sewer' related wastewater to the sanitary sewer system without written consent from ODUS. Examples of non-sewer related wastewater may be, but are not limited to, dumpster pad drains, storm drains, trench drains, roof leaders, boot washing stations, etc.

(h) The ODUS contact for all issues related to sanitary sewerage is Brandon LoGioco (HYPERLINK "<mailto:blogioco@odus.asusinc.com>" blogioco@odus.asusinc.com), 757-888-0485.

6.4.6.4 WATER SYSTEM

(a) The Water System at Ft. Lee has been privatized and is owned by Virginia American Water (VAW). VAW point of contact for this project is as noted in Appendix C.

(b) VAW will be responsible for the design and construction of the water distribution system to the building tap/meter point five feet outside the building line. Payment to VAW for design and construction of the water distribution system will be paid to VAW by the Government from construction funds for this project.

(c) The Design Build Contractor is responsible for the design and construction of the building water system inside of the five-foot line around the building, including the connection to the main distribution system provided by VAW. The DB Contractor shall coordinate capacities and connection points with the Contracting Officer and with VAW.

(d) The water supply for each site must be designed and constructed in accordance with 12 VAC 5-590 through 5-600, Prince George County and VAW requirements. The Commonwealth of Virginia requires permits for construction or modification of water distribution systems. Water supply systems must be designed according to requirements set forth in the Manual of Practice for Waterworks Design. A master meter must be provided on the primary water supply line to the site for reading by Prince George County. Each building or site requiring water service will have an individual water meter and backflow preventor in addition to any other required water meters and backflow devices on the primary water supply to the site. Prince George County also imposes a connection fee, which must be included in the proposal by the Contractor.

The Contractor will also be responsible for all aspects of the water system design, permitting and construction, including but not limited to: coordination with Prince George County, VDOT, the VDH, and other applicable federal, state, and local permitting and approval authorities. All permits and applications will be the responsibility of the Contractor. All costs associated with design and installation of the water service are the responsibility of the Contractor and must be included within the bid including but not limited to: tapping of the existing water supply line, installation of the service line from the main to the meter vault, installation of the meter vault, meter, backflow preventor, bypass line and valves, pavement restoration, utility relocation, and design and installation of the potable water distribution and fire protection system.

(e) The distribution system will be sized to accommodate domestic and industrial or flushing demands. Distribution must be looped to provide at least 50 percent of the required fire flow in case of a single break. Dead-end mains shall be avoided.

(f) All water lines will comply with applicable Local, State (VDH) and Federal UFC standards as listed in Paragraph 4. Local and State standards will dictate unless the Federal standards are more stringent.

(g) All new water lines and any existing lines which do not remain fully pressurized during construction or connection will be disinfected. The disinfection will be in accordance with the American Water Works Association Standard AWWA C651 and will not be complete until two consecutive days of bacteriological samples show no contamination. All bacteriological, lead and copper tests will be performed by Environmental Protection Agency (EPA) certified laboratories.

6.4.6.5 Fire Sprinkler Service

A minimum of one separate fire sprinkler service connection shall be provided with the building. A fire sprinkler main will be constructed to the building five foot line by Virginia American Water Company (VAWC). Construction of fire water supply line from the buildings five foot line to the building is the responsibility of the Contractor. VAWC is responsible for the post indicator valve (PIV) and the Fire Department Connection (FDC). Fire water supply line shall not be metered. The Contractor is not responsible for costs incurred for services provided by others. See Paragraph 6.4.3 for fire flow test information. The D/B contractor is responsible for the design of the utility system in terms of meeting code and criteria requirements (correct number of hydrants, location of PIV, etc.).

6.4.6.6 NATURAL GAS

(a) The natural gas utility service at Fort Lee has not been privatized. Natural gas is currently provided to Fort Lee by Columbia Gas of Virginia (CG). CG point of contact for this project is as noted in Appendix C.

(b) The DB Contractor shall coordinate the anticipated natural gas demand with Fort Lee DPW/DOL and with CG.

(c) Fort Lee DPW/DOL in coordination with CG is responsible for the design and construction of the natural gas system from the connection with the main to the gas meter.

(d) The DB Contractor is responsible for the design and construction of the natural gas distribution from the meter to each point of use within the building. All natural gas systems shall be designed constructed in accordance with UFC and Local, State, and Federal standards as listed in Paragraph 4. Local and State standards will dictate unless the Federal standards are more stringent.

6.4.6.7 ELECTRICAL SERVICE

- (a) The electrical infrastructure system at Fort Lee has been privatized and is owned by Dominion Virginia Power (DVP). DVP point of contact for this project is as noted in Appendix C.
- (b) The DB Contractor will coordinate all electrical service connections with the Dominion Virginia Power privatized utility group. Submission of load letters and documentation supporting the site location of transformers and meter equipment will also be coordinated and approved.
- (c) The DB Contractor is responsible for the design and construction of the electrical systems from the five-foot building line into and within the building. All electrical systems shall be designed constructed in accordance with UFC and Local, State, and Federal standards as listed in Paragraph 4. Local and State standards will dictate unless the Federal standards are more stringent.
- (d) The DB Contractor shall design the exterior building lighting system including walkway and parking lot lighting. The DB Contractor shall provide and install lighting fixtures that are mounted on/attached to the building. DVP will provide and install lighting fixtures located along walkways and parking areas and located within parking areas.

6.4.6.8 COMMUNICATIONS SERVICE

- (a) The communications infrastructure system at Fort Lee has not been privatized and is managed by the Fort Lee Directorate of Information Management (DOIM). DOIM point of contact for this project is as noted in Appendix C.
- (b) The DB Contractor will contact and coordinate all communications service connections with DOIM.
- (c) All communications systems, outside plant (OSP), voice system, and data network shall be designed and constructed in accordance with the USAISEC Technical Guide for Installation, Information, Infrastructure, Architecture (I3A), or as directed by the DOIM requirements.
- (d) The DB Contractor shall coordinate communication infrastructure design and construction requirements with the DOIM and USAISEC Site Engineer through the Corps of Engineers, Resident Engineer or other COE POC as designated. Construction drawings and specifications shall comply with UFC-3-580-2 and be coordinated with USAISEC, Fort Detrick Engineering. (For a copy of the I3A Guide, contact USAISEC-FDED, email: DetrickISECI3Aguide@conus.army.mil.)
- (e) The DB Contractor is responsible for the design and construction of the communications systems within the building and from the building to the connection point with the installation infrastructure. The DB Contractor shall engineer, furnish, install, secure, and test (EFIS&T) the telecommunications and information technology infrastructure and make operational.
- (f) The BD contractor shall refer to communication systems in paragraph 6.9.3 for additional building distribution and design information

6.4.6.9 TRACER WIRE AND MARKER TAPE

All non-metallic utility and storm drain lines will have #12 AWG TW (thermal-weather resistant) insulated, solid copper wire, installed parallel with and 6 inches above the utility for the reception of a locator transmitter signal. In addition, natural gas lines will have marking tape placed in the trench 6 inches below finish grade.

6.4.6.6 Electrical Service

- (a) The electrical infrastructure system at Fort Lee has been privatized and is owned by Dominion Virginia Power (DVP). DVP point of contact is Dennis Collins at (804) 757-4829 or dennis_collins@dom.com.

6.4.6.7 Water Utility

Refer to Paragraph 6.4.6.4.

6.4.6.8 Sanitary Utility

Refer to Paragraph 6.4.6.3.

6.4.6.9 Gas Utility

(a) The natural gas utility service at Fort Lee has not been privatized. Natural gas is currently provided to Fort Lee by Columbia Gas of Virginia (CG).

(b) The DB Contractor shall coordinate the anticipated natural gas demand with Fort Lee DPW/DOL and with CG.

(c) Fort Lee DPW/DOL in coordination with CG is responsible for the design and construction of the natural gas system from the connection with the main to the gas meter.

(d) The DB Contractor is responsible for the design and construction of the natural gas distribution from the meter to each point of use within the building. All natural gas systems shall be designed constructed in accordance with UFC and Local, State, and Federal standards as listed in Paragraph 4. Local and State standards will dictate unless the Federal standards are more stringent.

6.4.6.10 Cable Television (CATV)

Cable television is owned and operated by Comcast on Fort Lee. The point of contact for Comcast is Wilbur Morris at 804-915-5259. The D/B Contractor shall coordinate with Comcast and provide (1) 4" conduit stubbed out from the building to allow Comcast to bring in their cable and terminate it on the CATV backboard in the telecommunications room.

6.4.6.11 Telecommunications Service

(a) The telecommunication infrastructure system at Fort Lee has not been privatized and is managed by the Fort Lee Network Enterprise Center (NEC). Call NEC at (804)-734-7250 to be directed to the proper point of contact.

(b) The D/B Contractor shall contact and coordinate all telecommunications service connections with NEC.

(c) The D/B Contractor shall coordinate telecommunication infrastructure design and construction requirements with the NEC and USAISEC Site Engineer through the Corps of Engineers, Resident Engineer or other USACE POC as designated. Construction drawings and specifications shall be coordinated with USAISEC, Fort Detrick Engineering. (For a copy of the I3A Guide, contact USAISEC-FDED, email: DetrickISECI3Aguide@conus.army.mil) ISEC Fort Lee point of contact is Ron Michon, michonr@lee.army.mil.

(d) The D/B Contractor is responsible for the design and construction of the telecommunication systems within the building and from the building to the connection point with the installation infrastructure. All communication shall be designed and stamped by a Registered Communication Distribution Designer (RCDD). The D/B Contractor shall engineer, furnish, install, secure, and test (EFIS&T) the telecommunications and information technology infrastructure and make operational to include, but not limited to, the installation of outside cabling, manholes, conduit, duct bank system, and connections.

(e) The D/B Contractor shall refer to telecommunication systems in section 6.9 for additional outside plant distribution and design information.

6.4.7. Cut and Fill

See Plans (See Appendix J) for the existing elevations. Any off-site borrow soils required to bring the site to final grade or to backfill below grade structure walls, earth retaining structures, or utility trenches shall be approved by the government before use. Unsatisfactory soils, as defined in the Geotechnical Report, shall be hauled off site and disposed of in accordance with criteria.

Compaction requirements for fill shall be based on ASTM D1557, Modified Proctor compaction. Notify the licensed geotechnical engineer that will be preparing the final Geotechnical evaluation report of this requirement.

Depending on the final building footprint and finished floor elevation, a substantial amount of fill may be required to reach final grade, particularly for any building corner located in the northern portion of the project boundary. In the post-award geotechnical report (see Paragraph 5.2.2.1 and Section 01 33 16, Paragraph 3.5.3), the project geotechnical engineer shall be sure to address the possibility of differential settlement that would result from the building being located partially on natural ground and partially on substantial amounts of fill.

The near surface soils at the project site primarily consist of fine grained soils as indicated in the Preliminary Geotechnical Engineering Report in Appendix A. These fine grained soils are susceptible to strength loss and deterioration from exposure to excess moisture (precipitation) and manipulation by construction equipment. Portions of these fine grained soils are often problematic with regard to providing a firm and stable subgrade and often exhibit pumping and rutting during proof-rolling. The Contractor should be aware that pumping and rutting soils will need to be undercut and replaced with appropriate fill and should account for such contingencies in their proposal. Any over-excavation due to the action/inaction of the Contractor, or done to expedite the Contractors construction time, will be at no additional cost to the Government.

Ensure that the licensed project design geotechnical engineer oversees and directs proof rolling operations (for subgrade suitability); fill placement and compaction operations, including associated soil properties, compaction, and field density testing; and footing inspections on a full time basis. A Corps of Engineers validated geotechnical testing firm shall inspect, test, and document earthwork construction.

6.4.8. Borrow Material

Any off-site borrow soils required to bring the site to final grade or to backfill below grade structure walls, earth retaining structures, or utility trenches shall be approved by the government before use. The finished grades adjacent to the new building will be a minimum of 6" below finished floor except where grades are required on walk ways and entrances to buildings that are handicap accessible. Finish grades will slope away from the building at 5% for the first 10 feet and then will slope at a minimum of 1% to existing or new storm drainage

6.4.9. Haul Routes and Staging Areas

The Contractor will be allowed to use Fort Lee road system for transporting construction materials and debris to and from the project sites. Care shall be taken to minimize "tracking" of mud from the project sites with regular cleaning of equipment and street cleaning. The route for hauling of such material and debris shall be coordinated with the contracting officer prior to the start of construction.

6.4.10. Clearing and Grubbing:

All cleared shrubs and vegetation shall be chipped, shredded, and composted. Cleared shrubs and vegetation shall not be removed to stockpile on-site or off-site. Remove all soils to be stripped to the depth recommended by the contractor's geotechnical engineer. Note that the provided preliminary geotechnical report recommends that up to 8 inches of clearing will be required to remove the topsoil encountered in the borings located within the project site.

Clearing and grubbing of unsuitable materials may result in surface soil disturbances up to 36-inches, especially with regard to the removal of root balls from large sized trees. Following clearing and grubbing operations, the Contractor should realize that certain areas of the site may need to be backfilled with controlled structural fill and should account for such contingencies in their proposal.

Although the subsurface exploration did not reveal any previously existing structures, features such as gravel roadbeds, concrete pads, or similar construction debris is often encountered during clearing and grubbing operations on sites at Ft Lee that have been thought to be an undeveloped site. The Offeror shall realize that such features may be encountered and budget for such during the clearing and grubbing phase of the project.

6.4.11. Landscaping:

The Contractor shall establish turf in all disturbed areas. The Contractor also shall develop a site landscaping plan for the entire site. The plan shall incorporate plantings from the approved planting list shown in Appendix I of this RFP. Selection of planting and locations used shall also be in accordance with AT/FP requirements, Fort Lee's ADG and National Nursery Standards.

6.4.12. Turf:

In addition to the requirements of the Paragraph "Landscaping", seed mixes must be approved by the Ft Lee Environmental Office to meet seasonal needs see Appendix E.

6.5. ARCHITECTURE

6.5.1. General: To the maximum extent possible within the contract cost limitation, the buildings shall conform to the look and feel of the architectural style and shall use the same colors as adjacent facilities as expressed herein. The Government will evaluate the extent to which the proposal is compatible with the architectural theme expressed in the RFP during the contract or task order competition. The first priority in order of importance is that the design provides comparable building mass, size, height, and configuration compared to the architectural theme expressed herein. The second priority is that design is providing compatible exterior skin appearance based upon façade, architectural character (period or style), exterior detailing, matching nearby and installation material/color pallets, as described herein.

6.5.2. Design

6.5.2.1. Appendix F is provided "For Information Only", to establish the desired site and architectural themes for the area. Appendix F identifies the desired project look and feel based on Fort Lee's Installation Architectural Theme from existing and proposed adjacent building forms; i.e. building exterior skin, roof lines, delineation of entrances, proportions of fenestration in relation to elevations, shade and shadow effects, materials, textures, exterior color schemes, and organizational layout.

6.5.2.2. The design should address Fort Lee's identified preferences. Implement these preferences considering the following:

- (a) Achievable within the Construction Contract Cost Limitation (CCL)
- (b) Meets Milestones within Maximum Performance Duration.
- (c) Achieves Full Scope indentified in this Solicitation
- (d) Best Life-Cycle Cost Design
- (e) Meets the Specified Sustainable Design and LEED requirements
- (f) Complies with Energy Conservation Requirements Specified in this RFP.

6.5.2.3. Priority #1. Visual Compatibility: Facility Massing (Size, Height, Spacing, Architectural Theme, etc.) Exterior Aesthetic Considerations: The buildings massing, exterior functional aesthetics, and character shall create a comprehensive and harmonious blend of design features that are sympathetic to the style and context of the Installation. The Installation's intent for this area is:

Priority #1, Visual Compatibility: 75-100% brick of the Facility Massing (Size, Height, Spacing, Architectural Theme, etc.). Exterior Aesthetic Considerations: The building massing, exterior functional aesthetics, and character shall create a comprehensive and harmonious blend of design features that are complimentary to the style and context and visual environment of the Installation. Exterior elements of this facility shall be in accordance with the architectural character of the adjacent facilities unless otherwise required by building codes. The administrative portion of the facility shall match that of the "Typical South Post- Admin facilities," the warehouse portion shall match that of the "Typical South Post – COF," and the storage shed shall match the "Typical South Post – Organization Storage" theme. Use durable, low maintenance materials. Configure the building massing and use exterior elements and material detailing to provide human scale.

6.5.2.4. Priority #2. Architectural Compatibility: Exterior Design Elements (Materials, Style, Construction Details, etc.) Roofs, Exterior Skin, and Windows & Door Fenestrations should promote a visually appealing compatibility with the desired character while not sacrificing the integrity and technical competency of building systems.

6.5.2.5. See Appendix F for exterior colors that apply to Architectural character at Fort Lee. The manufacturers and materials referenced are intended to establish color only, and are not intended to limit manufacturers and material selections.

6.5.2.6. Additional architectural requirements:

(a) Install fall protection anchor points on all roofs with a slope greater than 2:12

(b) Fenestrations – Entrance doors shall be aluminum storefront. Service doors shall be painted hollow metals. Exterior doors and windows shall have Low-e insulated glass. Windows, except at vestibules, shall have operable blinds. Where possible, especially in storage buildings, operable windows shall be used and be provided with locks and insect screens. Windows shall comply with UFC 4-010-01. Glazing shall be insulated and follow ATFP guidelines.

(c) Roofs – All roof systems are required to provide with manufacture's standard warranty. No flat roofs are allowed on Fort Lee. Roof slope shall be a minimum 4:12. Sloped roofs shall have snow /ice guards above pedestrian walks needed for roof system selected, exposed gutters and downspouts. Splash-blocks shall be provided at each downspout, or rain leaders shall be tied into a sub-surface storm water collection system. Insulated roof systems shall not be ventilated; non-insulated roofs creating attics shall be ventilated with storm-proof ridge vents matching the roof construction. All roof penetrations shall match the roof construction and be discretely located. Varying roofing options/materials are covered further elsewhere within this Paragraph.

1. Where metal roofing is provided the system shall be a complete roof system consisting of finished, factory formed panels, fasteners, slip sheet, insulation, vapor retarder, all accessories, components and trim. Roof shall be tested in accordance with ASTM E 1592. The installer shall be certified by the roof system manufacturer. Roof panel and trim shall have no exposed fasteners. Snow/ice guards shall be adhered (no penetrations) to metal roof. Provide soffit/ridge ventilation where required by design. Vents through the roof shall not be located on the front of the building.

2. Where modified bitumen roofing is used, the entire roof system; including rigid insulation, roofing membrane assembly, all accessories, flashing, components and trim, shall be approved by the roofing manufacturer for use with roof system. The installer shall be certified by the roof system manufacturer.

(d) Exterior Canopies – Canopies shall match building and roof construction and shall be identical to the construction materials used for the Central Campus Part I facilities currently under construction. Columns are to be finished to match the walls on all four sides. Provide exterior canopies at all main building entrances. All exterior entrances and canopies shall be lighted and shall include Pigeon/Bird deterrent or be incorporated in its design. Canopy areas and soffits shall provide recessed or appropriate lighting for night time use.

(e) All materials for flashing and sheet metal trim; including gutters, downspouts, fascias, soffit, and trim shall be prefinished metal to match the roof; comply with SMACNA Architectural Sheet Metal Manual; and shall be provided with the manufacturers standard finish warranty. Trim and flashing shall be at least 26 gauge 55% Aluminum-Zinc alloy coated sheet steel in compliance with ASTM B 209 with a factory applied, oven baked, polyvinylidene fluoride resin finish, with no exposed fasteners. Soffits other than entry canopies shall be flush panels. Continuous wood backing shall support fascia. Metal trim and flashing shall be produced in the maximum practical lengths but in no case less than ten feet long. Trim shall be flat with no oil canning or waves. All exposed flashing must match the roof color.

- (f) Joint Sealant – Sealants shall be compatible and as recommended by the manufacturer of the items being sealed. Sealant at masonry shall be a one or two part urethane and shall match the color used for the Central Campus Part I facilities currently under construction. Sealant at window and door frames shall be a one or two part urethane and shall match the color used for the Central Campus Part I facilities currently under construction. Interior joint sealant shall be silicone and be clear or match the surface being sealed. Compatible primers and backer rods shall be used with sealant.
- (g) Brick – 75% Brick shall be severe weather rated, ASTM C 216/652.
- (h) Concrete Masonry Units – (CMU) shall be ASTM C90, may be lightweight units. Masonry work shall comply with the Brick Institute of America and American Concrete Institute guidelines. Masonry veneer shall be anchored to the structural substrate with galvanized adjustable wall ties. Steel lintels, if used, shall be hot dipped galvanized steel and painted. All masonry at windows and doors and wall/grade intersections shall be flashed with a flexible metal flashing. Exterior CMU walls shall be damp proofed above grade and above interior finished floor line.
- (i) Exterior Walls – Exterior metal wall panels shall be factory finished. Design loads are referenced in Paragraph 6.6. Wall panels, trim, flashing and accessories shall be from the same manufacturer. All materials shall be aluminum or steel and have a factory-applied color finish. Wall panels shall be fastened to framework using concealed fasteners.
- (j) Insulation – The insulation shall be provided in exterior walls, floors, and roof/ceiling assemblies with thermal transmittance (U-values) which comply with Applicable Criteria identified in Paragraph 4 of this RFP. Perimeter Slab Insulation. Insulation shall be un-faced preformed rigid expanded polystyrene.
- (k) EIFS – Exterior Insulation Finish System (EIFS) shall not be used on buildings at Fort Lee.
- (l) Walls – exterior and interior walls may be any material which meets the requirement of the RFP. Exterior walls to comply colors and architectural theme of the installation design guide (IDG). Sound attenuation batt shall be required in interior walls where needed for privacy purposes and noise reduction. Where acoustic separation is required, partitions shall extend to the roof or have a ceiling/floor assembly that maintains the acoustic rating. Vertical walls for stairs, shafts, mechanical, electrical, telecom, and janitor rooms shall comply with all code requirements and applicable criteria. Be fire rated according to code requirements and shall be constructed to accommodate all applicable Underwriters Laboratory (UL) assemblies.
- (m) Exterior Doors – Doors shall comply with UFC 4-010-01. Exterior doors at the building public entrance and exit shall be aluminum storefront door and frames with glazing. All glazing and frames shall comply with ATFP requirements. Exterior doors that access mechanical, electrical, and other utility functions rooms, are typically painted, insulated, hollow metal doors and frames or as required by applicable criteria in chapter 4. Exterior doors shall be fully weather-stripped and include a heavy duty threshold and a minimum 0.5 inch grade change to prevent drafts, dirt, water, and insect entry. Overhead doors shall be manually chain operated and insulated.
- (n) Compatibility – Exterior must be compatible with the new buildings on Fort Lee campus. No exterior shall have EIFS materials. The proposed facility should be sympathetic to existing facilities styles, but may employ new materials and color pallets. Refer to Appendix F for exterior colors.
- (o) Polyurethane foam – Use of spray polyurethane foam (SPF) in the building envelope shall comply with appropriate standards and codes for the selected assemblies. The application of spray polyurethane foam (SPF) directly to the face of precast concrete panels is prohibited.

6.5.2.7 Training Support Facility Program

(a) Training Space/Simulation Classroom

General instruction rooms are space that includes primarily classroom space for multipurpose training instruction. These general purpose rooms are intended for use by organizations which serve a large population for classroom and device simulation instruction. ~~This facility will have three simulation classrooms and contain two (2) each folding partitions.~~ Each individual classroom will have its own exit door to the corridor and emergency exit. Each simulation classroom will have a dedicated HVAC system to prevent overheating of equipment.

(b) Administrative Spaces

Coordinate access from the parking areas. A vestibule should separate the entrance to the building and the Administrative/Reception area will be a recessed foot grille located at the vestibule's floor with in-floor drain.

(c) Lobby

This is a transitional space and used for visitors and users to check-in upon entry and orient themselves to various activities. Also provides a waiting area. A control area within the lobby facilitates security procedures. The intent for the lobby is to encourage interest and traffic into the facility. The ceiling finish should be of highly reflective and sound absorbent materials. If an acoustical lay-in ceiling system is used, consider options for face design that introduce a distinctive element to the lobby space. Provide use of regular tiles if a lay-in system is used.

(1) The wall materials should utilize accent materials or textures.

(2) The flooring criteria should be based on appearance, durability, and yearly maintenance. Recommendations include terrazzo, porcelain tile and ceramic tile. Each material has certain advantages/disadvantages. Resilient tile shall not be used for the lobby due to aesthetics and durability.

(3) Each entry is to provide have a recessed mat, constructed of pre-finished metal retaining strips with nylon fiber, or shredded rubber inserts of a semi-open design. The entry mat can be constructed with or

without an edge frame, but the mat must be recessed into the floor, with a floor drain, for best effectiveness.

(d) Corridors

General building circulations serves to connect spaces visually as well as physically. Corridors should be broken into two main functions, central public axis and service corridors. Service corridors are isolated by doors for security and privacy when possible, and connect loading and off-loading entries to mechanical rooms and main corridors when required.

(1) Ceiling heights serve to identify main public corridors and may vary based on the width and visual axis desired within the facility. The ceiling height of public corridors should be 9'0" AFF. Lobby and main corridor ceiling heights should match, with lower ceilings reserved for service corridors and corridors leading to auxiliary spaces serving the main module. If the corridor ceiling must be lower than the lobby, then the transition between the corridor and the lobby needs to be designed so that it is apparent that the corridor is the primary circulation path.

(2) The ceiling finishes shall be highly reflective and sound absorbent materials. Provide 2' x 2' or 2' x 4' lay-in, wet-formed mineral fiber acoustical panels, on standard "T" shaped pre-finished metallic grid system. 15/16" or 9/16" wide "T" grids are based on selection criteria.

(3) Public corridors are to follow the level of finish and design utilized in the lobby module. This includes continuation of dropped soffits of false beam patterns utilized in the lobby module. Service corridors out of public view and secondary corridors not visually connected to the main corridor ceilings may reduce finishes to minimums.

(4) Main corridors will also serve as routes for hidden utilities. Use accessible ceilings as much as possible. Avoid large areas of dropped gypsum ceilings as accents in corridors unless dedicated accessible paths for utility routing can be accommodated. Use of gypsum board decorative ceilings should take into account HVAC and plumbing valves, damper and control locations above hard ceilings. These will require access doors to service these devices that will detract from the visual impact of the space.

(5) Corridor width should be no less than 8 feet wide to allow movement of personnel and for the maintenance/replacement of training devices. Walls should be able to resist impacts; protect with corner guards. Flooring should be ceramic or vinyl.

(6) Provide interior signage for overall way finding and life safety requirements. A comprehensive interior plan shall be from one manufacturer and shall include the following sign types: (1) Lobby Directory; (2) Directional signs; (3) Room identification signs (4) Building service signs; (5) Regulatory signs; (6) Official and Unofficial signs; (7) Visual communications boards.

(7) Provide bulletin boards in the lobby, main corridors, and administrative offices. Bulletin boards shall be planned and shall fit into an overall architectural theme. The intent is to avoid randomly placed bulletin boards that are not coordinated with the interior finishes, colors, and/or theme.

(e) Customer Waiting Area

The customer waiting area should be located within the Issue/Receiving Area adjacent to the Warehouse area.

(f) Administrative Offices

This space is dedicated to facility operations, budget, scheduling, technical support, a contracting office representative, office supplies storage, program and training administration.

(1) Partitions should be gypsum board protected with chair rails and corner guards. Impact resistant gypsum board at areas exposed to high traffic. Provide sound control/absorption between office rooms and public spaces.

(2) Typically, offices are centralized with individual offices connected to an open office core for shared administrative services. The office suite does not have to be adjacent to the control desk. Two required offices; one for the training support center manager and one for the property book officer.

(3) The ceiling should be a minimum of 9'0" AFF with 9'6" AFF preferred. The ceiling finishes shall be highly reflective and absorbent materials. Provide 2' x 2' or 2' x 4' lay-in, wet formed mineral fiber acoustical panels, on standard "T" shaped, pre-finished metallic grid system. 15/16" or 9/16" WIDE "T" grids are base selection criteria. Tegular (rounded edges) tiles are preferred. Random fissured, non-directional face design preferred. Main offices or conference/office space may benefit from continuing a textured or decorative face tile from centralized office entry points in an office suite. Avoid solid gypsum board ceilings. Perimeter soffits are acceptable. Maintain access above ceilings for HVAC maintenance and future data network upgrades. For walls, an acrylic latex paint with eggshell finish is minimum.

(4) Interior windows will be provided with a minimum ¼” clear tempered glass. Provide STC rated windows that meet required STC rating in the wall that it is located in. For window treatments, provide window blinds or an appropriate type of window treatment on all exterior windows in administrative spaces and classrooms.

(5) Corner Guards-On gypsum wall boards, provide surface-mounted, high-impact integral color rigid vinyl corner guards where necessary to reduce the potential for damage (i.e. in areas subject to high traffic and where carts or other mobile pieces may be used.) Provide steel corner guards at all outside corners of ceramic tile walls where necessary to reduce the potential for damage (i.e. in areas subject to high traffic and where carts or other mobile pieces may be used).

(g) Mold prevention

The building must be designed and constructed to maintain space humidity at reasonable levels. The building shall be constructed relatively air tight. Vapor barriers, if used, shall be located where the temperature is above dew point in both heating and cooling seasons, and shall not be used under insulation installed on top of a ceiling at a ventilated attic. Crawl spaces shall not be ventilated, and a vapor barrier shall be installed on ground surfaces of crawl spaces. Acoustical ceiling tiles shall have a factory-applied mold preventative and sag-resistant physical properties.

(h) Special Acoustical Requirements

(1) Administration Area and classroom exterior walls and roof/ceiling assemblies, doors, windows, and interior partitions shall be designed and constricted to provide for attenuation of external noise sources. Sound-None; avoid extending paging systems into offices or office suites.

(2) Acoustical Performance-Office walls should maintain STC (Sound Transmission Class) rating of 45 or better to ensure a minimum level of privacy.

(i) Carpet

Carpet shall be the principle material for centralized office suites. Carpet tiles are preferred; the minimum is commercial, solution-dyed nylon in 26 oz yarn weight, 45 oz total finished weight. Provide carpet with static control. Increasing total finished weight closer to 60 oz is preferred. Carpet should be darker tones and patterned to hide stains.

(j) Materials

Provide all wooden construction for flexibility in configuration. Provide stone or solid surface counters for durability. (Plaster laminate is not acceptable.) Make provision for lower counter for ADA access. Provide two-tier counter system, more to block view of countertop clutter and controls, than as privacy barrier. "Back wall" (if available) counters may be standard seating height for more extended paperwork functions.

(k) Warehousing, Shops and Storage

(1) Two (2) ea Shipping/Receiving bays with self-levelers and shall be provide. A 20-foot by 20-foot clear area on the interior for staging MILES containers and other training devices shall be provided.

(2) Overhead doors should be 10 feet wide x 12 feet high. One (1) exterior man-door should be located at the North and South corner of the east and West walls of the warehouse. Overhead doors shall be manually chain operated and insulated.

(3) Warehouse/Loading Dock bays should be numbered inside with a corresponding number outside above the protective canopy. An eight (8) foot deep protective canopy should be installed above each loading bay to protect the transfer of goods from the loading docks to the trucks and vice versa. The cantilevered canopy should be installed with a roof slop of three-on-twelve (3/12).

(4) Each loading dock shall be provided with individual automatic dock levelers at the edge of the dock wall and all dock doors shall be equipped with a swinging light fixture mounted on one of the door's jamb to illuminate the interior of the truck's cargo bay. Each dock shall be equipped with vehicle restraints at the edge of the loading dock to engage the delivery trucks and prevent from accidentally separating from the dock. ~~All overhead loading dock doors shall be equipped with dock shelter systems installed at all the perimeters of the doors to seal the gap between the cargo container and the door jamb.~~

(5) Device Fabrication (Woodworking/Plastic)

Training aids are fabricated using woodworking tools, and bench fabrication. Tools used include saws, drills, sanders and routers.

(6) Install 8 feet high ~~double~~ sliding door access into this area. No ceiling is required. A sealed concrete floor shall be installed.

(7) Shop requirements: The government will furnish and install tools for this facility.

1. ~~30' x 20'~~ area for tools
2. Spindle Sander (110v, 20 amp)
3. Shaper (110v, 20 amp)
4. Belt Sander (110v, 20 amp)
5. Panel Saw (110v, 20 amp)
6. Dust Kopp Filtration System (230v, 40 amp, 3 phase)
7. Radial Arm Saw (230v, 30 amp, 3 phase)
8. Joint/Planer (110v, 25 amp)
9. Surface Planer (240v, 50 amp, 3 phase)
10. Table Saw (110v, 20 amp)
11. Drill Press (110v, 20 amp)
12. Chop Saw (110v, 20 amp)
13. Mortiser (110v, 20 amp)
14. Air Compressor (230v, 50 amp, 3 phase)
15. Bandsaw (230v, 30 amp, 3 phase)
16. Metal Bandsaw (230v, 30 amp, 3 phase)
17. Router Table (110v, 20 amp)
18. Exterior Wall-Mounted Exhaust fan (4' x 4")
19. 8 Port Power Outlet (110v, 20 amp)

(8) Device Fabrications (Set-Up Area): ~~16' 25' floor area~~, lighting shall be 4 x double fluorescent 8' overhead lights.

(9) Device Fabrication (Finishing Room): ~~8' x 30' bay floor area with~~ 78' high x 8' wide sliding door that opens into main shop area; ensure wall mounted exhaust (4' x 4') fan ventilation. Lighting shall be double fluorescent 8' overhead lights.

(10) Device Fabrication (Raw Material Storage): Sheet Storage: 10' deep x 10' high x 12' wide (w/multiple level adjustments.)

Metal Stock Storage: 20' deep x 10' high x 10' wide (w/multiple level adjustments.)

(11) Device Maintenance and Repair Area:-Device Set-Up/Storage:

Provide work bench, storage, tools storage and repair parts storage areas. Provide 8 feet high double door access into this area.

(12) Walls should be concrete masonry units (cmu) and the floor shall be sealed, smooth concrete.

(1) ~~Maintenance~~-Shop Area layout requirements

(1) The main shop maintenance area shall be no less than 30 feet x 20 feet and include the following:

Work stations requirements at each of five (5) workstations.

1. 11'X 6' floor area work bench, cabinet and locker systems.
2. Ten (10) each double fluorescent 8' overhead lighting
3. Electrical outlets: 4 each, quad 110V, 20amp
4. LAN drop and telephone

(2) TADSS Receiving Area: 10' x 10' area with dock door, lighting: 2 x double fluorescent 8' overhead lights. TADSS Awaiting Parts Area (Holding), 12' x 12' floor space

Benchstock Storage: 14' x 11' floor space

(3) Welding Room Requirements: 20' x 24' separate room with exit door to outside and 8' wide x 7' high sliding utility door that enters into the main shop area or wide interior lane. Apply metal protective wall covering for welding room.

Tools and electrical requirements: The government will furnish and install tools for this facility.

- a. Arc Welder (250v, 50amp, 1 phase)
- b. Floor-Mounted Grinder (230v, 30amp, 3 phase)
- c. MIG Welder (110v, 20amp)
- d. Large Arc Welder (230v, 80amp, 1 phase)
- e. Metal Bandsaw (240v, 20amp, 3 phase)
- f. Welding Gas Exhaust System with moveable hose

(m) Other Requirements

1. OSHA Personal Protective Equipment (PPE) storage: 8' x 5' room with adjustable shelves.
2. OSHA eyewash station – will require nine(9) square feet of free floor space against a wall with plumbing to supply eye nozzles with water.
3. OSHA shower station – Will require overhead fixture, floor drain with signs posted on walls and floor.
4. Double shop basin/sink with hot and cold water plumbed at the end of the finishing room and a separate service sink to wash out paint brushes.
5. Mop bucket floor pan with hot and cold water to aid in filling and dumping mop buckets plumbed at the end of the finishing room.
6. Quad 110v, 25amp outlets spaced evenly at every 10 feet along existing shop wall space.
7. Separate shop latrine, one unisex stall in the Receiving/Storage area.

(n) Retail Device Storage/Classroom:

Provide acoustical tile ceiling (ACT) at 10-foot – 0-inches high. Fur CMU walls and install gypsum wall board (painted) to 6" above ACT. Floor to be covered with vinyl composition tile with 4-inch high base.

(o) Warehouse/Storage Area:

(1) The warehouse area shall be served by the loading docks and preparation areas. It shall also have direct contact with the fabrication area, the device maintenance shop, the retail storage, and the sensitive

item storage (a safe room/unit). The warehouse/storage area should be designed to include:
 MILES/TADOS = 15KSF x 15VF per MILES BDE set. 5,000 devices per BDE MILES Set, and should be based on rack storage of 9-foot – 4-inches x 7-feet – 6-inches of floor area x 5-feet x 3-feet tiers high = 15 feet high. Plus 5 feet to the underside of the roof structure.

(2) The walls shall be composed of 8 feet high concrete masonry units (cmu) and impact-resistant gypsum board panels up to the underside of the roof (at the interior partitions), and metal paneling system plus insulation at the exterior walls. No ceiling is required for this area and the floors shall be sealed, smooth concrete. Between the loading/shipping/receiving areas and the administration area, an 8 feet clear linear floor space to be used for central wheeled truck and fork lift path to connect all areas of the maintenance and exhibits sections shall be included.

The roof should be sloped and the overflow of water shall be captured by Roof drains and internal piping.

(3) Hazardous Material Storage Area-Hazardous materials used in the Training Support Center includes, but is not limited to propane, carbon dioxide, and oxygen. Storage areas will be in compliance with existing government safety regulations. Design and construct in accordance with the requirements of NFPA 58. Provide appropriate access space and cylinder racks to accommodate the sizes and types of cylinders utilized by the customer. ~~A caged in concrete pad will be build outside to store tanks.~~ Construct of a combination of knee wall and caged fencing. Construct the knee wall of the same material used on the main TSC building.

Table A-Gas Cylinder Storage

Gass	Cylinder Size	Number of Cylinders
Oxygen	40 CF	34
Oxygen	20 CF	112
Propane	20 Pound	64
Propane	8 Pound	52
Carbon Dioxide	40 Pound	11
Carbon Dioxide	20 Pound	25

(p) Special Functional Use Areas

(1) Latrines-Provide male and female latrines with standard fixtures for the administrative personnel and for the trainees that will visit/use the facility daily. Provide unisex latrine for the warehouse staff with access from the warehouse area. Ceiling Height-Toilet rooms 8’-0” minimum with 9’-0” preferred.

Provide fixtures to accommodate facility occupancy in accordance with applicable building code. Size the latrines for a 70 male to 30 female ratio. ~~Female latrine needs at minimum three (3) stalls with one (1) handicap stall due to high Soldier usage. Male Latrine needs at minimum three (3) urinals and two (2) stalls and one (1) handicap stall.~~

(2) Material Definition-“Wet Areas” are defined as rooms where direct contact at walls and floors with water is expected. This includes toilet and grooming areas. Wet areas may be considered “humid” space. “Humid” is defined as above 60% relative humidity during typical room function over the entire period of normal hours of operation.

(3) Ceiling Finishes: General Provisions-Light reflective and moisture resistant ceiling systems.

Humidity and Moisture Resistance-Toilet rooms can use painted, suspended gypsum board ceilings. Epoxy paint systems typical throughout. Use dropped soffits or fake gypsum board beams to divide ceiling systems and provide a barrier, at the ceiling line, for odor and moisture confinement.

(4) Wall Finishes-Provide ceramic tile, fill height behind toilets and urinals and as a 5' high ceramic tile wainscot throughout the room(s). Use gloss finish tiles. Consider creating a pattern of accent tiles or trims in complimentary colors to improve visual appearance. Avoid using darker colors as the main background color. Use bull nose edge tiles at all outside corners. Use coved base tiles to match wall or floor system. Where ceramic tile is not used, epoxy paint system is required for optimum moisture and stain resistance.

(5) Toilet Room Floor Finishes and accessories-Ceramic mosaic tile 2” x 2” preferred. Mud set with floors flat in toilet rooms with slight depression around floor drains. Overall floor slope should not exceed ½” in 10'-0”. Wet and dry skid resistance is the priority. Non-glazed mosaic tiles for floor use are typically provided with a roughened face texture. Natural (flat) finish tile may also be satisfactory. Toilet accessories: paper towel, toilet tissue and soap dispensers must be Kimberly Clark models

(q) Students/Staff Break Areas

(1) GFGI Equipment-Refrigerator, Sink, Microwave, phones and television will be GFGI. Lounge-type furniture with tables and with seating ~~for 24 personnel~~. The break room must offer seating ability in the form of tables and chairs for the purpose of training and demonstrations. Provide outlets for future vending in the student break room. For effective learning, students need an opportunity for a break area separated from the classroom.

- (2) Fixed Equipment: Kitchenette Cabinets-Premium grade. Solid wood fronts. Provide only 3/8" thick minimum plywood for shelving 3'-0" wide and under (1/2" thick otherwise), with wood veneer or fused and bonded vinyl finish. Solid wood face edging for shelving and door edges required. Ensure space is provided for a minimum 18 cubic foot refrigerator.
- (3) Casework-Premium grade. Solid wood fronts, veneer plywood exposed sides and knee spaces. Interior dividers may be fused and bonded vinyl or plastic laminate particle board. Provide only 3/8" thick minimum plywood for shelving 3'-0" wide under (1/2" thick otherwise), with wood veneer or fused and bonded vinyl finish. Solid wood face edging for door edges is to be provided. PVC edging is an alternative.
- (4) Counter-Solid 1/2" to 3/4" thick polymer resin counters. Provide 1 1/2" diameter rounded edges. Avoid square edges toward patrons. ~~Plastic laminate counters are not acceptable.~~
- (5) Drawers and Door Hardware-Provide commercial grade hardware. Drawer glides to use ball bearing, nylon wheels, rated for 50 pounds minimum at full extension. Storage drawers to use 150 pound nylon glides. Use concealed door hardware.
- (6) Ceiling Requirements: Where acoustical lay-in ceilings are provided, the following recommendations apply:
- (7) Surface Light Reflectance-No less than 0.80. Consider light placement and lamping types while considering ceiling design. Increase lighting output with off-white colors and/or panels with less than 0.80 light reflectance. Sound Absorption for Acoustical Panels – No less than .55NCR. Fire Resistance-Only Class A materials as determined by recognized testing laboratories such as Underwriters Laboratories (UL).
- (8) Seismic Requirements-Provide sway bracing for ceiling grids, structural, mechanical, electrical, plumbing and fire protection systems installed in seismic zones where local building officials would normally require such protections.
- (9) Wall Materials-Walls shall be extremely Durable and impact resistant. Use bullnose CMU corner units at all outside corners. On gypsum board walls, consider using corner protectors on outside corners in high traffic areas, or where high potential for impact is significant.
- (10) Wall Finishes- water-based epoxy, semi-gloss finish. Apply one coat compatible primer with two coats of 5 to 6 mils DFT.

(11) Floor Finishes-Non-slip ceramic tile or VCT.

(12) Secure Operations Storage: Provide a secure storage area for sensitive devices and other sensitive communications and automation components. This is not an arms room (vault) and does not require compliance with AR 190-11 criteria. But it will meet secure room criteria.

(13) Provide concrete masonry unit (CMU) walls up to the underside of roof with an 8 foot high, double door access without transom and a sealed, smooth concrete floor.

(14) Support Spaces: Janitor Closet-Provide one janitor closet ~~at each latrine location.~~

Provide space to store basic, common household cleaning supplies and small items such as brooms and/or mops, etc. The closet shall be sized large enough to accommodate a mop sink.

(15) Walls should be moisture-resistant gypsum board with a 5 feet high ceramic tile wainscot where the wash basin is located. Provide a suspended acoustical ceiling and ceramic tiled floor.

(16) Provide dedicated interior spaces and exterior areas for plumbing, fire protection, and HVAC equipment.

(17) Color Schedules-Exterior and interior colors shall comply with the current Fort Lee Color Matrix. (Refer to the Appendices) The successful contractor must provide two (2) color boards for each exterior and interior material to the Contracting Officer and Fort Lee. The color boards must show samples of the materials to be incorporated into the project and the color proposed.

(18) Concrete-Exposed concrete is not permitted for major architectural elements, except as noted for concrete floors, precast sills, and accent blocks. Building foundations and other structural elements of concrete shall be concealed through the use of stepped brick ledges, grading, etc. All exterior concrete surfaces shall receive a broom finish. Broom finish in a direction perpendicular to traffic. All sidewalks shall be constructed of a minimum strength 4500 psi concrete, to a thickness of 4 inches thick, unless the surface is to be used by service vehicles where those will be six inches thick and reinforced.

(19) Exterior Soffits and Fascias-Provide continuous ventilation (where required). Soffit vents shall be fully perforated metal panels, screen and seal to resist insect intrusion. Soffits and fascias shall be pre-

finished metal or steel to match the standing seam metal roof. Eaves shall be a minimum of three feet-six inches and no gutters will be allowed.

(r) Doors and Hardware

Hardware

(1) Locksets and Latch Sets- The lock shall be supplied with Fort Lee current Base Master Key System for all doors except all doors utilizing the programmable electronic key card access system as identified in paragraph 6.5.3 and the appendices.

(2) 00` Building entrance doors shall be keyed alike. The contractor will provide three sets of keys for each door to Public Works, Fort Lee. Coordinate keying requirements with Fort Lee and the Contracting Office.

(3) Door Closers-Provide overhead holders or closers with hold-open capability at exterior doors to lobbies, corridors, mechanical rooms, electrical rooms, and janitor's closets.

(4) Exterior Windows-Exterior windows shall be operable ~~double hung windows~~.

(5) Building identification-Each building shall have a minimum of two sets of aluminum 12-inch high Helvetica numbers. Coordinate with Fort Lee personnel. Signage shall be vandal-resistant.

(6) Floors-Contractor to comply with the requirements of applicable codes. Provide durable flooring materials. Resilient flooring and/or carpeting for the administration areas, and provide the appropriate associated base for each type of flooring.

(7) Entryway Grille System-Contractor is to provide a slab recess to accept a walk-off mat. Provide a floor drain under the mat at building entrances. The floor drain in the entry vestibule shall include a sediment bucket to facilitate easy cleaning and to minimize clogging.

6.5.3. Programmable Electronic Key Card Access Systems:

Not required.

6.5.4. INTERIOR DESIGN

- (a) Public spaces of each building will have design interest; permanent finishes will be neutral with accent colors in carpet, paint and or wall covering. Use pattern and texture in the carpet selection to hide soiling and provide appearance retention. Accent color or layering of colors will be considered for the walls and flooring to highlight and accentuate architectural features. Hard surface flooring will be designed with minimal patterning.
- (b) Office type spaces will be welcoming, comfortable and designed with future flexibility in mind. Access to exterior light and views for the greatest number of occupants is an objective.
- (c) The following paragraphs provide performance requirements for construction materials and components that may be used in this project. It is not intended to be an all-inclusive listing of materials or direction on what materials to utilize. It is intended to establish a quality base-line for select materials and methods of construction that may be used in this contract.
- a. Interior hollow metal doors and frames will comply with Applicable Criteria identified in Paragraph 4. Frames shall be Level 2, 16 gauge, with continuously welded corners and seamless face joints; factory primed. Anchors and accessories shall be zinc coated. Frames in masonry shall have bituminous back-coating and plaster guards, and shall be grouted solid. Frames at masonry walls shall be grouted solid. Frames shall be wrap-around type at all gypsum board walls. All doors that provide access into instructional spaces shall have vision panels, 6" wide x 24" high, minimum.
- b. Wood doors shall comply with Applicable Criteria identified in Paragraph 4. Doors shall be constructed to provide sound transmission rating of 30 or the STC rating of walls indicated. Stile edges shall be non-finger jointed hardwood compatible with face veneer. Provide American Woodwork Institute (AWI) Grade A hardwood face veneer with transparent finished doors. Provide solid core, type II flush doors with faces of sound grade hardwood where acoustical doors are not required. At doors that provide access into instructional space, provide vision panels, 6" wide x 24" high, minimum.
- c. Fire-Rated and Smoke Control Doors and Frames shall comply with applicable codes and criteria identified in Paragraph 4, and requirements of labeling authority. Doors and frames shall bear labels from code approved testing laboratory. Comply with positive pressure testing requirements of building codes.
- d. DB Contractor shall provide a complete door hardware package that complies with all ANSI/BHMA requirements. Hardware shall be fire rated to match door requirements. Weather-stripping shall be provided on all exterior doors.
- i. Exterior Door Hardware finish shall be polished stainless steel or chrome plated non-ferrous metal.
1. Exterior Door Hinges. ANSI/BHMA A156.1 – template, full mortise, heavy duty, ball bearing, minimum size 4 1/2"x4 1/2", non-ferrous base metal, non-removable pins.
2. Locksets on exterior doors. ANSI/BHMA A156.13 – mortise lockset with removable core; non-ferrous base metal. Fort Lee uses Best locks and cylinders.
3. Exit (panic) devices. ANSI/BHMA 156.3 – heavy-duty touch-pad type, through-bolted mounting, listed and labeled for panic protection based on UL 305.
4. Exterior Closers. ANSI/BHMA A156.4 – series C02000, Grade1, Hydraulic, Factory-sized, adjustable to meet field conditions. Provide for all exterior doors, all doors opening to corridors and as required by codes. At exterior doors to lobbies, corridors, mechanical rooms, janitor's closets, and storage areas provide over head holders and closers with hold open capability. Storefront doors shall have concealed closers. Exposed closers shall have covers painted to match hardware.
5. Thresholds. ANSI/BHMA A156.21 – non-ferrous metal. Provide at all exterior doors.
6. Weather-stripping. ANSI/BHMA A156.22. Provide at all exterior doors; shall be severe weather rated, ASTM C 216/652. Color and material shall comply with this RFP.
- ii. Interior door finish hardware finish shall be polished matte or satin stainless steel or chrome plated non-ferrous metal to hide fingerprints.

1. Hinges. ANSI/BHMA A156.1 – template, full mortise; heavy duty, ball bearing on doors with closers; standard duty anti-friction bearing on doors without closers. Minimum size 4 ½” x 4 ½”.
2. Locksets on interior doors. ANSI/BHMA A156.2 – BEST series 4000, Grade 1, nonferrous base metal, removable core. Match installation standard locks and cylinders. All Classrooms and Administration & Operations Spaces shall be equipped with Classroom locksets.
3. Combination Locks. All doors leading to spaces requiring higher levels of security (i.e. Weapons/ Armory Vaults) shall include heavy-duty, X-09 Lock.
4. Use floor finish transition strips when floor finish changes between rooms. Locate strip below door.
5. Keying shall be coordinated with Fort Lee DOL/DPW. Keying system shall match the installation standard. A grand master keying system shall be used for interior and exterior locks at the facilities. Each private door shall have its own individual keying. Provide 3 copies and 3 spare blanks for each key. All keys shall be stamped “Government Property – Do Not Duplicate”

e. FINISHES

- i. Gypsum Board - Comply with ASTM C 36. Minimum panel thickness: 5/8”. Provide Type X panels in fire-rated assemblies. Provide moisture resistant panels at locations subject to moisture and comply with ASTM C 630. Screws ASTM C 646. Drywall installation: ASTM C 840. Sealant in acoustic rated partitions at the intersection of walls and ceilings shall be acoustic sealant. Acoustic or fire rated partitions shall extend from the floor to the underside of the rated floor or roof and shall be sealed with smoke stop or fire stop as required by code. Gypsum board or plaster ceilings shall be installed in accordance with the US Gypsum Handbook. All gypsum board shall be at least 5/8” thick and supported on framing spaced no greater than 16” on center. Gypsum board shall not be finished with spray applied texture. Provide High Impact Gypsum board in corridors. Where utilized it shall resist a force of 250 foot-pounds in compliance with ASTM D 2394. All gypsum board surfaces shall be finished in accordance to GA 214 Level 4. Cementations Backer Units shall comply with ANSI A118.9. Where cementitious backer units are used, a moisture barrier shall be used behind the units.
- ii. Carpet shall be loop pile, or cut and loop in type 6.6 nylon, carpet tile. Size shall be no smaller than 24” x 24”, backing to be cushion backed with peel and stick backing system. Patterned, solution dyed, tufted pile weight shall be a minimum of 21.0 ounce per square yard. Density shall be a minimum of 7,000 to meet sever wear classification. Large dye lot capacity with clear, crisp colors shall be provided Transition strips shall be dark metal securely fastened to the slab. All carpet and adhesives shall contain low VOC emitting, recycled and/or bio-based materials.
- iii. Wall tile can be either smooth or textured ceramic or porcelain wall tile. Comply with Applicable Criteria identified in Paragraph 4. Substrate for wall tile shall be mortar setting bed or cement backer board (gypsum board is not acceptable). Tile shall be standard grade and containers should be grade sealed. Tile shall be impact resistant with a minimum breaking strength for wall tile of 90 lbs. Tile shall contain low VOC emitting, recycled and/or bio-based materials. Wall tile shall be 4”x4” or larger.
- iv. Floor tile shall be impervious mosaic tiles with less than 0.5 moisture absorption. Tiles shall be colored throughout with an unglazed, non-slip finish; suitable for heavy traffic. Provide base of same or suitable material. Tile shall be impact resistant with a minimum breaking strength for floor tile of 250 lbs. Tile shall contain low VOC emitting, recycled and or bio-based materials. Floor tile shall be Class IV heavy traffic, durability classification as rated by the manufacturer. Tile shall be standard grade and containers should be grade sealed. Provide marble threshold under doors where a tile floor meets a different floor finish. Floor tile shall be 4”x4” or larger and may be a mix of sizes to add interest. Minimize grout lines.
- v. Ceiling Tile shall comply with EPA requirements in accordance with Section 01 62 35 RECYCLED/RECOVERED MATERIALS. Acoustical units shall conform to Applicable Criteria identified in Paragraph 4.
- vi. Suspended acoustic ceiling grid shall be white painted aluminum in damp areas. Other grids may be electro coated steel.

- vii. Resilient flooring shall be vinyl composition tile. Class 2, through color Composition I, solid color or through pattern, smooth surface, 12" x 12" x 1/8" thick. Installation shall be per manufacturer's instructions and include all necessary accessories.
- viii. Slip-resistant flooring shall meet Applicable Criteria identified in Paragraph 4. Material shall be a homogeneous vinyl floor covering incorporating a surface either slightly embossed or studded.
- ix. Static Dissipative Flooring shall meet ASTM 150/EOS/ESD S7.1; FTMS 4046 (101C) 5,000 to 50 Volts; AATCC-134.
- x. Paint colors shall be selected by from the Contractors submittals. Paint shall not contain lead, chromate, asbestos or mercury.
 - 1. Surfaces to be painted - Paint all exposed finish surfaces of materials such as gypsum wallboard, concrete masonry units, concrete walls, plaster, etc. Painting includes field painting exposed bare and covered pipes and ducts (including color coding), hangers, exposed steel and iron work, and primed metal surfaces of mechanical and electrical equipment. Walls shall be painted to 4" above the finished ceiling. Painting is not required on prefinished items unless otherwise noted, finished metal surfaces, concealed surfaces, operating parts and labels.
 - 2. Coatings - All painted surface shall be primed and receive a minimum of 2 coats of paint. Finish coat shall provide complete coverage. Painted masonry shall also receive block filler after blocks has been cleaned and accepted by the Owner. Concrete floors shall be sealed with a clear, abrasive non-slip hardener-sealer. Provide 2 coats of sealer.
- xi. Types of Paint - All paints shall be low VOC emitters.
- xii. Miscellaneous
 - 1. Provide a minimum 6'x8' recessed entry mat centered between vestibule walls and one course of corridor floor materials from exterior doors. Provide corridor floor finish for perimeter of remaining floor
 - 2. Toilet Partitions - Solid phenolic, floor supported. Reinforce panels to receive partition-mounted accessories.
 - 3. Urinal Screens - Solid phenolic, wall hung. Secure wall hung screens with 42" long, continuous flanges. Screens shall be manufacturer's standard size approximately 48" tall and 24" deep.
 - 4. Interior Signage - Comply with Applicable ADAAG and UFAS Criteria identified in Paragraph 4. Provide interior room identification signage for all rooms. All interior signage shall be mounted on the strike side of the door (opposite the hinge).
 - 5. Toilet Accessories – brushed or matte stainless steel
 - a. Grab Bar - Grab bar shall comply with Applicable ADAAG and UFAS Criteria identified in Paragraph 4.
 - b. Mirrors – Mirrors shall comply with Applicable ADAAG and UFAS Criteria identified in Paragraph 4.
 - c. Paper Tower Dispenser – Paper Towel Dispensers shall comply with Applicable ADAAG and UFAS Criteria identified in Paragraph 4.
 - d. Sanitary Napkin Dispenser – Sanitary Napkin Dispensers shall comply with Applicable ADAAG and UFAS Criteria identified in Paragraph 4.
 - e. Toilet Tissue Dispenser – Toilet Tissue Dispenser shall comply with Applicable ADAAG and UFAS Criteria identified in Paragraph 4.
 - f. Shower Accessories - Robe Hooks shall comply with Applicable ADAAG and UFAS Criteria identified in Paragraph 4.

xiii. Casework, Cabinets and Countertops - Provide architectural cabinets of wood construction with laminate countertops in dry areas and solid surface countertops in wet areas. Laminate countertops to have integral backsplash and waterfall front edge. Coordinate wood cabinetry species and finish with finishes in the FF&E package and with doors, chair rail and wainscot throughout building.

xiv. Interior doors in public areas shall be solid core wood; doors in storage, mechanical rooms, etc. areas shall be painted hollow metal. Wall base in public areas shall be wood; in wet areas it shall be porcelain or ceramic tile; in other areas it may be resilient. Chair rail and wainscot shall be utilized throughout the main lobby areas. Coordinate wood species and stain with the FF&E package furniture finishes (i.e. if the private office furniture finish is medium cherry, natural oak doors is not acceptable).

Interior building signage requirements:

The contractor will provide directional signage for rooms in each wing on each floor (i.e. rooms 100-200) with directional arrows. Rooms require sign with room number and two slots for room name and occupant, unless otherwise noted by user.

6.6. STRUCTURAL DESIGN

6.6.1 General

Consider mission effectiveness, the most economical system in the locality, life-cycle economics, and space adaptability in choosing the structural systems. Space adaptability includes future reorganization or reallocation of space.

Consider climate conditions, high humidity, industrial atmosphere, saltwater exposure, or other adverse conditions when selecting the type of cement and admixtures used in concrete, the concrete cover on reinforcing steel, the coatings on structural members, expansion joints, the level of corrosion protection, and the structural systems. All concrete shall be a minimum of 3,000 psi and shall be steel reinforced. Place floor mounted mechanical and electrical equipment on a 4" minimum concrete pad.

In addition to gravity, seismic, and lateral loads, design ancillary building items, e.g. doors, window jambs and connections, overhead architectural features, equipment bracing, for the requirements of UFC 4-010-01, DOD Minimum Antiterrorism Standards for Buildings. Ensure and document that the design of glazed items includes, but is not limited to, the following items under the design loads prescribed in UFC 4-010-01:

- (a) Supporting members of glazed elements, e.g. window jamb, sill, header
- (b) Connections of glazed element to supporting members, e.g. window to header
- (c) Connections of supporting members to each other, e.g. header to jamb
- (d) Connections of supporting members to structural system, e.g. jamb to foundation.

6.6.2 Applicable Standards, Codes, and Criteria

The structural design shall fully comply with the following listed criteria in addition to the provisions provided in Section 01 10 00 paragraph 4.0 Applicable Criteria. Use the latest edition of the International Building Code (IBC) for design guidance, and coordinate design with UFC 4-010-01. For buildings three stories and taller, design for progressive collapse in accordance with UFC 4-023-03, Design of Buildings to Resist Progressive Collapse.

6.6.3 Project Specific Design Loads:

Building Occupancy Category II

Ground Snow: 20 psf

Wind Speed: 90 mph, Exposure C

Frost Penetration: 14 inches

Seismic Design Data: The mapped maximum considered earthquake (MCE) spectral response accelerations for site class B are:

Ss (at short periods) = 19% g

S1 (at 1-second period) = 6% g

The acceleration values identified are for the general location of the facility. Verify and use site specific criteria based on the final site location of the facility. Adjust site class per IBC to match specific site information in geotechnical report.

The acceleration values identified are for the general location of the facility. Verify and use site specific criteria based on the final site location of the facility. Adjust site class per IBC to match specific site information in geotechnical report.

6.6.3.6. Antiterrorism/Force Protection loads and minimum requirements are per UFC 4-010-01. For design of structural components subjected to dynamic loads, the U.S. Army Corps of Engineers Protective Design Center (PDC) developed SBEDS, Single-Degree-of-Freedom Blast Effects Design Spreadsheets (SBEDS). SBEDS is available at the software tab of the PDC website, HYPERLINK "<https://pdc.usace.army.mil/>"<https://pdc.usace.army.mil/>.

6.6.4 Foundation

The foundation is site specific and must be designed upon known geotechnical considerations by an engineer knowledgeable of the local conditions, e.g. highly expansive soils, groundwater levels. Coordinate the need for a vapor barrier with the architectural floor finishes and requirements of the geotechnical report. All slab-on-grade to

receive a coating (e.g. epoxy) or to receive an overlaying finish (e.g. carpet or tile), shall be underlain by a vapor barrier system with a minimum 10-mil polyethylene membrane.

6.6.5 Site Features – Retaining Walls/Bridges/etc.

Design site features, e.g. retaining walls, culverts, bridges, in accordance with the appropriate American Association of State Highway and Transportation Officials (AASHTO) criteria including AASHTO LRFD Bridge Design Specifications, AASHTO Standard Specifications for Highway Bridges, and AASHTO Guide Specifications for Design of Pedestrian Bridges. Consider operation and maintenance requirements, e.g. painting, mowing, inspecting, routine maintenance. Design site features to drain properly in order to meet loading assumptions.

6.7. THERMAL PERFORMANCE

6.7.1 STANDARDS AND CODES: Building construction shall conform to APPLICABLE CRITERIA.

6.7.2 Thermal Characteristics. Building construction shall conform to the current version of ASHRAE 90.1. All buildings shall be classified as non-residential. “R” and “U” values shall be calculated in accordance with ASHRAE methods.

6.7.3 Thermal Insulation. Thermal insulation shall have a flame-spread rating of 25 or less and a smoke-development rating of 50 or less, exclusive of the vapor barrier, when tested in accordance with ASTM E84. A vapor barrier shall be provided on the warm-in-winter side of the exterior wall and ceiling insulation. Polystyrene is allowed as an insulation material for slabs and outside concrete or unit masonry walls. It is prohibited as an injected insulation material in walls or floor cavities or within the building envelope.

6.7.4 Infiltration. To limit air infiltration, buildings will be sealed with an air infiltration barrier, installed in accordance with the manufacturer’s recommendations. The building envelope shall be caulked, gasketed, weather-stripped or otherwise sealed: around window and door frames, between wall cavities and frames, between walls and ceiling and roof, between walls and floors, at access doors and panels, at utility penetrations through walls, floors and roofs, and at any other exterior envelope joint which may be a source of air leakage. These steps shall constitute tight building construction.

6.7.5 Humid Area Design. Climates which have 1500 hours or more of 73 degree F (22.8 deg C) or higher wet bulb temperature in combination with an outside design condition of 50 percent or higher relative humidity shall be considered humid areas. An effective infiltration barrier is critical to limiting moisture flow into conditioned occupied spaces. Provide materials on the interior side of vapor barrier that have high permeable rating, 7 or higher, that will not inhibit the remaining vapor to enter the room. The vapor barrier in humid areas shall have a maximum perm rating of 0.5, and shall be located on the outside face of the exterior wall or ceiling insulation. Moisture analysis calculations shall be provided to demonstrate compliance with requirements.

6.8. PLUMBING

6.8.1 The plumbing system design shall be in compliance with the International Plumbing Code with standard diversities for sizing of all water, drainage, and vent piping.

6.8.2 Utility Connections: Provide all utilities from the utility meter to each building or facility.

6.8.3 Utility Metering: Domestic water and natural gas utilities shall be metered. The D/B Contractor shall provide the natural gas meter, pressure regulator and all associated appurtenances. The water meter shall be provided by the water privatized utility provider.

6.8.4 Piping Materials: Piping materials shall be complied with applicable criteria and codes but may be restricted based on specific conditions at a particular site.

6.8.5 Cross Connection Control: All local site specific requirements for cross connection control / backflow prevention shall be followed. Domestic water main entering the building shall be provided with a reduced pressure backflow preventer. Additionally, domestic water systems shall be protected from contamination by hydronic water systems and other HVAC systems via a reduced pressure zone backflow preventer.

6.8.6 Natural Gas Supply: The natural gas system is owned and operated by Ft Lee DPW. The D/B Contractor shall coordinate with Ft Lee DPW to obtain the gas pressure available at the project site. Additionally, the D/B contractor shall provide Ft Lee DPW their required flow rate and expected gas usage. The D/B contractor also shall coordinate with Ft Lee DPW to natural gas meter requirements. Gas meter and piping shall be sized with all loads are firing at the same time.

6.8.7 Gas Regulator Venting: All gas regulators in building shall be vented to the outside. All gas piping shall be in compliance with applicable criteria and codes.

6.8.8 Domestic Water Heating: Domestic hot water shall be designed to maintain at 140 degrees F at the storage tanks. Hot water delivered to plumbing fixtures shall be designed for 110 degrees F.

6.8.9 Water Service Utility Provider (WSUP) Coordination: The D/B Contractor shall provide water service and fire water service to the building. Contractor shall connect to the meter to provide domestic water service to the facility. A backflow prevention device shall be provided at the domestic water main entrance located in the mechanical room.

6.8.10 Sanitary sewer connection will be required. Specific points of connection for building utilities shall be coordinated with the privatized sanitary provider.

6.8.11 Equipment Pads: Floor or on-grade mounted equipment shall be elevated on 6 inch thick concrete pads to prevent accumulation of water and metal corrosion.

6.8.12 Exterior Water Piping Freeze Protection: Seasonally (not used in winter) utilized water supply piping shall detailed and installed for complete drain down and shall be provided with an interior or below grade isolation valve. Exposed water piping that is utilized year round shall be insulated and heat traced and protected with pipe jacketing to ensure that the piping will not freeze.

6.8.13 Janitor Closets: In janitor spaces/room/closets provide at minimum a floor drain and a service/janitorial sink.

6.8.14 Stop Valves for Specific Equipment Domestic Water Supply: Stop valves shall be provided for refrigerators and ice makers and shall have ball valves.

6.8.15 Trap Primers: Provide automatic trap primers for floor drains as per International Plumbing Code.

6.8.16 See Paragraph 6.15 Environmental and Appendix E for additional requirements.

6.9. SITE ELECTRICAL AND TELECOMMUNICATIONS SYSTEMS

6.9.1 Primary and Secondary Distribution

6.9.1.1 DVP owns and operates the 13.2 kV electrical distribution system (aerial and underground) on Ft. Lee. Electrical distribution system, transformer, and secondary capacity to support the new service at the facility will be determined by DVP, based on electrical load information provided by the D/B Contractor. The D/B Contractor will complete a DVP load letter for all electrical service requests. This load letter can be found on DVP's website at: HYPERLINK "www.dom.com" www.dom.com (type Load Letter in search box).

6.9.1.2 DVP will be responsible for the design and construction of all exterior electrical distribution system, transformation, and secondary service work up to 5 feet within the new facility as per the requirements of the DVP Information and Requirements for Electrical Service "Blue Book". The DVP point of connection (service delivery point) at the facility shall be as specified in the "Blue Book" and includes exterior mounted CT Cabinet, meterbase, electrical switchgear or panelboard with the new facility (5 ft. rule applies), etc. Specification for all termination/metering compartments for switchboard/switchgear equipment must have written approval by DVP prior to material procurement. The D/B Contractor shall provide an empty conduit from the metering section to the exterior mounted meter base to allow for DVP exterior metering. The D/B Contractor shall coordinate location and requirements with DVP. Please reference the Blue Book for other restrictions and requirements for electrical service connections.

6.9.1.3 If service equipment connection point is greater than 5 feet within the building, then the D/B Contractor shall follow the DVP Blue Book requirements on the exceptions to the Five Foot Rule.

6.9.1.4 The DVP electrical distribution system shall include all primary and secondary ductbanks and conductors, manholes, primary switchgear, transformers, current transformer (CT) cabinets and utility connection boxes.

6.9.1.5 CT Cabinets and meters shall be provided by DVP and will be installed as per the requirements of the DVP Blue Book. The D/B Contractor shall be responsible for coordinating the service location with DVP, installing the DVP provided CT cabinet, and providing an empty conduit from the building service entrance to the CT cabinet and meter base.

6.9.1.6 The Government will engage DVP to perform this work and pay all associated costs, however, the D/B Contractor shall carefully adapt scheduling and performing the work under this contract to fully coordinate with and accommodate work by DVP.

6.9.1.7 The electrical design shall be in accordance with DVP's safety and construction standards and IEEE/ANSI C2 National Electrical Safety Code and NFPA 70 National Electrical Code.

6.9.2 Exterior Luminaires and Accessories

6.9.2.1 The parking lot, sidewalk, area, and street lighting on Ft. Lee will be provided, installed, and maintained by Dominion Virginia Power (DVP). The point of contact at Ft. Lee DPWL for power company coordination purposes is Mr. John Royster (804) 734-5039.

6.9.2.2 Design Build Contractor shall provide a complete exterior lighting design for the new facility. The Design Build Contractor's exterior lighting design for these areas shall utilize DVP standard fixtures and poles. See Appendix AA - DVP Lighting Product Datasheet. Parking lot lighting design shall utilize Cooper type RC luminaires. Lighting circuits for these fixtures shall be served from DVP owned transformers.

6.9.2.3 All additional exterior lighting not listed (i.e. building mounted lighting, site lighting, sign lighting, flagpole lighting, light over each exterior door, etc.) on the DVP Lighting Product Datasheet shall be provide and installed by the Design Build Contractor.

6.9.2.4 Provide lighting at each exterior door.

6.9.3 Telecommunication Distribution

6.9.3.1 All telecommunications design shall be coordinated with the Ft. Lee NEC POCs found in 6.4.6.11. Design analysis shall include meeting minutes of coordination effort. All outside plant work shall be in accordance with TR No. AMSEL-IE-TI-06001-7 United States Army Information Systems Engineering Command Worldwide Outside Plant Design and Performance Requirements. All design work shall be performed by Registered Communications Distribution Designer (RCDD) with a minimum of 5 years experience in the application of related telecommunications system of outside plant and interior systems. Provide evidence to certify designer's qualifications.

6.9.3.2 The D/B Contractor shall provide a new manhole on 1st St. in front of the new building and install (4) 4" concrete duct bank to manhole BH3 on the east side of 1st St. (approximately 200 ft. from the new manhole) and then to MH-AB1 on the west side of 1st St. Manhole MH-AB1 where 100 pair of 24 AWG copper and 12 strands of single mode of fiber optic cables will be pulled from. The pathway shall be MH-AB1 to MH-BH3 to new manhole to telecommunications room in new building. Ft. Lee NEC will determine which cables to pull.

6.9.4 CATV Distribution

6.9.4.1 All exterior CATV work shall be coordinated with the Ft. Lee DPWL, the NEC, and Comcast Cable.

6.9.4.2 The D/B Contractor shall terminate the empty 4" conduit in the main telecommunications room of the new facility.

6.10. FACILITY ELECTRICAL AND TELECOMMUNICATIONS SYSTEMS

6.10.1 The Ft. Lee Physical Security (ICIDS) POC is Donald Butler at (804) 734-7438.

6.10.2 Provide a dedicated circuit for each of the electrical equipment items located in the welding and fabrication rooms.

6.10.3 Provide dual technology occupancy sensors to control lighting in bathrooms.

6.10.4 Telecommunications System

6.10.4.1 Voice/data outlets shall be two 8-pin modular (RJ45 type) outlet/connector in a double gang outlet faceplate, one connector labeled voice use and one labeled data use. Copper outlet/connector must be TIA/EIA Category 6 for all projects. All connectors must be 8-pin/8-position insulation displacement terminations wired per T568A (default configuration). One Cat 6 UTP cable must be installed to each standard 8-pin modular connector provisioned at the faceplate. Copper distribution cable must be terminated at the TR on Cat 6 cabinet or rack mounted patch panels with 110-type compliant connectors on the back and 8-pin modular connectors on the front.

6.10.4.2 Each utility space, such as mechanical, electrical and telecommunications rooms will be provided with at least one wall mounted telecommunications (data/voice) outlet, with a wall mounting lug face plate near the entrance door.

6.10.5 CATV System

Provide a completely operational CATV cabling system including, but not limited to, all necessary raceways, cabling, terminations, jacks and faceplates. The horizontal cable for the CATV system will be RG-6 with "F" type connectors on the terminal end. The CATV cabling will be terminated on splitters in the telecommunications room. CATV riser cable will be RG-11 type. Splitters will be located on the CATV backboard in the telecommunications room. All CATV horizontal cabling will be homerun between CATV jacks and the CATV backboard. Service requirements to the building will be coordinated with Comcast Cable.

6.11. HEATING, VENTILATING, AND AIR CONDITIONING

Information included in Paragraph 6 supersedes Paragraph 5 where conflict occurs between the two paragraphs.

6.11.1 Self-contained heat pump systems shall be equipped with emergency electric heat sized to meet the capacity of the entire facility. Refrigerants used must be non-CFC.

- 6.11.2 HVAC equipment shall automatically start after a power outage.
- 6.11.3 Ventilation systems shall operate when the building is occupied. Ventilation systems for unoccupied spaces shall operate as necessary, according to building codes and standards.
- 6.11.4 Ventilation for acceptable indoor air quality shall be in accordance with ASHRAE 62.1. Ventilation is required for occupied spaces such as classrooms and offices and is based on the expected occupant load.
- 6.11.5 Shower compartments and restrooms shall have an exhaust air system, which will run continuously when occupied.
- 6.11.6 Connect and integrate Building level DDC control systems into current base wide UMCS system at Ft Lee.

The building level DDC control system shall be fully integrated with the base wide Ft Lee UMCS system located in building 6220 in accordance with UL 916. Ft Lee currently has Johnson Controls base-wide UMCS. The current base wide UMCS system shall fully control and monitor the new DDC control system for the complete building. The current base wide UMCS system shall be used to perform supervisory monitoring and control functions including but not limited to scheduling, alarm handling, trending, downloading memory to field devices, tree navigation, parameter change of properties, set point adjustments, configuration of operators, execution of global command, report generation plus Electrical Peak Demand Limiting and Anti-terrorist emergency shutdown in accordance with existing Fort Lee protocols. All communications between the current base wide UMCS and the new building level DDC networks shall be via the ANSI/EIA 709.1B protocol over the Fort Lee IP network in accordance with ANSI/EIA, and shall be complied with the latest UFGS section 2510 10 - Utility Monitoring and Control System (UMCS). IP network usage or construction shall be fully coordinated with the FT Lee DOIM. The Contractor shall extend the current UMCS interactive user interface and provide a graphical representation for each building level system (AHU's, fans, pumps, chillers, boilers, etc.), provide access to real-time data for building level systems, provide the ability to override points in the building level systems, and allow for access to all supervisory monitoring and control functions at the building level. Software graphics shall include color floor plans with heating and cooling zones and the display of mechanical components that reflect the type of system and zones served.

- 6.11.7 The controls Contractor shall submit final as-built shop drawings in a hard copy and on CD-ROM in AutoCAD format delivered to DPW Fort Lee office at building 6205.
- 6.11.8 The contractor shall coordinate with the Government for the exact locations of HVAC Emergency Shutoff buttons.
- 6.11.9 See Paragraph 6.15 Environmental and Appendix E for additional requirements.

Integrate the control system to the installation's existing UMCS. The existing UMCS is Johnson Controls

6.12. ENERGY CONSERVATION

6.12.1. General

Federal agencies are required by the Energy Policy Act of 2005 (P.L. 109-58), Executive Order 13423, Energy Independence and Security Act of 2007, and Federal Acquisition Regulation (FAR) Section 23.203 to incorporate the performance criteria used for ENERGY STAR®-qualified and FEMP-designated products into procurement contracts for energy consuming products and systems. Criteria for ENERGY STAR Qualified products are attached or can be viewed at: **HYPERLINK**
["http://www.energystar.gov/index.cfm?fuseaction=find_a_product"](http://www.energystar.gov/index.cfm?fuseaction=find_a_product)**http://www.energystar.gov/index.cfm?fuseaction=find_a_product**.

Provide energy conservation in accordance with Paragraphs 4 (Applicable Criteria), 5 (General Technical Requirements), and 6 (Project Specific Requirements). In addition see Paragraphs 5.9 and 6.15.

- 6.12.2. Inclusion of Renewable Energy Features. The following renewable energy features have been determined lifecycle cost effective, are included in the project budget and shall be provided:

NOT USED

6.13. FIRE PROTECTION

- (a) All fire protection and life safety features for the facilities will be in accordance with UFC 3-600-01.
- (b) Provide automatic fire suppression protection throughout.
- (c) Provide a mass notification system complying with UFC 4-021-01. Provide a Monaco compatible radio transceiver assembly for each building. All alarms shall be transmitted to the installation alarm receiving station. A mass notification system shall be fully compatible with the existing base-wide system, which currently is the Monaco Enterprises Inc., BT-XM system. The new mass notification system shall be tested at the building level after installation completed and tested again after connection to the base-wide system to insure fully functional system.
- (d) Fire Alarm and Detection System: Required fire alarm and detection systems shall be the addressable type. All initiation devices shall have unique addresses. Provide an annunciator panel at the main building entrance.
- 1) The RF Transceiver shall be compatible with the Fire Department receiving system. The RF transceiver shall be a Monaco BT-X or approved equal operating on a frequency of 138.2875 MHZ. The fire alarm receiving system is a Monaco D-21 system.
- 2) The information sent to the Fire Department receiving system shall be zone by zone information. All tamper devices shall be sent to the D-21 system as a supervisory tamper. All initiating devices shall be connected to signal line circuits (SLC). All alarm appliances shall be connected to notification appliance circuits (NAC). A looped conduit system shall be provided so that if the conduit and all conductors within are severed at any point, all NAC and SLC will remain functional.
- 3) Provide photoelectric smoke detectors with 2.5% obstruction, pigtails for permanent connections, continuous power indicator light, test button, and metal base. Pull stations shall be single-action, non-glass rod type.
- 4) All software, software locks, special tools and any other proprietary equipment required to maintain, add devices to or delete devices from the system, or test the Fire Alarm system shall become the property of the Government and be furnished to the Contracting Officers Representative prior to the final inspection of the system.
- (e) Preliminary Fire Flow Test Data is provided in Appendix D.
- (f) Each fire department connection shall be a 5 inch Storz connection. FDC shall be located on the street side of the building with appropriate signage.
- (g) The contractor shall provide a fire pump for fire suppression system. Fire pump and its controllers shall be in accordance with the UFC 3-600-01 and NFPA 20.
- (h) The Contractor shall provide the following infrastructure and equipment to support Government Furnished Government Automatic External Defibrillators. The Contractor shall design and place AED cabinets throughout the facility so that the AED user does not travel more than 300 feet to reach the device. At a minimum, one AED cabinet shall be located on each level of the building. POC is Briann Harness, (804) 765-3967.
- 1) Provide a 17 ½" H x 17 ½" W x 7 ¼" deep recessed AED Cabinet.
- 2) Each AED cabinet shall be furnished with a tamper switch to send a supervisory signal to the fire department through the fire alarm panel alerting them when the cabinet door is opened.
- 3) An 8 ½" x 11" AED PLUS wall sign.

- (i) Provide facility lock box recessed in wall for Fire Department Access.

6.14. SUSTAINABLE DESIGN

6.14.1. LEED Rating Tool Version. This project shall be executed using LEED-NC Version 3.

6.14.2. The minimum requirement for this project is to achieve LEED Silver level. Each non-exempt facility (building plus sitework) must achieve this level. In addition to any facilities indicated as exempt in paragraph 3, the following facilities are exempt from the minimum LEED achievement requirement: [Not Supplied - PS_SustainableDesignGeneral : SD_EXEMPT_FACILITIES].

6.14.3. Credit Validation: LEED registration, compiling of documentation at LEED OnLine and use of the LEED Letter Templates is required. Registration and payment of registration fees will be by the Government. Administration/team management of the online project will be by the Contractor. Validation of credits will be accomplished by the Government. LEED certification of the project by the Contractor is not required. The Government may choose to seek LEED certification of the project, in which case the Government will pay certification fees and coordinate with the GBCI and the Contractor will furnish audit data as requested at no additional cost.

6.14.4. Commissioning: See Appendix M for Owner's Project Requirements document(s).

6.14.5. LEED Credits Coordination. The following information is provided relative to Sustainable Sites and other credits.

SS Credit 1 Site Selection:

Project site IS NOT considered prime farmland.

Delineation of 100-year flood elevation is shown on site drawings provided in this CONTRACT.

Delineation of threatened or endangered species habitat is shown on site drawings provided in this CONTRACT.

Delineation of water, wetlands and areas of special concern is shown on site drawings provided in this CONTRACT.

Project site WAS NOT previously used as public parkland.

SS Credit 2 Development Density & Community Connectivity.

Project site DOES NOT meets the criteria for this credit.

SS Credit 3 Brownfield Redevelopment.

Project site DOES NOT meets the criteria for this credit.

SS Credit 4.1 Public Transportation Access.

Project site DOES NOT meets the criteria for this credit.

EA Credit 6 Green Power.

35% of the project's electricity WILL NOT will be provided through an Installation renewable energy contract. Do not purchase Renewable Energy Credits (REC's) to earn this credit.

MR Credit 2 Construction Waste Management.

The Installation does not have an on-post recycling facility available for Contractor's use.

Regional Priority Credits (Version 3 only)

The project zip code is 23801.

6.14.6. LEED Credit Preferences, Guidance and Resources. See Appendix L LEED Project Credit Guidance for supplemental information relating to individual credits.

6.14.7. Not Used

6.14.8. Additional Information

Not Used

6.15. ENVIRONMENTAL

All work is to be performed in a manner that prevents pollution, protects the environment, and conserves natural and cultural resources and in compliance with all requirements noted in the Environmental Information included in Appendix E.

6.15.1 The Contractor shall coordinate with Fort Lee DPW-EMO to define the limits of construction with the environmental constraints surrounding each site. The following examples of constraints should be considered if known:

- (a) Any archaeological site that is adjacent to or within the project limits.
- (b) Wetlands and the 100' RPA Buffer that exists adjacent to or within the project limits.

6.15.2 No land disturbance work shall begin without approval of the EMO.

6.16. PERMITS

6.16.1 The Contractor shall be responsible for obtaining all permits (local, state, and federal) required for design and construction of all site features and utilities.

6.16.2 Air permitting is required for this project unless formal written confirmation from USAG-Fort Lee's DOL/DPW-EMO's Air Quality Program is received by USACE RFP Preparer or Contractor that states air permitting will not be required for the project.

6.16.3 Proper Storm Water Permits must be obtained from the State of Virginia. Contractor shall provide copy of Forms DCR01 and DCR199-146 and any required plans and specifications to DOL/DPW EMO for review at least 30 days prior to submission to VA DCR. Contractor shall submit this registration and any required plans and specifications to VA DCR at least 30 days prior to construction start.

6.16.4 For specific requirements refer to Paragraph 4 Applicable Criteria; Appendix E, Environmental Information and Appendix BB Sustainable Management of Waste.

6.16.5 All Military construction, renovation and demolition projects shall include contract performance requirements for a 50% minimum diversion of construction and demolition (C&D) waste by weight from landfill disposal.

6.17. DEMOLITION

- (a) Verify with Fort Lee's DPW and EMO for the presence of any existing utilities that would have to be demolished or relocated to allow for construction. (Also, refer to the drawings in Appendix J.)
- (b) No existing utilities should be abandoned in place. Coordinate demolition of privatized utilities with the appropriate utility provider and the Contracting Officer's Representative (COR).
- (c) There are no existing structures requiring demolition on the site.

6.18. ADDITIONAL FACILITIES

6.19 OTHER PROJECT REQUIREMENTS

6.19.1 PROJECT WORK REQUIREMENTS AND RESTRICTION

6.19.1.1 Hours of Work

The normal work hours for construction shall be from 0730 to 1600, Monday through Friday of each week. Any request to change these hours shall be made in writing to the Contracting Officer at least two calendar days prior to the desired day on which the change is to go into effect. The changed hours shall not go into effect until written permission has been received from the Contracting Officer.

6.19.1.2 Gate Times

Sisisky Gate 0500 – 2100, seven days a week

Mahone Ave. Gate 0500 – 2100, seven days a week

Jackson Circle Gate 24 hours a day, seven days a week

A. Ave. Gate 0500 – 2100, Monday through Friday

Lee Ave. Gate 24 hours a day, seven days a week

Shop Road Gate 0500 – 2100, seven days a week (without a RapidGate pass this is the only gate that contractors can use to enter Fort Lee)

6.19.1.3 Cellular Phone Use

Cellular phone use is prohibited within the construction site, except by superintendents and job foremen. Cellular phone use while driving and/or operating construction equipment is prohibited.

6.19.1.4 Antiterrorism and Force Protection

Electronic Intrusion Detection System (IDS): Any IDS installed will be compatible with the current Fort Lee base-wide system, to include the current base-wide operating platform and remote monitoring work stations and will meet all Fort Lee and US Army security requirements. The IDS shall include, but not limited to, passive infrared detection, triple balanced biased magnetic switches, central on-site IDS controller which monitors, interrogates, supervises, annunciates, identifies unauthorized intrusion, electronically notifies the operating platform by use of "dry copper telephone lines" (no cellular communication) in order for the base security response to events. Contractor will coordinate all IDS issues with the user and the Physical Security Office, Ft Lee.

6.19.2 PROJECT SCHEDULE

Information contained within this paragraph shall supplement Section 01 32 01.00 10, providing requirements specific to Norfolk District USACE.

6.19.2.1 GENERAL REQUIREMENTS

Pursuant to the Contract Clause, SCHEDULE FOR CONSTRUCTION CONTRACTS, a Project Schedule as described below shall be prepared. The NAS Project Schedule shall be a composite schedule including the design and construction activities. The scheduling of construction design and construction shall be the responsibility of the Contractor. Contractor management personnel shall actively participate in its development. Subcontractors and suppliers Designers, Subcontractors and suppliers working on the project shall also contribute in developing and maintaining an accurate Project Schedule. The approved Project Schedule shall be used

To measure the progress of the work, to aid in evaluating time extensions, and to provide the basis of all progress payments. The Government will use the NAS Project Schedule to evaluate the contractor's progress for timely completion, plan for Quality Assurance verification of the work and evaluate the effects of a proposed modification on the contract duration (critical path activities)

6.19.2.2 QUALIFICATIONS- CONTRACTOR SCHEDULING REPRESENTATIVE

The Contractor shall designate, a scheduling representative, the individual tasked with the responsibility for preparation-updating-revision of the NAS schedule who shall be responsible for the preparation and submittal of the entire NAS project schedule including all items specified below and revisions to the schedule or supplemental completion schedules, as applicable or directed by the Contracting Officer. The scheduling representative shall be approved by the Contracting Officer based on a resume indicating as a minimum, formal training from software vendor or 5 years experience in working with NAS schedules.

6.19.2.3 BASIS FOR PAYMENT

The schedule shall be the basis for measuring Contractor progress. Lack of an approved schedule or scheduling personnel will result in an inability of the Contracting Officer to evaluate Contractor's progress for the purposes of payment. Failure of the Contractor to provide all information, as specified below, shall result in the disapproval of the entire Project Schedule submission and the inability of the Contracting Officer to evaluate Contractor progress for payment purposes. In the case where Project Schedule revisions have been directed by the Contracting Officer and those revisions have not been included in the Project Schedule, the Contracting Officer may hold retainage up to the maximum allowed by contract, each payment period, until revisions to the Project Schedule have been made.

6.19.2.4 PROJECT SCHEDULE

The contractor shall prepare the NAS schedule using a computer software system. The system utilized by the Contractor shall be capable of satisfying all requirements of this specification and ER 1-1-11. Manual methods used to produce any required information shall require prior approval by the Contracting Officer. The Contracting Officer intends to use PRIMAVERA P3. Should the contractor utilize software that is different than that utilized by the Contracting Officer, based on the software utilized by the contractor for the preparation of the NAS schedule, the

Contractor shall provide a copy of the software and a license to the Administrative Contracting Officer at the Government field office. The Contractor shall submit a copy of the user's manual outlining the selected CPM computer program's mathematical analysis capabilities, details, functions and operation. The Contractor shall provide to the Government a complete input listing for the selected software.

a) The Critical Path Method (CPM) of network calculation shall be used to generate the Project Schedule. The Contractor shall provide the Project Schedule in the Precedence Diagram Method (PDM).

b) The Project Schedule shall include an appropriate level of detail. Failure to develop or update the Project Schedule or provide data to the Contracting Officer at the appropriate level of detail, as specified by the Contracting Officer, shall result in the disapproval of the schedule. The Contracting Officer will use, but is not limited to, the following conditions to determine the appropriate level of detail to be used in the Project Schedule:

1 Cost and Resource Loading

a. Cost Loading Activities: Costs for incremental design preparation will be assigned to the respective design phase submittal milestone(s). Equipment costs will be assigned to their respective Procurement Activities (i.e., the delivery milestone activity). Costs for installation of the material/equipment (labor, construction equipment, and temporary materials) will be assigned to their respective Construction Activities. The value of inspection/testing activities will not be less than 10 percent of the total costs for Procurement and Construction Activities. Evenly disperse overhead and profit to each activity over the duration of the project. The total of all cost loaded activities; including costs for material and equipment delivered for installation on the project, and labor and construction equipment loaded construction activities, shall total to 100 percent of the value of the contract.

b. Quantities and Units of Measure: Each cost loaded activity will have a detailed breakdown of the contract price, giving quantities for each of the various kinds of work, unit prices, etc.

c. Labor Resource Loading: As part of the Baseline Schedule development each construction activity shall have an estimate of the number of workers per day by trade, hours per day by trade and total expected hours used by trade during the execution of the activity. If no workers are required for an activity, then the activity shall be identified as using zero workers per day. Actual labor resource expended on an activity will be recorded in the monthly updated schedules and will coincide with entries made in the Daily Reports.

d. Equipment Resource loading: As part of the Baseline Schedule development each construction activity shall have an estimate of the equipment used per day, number of units per day and total expected hours for each piece of equipment used during the duration of the activity. Include a description of the major items of construction equipment planned for each construction activity on the project. The description shall include the year, make, model, and capacity. If no equipment is required for an activity, then the activity shall be identified as using zero equipment per day. Actual equipment resource expended on an activity will be recorded in the monthly updated schedules and will coincide with entries made in the Daily Reports.

2 Activity Durations - Contractor submissions shall follow the direction of the Contracting Officer regarding reasonable activity durations. Reasonable durations are those that allow the progress of activities to be accurately determined between payment periods (usually less than 2 percent of all non-procurement activities' Original Durations are greater than 20 days). Durations shall be in work days.

3 Design and Permit Activities - Design and permitting activities, including necessary conferences and follow-up actions and design package submission dates, shall be integrated into the schedule.

4 Procurement Activities - Tasks related to the procurement of long lead materials or equipment shall be included as separate activities in the project schedule. Long lead materials and equipment are those materials that have a procurement cycle of over 90 days. Examples of procurement process activities include, but are not limited to: submittals, approvals, procurement, fabrication, and delivery.

5 Critical Activities - The following activities shall be listed as separate line activities on the Contractor's project schedule:

- a. Submission and approval of mechanical/electrical layout drawings.
- b. Submission and approval of O & M manuals.
- c. Submission and approval of as-built drawings.
- d. Submission and approval of 1354 data and installed equipment lists.
- e. Submission and approval of testing and air balance (TAB).
- f. Submission of TAB specialist design review report.
- g. Submission and approval of fire protection specialist.
- h. Submission and approval of testing and balancing of HVAC plus commissioning plans and data.
- i. Air and water balance dates.
- j. HVAC commissioning dates.
- k. Controls testing plan.
- l. Controls testing.
- m. Performance Verification testing.
- n. Other systems testing, if required.
- o. Pre-final inspection.

- p. Correction of punch list from pre-final inspection.
- q. Final inspection.

6 Government Activities - Government and other agency activities that could impact progress shall be included in the schedule. These activities include, but are not limited to: Government approvals, Government review and verification that design submittals are in accordance with the RFP, inspections, utility tie-in, Government Furnished Equipment (GFE) and Notice to Proceed (NTP) for phasing requirements, environmental permit approvals by State regulators, inspections, Government approval of shop drawings activities should be shown with the duration at least the minimum allowed by the contract. The contractor's failure to provide reasonable durations in its schedule for Government activities does not establish or change the Government's review or approval path periods and the durations established for Government's activities are subject to approval by the Contracting Officer.

- a. Work activities to be included on the critical path
 - CQC (all) mechanical systems test (indicate the specific system)
 - CQC (all) electrical system tests (indicate the specific system)
 - Government QA (all) mechanical system acceptance/operational test (indicate specific system)
 - Government QA (all) electrical system acceptance /operational test (indicate specific system)
 - CQC completion inspection of the entire project
 - Contractor works off CQC punch list
 - Pre-final inspection performed when the facility is completed such that it can be used for it intended function (as determined by the Contracting Officer)
 - Contractor works off pre-final punch list
 - Final/acceptance inspection of the entire project
 - Contractor works off final punch list.
 - Contractor shall allow 30 calendar days total duration prior to current contract completion date for the above stated activities. (See Specification Section 01 45 04.00 50 CONTRACTOR QUALITY CONTROL).

b. Contracts with multiple buildings/facilities - The contractor shall prepare a separate detailed NAS schedule for each building/facility indicating its critical path for specified interim completion dates or critical milestone date. The master NAS schedule shall indicate the interface/lag/link between buildings/facilities to maximize/level the labor and other resources. The master schedule critical path must be indicated through the various buildings/facilities and total duration equal to the contract duration.

7 Responsibility - All activities shall be identified in the project schedule by the party responsible to perform the work. Responsibility includes, but is not limited to, the subcontracting firm, contractor work force, or government agency performing a given task. Activities shall not belong to more than one responsible party. The responsible party for each activity shall be identified by the Responsibility Code.

8 Work Areas - All activities shall be identified in the project schedule by the work area in which the activity occurs. Activities shall not be allowed to cover more than one work area. The work area of each activity shall be identified by the Work Area Code.

9 Modification or Claim Number - Any activity that is added or changed by contract modification or used to justify claimed time shall be identified by a mod or claim code that changed the activity. Activities shall not belong to more than one modification or claim item. The modification or claim number of each activity shall be identified by

the Mod or Claim Number. Whenever possible, changes shall be added to the schedule by adding new activities. Existing activities shall not normally be changed to reflect modifications.

10 Bid Item - All activities shall be identified in the project schedule by the Bid Item to which the activity belongs. An activity shall not contain work in more than one bid item. The bid item for each appropriate activity shall be identified by the Bid Item Code.

11 Phase of Work - All activities shall be identified in the project schedule by the phases of work in which the activity occurs. Activities shall not contain work in more than one phase of work. The project phase of each activity shall be by the unique Phase of Work Code.

12 Category of Work - All Activities shall be identified in the project schedule according to the category of work which best describes the activity. Category of work refers, but is not limited, to the procurement chain of activities including such items as submittals designs, design package submissions design reviews, review conferences, permits, submittals, approvals, procurement, fabrication, delivery, installation, start-up, and testing. The category of work for each activity shall be identified by the Category of Work Code.

13 Feature of Work - All activities shall be identified in the project schedule according to the feature of work to which the activity belongs. Feature of work refers, but is not limited to, a work breakdown structure for the project. The feature of work for each activity shall be identified by the Feature of Work Code.

c) Scheduled Project Completion - The schedule duration shall extend from NTP to the official contract completion date as awarded (unless approved by Contracting Officer-for early completion).

1 Project Start Date - The schedule shall start no earlier than the date on which the NTP was acknowledged. The Contractor shall include as the first activity in the project schedule an activity called "Start Project". The "Start Project" activity shall have an "ES" constraint date equal to the date that the NTP was acknowledged, and a zero day duration.

2 Constraint of Last Activity - Completion of the last activity in the schedule shall be constrained by the contract completion date. Calculation on project updates shall be such that if the early finish of the last activity falls after the contract completion date, then the float calculation shall reflect a negative float on the critical path. The Contractor shall include as the last activity in the project schedule an activity called "End Project". The "End Project" activity shall have an "LF" constraint date equal to the completion date for the project, and a zero day duration.

3 Early Project Completion - In the event the project schedule shows completion of the project prior to the contract completion date, the Contractor shall identify those activities that have been accelerated and/or those activities that are scheduled in parallel to support the Contractor's "early" completion. Contractor shall specifically address each of the activities noted in the narrative report at every project schedule update period to assist the Contracting Officer in evaluating the Contractor's ability to actually complete prior to the contract period. The Contractor shall include an activity named "contingency" with no cost and a duration equal to the number of calendar days from the date all the contract work is planned to be completed, to the official contract completion date as awarded.

d) Interim Completion Dates

Contractually specified interim completion dates shall also be constrained to show negative float if the early finish date of the last activity in that phase falls after the interim completion date.

1 Design phase - The contractor shall include the following design phase activities in the composite design and construction NAS Project schedule.

- a. Pre-work conference within 5 days after NTP
- b. Design Charrette (Preliminary Design) within 7 days after NTP
- c. Submittal of preliminary design (60%)
- d. Design review conference of Preliminary design Submittal of Final design (95%)

- e. Design review conference of Final design
- f. Submittal of Corrected Final design (100%)
- g. Design review conference of Corrected Final design
- h. Design Complete--- {The contracting officer shall advise the contractor in writing when the final design documents are approved for construction}
- i. The duration of each of these activities must be the duration as included in the contract award.

2 Design Network Analysis Schedule

Submit the Design Network Analysis Schedule defining the planned operations during the design phase(s) of the contract. The general (summarized) approach for the construction phase(s) of the project shall also be indicated. When the project is being Fast-Tracked, the Design Network Analysis Schedule shall include all fast-tracked design phases, including the required or proposed design submittals within each phase that will occur during the duration of the project. In accordance with paragraph entitled "Monthly Network Analysis Updates" the design network may be used for requesting progress payments for a period not to exceed the design phase(s) of the contract. Submittal and acceptance of the Design Network Analysis Schedule is condition precedent to the processing of the Contractor's pay requests on this schedule. The activities and relationships of the design schedule shall coincide and mesh with the activities of the Baseline NAS project Schedule. As part of this submittal, provide the Project Name format (and Project Group Name if used) that will be used by the Contractor to identify initial schedule submittals, updates, fragments, changes, etc.

3 Start Phase - The Contractor shall include as the first activity for a project phase an activity called "Start Phase X" where "X" refers to the phase of work. The "Start Phase X" activity shall have an "ES" constraint date equal to the date on which the NTP was acknowledged, and a zero day duration.

4 End Phase - The Contractor shall include as the last activity in a project phase an activity called "End Phase X" where "X" refers to the phase of work. The "End Phase X" activity shall have an "LF" constraint date equal to the completion date for the project, and a zero day duration.

5 Phase X - The Contractor shall include a hammock type activity for each project phase called "Phase X" where "X" refers to the phase of work. The "Phase X" activity shall be logically tied to the earliest and latest activities in the phase.

e) Default Progress Data Disallowed

Actual Start and Finish dates shall not be automatically updated by default mechanisms that may be included in CPM scheduling software systems. Actual Start and Finish dates on the CPM schedule shall match those dates provided from Contractor Quality Control Reports. Failure of the Contractor to document the Actual Start and Finish dates on the Daily Quality Control report for every in-progress or completed activity, and failure to ensure that the data contained on the Daily Quality Control reports is the sole basis for schedule updating shall result in the disapproval of the Contractor's schedule and the inability of the Contracting Officer to evaluate Contractor progress for payment purposes. Updating of the percent complete and the remaining duration of any activity shall be independent functions. Program features which calculate one of these parameters from the other shall be disabled.

f) Out-of-Sequence Progress

Activities that have posted progress without all preceding logic being satisfied (Out-of-Sequence Progress) will be allowed only on a case-by-case approval of the Contracting Officer. The Contractor shall propose logic corrections to eliminate all out of sequence progress or justify not changing the sequencing for approval prior to submitting an updated project schedule.

g) Negative Lags

Lag durations contained in the project schedule shall not have a negative value.

6.19.2.5 PROJECT SCHEDULE SUBMISSIONS

The Contractor shall provide the submissions as described below. The data for each submission is as follows: The contractor shall provide a bar chart schedule for the first 30 calendar days of the contract at the Pre-construction conference.

a) Preliminary NAS Project Schedule Submission

The Preliminary NAS Project Schedule, defining the Contractor's planned operations for the first {90} calendar days shall be submitted for approval within 21 days after NTP. The approved preliminary schedule shall be used for payment purposes not to exceed {90} calendar days after NTP. The preliminary schedule shall be detailed for the first {90} days and depict the remainder of the project in summary format. The preliminary schedule shall be submitted on data disk or CD (2 copies).

Two hard copy of diagrams in color.

Three hard copies of all sorts / report ----earning curve----manpower plot

b) Initial NAS Project Schedule Submission

The Initial NAS Project Schedule shall be submitted for approval within 60 calendar days after NTP is acknowledged. The schedule shall include detailed activities for the entire project with a reasonable sequence of activities, and shall be at a reasonable level of detail as approved by the Contracting Officer.

The Initial schedule shall be submitted on data disk or CD (2 copies).

Two hard copy of diagrams in color.

Three hard copies of all sorts / report ----earning curve----manpower plot

c) Monthly Network Analysis Updates (Entire NAS Project Schedule)

The Contractor shall submit monthly schedule updates to the Contracting Officer for approval. Monthly updates shall continue until the contract is accepted by the Contracting Officer. These submissions shall enable the Contracting Officer to evaluate the Contractor's monthly progress.

The contractor's invoice may be deemed as an improper invoice, if it fails to provide monthly updates acceptable to Contracting Officer, this may delay progress payment and may result in an interim unsatisfactory performance rating. The contractor shall include its requests to revise/adjust the NAS schedule for approval, prior to implementing the revisions into the official schedule.

d) Review and Evaluation

After the Government's review(s) of the [Design Network Analysis Schedule](#) and Initial Network Analysis Schedule, the Contractor shall meet with the Contracting Officer to discuss the review and evaluation of the NAS submittal. Revisions necessary as a result of this review shall be resubmitted for acceptance within 10 calendar days after the meeting.

1 Acceptance - Review comments made by the Government on the Contractor's schedule(s) will not relieve the Contractor from compliance with requirements of the Contract Documents. The Contractor is responsible for scheduling, sequencing, and prosecuting the Work to comply with the requirements of the Contract Documents. Government acceptance extends only to the activities of the Contractor's schedule that the Government has been assigned responsibility for and agrees it is responsible. The Government will also review for contract imposed schedule constraints and conformance, and cost loading of the CPM activities. Comments offered on other parts of the schedule, which the Contractor is assigned responsibility, are offered as a courtesy and are not conditions of Government acceptance; but are for the general conformance with established industry schedule concepts.

a. When the Design Network Analysis Schedule is submitted and accepted by the Contracting Officer it will be considered the "Baseline Network Analysis Schedule for Design". The Design Network Analysis Schedule shall be

updated at least monthly or submitted as part of the design submittals, whichever occurs first. When the Initial NAS Project Schedule is submitted and accepted by the Contracting Officer, it will then be considered the "Baseline Network Analysis Schedule". The Baseline Network Analysis Schedule will then be used by the Contractor for planning, organizing, and directing the work; reporting progress; and requesting payment for work accomplished. The schedule will be updated monthly by the Contractor and submitted monthly with the progress pay request to reflect the current status of the work. Submittal and acceptance of the Baseline Network Analysis Schedule for Design and Baseline Network Analysis Schedule and accurate updated schedules accompanying the pay requests are both conditions precedent to processing pay requests. Only bonds will be paid prior to acceptance of the Baseline Schedule(s).

b. Submittal of the Network, and subsequent schedule updates, will be understood to be the Contractor's representation that the submitted schedule meets all of the requirements of the Contract Documents, accurately reflects the work accomplished, and that Work will be executed in the sequence indicated on the submitted schedule.

2 Baseline Network Analysis Schedule - Once review comments are resolved and the Contracting Officer has accepted the Design Network Analysis Schedule and Construction Network Analysis Schedule, the Contractor shall within 5 calendar days furnish:

a. Two copies of the network diagrams.

b. Two copies of the Cash Flow S-Curve indicating the cash flow based upon both the projected early and late finish dates.

c. Two sets of data disks containing the project schedule shall be provided for the initial submission and every periodic project update. Data shall be submitted on electronic media that is acceptable to the Contracting Officer. A permanent exterior label shall be affixed to each disk submitted. The label shall indicate the type of schedule (**Design NAS**, Construction NAS, Baseline, Update, Recovery, Change, etc.), full contract number, Project Name used to identify project in scheduling software, contract name & location, data status date, diskette number with total number of diskettes in set, software name and version used to run the schedule, and the name and telephone number of person responsible for the schedule. For major revisions, updates or changes to the network diagrams, once accepted by the Contracting Officer, the Contractor shall submit these same diagrams and reports.

e) Standard Activity Coding Dictionary

The Contractor shall use the activity coding structure defined in the Standard Data Exchange Format (SDEF) in ER 1-1-11, Appendix A. This exact structure is mandatory, even if some fields are not used.

6.19.2.6 SUBMISSION REQUIREMENTS

The following items shall be submitted by the Contractor for the preliminary submission, initial submission, and every periodic project schedule update throughout the life of the project:

a) Data Disks

Two data disks containing the project schedule shall be provided. Data on the disks shall adhere to the SDEF format specified in ER 1-1-11, Appendix A.

1 File Medium - The electronic files will be supplied on compact disc, read-only memory (CD-ROM) unless otherwise approved by the Contracting Officer.

2 Disk Label - A permanent exterior label shall be affixed to each disk submitted. The label shall indicate the type of schedule (Preliminary, Initial, Update, or Change), full contract number, project name, project location, data date, name and telephone number or person responsible for the schedule, and the MS-DOS version used to format the disk.

3 File Name - Each file submitted shall have a name related to either the schedule data date, project name, or contract number. The Contractor shall develop a naming convention that will ensure that the names of the files

submitted are unique. The Contractor shall submit the file naming convention to the Contracting Officer for approval.

b) Narrative Report

A Narrative Report shall be provided with the preliminary, initial, and each monthly update of the project schedule. This report shall include a description of activities along the most critical paths, a description of current and anticipated problem areas or delaying factors and their impact, and an explanation of corrective actions taken or required to be taken. The narrative report is expected to relay to the Government, the Contractor's thorough analysis of the schedule output and its plans to compensate for any problems, either current or potential, which are revealed through that analysis. If the contractor believes that any Government action or inaction has, or potentially, will impact its progress, it will include the specific notice of the fact in this report. This information should include the activity number of the impacted work, nature and duration of the impact. The narrative report shall address all modifications and weather activities that were input for the progress and their impact on the contract completion and total float.

c) Approved Changes Verification

Only project schedule changes that have been previously approved by the Contracting Officer shall be included in the schedule submission. The Narrative Report shall specifically reference, on an activity by activity basis, all changes made since the previous period and relate each change to documented, approved schedule changes.

d) Schedule Reports

The format for each activity for the schedule reports listed below shall be printed for those activities in progress or completed. The report shall contain:

Activity Numbers

Activity Description

Original Duration

Remaining Duration

Early Start Date

Early Finish Date

Late Start Date

Late Finish Date

Total Float

Actual Start

Actual Finish Dates

1. Milestone Report - The established monthly and special milestones shall be included in this report. The milestones must be established for each significant project features such as: Clearing-grading-demolition, foundation, slab-on-grade, structure-frame, exterior walls-windows, roof-building dry-in, interior walls-mech/elect R/I, above ceiling mech/elect R/I, ceiling, interior wall finish--doors, painting-coverings, floor finish, installation of mech/elect and other equipment-fixtures-casework, plumbing, HVAC system, finish interior mech/elect, testing-commissioning mech/elect systems, onsite utilities, paving-landscaping, prefinal-final inspections-final cleanup and/or other features (as applicable for the project).

The milestones for a building must approximate the following

Milestone work activity % of total duration

NTP 0%

STRUCTURE COMPLETE 36%

ROOF COMPLETE 40%

BUILDING DRY-IN 44%

INTERIOR WALLS COMPLETE 53%

PLUMBING COMPLETE 78%

FLOORING COMPLETE 80%

HVAC DUCTWORK 88%

FINISH MECH/ELECT SYSTEMS COMPLETE 91%

QC TESTING COMPLETE 92%

QA ACCEPTANCE TESTING COMPLETE 93%

CQC INSPECTION OF ENTIRE CONTRACT 95%

PREFINAL INSPECTION 97%

FINAL INSPECTION 99%

CCD 100%

Late Start /Late Finish Report

Late Start -Actual Start/Late Finish-Actual Finish-----total float-duration sort -----sorted by LS in chronological order from data date to contract completion date.

2 Activity Report - A list of all activities sorted according to activity number.

3 Logic Report - A list of Preceding and Succeeding activities for every activity in ascending order by activity number. Preceding and succeeding activities shall include all information listed above in paragraph Schedule Reports. A blank line shall be left between each activity grouping.

4 Total Float Report - A list of all incomplete activities sorted in ascending order of total float. Activities which have the same amount of total float shall be listed in ascending order of Early Start Dates. Completed activities shall not be shown on this report.

5 Earnings Report - A compilation of the Contractor's Total Earnings on the project from the NTP until the most recent Monthly Progress Meeting. This report shall reflect the Earnings of specific activities based on the agreements made in the field and approved between the Contractor and Contracting Officer at the most recent Monthly Progress Meeting. Provided that the Contractor has provided a complete schedule update, this report shall serve as the basis of determining Contractor Payment. Activities shall be grouped by bid item and sorted by activity numbers. This report shall: sum all activities in a bid item and provide a bid item percent; and complete and sum all bid items to provide a total project percent complete. The printed report shall contain, for each activity: the Activity Number, Activity Description, Original Budgeted Amount, Total Quantity, Quantity to Date, Percent Complete (based on cost), and Earnings to Date.

e) Network Diagram

One hard copy of the network diagram shall be required on the preliminary schedule, initial schedule submission, and updated on each monthly schedule submissions. Monthly updates must indicate actual progress as of the data date. The network diagram shall depict and display the order and interdependence of activities and the sequence in which the work is to be accomplished.

Network diagrams shall show the order and interdependence of project activities and the sequence in which the work is to be accomplished, as planned by the Contractor. The network diagramming procedure which will be used will show how the start of a given activity is dependent on the completion of preceding activities, and how its completion restricts the start of following activities.

Activity Duration: The activity duration shall be indicated in "work" days, and revise the assigned calendar.

The contractor may request to change the work days from 5 days/week to 6 or 7 days/week should this action become necessary to regain the schedule due to problems unrelated to the Government actions.

Contractor submissions shall include reasonable activity durations as determined by the contractor and subcontractors. The durations are to be determined by the contractor using the planned crew size/composition.

The network diagram shall be required on the initial schedule submission and on monthly schedule update submissions. The network diagram shall depict and display the order and interdependence of activities and the sequence in which the work is to be accomplished. The Contracting Officer will use, but is not limited to, the following conditions to review compliance with this paragraph:

- 1 Continuous Flow - Diagrams shall show a continuous flow from left to right with no arrows from right to left. The activity number, description, duration, and estimated earned value shall be shown on the diagram.
- 2 Project Milestone Dates - Dates shall be shown on the diagram for start of project, any contract required interim completion dates, and contract completion dates.
- 3 Critical Path - The critical path shall be clearly shown.
- 4 Banding - Activities shall be grouped to assist in the understanding of the activity sequence. Typically, this flow will group activities by category of work, work area and/or responsibility.
- 5 Earning (S-Curves) - Earnings (cash flow) curves (as required for submissions) shall show scheduled ES/EF and LS/LF curves. The monthly updates must indicate the actual progress plotted as of the data date. The cash flow curves are affected by the assigned cost and duration of the activities. The LS/LF cash flow curve is expected approximate 40% earning (without stored material) @ 50% of the contract duration and 70% earning @ 70% of contract duration. Earnings curves showing projected early and late earnings and earnings to date.

6.19.2.7 PERIODIC PROGRESS MEETINGS

- a) There will be two progress meetings for the review and updating of the project scheduling.

A progress update meeting will be held at the onsite between USACE and the authorized contractor representatives, on the agreed cut-off date established at the pre-construction conference. During this meeting the Contractor shall indicate its requested percentage completed on each activity on which there was a revised percentage of completion. The Contracting Officer must approve actual progress percentages for each Progress meetings to discuss payment shall include a monthly onsite meeting or other regular intervals mutually agreed to at the pre-construction conference. During this meeting the Contractor shall describe, on an activity-by-activity basis, all proposed revisions and adjustments to the project schedule required to reflect the current status of the project. The Contracting Officer will approve activity progress, proposed revisions, and adjustments as appropriate.

- b) The updated progress data will be evaluated at the second progress meeting.

A progress evaluation meeting shall be held with the contractor, after the updating of the current progress period work activities percentage is complete including modifications and adverse weather activities, to evaluate progress and the NAS schedule.

Adjustments to the NAS schedule. Update information must include the Actual Start Dates, Actual Finish Dates, Remaining Durations, and Cost to Date. The Contractor must address all the activities on an activity-by-activity basis during the second progress meeting.

The monthly updated NAS schedule is submitted to the Contracting Officer, for approval, with the contractor's request for progress payment. The evaluation will include a review of actual durations compared to scheduled durations for critical and non-critical activities, progress on critical activities and near critical activities, trends, and current/potential problem areas, cash flow progress, and projected workflow of activities.

The contractor's narrative report shall be available for review at least three days prior to the second progress meeting.

c) Meeting Attendance

The Contractor's Project Manager and Scheduler shall attend the regular progress meeting.

d) Update Submission Following Progress Meeting

A complete update of the project schedule containing all approved progress, revisions, and adjustments, based on the regular progress meeting, shall be submitted not later than 4 working days after the monthly progress meeting.

e) Progress Meeting Contents

Update information, including Actual Start Dates, Actual Finish Dates, Remaining Durations, and Cost-to-Date shall be subject to the approval of the Contracting Officer. As a minimum, the Contractor shall address the following items on an activity by activity basis during each progress meeting.

1 Start and Finish Dates - The Actual Start and Actual Finish dates for each activity currently in-progress or completed.

2 Time Completion - The estimated Remaining Duration for each activity in-progress. Time-based progress calculations shall be based on Remaining Duration for each activity.

3 Cost Completion - The earnings for each activity started. Payment will be based on earnings for each in-progress or completed activity. Payment for individual activities will not be made for work that contains quality defects. A portion of the overall project amount may be retained based on delays of activities.

4 Logic Changes - All logic changes pertaining to NTP on change orders, change orders to be incorporated into the schedule, contractor proposed changes in work sequence, corrections to schedule logic for out-of-sequence progress, lag durations, and other changes that have been made pursuant to contract provisions shall be specifically identified and discussed.

5 Other Changes - Other changes required due to delays in completion of any activity or group of activities include:

- a. Delays beyond the Contractor's control, such as strikes and unusual weather.
- b. Delays encountered due to submittals, Government Activities, deliveries or work stoppages which make re-planning the work necessary.
- c. Changes required to correct a schedule which does not represent the actual or planned prosecution and progress of the work.

6.19.2.8 REQUESTS FOR TIME EXTENSIONS

In the event the Contractor requests a time extension of the contract completion date, or any interim milestone date, the Contractor shall furnish the following for a determination as to whether or not the Contractor is entitled to an extension of time under the provisions of the contract: justification, project schedule data, and supporting evidence as the Contracting Officer may deem necessary. Submission of proof of delay shall be based on a

subnet/fragnet of work activities, revised activity logic, duration, and costs (updated to the specific date that the delay occurred) is required for any time extension approvals. The project schedule shall clearly display that the Contractor has used, in full, all the float time available for the work involved with this request. Actual delays that are found to be caused by the Contractor's own actions, which result in the extension of the schedule, shall not be a cause for a time extension to the contract completion date.

a) Justification of Delay

The project schedule shall clearly display that the Contractor has used, in full, all the float time available for the work involved with this request. The Contracting Officer's determination as to the number of allowable days of contract extension shall be based upon the project schedule updates in effect for the time period in question, and other factual information. Actual delays that are found to be caused by the Contractor's own actions, which result in the extension of the schedule, will not be a cause for a time extension to the contract completion date.

b) Submission Requirements for Time Extension Requests

The Contractor shall submit a comprehensive time analysis and justification for each "Request for Proposal" for a change in the contract, based upon the most recent approved schedule update at the time of the RFP issued. Such a time analysis and justification shall be in accordance with the requirements of other appropriate Contract Clauses and shall include, as a minimum:

1. A subnet/fragnet of activities indicating all new change activities and the affect on existing schedule activities.
2. A brief explanation of the causes of the change.
3. An analysis of the overall impact the subnet/fragnet has when applied to the current-updated approved NAS schedule.
4. Activities impacted in each justification for change shall be identified by a unique activity code contained in the required data file.
5. Modifications to the contract
6. Unpriced, unilateral and bilateral (without agreement on time) modifications

Upon receipt of the signed SF 30, for un-priced and unilateral modifications (or bilateral modifications with agreement on costs without an agreement on time, the Contractor shall submit proposed schedule revisions (in the form of a proposed subnet/fragnet) to the Contracting Officer for approval, within 14 days of the SF 30 being issued. The proposed (subnet/fragnet) revisions to the schedule will be approved by the Contracting Officer prior to application of those changes within the project schedule.

Should the contractor fail or refuse to submit the provisions, the Contracting Officer may furnish the Contractor suggested (subnet/fragnet) revisions to the project schedule.

Upon receipt, the Contractor shall include these subnet/fragnet revisions in the project schedule.

If the Contractor has any objections to the revisions furnished by the Contracting Officer, the Contractor shall advise the Contracting Officer within 14 days of receipt of the revisions.

Regardless of the objections, the Contractor shall continue to update the schedule with the Contracting Officer's revisions until a mutual agreement on the revisions is reached.

If the Contractor fails to submit alternative revisions within 2 weeks of receipt of the Contracting officer's proposed revisions, the contractor will be deemed to have concurred with the Contracting Officer's proposed revisions. The proposed revisions will be the basis for an "equitable adjustment" for performance of the work.

Bilateral modifications shall be entered into the NAS schedule, utilizing the subnet/fragnet as agreed during negotiations, immediately after receipt of signed SF 30. Entries to the schedule must be approved by Contracting Officer.

All modifications subnets/fragnets shall be applied to the NAS schedule immediately in the sequence in which they were finalized (received signed SF 30). The modification with time extension shall result in new work activities entered adjacent to the critical path work activity affected by the modification.

Weather time extensions must be included monthly upon receipt of the written results of the monthly weather evaluation from the Contracting Officer.

c) Contractor falls behind the approved project schedule

If the Contractor falls behind its approved schedule, (behind the LS/LF cash flow curve or more than 10 work days of negative float) or performs the work in such a manner that the network diagram and mathematical analysis no longer indicate reasonable logic and duration for completion of the work by the current contract completion date, as determined by the Contracting Officer, the Contractor shall promptly provide a supplemental NAS recovery or completion schedule for completion by the current completion date, by reducing the remaining durations, revising logic, or adjusting resources onsite (in addition to the original approved NAS schedule) as approved by the Contracting Officer. The supplemental schedule shall be resource loaded with crew size and productivity for each remaining activity, and indicating overtime, weekend work, double shifts needed to regain the schedule, in accordance with FAR 52.236-15, without additional cost to the Government. The supplement schedule shall not replace the original approved schedule as the official contract schedule. The original approved schedule shall be updated monthly (in addition to the supplemental schedule) and monitored by the contractor and the Contracting Officer to determine the effect of the supplemental schedule progress has on the contract progress to regain its rate of progress for timely completion as specified.

The Contractor shall not artificially improve its progress by revising the schedule logic restraints or shortening future work activity durations. The contractor may improve its progress by performing sequential work activities concurrently or by performing activities more quickly than planned, but such improvements shall be indicated on a supplement schedule and shall not be recorded on the official until they have actually been achieved by the contractor. The additional resources required to improve the progress must be evident on the work site.

Failure of the contractor to perform work and maintain progress in accordance with the supplemental recovery or completion schedule may result in an interim and final unsatisfactory performance rating and/or may result in corrective action by the contracting officer in accordance with FAR 52.236-15.

The Contractor shall submit a justification for each request for a change in the contract completion date of less than 2 weeks based upon the most recent schedule update at the time of the NTP or constructive direction issued for the change. Such a request shall be in accordance with the requirements of other appropriate Contract Clauses and shall include, as a minimum:

1. A list of affected activities, with their associated project schedule activity number.
2. A brief explanation of the causes of the change.
3. An analysis of the overall impact of the changes proposed.
4. A sub-network of the affected area.

Activities impacted in each justification for change shall be identified by a unique activity code contained in the required data file.

d) Additional Submission Requirements

For any requested time extension of over 2 weeks, the Contracting Officer may request an interim update with revised activities for a specific change request. The Contractor shall provide this disk within 4 days of the Contracting Officer's request.

6.19.2.9 DIRECTED CHANGES

If the NTP is issued for changes prior to settlement of price and/or time, the Contractor shall submit proposed schedule revisions to the Contracting Officer within 2 weeks of the NTP being issued. The proposed revisions to the schedule will be approved by the Contracting Officer prior to inclusion of those changes within the project schedule. If the Contractor fails to submit the proposed revisions, the Contracting Officer may furnish the Contractor with suggested revisions to the project schedule. The Contractor shall include these revisions in the project schedule until revisions are submitted and final changes and impacts have been negotiated. If the Contractor has any objections to the revisions furnished by the Contracting Officer, the Contractor shall advise the Contracting Officer within 2 weeks of receipt of the revisions. Regardless of the objections, the Contractor shall continue to update the schedule with the Contracting Officer's revisions until a mutual agreement in the revisions is reached. If the Contractor fails to submit alternative revisions within 2 weeks of receipt of the Contracting Officer's proposed revisions, the Contractor will be deemed to have concurred with the Contracting Officer's proposed revisions. The proposed revisions will then be the basis for an equitable adjustment for performance of the work.

6.19.2.10 OWNERSHIP OF FLOAT

Float available in the schedule, at any time, shall not be considered for the exclusive use of either the Government or the Contractor.

6.19.3 SUPPLEMENTAL SUBMITTAL PROCEDURES

The following are submittals and submittal procedures to supplement those described in Section 01.33.00.

6.19.3.1 Submittal Descriptions (SD)

SD-01 Preconstruction Submittals

- Activity Hazard Analysis (AHA)
- Design Network Analysis Schedule
- Crane Critical Lift Plan

6.19.3.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. The following shall be submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SC-01 preconstruction Submittals

Submittal register; G

6.19.3.3 GOVERNMENT REVIEW SCHEDULING

Submittals covering component items forming a system or items that are interrelated shall be scheduled to be coordinated and submitted concurrently. Certifications to be submitted with the pertinent drawings shall be so scheduled. Adequate time (a minimum of 30 calendar days exclusive of mailing time) shall be allowed and shown on the register for review and approval. No delay damages or time extensions will be allowed for time lost in late submittals.

- a) Pre-Construction Submittal Scheduling

Pre-Construction submittals shall be scheduled and shown on the submittal register to allow a minimum of 30 calendar days (exclusive of mailing time) for review and approval. No delay damages or time extensions will be allowed for time lost in late submittals.

b) Design Submittal Scheduling

Design submittals shall be submitted in accordance with the requirements of Section 01 33.16 "Design After Award".

6.19.3.4 SUBMITTAL PROCEDURES (Refer to Paragraph 1.11)

Submittals shall be made as follows:

a) Procedures

1. The Contractor shall be responsible for the scheduling and control of all submittals. The Contractor is responsible for confirming that the submittal register includes all submittals required by the contract documents.
2. In addition to those items listed on ENG Form 4288, the Contractor will furnish submittals for any deviation from the plans or specifications. The scheduled need dates must be recorded on the document for each item for control purposes and critical items must be tied to the Contractor's approved schedule where applicable.
3. The Contractor will submit to the Contracting Officer for approval a minimum of five copies of all G/RE (Resident/Area Office Review), G/ED (Engineering Division Review) or G/AE (Architect-Engineer Review) level submittals. Three copies of all FIO level submittals will be provided. The number of copies of submittals specified in this portion of the contract shall be complied with in lieu of four copies as specified by FAR 52.236-21.
4. For those contracts requiring Network Analysis System (NAS), the Contractor will schedule on the NAS critical items of equipment submittals and procurement activities which will, or have the potential to, significantly impact project completion. The inclusion or exclusion of critical items shall be subject to the approval of the Contracting Officer. Where ENG Form 4025 must be submitted prior to approval of the Construction Progress Schedule, the Contractor shall submit an initial annotated ENG Form 4288 upon which dates for submittal, approval and delivery of procurement items shall be included for the first 60 days of the work. Upon approval of the Construction Progress Schedule, or no later than 60 days after Notice to Proceed, the Contractor shall submit final annotated copies of ENG Form 4288. Dates shall be coordinated with the approved Construction Progress Schedule to logically interface with the sequence of construction. Critical item numbers will be shown on the listing if NAS is required.
5. Furnishing the schedule shall not be interpreted as relieving the Contractor of his obligation to comply with all the specification requirements for the items on the schedule. Contractor's Quality Control representative shall review the listing at least every 30 days and take appropriate action to maintain an effective system. The Contractor shall furnish a list each 30 days of all submittals on which either Government's or Contractor's action is past due. He shall also furnish revised due dates in those cases when the original submittal schedule is no longer realistic. This monthly list of delayed items shall also be annotated by the Contractor to show what corrective action he is taking with regard to slippages in submittal schedule which are attributable to actions by him, his subcontractors, or suppliers.
6. The Contractor shall provide a complete updated submittal register indicating the current status of all submittals when requested by the Contracting Officer in order to assure himself the schedule is being maintained.

7. The Contractor shall certify that each submittal is correct and in strict conformance with the contract drawings and specifications. All submittals not subject to the approval of the Contracting Officer will be submitted for information purposes only.
8. No Corps of Engineers action will be required prior to incorporating these items into the work, but the submittal shall be furnished to the Area/Resident Engineer not less than 2 weeks prior to procurement of Contractor certified material, equipment, etc.
9. These Contractor approved submittals will be used to verify that material received and used in the job is the same as that described and approved and will be used as record copies. All samples of materials submitted as required by these specifications shall be properly identified and labeled for ready identification, and upon being certified by the Contractor and reviewed by the Contracting Officer, shall be stored at the site of the work for job site use until all work has been completed and accepted by the Contracting Officer. Delegation of this approval authority to Contractor Quality Control does not relieve the Contractor from the obligation to conform to any contract requirement and will not prevent the Contracting Officer from requiring removal and replacement of construction not in contract conformance; nor does it relieve the Contractor from the requirement to furnish "samples" for testing by the Government Laboratory or check testing by the Government in those instances where the technical specifications so prescribe.
10. Contractor certified drawings will be subject to quality assurance review by the Government at any time during the duration of the contract. No adjustment for time or money will be allowed for corrections required as a result of noncompliance with plans and specifications.
11. Submittals Requiring Government Approval (G/ED Level, G/RE Level or G/AE level). Where the review authority is designated to the Government, the Contractor is required to sign the certification on ENG Form 4025 in the box beside the remarks block in Section I. The Government will code the items in block h and sign the approval action block in Section II as the approving authority.
12. Operating and Maintenance Instructions. Six complete sets of instructions containing the manufacturer's operating and maintenance instructions for each piece of equipment shall be furnished. Each set shall be permanently bound and shall have a hard cover. One complete set shall be furnished at the time test procedures are submitted. Remaining sets shall be furnished before the contract is completed. The following identification shall be inscribed on the covers: The words "OPERATING AND MAINTENANCE INSTRUCTIONS," name and location of the facility, name of the Contractor, and contract number. Fly sheets shall be placed before instructions covering each subject. Instruction sheets shall be approximately 8-1/2 by 11 inches, with large sheets of drawings folded in. Instructions shall include but are not limited to:
 - a. System layout showing piping, valves and controls;
 - b. Approved wiring and control diagrams;
 - c. A control sequence describing startup, operation and shutdown;
 - d. Operating and maintenance instructions for each piece of equipment, including lubrication instructions and troubleshooting guide; and
 - e. Manufacturer's bulletins, cuts and descriptive data; parts lists and recommended parts.
13. The Government will further discuss and detail the required submittal procedures at the Pre-Construction Conference.
14. If the Government performs a conformance review of other Designer of Record approved submittals, the submittals will be so identified and returned, as described above.

15. For design-build construction the Government will retain 2 copies of information only submittals.

6.19.4 SAFETY AND OCCUPATIONAL HEALTH REQUIREMENTS

6.19.4.1 GENERAL

a) REFERENCES

Refer to APPLICABLE CRITERIA in Paragraph 4.

b) SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

Government acceptance is required for submittals with a "G, A" designation.

SD-01 Preconstruction Submittals

Accident Prevention Plan (APP); G, A

Activity Hazard Analysis (AHA); G, A

Crane Critical Lift Plan; G, A

Proof of qualification for Crane Operators; G, A

SD-06 Test Reports

Reports

Submit reports as their incidence occurs, in accordance with the requirements of the paragraph entitled, "Reports."

Accident Reports

Monthly Exposure Reports

Crane Reports

Regulatory Citations and Violations

SD-07 Certificates

Confined Space Entry Permit

Hot work permit

Certificate of Compliance (Crane)

Submit one copy of each permit/certificate attached to each Daily Quality Control Report.

c) DEFINITIONS

1. High Visibility Accident. Any mishap which may generate publicity and/or high visibility.
2. Medical Treatment. Treatment administered by a physician or by registered professional personnel under the standing orders of a physician. Medical treatment does not include first aid treatment even through provided by a physician or registered personnel.
3. Recordable Injuries or Illnesses. Any work-related injury or illness that results in:
 - a. Death, regardless of the time between the injury and death, or the length of the illness;
 - b. Days away from work (any time lost after day of injury/illness onset);
 - c. Restricted work;
 - d. Transfer to another job;
 - e. Medical treatment beyond first aid;
 - f. Loss of consciousness; or
 - g. A significant injury or illness diagnosed by a physician or other licensed health care professional, even if it did not result in (1) through (6) above.
4. "USACE" property and equipment specified in USACE EM 385-1-1 should be interpreted as Government property and equipment.

6.19.4.2 REGULATORY REQUIREMENTS

In addition to the detailed requirements included in the provisions of this contract, work performed shall comply with USACE EM 385-1-1, and the following federal, state, and local, laws, ordinances, criteria, rules and regulations. Submit matters of interpretation of standards to the appropriate administrative agency for resolution before starting work. Where the requirements of this specification, applicable laws, criteria, ordinances, regulations, and referenced documents vary, the most stringent requirements shall apply.

6.19.4.3 SITE QUALIFICATIONS, DUTIES AND MEETINGS

a) Personnel Qualifications

1. Site Safety and Health Officer (SSHO): Site Safety and Health Officer (SSHO) shall be provided at the work site at all times to perform safety and occupational health management, surveillance, inspections, and safety enforcement for the Contractor. The Contractor Quality Control (QC) person cannot be the SSHO on this project, even though the QC has safety inspection responsibilities as part of the QC duties. The SSHO shall meet the following requirements:

Level 3:

A minimum of 5 years safety work on similar projects.

30-hour OSHA construction safety class or equivalent within the last 5 years.

An average of at least 24 hours of formal safety training each year for the past 5 years.

Competent person training as needed.

2. Crane Operators: Crane operators shall meet the requirements in USACE EM 385-1-1, Section 16 and Appendix G. In addition, for mobile cranes with Original Equipment Manufacturer (OEM) rated capacities of 50,000 pounds or greater, crane operators shall be designated as qualified by a source that qualifies crane

operators (i.e., union, a government agency, or and organization that tests and qualifies crane operators). Proof of current qualification shall be provided.

b) Personnel Duties

1. Site Safety and Health Officer (SSHO)/Superintendent

a. Conduct daily safety and health inspections and maintain a written log which includes area/operation inspected, date of inspection, identified hazards, recommended corrective actions, estimated and actual dates of corrections. Safety inspection logs shall be attached to the Contractors' daily quality control report.

b. Conduct mishap investigations and complete required reports. Maintain the OSHA Form 300 and Daily Production reports for prime and sub-contractors.

c. Maintain applicable safety reference material on the job site.

d. Attend the pre-construction conference, pre-work meetings including preparatory inspection meeting, and periodic in-progress meetings.

e. Implement and enforce accepted APPS and AHAs.

f. Maintain a safety and health deficiency tracking system that monitors outstanding deficiencies until resolution. A list of unresolved safety and health deficiencies shall be posted on the safety bulletin board.

g. Ensure sub-contractor compliance with safety and health requirements.

2. Failure to perform the above duties will result in dismissal of the superintendent and/or SSHO, and a project work stoppage. The project work stoppage will remain in effect pending approval of a suitable replacement.

c) Meetings

Preconstruction Conference

1. Contractor representatives who have a responsibility or significant role in accident prevention on the project shall attend the preconstruction conference. This includes the project superintendent, site safety and health officer, quality control supervisor, or any other assigned safety and health professionals who participated in the development of the APP (including the Activity Hazard Analyses (AHAs) and special plans, program and procedures associated with it).

2. The Contractor shall discuss the details of the submitted APP to include incorporated plans, programs, procedures and a listing of anticipated AHAs that will be developed and implemented during the performance of the contract. This list of proposed AHAs will be reviewed at the conference and an agreement will be reached between the Contractor and the Contracting Officer's representative as to which phases will require an analysis. In addition, a schedule for the preparation, submittal, review, and acceptance of AHAs shall be established to preclude project delays.

3. Deficiencies in the submitted APP will be brought to the attention of the Contractor at the preconstruction conference, and the Contractor shall revise the plan to correct deficiencies and re-submit it for acceptance. Work shall not begin until there is an accepted APP.

4. The functions of a Preconstruction conference may take place at the Post-Award Kickoff meeting for Design Build Contracts.

1. ACCIDENT PREVENTION PLAN (APP)

a. The Contractor shall use a qualified person to prepare the written site-specific APP. Prepare the APP in accordance with the format and requirements of USACE EM 385-1-1 and as supplemented herein. Cover all paragraph and subparagraph elements in USACE EM 385-1-1, Appendix A, "Minimum Basic Outline for Accident Prevention Plan". Specific requirements for some of the APP elements are described below. The APP shall be job-

specific and shall address any unusual or unique aspects of the project or activity for which it is written. The APP shall interface with the Contractor's overall safety and health program. Any portions of the Contractor's overall safety and health program referenced in the APP shall be included in the applicable APP element and made site-specific. The Government considers the Prime Contractor to be the "controlling authority" for all work site safety and health of the subcontractors. Contractors are responsible for informing their subcontractors of the safety provisions under the terms of the contract and the penalties for noncompliance, coordinating the work to prevent one craft from interfering with or creating hazardous working conditions for other crafts, and inspecting subcontractor operations to ensure that accident prevention responsibilities are being carried out. The APP shall be signed by the person and firm (senior person) preparing the APP, the Contractor, the on-site superintendent, the designated site safety and health officer and any designated CSP and/or CIH.

- b. Submit the APP to the Contracting Officer 15 calendar days prior to the date of the preconstruction conference for acceptance. Work cannot proceed without an accepted APP.
- c. Once accepted by the Contracting Officer, the APP and attachments will be enforced as part of the contract. Disregarding the provisions of this contract or the accepted APP will be cause for stopping of work, at the discretion of the Contracting Officer, until the matter has been rectified.
- d. Once work begins, changes to the accepted APP shall be made with the knowledge and concurrence of the Contracting Officer, project superintendent, SSHO and quality control manager. Should any hazard become evident, stop work in the area, secure the area, and develop a plan to remove the hazard. Notify the Contracting Officer within 24 hours of discovery. Eliminate/remove the hazard. In the interim, all necessary action shall be taken to restore and maintain safe working conditions in order to safeguard onsite personnel, visitors, the public (as defined by ANSI/ASSE A10.34,) and the environment.
- e. Copies of the accepted plan will be maintained at the resident engineer's office and at the job site.
- f. The APP shall be continuously reviewed and amended, as necessary, throughout the life of the contract. Unusual or high-hazard activities not identified in the original APP shall be incorporated in the plan as they are discovered.

6.19.4.4 ACTIVITY HAZARD ANALYSIS (AHA)

- a) The Activity Hazard Analysis (AHA) format shall be in accordance with USACE EM 385-1-1. Submit the AHA for review at least 15 calendar days prior to the start of each phase. Format subsequent AHAs as amendments to the APP. The analysis should be used during daily inspections to ensure the implementation and effectiveness of the activity's safety and health controls.
- b) The AHA list will be reviewed periodically (at least monthly) at the Contractor supervisory safety meeting and updated as necessary when procedures, scheduling, or hazards change.
- c) The activity hazard analyses shall be developed using the project schedule as the basis for the activities performed. Any activities listed on the project schedule will require an AHA. The AHAs will be developed by the contractor, supplier or subcontractor and provided to the prime contractor for submittal to the Contracting Officer.

6.19.4.5 DISPLAY OF SAFETY INFORMATION

Within 1 calendar days after commencement of work, erect a safety bulletin board at the job site. The safety bulletin board shall include information and be maintained as required by EM 385-1-1, section 01.A.06.

6.19.4.6 SITE SAFETY REFERENCE MATERIAL

Maintain safety-related references applicable to the project, including those listed in the article "References." Maintain applicable equipment manufacturer's manuals.

6.19.4.7 EMERGENCY MEDICAL TREATMENT

Contractors will arrange for their own emergency medical treatment. Government has no responsibility to provide emergency medical treatment.

6.19.4.8 REPORTS

- a) Accident Reports - For recordable injuries and illnesses, and property damage accidents resulting in at least \$2,000 in damages, the Prime Contractor shall conduct an accident investigation to establish the root cause(s) of the accident, complete the USACE Accident Report Form 3394 and provide the report to the Contracting Officer within 5 calendar day(s) of the accident. The Contracting Officer will provide copies of any required or special forms.
- b) Accident Notification - Notify the Contracting Officer as soon as practical, but not later than four hours, after any accident meeting the definition of Recordable Injuries or Illnesses or High Visibility Accidents, property damage equal to or greater than \$2,000, or any weight handling equipment accident Information shall include contractor name; contract title; type of contract; name of activity, installation or location where accident occurred; date and time of accident; names of personnel injured; extent of property damage, if any; extent of injury, if known, and brief description of accident (to include type of construction equipment used, PPE used, etc.). Preserve the conditions and evidence on the accident site until the Government investigation team arrives on-site and Government investigation is conducted.
- c) Monthly Exposure Reports - Monthly exposure reporting to the Contracting Officer is required to be attached to the monthly billing request. This report is a compilation of employee-hours worked each month for all site workers, both prime and subcontractor. The Contracting Officer will provide copies of any special forms.
- d) Crane Reports - Submit crane inspection reports required in accordance with USACE EM 385-1-1, Appendix H and as specified herein with Daily Reports of Inspections.
- e) Certificate of Compliance - The Contractor shall provide a Certificate of Compliance for each crane entering an activity under this contract (see Contracting Officer for a blank certificate). Certificate shall state that the crane and rigging gear meet applicable OSHA regulations (with the Contractor citing which OSHA regulations are applicable, e.g., cranes used in construction, demolition, or maintenance shall comply with 29 CFR 1926 and USACE EM 385-1-1 section 16 and Appendix H. Certify on the Certificate of Compliance that the crane operator(s) is qualified and trained in the operation of the crane to be used. The Contractor shall also certify that all of its crane operators working on the DOD activity have been trained in the proper use of all safety devices (e.g., anti-two block devices). These certifications shall be posted on the crane.

6.19.4.9 HOT WORK

- a) Prior to performing "Hot Work" (welding, cutting, etc.) or operating other flame-producing/spark producing devices, a written permit shall be requested from the Fire Division. CONTRACTORS ARE REQUIRED TO MEET ALL CRITERIA BEFORE A PERMIT IS ISSUED. The Contractor will provide at least two (2) twenty (20) pound 4A:20 BC rated extinguishers for normal "Hot Work". All extinguishers shall be current inspection tagged, approved safety pin and tamper resistant seal. It is also mandatory to have a designated FIRE WATCH for any "Hot Work" done at this activity. The Fire Watch shall be trained in accordance with NFPA 51B and remain on-site for a minimum of 30 minutes after completion of the task or as specified on the hot work permit.
- b) When starting work in the facility, Contractors shall require their personnel to familiarize themselves with the location of the nearest fire alarm boxes and place in memory the emergency Fire Division phone number. ANY FIRE, NO MATTER HOW SMALL, SHALL BE REPORTED TO THE RESPONSIBLE FIRE DIVISION IMMEDIATELY.

6.19.4.10 CONSTRUCTION AND/OR OTHER WORK

- a) Hazardous Material Exclusions - Notwithstanding any other hazardous material used in this contract, radioactive materials or instruments capable of producing ionizing/non-ionizing radiation (with the exception of radioactive material and devices used in accordance with USACE EM 385-1-1 such as nuclear density meters for compaction testing and laboratory equipment with radioactive sources) as well as materials which contain asbestos, mercury or polychlorinated biphenyls, di-isocyanates, lead-based paint are prohibited. The Contracting Officer, upon written request by the Contractor, may consider exceptions to the use of any of the above excluded materials.

b) Unforeseen Hazardous Material - If material, not indicated, that may be hazardous to human health upon disturbance during construction operations is encountered, stop that portion of work and notify the Contracting Officer immediately. Within 14 calendar days the Government will determine if the material is hazardous. If material is not hazardous or poses no danger, the Government will direct the Contractor to proceed without change. If material is hazardous and handling of the material is necessary to accomplish the work, the Government will issue a modification pursuant to "FAR 52.243-4, Changes" and "FAR 52.236-2, Differing Site Conditions."

6.19.4.11 PRE-OUTAGE COORDINATION MEETING

Contractors are required to apply for utility outages at least 15 days in advance. As a minimum, the request should include the location of the outage, utilities being affected, duration of outage and any necessary sketches. Special requirements for electrical outage requests are contained elsewhere in this specification section. Once approved, and prior to beginning work on the utility system requiring shut down, the Contractor shall attend a pre-outage coordination meeting with the Contracting Officer and the Public Utilities representative to review the scope of work and the lock-out/tag-out procedures for worker protection. No work will be performed on energized electrical circuits unless proof is provided that no other means exist.

6.19.4.12 FALL HAZARD PROTECTION AND PREVENTION PROGRAM

The Contractor shall establish a fall protection and prevention program, for the protection of all employees exposed to fall hazards. The program shall include company policy; identify responsibilities, education and training requirements, fall hazard identification, prevention and control measures, inspection, storage, care and maintenance of fall protection equipment and rescue and evacuation procedures.

1. Training - The Contractor shall institute a fall protection training program. As part of the Fall Hazard Protection and Prevention Program, the Contractor shall provide training for each employee who might be exposed to fall hazards. A competent person for fall protection shall provide the training. Training requirements shall be in accordance with USACE EM 385-1-1, section 21.A.16.

2. Fall Protection Equipment and Systems - The Contractor shall enforce use of the fall protection equipment and systems designated for each specific work activity in the Fall Protection and Prevention Plan and/or AHA at all times when an employee is exposed to a fall hazard. Employees shall be protected from fall hazards as specified in EM 385-1-1, section 21. In addition to the required fall protection systems, safety skiff, personal floatation devices, life rings etc., are required when working above or next to water in accordance with USACE EM 385-1-1, paragraphs 05.H. and 05.I. Personal fall arrest systems are required when working from an articulating or extendible boom, swing stages, or suspended platform. In addition, personal fall arrest systems are required when operating other equipment such as scissor lifts if the work platform is capable of being positioned outside the wheelbase. The need for tying-off in such equipment is to prevent ejection of the employee from the equipment during raising, lowering, or travel. Fall protection must comply with 29 CFR 1926.500, Subpart M, USACE EM 385-1-1 and ANSI A10.32.

Personal Fall Arrest Equipment - Personal fall arrest equipment, systems, subsystems, and components shall meet ANSI Z359.1. Only a full-body harness with a shock-absorbing lanyard or self-retracting lanyard is an acceptable personal fall arrest body support device. Body belts may only be used as a positioning device system (for uses such as steel reinforcing assembly and in addition to an approved fall arrest system). Harnesses shall have a fall arrest attachment affixed to the body support (usually a Dorsal D-ring) and specifically designated for attachment to the rest of the system. Only locking snap hooks and carabiners shall be used. Webbing, straps, and ropes shall be made of synthetic fiber. The maximum free fall distance when using fall arrest equipment shall not exceed 1.8 m (6 feet). The total fall distance and any swinging of the worker (pendulum-like motion) that can occur during a fall shall always be taken into consideration when attaching a person to a fall arrest system.

3. Fall Protection for Roofing Work - Fall protection controls shall be implemented based on the type of roof being constructed and work being performed. The roof area to be accessed shall be evaluated for its structural integrity including weight-bearing capabilities for the projected loading.

a. Low Sloped Roofs:

(1) For work within 6 feet of an edge, on low-slope roofs, personnel shall be protected from falling by use of personal fall arrest systems, guardrails, or safety nets.

- (2) For work greater than 6 feet from an edge, warning lines shall be erected and installed in accordance with 29 CFR 1926.500 and USACE EM 385-1-1.
- b. Steep-Sloped Roofs: Work on steep-sloped roofs requires a personal fall arrest system, guardrails with toe-boards, or safety nets. This requirement also includes residential or housing type construction.
4. Existing Anchorage - Existing anchorages, to be used for attachment of personal fall arrest equipment, shall be certified (or re-certified) by a qualified person for fall protection in accordance with ANSI Z359.1. Existing horizontal lifeline anchorages shall be certified (or re-certified) by a registered professional engineer with experience in designing horizontal lifeline systems.
5. Horizontal Lifelines - Horizontal lifelines shall be designed, installed, certified and used under the supervision of a qualified person for fall protection as part of a complete fall arrest system which maintains a safety factor of 2 (29 CFR 1926.500).
6. Guardrails and Safety Nets - Guardrails and safety nets shall be designed, installed and used in accordance with EM 385-1-1 and 29 CFR 1926 Subpart M.
7. Rescue and Evacuation Procedures - When personal fall arrest systems are used, the contractor must ensure that the mishap victim can self-rescue or can be rescued promptly should a fall occur. A Rescue and Evacuation Plan shall be prepared by the contractor and include a detailed discussion of the following: methods of rescue; methods of self-rescue; equipment used; training requirement; specialized training for the rescuers; procedures for requesting rescue and medical assistance; and transportation routes to a medical facility. The Rescue and Evacuation Plan shall be included in the Activity Hazard Analysis (AHA) for the phase of work, in the Fall Protection and Prevention (FP&P) Plan, and the Accident Prevention Plan (APP).

6.19.4.13 EQUIPMENT

a) Material Handling Equipment -

1. Material handling equipment such as forklifts shall not be modified with work platform attachments for supporting employees unless specifically delineated in the manufacturer's printed operating instructions.
2. The use of hooks on equipment for lifting of material must be in accordance with manufacturer's printed instructions.
3. Operators of forklifts or power industrial trucks shall be licensed in accordance with OSHA.

b) Weight Handling Equipment

1. Cranes and derricks shall be equipped as specified in EM 385-1-1, section 16.
2. The Contractor shall comply with the crane manufacturer's specifications and limitations for erection and operation of cranes and hoists used in support of the work. Erection shall be performed under the supervision of a designated person (as defined in ASME B30.5). All testing shall be performed in accordance with the manufacturer's recommended procedures.
3. The Contractor shall comply with ASME B30.5 for mobile and locomotive cranes, ASME B30.22 for articulating boom cranes, ASME B30.3 for construction tower cranes, and ASME B30.8 for floating cranes and floating derricks.
4. Under no circumstance shall a Contractor make a lift at or above 90% of the cranes rated capacity in any configuration.
5. When operating in the vicinity of overhead transmission lines, operators and riggers shall be alert to this special hazard and shall follow the requirements of USACE EM 385-1-1 section 11 and ASME B30.5 or ASME B30.22 as applicable.

6. Crane suspended personnel work platforms (baskets) shall not be used unless the Contractor proves that using any other access to the work location would provide a greater hazard to the workers or is impossible. Personnel shall not be lifted with a line hoist or friction crane.
7. Portable fire extinguishers shall be inspected, maintained, and recharged as specified in NFPA 10, Standard for Portable Fire Extinguishers.
8. All employees shall be kept clear of loads about to be lifted and of suspended loads.
9. The Contractor shall use cribbing when performing lifts on outriggers.
10. The crane hook/block must be positioned directly over the load. Side loading of the crane is prohibited.
11. A physical barricade must be positioned to prevent personnel from entering the counterweight swing (tail swing) area of the crane.
12. Certification records which include the date of inspection, signature of the person performing the inspection, and the serial number or other identifier of the crane that was inspected shall always be available for review by Contracting Officer personnel.
13. Written reports listing the load test procedures used along with any repairs or alterations performed on the crane shall be available for review by Contracting Officer personnel.
14. Certify that all crane operators have been trained in proper use of all safety devices (e.g. anti-two block devices).

6.19.4.14 EXCAVATIONS

The competent person shall perform soil classification in accordance with 29 CFR 1926.

- a) Utility Locations - Prior to digging, the appropriate digging permit must be obtained. All underground utilities in the work area must be positively identified by a private utility locating service in addition to any station locating service and coordinated with the station utility department. Any markings made during the utility investigation must be maintained throughout the contract.
- b) Utility Location Verification - The Contractor must physically verify underground utility locations by hand digging using wood or fiberglass handled tools when any adjacent construction work is expected to come within three feet of the underground system. Digging within 2 feet of a known utility must not be performed by means of mechanical equipment; hand digging shall be used. If construction is parallel to an existing utility the utility shall be exposed by hand digging every 100 feet if parallel within 5 feet of the excavation.
- c) Shoring Systems - Trench and shoring systems must be identified in the accepted safety plan and AHA. Manufacturer tabulated data and specifications or registered engineer tabulated data for shoring or benching systems shall be readily available on-site for review. Job-made shoring or shielding shall have the registered professional engineer stamp, specifications, and tabulated data. Extreme care must be used when excavating near direct burial electric underground cables.
- d) Trenching Machinery - Trenching machines with digging chain drives shall be operated only when the spotters/laborers are in plain view of the operator. Operator and spotters/laborers shall be provided training on the hazards of the digging chain drives with emphasis on the distance that needs to be maintained when the digging chain is operating. Documentation of the training shall be kept on file at the project site.

6.19.4.15 UTILITIES WITHIN CONCRETE SLAB/ELECTRICAL

Utilities located within concrete slabs or pier structures, bridges, and the like, are extremely difficult to identify due to the reinforcing steel used in the construction of these structures. Whenever contract work involves concrete chipping, saw cutting, or core drilling, the existing utility location must be coordinated with station utility departments in addition to a private locating service. Outages to isolate utility systems shall be used in circumstances where

utilities are unable to be positively identified. The use of historical drawings does not alleviate the contractor from meeting this requirement.

6.19.4.16 ELECTRICAL

a) Conduct of Electrical Work - Underground electrical spaces must be certified safe for entry before entering to conduct work. Cables that will be cut must be positively identified and de-energized prior to performing each cut. Positive cable identification must be made prior to submitting any outage request for electrical systems. Arrangements are to be coordinated with the Contracting Officer and Station Utilities for identification. The Contracting Officer will not accept an outage request until the Contractor satisfactorily documents that the circuits have been clearly identified. Perform all high voltage cable cutting remotely using hydraulic cutting tool. When racking in or live switching of circuit breakers, no additional person other than the switch operator will be allowed in the space during the actual operation. Plan so that work near energized parts is minimized to the fullest extent possible. Use of electrical outages clear of any energized electrical sources is the preferred method. When working in energized substations, only qualified electrical workers shall be permitted to enter. When work requires Contractor to work near energized circuits as defined by the NFPA 70, high voltage personnel must use personal protective equipment that includes, as a minimum, electrical hard hat, safety shoes, insulating gloves with leather protective sleeves, fire retarding shirts, coveralls, face shields, and safety glasses. In addition, provide electrical arc flash protection for personnel as required by NFPA 70E. Insulating blankets, hearing protection, and switching suits may also be required, depending on the specific job and as delineated in the Contractor's AHA.

b) Portable Extension Cords - Portable extension cords shall be sized in accordance with manufacturer ratings for the tool to be powered and protected from damage. All damaged extension cords shall be immediately removed from service. Portable extension cords shall meet the requirements of NFPA 70.

6.19.4.17 WORK IN CONFINED SPACES

The Contractor shall comply with the requirements in Section 06.I of USACE EM 385-1-1, OSHA 29 CFR 1910.146 and OSHA 29 CFR 1926.21(b)(6). Any potential for a hazard in the confined space requires a permit system to be used.

6.19.5 TEMPORARY CONSTRUCTION FACILITIES

6.19.5.1 GENERAL

The following are Temporary Construction Facilities to supplement those described in Section 01.50 02.

Refer to APPLICABLE CRITERIA in Paragraph 4.

6.19.5.2 IDENTIFICATION OF EMPLOYEES

The Contractor shall be responsible for furnishing to each employee, and for requiring each employee engaged on the work to display, identification as approved and directed by the Contracting Officer. Prescribed identification shall immediately be delivered to the Contracting Officer for cancellation upon release of any employee. When required, the Contractor shall obtain and provide fingerprints of persons employed on the project. Contractor and subcontractor personnel shall wear identifying markings on hard hats clearly identifying the company for whom the employee works.

6.19.5.3 AVAILABILITY AND USE OF UTILITY SERVICES

a) Payment for Utility Services

The Government will make all reasonably required utilities available to the Contractor from existing outlets and supplies, as specified in the contract. Unless otherwise provided in the contract, the amount of each utility service consumed shall be charged to or paid for by the Contractor at prevailing rates charged to the Government or, where the utility is produced by the Government, at reasonable rates determined by the Contracting Officer. The Contractor shall carefully conserve any utilities furnished without charge.

b) Meters and Temporary Connections

The Contractor is responsible for obtaining all meters and temporary connections for temporary facilities or temporary use. Utilities on Ft. Lee, including electric, water; sewer, telephone, and cable are operated by privatized utility companies. The Contractor shall coordinate all required temporary connections and/or metering for electric, water, and sewer with the Ft. Lee Directorate of Logistics/Directorate of Public Works (DOL/DPW) and set up accounts for payment of utility usage with DOL/DPW. The POC for this action is Ms. Arlene Day. The Contractor shall be required to contact the local telephone provider and local cable provider directly and coordinate and pay for all services required.

c) Sanitation

The Contractor shall provide and maintain within the construction area minimum field-type sanitary facilities approved by the Contracting Officer. Government toilet facilities will not be available to Contractor's personnel.

d) Telephone

The Contractor shall make arrangements and pay all costs for telephone facilities desired.

6.19.5.4 BULLETIN BOARD, PROJECT SIGN, AND PROJECT SAFETY SIGN

a) Bulletin Board

Immediately upon beginning of work, the Contractor shall provide a weatherproof glass-covered bulletin board not less than **36 by 48 inches** in size for displaying the Equal Employment Opportunity poster, a copy of the wage decision contained in the contract, Wage Rate Information poster, and other information approved by the Contracting Officer. The bulletin board shall be located at the project site in a conspicuous place easily accessible to all employees, as approved by the Contracting Officer. Legible copies of the aforementioned data shall be displayed until work is completed. Upon completion of work the bulletin board shall be removed by and remain the property of the Contractor.

b) Project and Safety Signs

The requirements for the signs, their content, and location shall be provided at a location designated by the Contracting Officer. The signs shall be erected within 15 days after receipt of the Notice to Proceed. The data required by the safety sign shall be corrected daily, with light colored metallic or non-metallic numerals. Upon completion of the project, the signs shall be removed and disposed of by the Contractor.

1. Project Identification Signs shall be in accordance with standards as follows:

Figure 1 – Project Sign

2. Safety Sign - The safety sign shall conform to the requirements as indicated on Figure 2. The data required by the sign shall be corrected daily, with light colored metallic or non-metallic numerals. Numerals, including mounting hardware, shall be subject to the approval of the CO.

Figure 2 – Safety Sign

3. Sign Erection - The project sign shall be erected to conform to the requirements as indicated on Figure 1.

6.19.5.5 PROTECTION AND MAINTENANCE OF TRAFFIC

a) During construction the Contractor shall provide access and temporary relocated roads as necessary to maintain traffic. The Contractor shall maintain and protect traffic on all affected roads during the construction period except as otherwise specifically directed by the Contracting Officer. Measures for the protection and diversion of traffic, including the provision of watchmen and flagmen, erection of barricades, placing of lights around and in front of equipment and the work, and the erection and maintenance of adequate warning, danger, and direction signs, shall be as required by the State and local authorities having jurisdiction. The traveling public shall be protected from damage to person and property. The Contractor's traffic on roads selected for hauling material to and the site shall interfere as little as possible with public traffic. The Contractor shall investigate the adequacy of existing roads and the allowable load limit on these roads. The Contractor shall be responsible for the repair of any damage to roads caused by construction operations.

b) Barricades: The Contractor shall erect and maintain temporary barricades to limit public access to hazardous areas. Such barricades shall be required whenever safe public access to paved areas such as roads, parking areas or sidewalks is prevented by construction activities or as otherwise necessary to ensure the safety of both pedestrian and vehicular traffic. Barricades shall be securely placed, clearly visible with adequate illumination to provide sufficient visual warning of the hazard during both day and night.

6.19.5.6 CONTRACTOR'S TEMPORARY FACILITIES

- a) Administrative Field Offices

The Contractor shall provide and maintain administrative field office facilities within the construction area at the designated site. Government office and warehouse facilities will not be available to the Contractor's personnel.

- b) Project Area

The Contractor shall construct a temporary 6 foot high chain link fence around trailers and materials. The fence shall include plastic strip inserts, colored green, so that visibility through the fence is obstructed. Fence posts may be driven, in lieu of concrete bases, where soil conditions permit. Trailers, materials, or equipment shall not be placed or stored outside the fenced area unless such trailers, materials, or equipment are assigned a separate and distinct storage area by the Contracting Officer away from the vicinity of the construction site but within the military boundaries. Trailers, equipment, or materials shall not be open to public view with the exception of those items which are in support of ongoing work on any given day. Materials shall not be stockpiled outside the fence in preparation for the next day's work. Mobile equipment, such as tractors, wheeled lifting equipment, cranes, trucks, and like equipment, shall be parked within the fenced area at the end of each work day.

- c) Supplemental Storage Area

Upon Contractor's request, the Contracting Officer will designate another or supplemental area for the Contractor's use and storage of trailers, equipment, and materials. This area may not be in close proximity of the construction site but shall be within the military boundaries. Fencing of materials or equipment will not be required at this site; however, the Contractor shall be responsible for cleanliness and orderliness of the area used and for the security of any material or equipment stored in this area. Utilities will not be provided to this area by the Government.

- d) Appearance of Trailers

Trailers utilized by the Contractor for administrative or material storage purposes shall present a clean and neat exterior appearance and shall be in a state of good repair. clean and neat exterior appearance and shall be in a state of good repair. Trailers which, in the opinion of the Contracting Officer, require exterior painting or maintenance will not be allowed on the military property.

e) Maintenance of Project Area

Fencing shall be kept in a state of good repair and proper alignment. Should the Contractor elect to traverse, with construction equipment or other vehicles, grassed or unpaved areas which are not established roadways, such areas shall be covered with a layer of gravel as necessary to prevent rutting and the tracking of mud onto paved or established roadways; gravel gradation shall be at the Contractor's discretion. Grass located within the boundaries of the construction site shall be mowed for the duration of the project. Grass and vegetation along fences, buildings, under trailers, and in areas not accessible to mowers shall be edged or trimmed neatly.

f) Security Provisions

Adequate outside security lighting shall be provided at the Contractor's temporary facilities. The Contractor shall be responsible for the security of its own equipment; in addition, the Contractor shall notify the appropriate law enforcement agency requesting periodic security checks of the temporary project field office.

6.19.5.7 GOVERNMENT FIELD OFFICE

The Contractor shall provide the Government Resident Engineer with an office, located on the site as directed by the Contracting Officer. The trailer shall be like new in appearance with at least one operable window in each exterior wall and an entrance landing and steps per 29 OER 1910 (OSHA Standards). Minimum square footage shall be 1440 SF. Space shall include heat, electric power, lighting, plumbing, air conditioning, and high speed broad band internet service from a local cable provider. Office space shall be provided with minimum of 7 desks with chairs, 7 three section and 3 five section bookshelves, a telephone/data jack at each desk plus one additional jack for a printer and one additional telephone jack from the fax machine, 4-4 drawer file cabinets or equal, plan table with plan and rack, mini-blinds in all windows, kitchen (with wet sink, 18 cf refrigerator, and microwave oven), bottled water services with a dispenser that dispenses cold and hot water, toilet and lavatory in a separate room, including sewer and hot and cold water connections. One faucet at lavatory to include hot water, janitorial service shall be provided twice a week. A minimum 192 SF conference room shall also be provided which shall include a conference room table and 8 conference room chairs. Provide a storage room minimum of 48 SF. Contractor shall also provide and maintain a graveled parking area suitably sized for 7 full size vehicles. At completion of the project, the office shall remain the property of the Contractor and shall be removed from the site. Utilities shall be connected and disconnected in accordance with local codes and to the satisfaction of the Contracting Officer. The Contractor is responsible for payment of all utility usage, to include electric, water, sewer, telephone, and internet service. This project has multiple project sites, but only one Field Office Trailer is required and will be located at the direction of the Contracting Officer.

6.19.5.8 PLANT COMMUNICATION

Whenever the Contractor has the individual elements of its plant so located that operation by normal voice between these elements is not satisfactory, the Contractor shall install a satisfactory means of communication, such as telephone or other suitable devices. The devices shall be made available for use by Government personnel.

6.19.5.9 TEMPORARY PROJECT SAFETY FENCING

As soon as practicable, but not later than 15 days after the date established for commencement of work, the Contractor shall furnish and erect temporary project safety fencing at the work site. The safety fencing shall be a high visibility orange colored, high density polyethylene grid or approved equal, a minimum of 42 inches high, supported and tightly secured to steel posts located on maximum 10 foot centers, constructed at the approved location. The safety fencing shall be maintained by the Contractor during the life of the contract and, upon completion and acceptance of the work, shall become the property of the Contractor and shall be removed from the work site.

6.19.5.10 CLEANUP

Construction debris, waste materials, packaging material and the like shall be removed from the work site daily. Any dirt or mud which is tracked onto paved or surfaced roadways shall be cleaned away. Materials resulting from demolition activities which are salvageable shall be stored within the fenced area described above or at the supplemental storage area. Stored material not in trailers, whether new or salvaged, shall be neatly stacked when stored.

6.19.5.11 RESTORATION OF STORAGE AREA

Upon completion of the project and after removal of trailers, materials, and equipment from within the fenced area, the fence shall be removed and will become the property of the Contractor. Areas used by the Contractor for the storage of equipment or material, or other use, shall be restored to the original or better condition. Gravel used to traverse grassed areas shall be removed and the area restored to its original condition, including top soil and seeding as necessary.

6.19.6 CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT

6.19.6.1 GOVERNMENT POLICY

Government policy is to apply sound environmental principles in the design, construction and use of facilities. As part of the implementation of that policy the Contractor shall: (1) practice efficient waste management when sizing, cutting, and installing products and materials and (2) use all reasonable means to divert construction and demolition waste from landfills and incinerators and to facilitate their recycling or reuse.

6.19.6.2 MANAGEMENT

The Contractor shall take a pro-active, responsible role in the management of construction and demolition waste and require all subcontractors, vendors, and suppliers to participate in the effort. Construction and demolition waste includes products of demolition or removal, excess or unusable construction materials, packaging materials for construction products, and other materials generated during the construction process but not incorporated into the work. In the management of waste consideration shall be given to the availability of viable markets, the condition of the material, the ability to provide the material in suitable condition and in a quantity acceptable to available markets, and time constraints imposed by internal project completion mandates. The Contractor shall be responsible for implementation of any special programs involving rebates or similar incentives related to recycling of waste. Revenues or other savings obtained for salvage, or recycling shall accrue to the Contractor. Firms and facilities used for recycling, reuse, and disposal shall be appropriately permitted for the intended use to the extent required by federal, state, and local regulations.

6.19.6.3 CONSTRUCTION AND DEMOLITION (C&D) WASTE MANAGEMENT PLAN

A waste management plan shall be submitted within 15 days after notice to proceed and prior to initiating any site preparation work. At a minimum, the plan shall include the contractor's plan(s) for a minimum fifty percent (50%) diversion rate or justification for less than a fifty percent (50%) rate due to time and/or cost constraints as identified below. The plan shall include the following:

- a. Name of individuals on the Contractor's staff responsible for waste prevention and management.
- b. Actions that will be taken to reduce solid waste generation.
- c. Description of the specific approaches to be used in recycling/reuse of the various materials generated, including the areas and equipment to be used for processing, sorting, and temporary storage of wastes.
- d. Characterization, including estimated types and quantities, of the waste to be generated.
- e. Name of landfill and/or incinerator to be used and the estimated costs for use, assuming that there would be no salvage or recycling on the project.

- f. Identification of local and regional reuse programs, including non-profit organizations such as schools, local housing agencies, and organizations that accept used materials such as materials exchange networks and Habitat for Humanity.
- g. List of specific waste materials that will be salvaged for resale, salvaged and reused, or recycled. Recycling facilities that will be used shall be identified.
- h. Identification of materials that cannot be recycled/reused with an explanation or justification.
- i. Anticipated net cost savings determined by subtracting Contractor program management costs and the cost of disposal from the revenue generated by sale of the materials and the incineration and/or landfill cost avoidance.

The contractor shall notify the Contracting Officer if diversion activities will cause the project duration time to be exceeded. Along with the notification, the contractor shall provide the highest diversion rate that can be obtained based on the project schedule. If it is determined by the Government that the project is mission-critical, the diversion rate may be amended.

If the cost of achieving the fifty percent (50%) minimum diversion rate is significantly greater than the cost of conventional demolition methods and the risk can be attributed directly to meeting the minimum diversion rate, the contractor shall immediately notify the Contracting Officer for a determination on whether a lower diversion rate is acceptable. If the Contracting Officer determines that a lower diversion rate is acceptable, the rate may be amended to the highest obtainable rate that can be met as agreed upon by all parties.

6.19.6.4 RECORDS

Records shall be maintained to document the quantity of waste generated; the quantity of waste diverted through sale, reuse, or recycling; and the quantity of waste disposed by landfill or incineration. In addition to the reporting criteria contain herein, the Contractor shall refer to Appendix E - FORT LEE ENVIRONMENTAL SPECIAL CONDITIONS for specific reporting requirements. The records shall be made available to the Contracting Officer during construction, and a copy of the records shall be delivered to the Contracting Officer upon completion of the construction. Throughout the duration of the contract, contractor shall maintain and make available to the Contracting Officer, records, to include all weight tickets, documenting the quantity of waste generated, the quantity of waste diverted from a landfill or incineration and the quantity of waste disposed by landfill or incineration. Upon contract completion, the contractor shall submit a copy of all records with a statement certifying that at least fifty percent (50%) of C&D waste has been diverted from landfill disposal to the Installation EMO.

6.19.6.5 COLLECTION

The necessary containers, bins and storage areas to facilitate effective waste management shall be provided and shall be clearly and appropriately identified. Recyclable materials shall be handled to prevent contamination of materials from incompatible products and materials and separated by one of the following methods:

- a) Source Separated Method.

Waste products and materials that are recyclable shall be separated from trash and sorted into appropriately marked separate containers and then transported to the respective recycling facility for further processing.

- b) Co-Mingled Method.

Waste products and recyclable materials shall be placed into a single container and then transported to a recycling facility where the recyclable materials are sorted and processed.

- c) Other Methods.

Other methods proposed by the Contractor may be used when approved by the Contracting Officer.

6.19.6.6 DISPOSAL

Except as otherwise specified in other sections of the specifications, disposal shall be in accordance with the following:

a) Reuse.

First consideration shall be given to salvage for reuse since little or no re-processing is necessary for this method, and less pollution is created when items are reused in their original form. Sale or donation of waste suitable for reuse shall be considered. Salvaged materials, other than those specified in other sections to be salvaged and reinstalled, shall not be used in this project.

b) Recycle.

Waste materials not suitable for reuse, but having value as being recyclable, shall be made available for recycling whenever economically feasible.

c) Waste.

Materials with no practical use or economic benefit shall be disposed at a landfill or incinerator.

6.19.7 STRUCTURAL INTERIOR DESIGN (SID) REQUIREMENTS

6.19.7.5 GENERAL INFORMATION

Structural Interior Design includes all building related elements and components generally part of the building itself, such as wall finishes, ceilings finishes, floor coverings, marker/bulletin boards, blinds, signage and built in casework. The SID should be developed in conjunction with the furniture footprint.

6.19.7.6 STRUCTURAL INTERIOR DESIGN (SID) REQUIREMENTS FOR THE INTERIM AND FINAL DESIGN SUBMITTALS

a) FORMAT AND SCHEDULE

1. Prepare and submit for approval an interior and exterior building finishes scheme for an interim design submittal. The DOR shall meet with and discuss the finish schemes with the appropriate Government officials prior to preparation of the schemes to be presented. Present original sets of the schemes to reviewers at an interim design conference.

2. At the conclusion of the interim phase, after resolutions to the comments have been agreed upon between DOR and Government reviewers, the DB Contractor may proceed to final design with the interior finishes scheme presented.

3. The SID information and samples are to be submitted in 8 1/2" x 11" format using three ring binders with pockets on the inside of the cover. When there are numerous pages with thick samples, use more than one binder. Large D-ring binders are preferred to O-ring binders. Use page protectors that are strong enough to keep pages from tearing out. Anchor large or heavy samples with mechanical fasteners, Velcro, or double-faced foam tape rather than rubber cement or glue. Fold out items must have a maximum spread of 25 1/2". Provide cover and spine inserts sheets identifying the document as "Structural Interior Design" package and include the project title and location, project number, Contractor/A/E name and phone number(s), submittal stage and date.

4. The design submittal requirements will include, but are not limited to:

a. Narrative of the Structural Interior Design Objectives - The SID shall include a narrative that discusses the building related finishes. Include topics that relate to base standards, life safety, sustainable design issues, aesthetics, durability and maintainability, discuss the development and features as they relate to the occupants requirements and the building design.

b. Interior Color Boards - Each item on the color boards shall be identified and keyed to the contract documents to provide a clear indication of how and where each item will be used. To the maximum extent possible, finish samples shall be arranged by room type in order to illustrate room color coordination. All samples shall be labeled on the color boards with the manufacturer's name, patterns and colors name and number. Samples shall also be keyed or coded to match key code system used on contract drawings.

c. Material and finish samples shall indicate true pattern, color and texture. Photographs or colored photocopies of materials or fabrics to show large overall patterns are required in conjunction with actual samples to show the actual colors. Finish samples must be large enough to show a complete pattern or design where practical.

d. Interior Color boards shall include but not be limited to original color samples of the following:

i. All walls finishes, ceiling finishes, including information regarding tile patterns.

ii. All flooring finishes, including information regarding tile patterns.

iii. All signage, wall base, toilet partitions, operable/folding partitions and trim

iv. All millwork materials and finishes (cabinets, counter tops, etc.)

v. All window treatments (sills, blinds, etc.)

e. Exterior Color Boards - Prepare exterior finishes color boards in similar format as the interior finishes color boards, for presentation to the reviewers during an interim design conference. The exterior finishes boards shall include original color samples of all exterior finishes including but not limited to the following:

i. All Roof Finishes

ii. All Brick and cast stone Samples

iii. All Exterior Insulation and Finish Samples

iv. All Glass Color Samples

v. All Exterior Metals Finishes

vi. All Window & Door Frame Finishes

vii. All Specialty Item Finishes, including trim

viii. Identify each item on the exterior finishes color boards and key to the building elevations to provide a clear indication of how and where each item will be used.

f. Color board samples shall reflect all actual finish textures, patterns and colors required as specified. Patterned samples shall be of sufficient size to adequately show pattern and its repeat if a repeat occurs.

b) STRUCTURAL INTERIOR DESIGN DOCUMENTS

1. General - Structural interior design related drawings must indicate the placement of extents of SID material, finishes and colors and must be sufficiently detailed to define all interior work. The following is a list of minimum requirements:

2. Finish Color Schedule - Provide finish color schedule(s) in the contract documents. Provide a finish code, material type, manufacturer, series, and color designations.

3. Interior Finish Plans - Indicate wall and floor patterns and color placement, material transitions and extents of interior finishes.
4. Furniture Footprint Plans - Provide furniture footprint plans showing the outline of all freestanding and systems furniture for coordination of all other disciplines.
5. Interior Signage - Include interior signage plans or schedules showing location and quantities of all interior signage. Key each interior sign to a quantitative list indicating size, quantity of each type and signage text.
6. Interior Elevations, Sections and Details - Interior Elevations, Sections and Details: Indicate material, color and finish placement.

6.19.8 FURNITURE, FIXTURES & EQUIPMENT (FF&E) REQUIREMENTS

6.19.8.1 GENERAL INFORMATION

- a) FF&E is the selection, layout, specification and documentation of furniture includes but is not limited to workstations, seating, tables, storage and shelving, filing, trash receptacles, clocks, framed artwork, artificial plants, and other accessories. Contract documentation is required to facilitate pricing, procurement and installation. The FF&E package is based on the furniture footprint developed in the SID portion of the interior design. The FF&E package shall be developed concurrently with the building design to ensure that there is coordination between the furniture design, the electrical, IT and other building requirements.
- b) The DOR shall interview Government personnel to determine FF&E requirements for furniture and furnishings. Determine FF&E items and quantities by, but not limited to: (1) the number of personnel to occupy the building, (2) job functions and related furniture/office equipment to support the job function, (3) room functions, (4) rank and grade.
- c) Lastly, for all designs provided regardless of facility type, the DOR shall make every effort to implement all aspects of sustainability to the greatest extent possible for all the selections made in the FF&E package. This includes but is not limited to the selection of products that consider: Material Chemistry and Safety of Inputs (What chemicals are used in the construction of the selections?); Recyclability (Do the selections contain recycled content?); Disassembly (Can the selections be disassembled at the end of their useful life to recycle their materials?).
- d) The DOR is encouraged to make selections to the greatest extent possible of products that possess McDonough Braungart Design Chemistry (HYPERLINK "<http://www.mbdc.com>" [MBDC](#)) certification or other "third-party" certified Cradle to Cradle program, Forest Stewardship Council (FSC) certification, GREENGAURD certification or similar "third-party" certified products consisting of low-emitting materials.

6.19.8.2 FF&E REQUIREMENTS FOR THE INTERIM AND FINAL DESIGN SUBMITTALS

a) FORMAT AND SCHEDULE

1. Prepare and submit for approval a comprehensive FF&E scheme for an interim design submittal. The DOR shall meet with and discuss the FF&E scheme with the appropriate Government representatives prior to preparation of the scheme to be presented to discuss the intent of the overall design with regard to all the aspects of the FF&E design listed in paragraph 2.1.1 Narrative of Interior Design Objectives below. Then, present original sets of the scheme to reviewers at an interim design conference in conjunction with the interim architectural design or three months prior to the submittal of the final FF&E package (whichever comes first).
2. At the conclusion of the interim phase, after resolutions to the comments have been agreed upon between DOR and Government reviewers, the DB Contractor may proceed to final design with the FF&E scheme presented.

3. A complete and final FF&E package must be submitted to the Government in conjunction with the 100% architectural design submittal or ten months prior to the contract completion date (whichever comes first) to ensure adequate time for furniture acquisition.
4. The FF&E information and samples are to be submitted in 8 ½" x 11" format using three ring binders with pockets on the inside of the cover. When there are numerous pages with thick samples, use more than one binder. Large D-ring binders are preferred to O-ring binders. Use page protectors that are strong enough to keep pages from tearing out. Anchor large or heavy samples with mechanical fasteners, Velcro, or double-faced foam tape rather than rubber cement or glue. Fold out items must have a maximum spread of 25 ½". Provide cover and spine inserts sheets identifying the document as "Furniture, Fixtures & Equipment" package and include the project title and location, project number, Contractor/A/E name and phone number(s), submittal stage and date.
5. The design submittal requirements will include, but are not limited to:
 - a. Narrative of Interior Design Objectives - Provide a narrative description of the furnishings design speaking to the selection of furnishings, finishes and colors. The narrative shall also include a discussion of the market research that resulted in the selection of a preferred vendor(s) items, including the sources that were considered and rejected, and why. Enumerate the design decisions made to fully coordinate the SID and the FF&E. Furthermore the narrative should include but not be limited to discussions on function, safety and ergonomics, durability, aesthetics, and all aspects of sustainability. Lastly, the narrative shall also include the written product description (item o. on the Furnishings Order Form) for each item to be procured in the FF&E package.
 - b. FF&E Procurement Listing - Provide a comprehensive listing of all the FF&E items with designation of whether each item will be procured as part of furnishings, equipment or the construction contract. The FF&E package shall be divided into sections based on this listing.
 - c. Point of Contacts - Provide a comprehensive list of Point of Contacts (POCs) needed to implement the FF&E project. This would include appropriate project team members, using activity contacts, interior design representatives, contractors and installers involved in the project. For each contact the name, company, job function, address, phone, fax and email.
 - d. Item Code Legend - Provide a consolidated list of all FF&E items in the design package with the item code and a short description of each item.
 - e. Item Installation List - The Item Code Legend may be expanded to be used as an Item installation List. Indicate quantity per room, model number, manufacturer and which vendor is responsible for installing each furnishings item.
 - f. Manufacturers Source List - Provide the Contractor's address, the ordering address, and the payment address including contact names, phone numbers, fax and email address. Also provide GSA contract information including contract number, FSC group, part, section, expiration date, maximum order limit, pricing terms, shipping terms, etc.
 - g. Furnishings Order Forms - One Furnishings Order Form will be prepared for each item selected in the design. The goal is to provide this information on one page, however, if necessary, a second page may be used for additional detailed requirements. Each form shall identify all information required to procure each individual item. In addition to the project name and location, project number, and submittal phase, the order form must include:
 - i. Furniture item illustration and code
 - ii. Furniture item name

- iii. Job name, location, and date
- iv. General Services Administration (GSA) FSC Group, part, and section
- v. GSA Contract Number, Special Item Number (SIN), and contract expiration date
- vi. Maximum Order Limitation
- vii. GSA Contractor name (Include ordering and payment address, telephone number & fax number, e-mail or website)
- viii. Manufacturer's name (Include address, telephone number & fax number) or indicate if same as GSA Contractor
- ix. Dealership/Installer name (include address, telephone number, fax number and point of contact name)
- x. Product name
- xi. Product model number or National Stock Number (NSN)
- xii. Finish name and number (code to finish samples)
- xiii. Fabric name and number, minimum Wyzenbeek Abrasion Test double rubs (code to fabric samples)
- xiv. Dimensions
- xv. Written Product Description: include a non-proprietary paragraph listing the salient features of the item to include but not limited to:
 - required features and characteristics
 - ergonomic requirements
 - functional requirements
 - testing requirements
 - furniture style
 - construction materials
 - minimum warranty

(Example: "These guest chairs are coordinated to match the task seating at each workstation. The size of the guest chair is critical because of the limited space where they are to be placed. If this company is not selected, coordinate the newly proposed finishes with furniture item numbers #001, 002, 003.")

- xvi. Item location by room number
- xvii. Quantity per room
- xviii. Total quantity
- xix. Special instructions for procurement ordering and/or installation (if applicable)
- xx. In addition to the preferred selected item, list two additional manufacturers' products that meet the requirements of the written product description. Information provided for each of the two additional manufacturer's

products selected shall include manufacturer name address and telephone number, product series, product name and any other pertinent information necessary for their procurement.

h. Color Boards - Color boards shall be provided for all finishes and fabrics for all FF&E items. Finishes to be included but not limited to paint, laminate, wood finish, fabric, etc.

i. Itemized Furniture Cost Estimate - Provide an itemized cost estimate of furnishings keyed to the plans and specifications of products included in the package. This cost estimate should be based on GSA price schedules. The cost estimate must include separate line items for general contingency, installation, electrical hook-up for systems furniture or other furniture requiring hardwiring by a licensed electrician, freight charges and any other related costs. Installation and freight quotes from vendors should be use in lieu of a percentage allowance when available.

b) INTERIOR DESIGN DOCUMENTS

1. Overall Furniture and Area Plans - Provide floor Plans showing locations and quantities of all freestanding, and workstation furniture proposed for each floor of the building. Key each room to a large scale Furniture Placement Plan showing the furniture configuration, of all furniture. Provide enlarged area plans with a key plan identifying the area in which the building is located. All the items on the drawings should be keyed by furniture item code.

2. Workstation Plans - Provide plans showing each typical workstation configuration in plan view, elevations or isometric view. Drawings shall illustrate panels and all major components for each typical workstation configuration. Workstations shall be identified using the same numbering system as shown on the project drawings. Components shall be keyed to a legend on each sheet which identifies and describes the components along with dimensions. To facilitate review the plan, elevations and isometric of each typical workstation shall appear together on a drawing sheet.

3. Panel Plans - Provide plans showing panel locations and critical dimensions from finished face of walls, columns, panels including clearances and aisle widths. Assemblies shall be keyed to a legend which shall include width, height, configuration and composition of frames, covers finishes, and fabrics, (if different selections exist within a project), power or non-powered connectors and wall mount hardware.

4. Electrical and Telecommunication Plans - Provide plans showing power provisions including type and locations of feeder components, activated outlets and other electrical components. Include on the plans locations and quantities of outlets for workstations. Clearly identify different outlets, i.e. electrical, LAN and telecommunication receptacles indicating each type proposed. Show wiring configuration, (circuiting, switching, internal and external connections) and provide as applicable.

5. Artwork Placement Plans - Provide an Artwork Placement Plan to show location of artwork, assign an artwork item code to each piece of artwork. As an alternative, artwork can be located on the Furniture Plans. Provide a schedule that identifies each piece by room name and number. Provide installation instructions; include mounting height.

6. Window Drapery Plans - Provide Interior Window Drapery Plans. Key each drapery treatment to a schedule showing color, pattern, material, drapery size and type, draw direction, location and quantities.

c) ELECTRONIC DOCUMENTS (Not Required for Interim Submittal)

1. Upon completion of the corrected final submittal, provide five compact disks with electronic versions of all FF&E documents. Provide all drawings files in the latest release of AutoCAD. Provide all files needed to view complete drawings. These drawing files shall not be bound.

2. Provide all text documents in Microsoft Word and/or Excel.

6.19.9 FORT LEE REQUIREMENTS FOR CAD AND HARD COPY DRAWINGS

6.19.9.1 Use National Cad Standard, A/E/C CADD Standard Release 3.0 dated September 2006.

6.19.9.2 Hard Copy requirements:

Mylars are required for all as-built drawings.

6.19.9.3. CD requirements:

(a) Label CD using a label maker. See 8. CD Label Requirements. The top portion of the label shows the layout and the information required. The bottom portion is an example of a cd label.

(b) CD of all as-built drawings is required.

(c) Cost estimates are to be on a separate CD from CD with drawings.

(d) The CD that contains drawings shall have the following subdirectories and files:

cad - dwg files of every mylar drawing.

pdf - pdf files of every mylar drawing.

cal - cal files of every mylar drawing.

cal files are required only for Corps of Engineers projects.

basis of design – files related to basis of design.

6.19.9.4. Title Blocks:

(a) Fort Lee will supply title block drawings for DOL/DPW Design Projects. Insert title block drawings as a block. DOL/DPW title block drawings have attributes. Do not explode the title block drawings.

(b) Corps of Engineers will supply title block drawings for their Design Projects.

6.19.9.5. Drawing Index Sheet:

An index sheet is required for each set of drawings. Include the following on the index sheet for each drawing that makes up the set.

1. three digit sequential number starting with 001

2. sheet number

3. sheet name

6.19.9.6. Electronic CAD files names:

(a) See the National Cad Standard, A/E/C CADD Standard Release 3.0 dated September 2006 starting on page 6 for file name requirements.

(b) A 20 character project code field shall be used as part of the electronic file name for ready-to-plot files and all other files that make up a set of drawings.

- (c) Ready-to-plot files – these drawings are listed on the index sheet.
- (d) Ready-to-plot electronic file names shall start with a three digit sequential number starting with 001, followed by an underscore, followed by the last four digits of the Fort Lee drawing number, followed by an underscore, followed by a 10 digit project number, followed by an X or X's to complete the 20 character project code.
- (e) All other files - can be defined as reference and block files.
- (f) All other electronic file names shall start with XXX, followed by an underscore, followed by the last four digits of the Fort Lee drawing number, followed by an underscore, followed by a 10 digit project number, followed by an X or X's to complete the 20 character project code.
- (g) The drawing number and project number shall be assigned to each set of drawings by Fort Lee.
- (h) The drawing number assigned to the project by Fort Lee shall be on every drawing, the drawing number is the same for each sheet.
- (i) Use the same ready-to-plot .dwg file names for the pdf & cal files.

6.19.9.7. Misc. Requirements:

- (a) All mylar drawings and cd drawings shall match each other.
- (b) If a revision occurs after a mylar is submitted, a revised mylar drawing shall be resubmitted to replace the old mylar.
- (c) If a revision occurs to a drawing after a cd is submitted, a cd with all current drawings for the project shall be resubmitted to replace the old cd.
- (d) use the insertion point of 0,0 for all reference files.

6.19.9.8. CD Label Requirements:

The following are examples of CD Labels:

End of Section 01 10 00.0001

**SECTION 01 33 00.0001
SUBMITTAL PROCEDURES
(DESIGN-BUILD TASK ORDERS)**

1.0 GENERAL

1.13. GOVERNMENT APPROVED OR CONCURRED WITH SUBMITTALS

1.14. INFORMATION ONLY SUBMITTALS

1.0 GENERAL

1.1.1. This section contains requirements specifically applicable to this task order. The requirements of Base ID/IQ contract Section 01 33 30 apply to this task order, except as otherwise specified herein.

1.13. GOVERNMENT APPROVED OR CONCURRED WITH SUBMITTALS

Upon completion of review of submittals requiring Government approval or concurrence, the Government will stamp and date the submittals as approved or concurred. The Government will retain three (3) copies of the submittal and return one (1) copy(ies) of the submittal.

1.14. INFORMATION ONLY SUBMITTALS

Normally submittals for information only will not be returned. Approval of the Contracting Officer is not required on information only submittals. The Government reserves the right to require the Contractor to resubmit any item found not to comply with the contract. This does not relieve the Contractor from the obligation to furnish material conforming to the plans and specifications; will not prevent the Contracting Officer from requiring removal and replacement of nonconforming material incorporated in the work; and does not relieve the Contractor of the requirement to furnish samples for testing by the Government laboratory or for check testing by the Government in those instances where the technical specifications so prescribe. The Government will retain two (2) copies of information only submittals.

End of Section 01 33 00.0001

**SECTION 01 33 16
DESIGN AFTER AWARD**

1.0 GENERAL INFORMATION

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3.0 EXECUTION

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- 3.9. SUBMITTAL DISTRIBUTION, MEDIA AND QUANTITIES
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ATTACHMENT A STRUCTURAL INTERIOR DESIGN (SID) REQUIREMENTS

ATTACHMENT B FURNITURE, FIXTURES AND EQUIPMENT REQUIREMENTS

ATTACHMENT C TRACKING COMMENTS IN DRCHECKS

ATTACHMENT D SAMPLE FIRE PROTECTION AND LIFE SAFETY CODE REVIEW

ATTACHMENT E LEED SUBMITTALS

ATTACHMENT F BUILDING INFORMATION MODELING REQUIREMENTS

ATTACHMENT G DESIGN SUBMITTAL DIRECTORY AND SUBDIRECTORY FILE ARRANGEMENT

1.0 GENERAL INFORMATION

1.1. INTRODUCTION

1.1.1. The information contained in this section applies to the design required after award. After award, the Contractor will develop the accepted proposal into the completed design, as described herein.

1.1.2. The Contractor may elect to fast track the design and construction that is, proceed with construction of parts of the sitework and facilities prior to completion of the overall design. To facilitate fast tracking, the Contractor may elect to divide the design into no more than six (6) design packages per major facility type and no more than three (3) design packages for site and associated work. Designate how it will package the design, consistent with its overall plan for permitting (where applicable) and construction of the project. See Sections 01 33 00 SUBMITTAL PROCEDURES and 01 32 01.00 10 PROJECT SCHEDULE for requirements for identifying and scheduling the design packaging plan in the submittal register and project schedule. See also Sections 01 10 00 STATEMENT OF WORK and 01 57 20.00 10 ENVIRONMENTAL PROTECTION for any specified permit requirements. If early procurement of long-lead item construction materials or installed equipment, prior to completion of the associated design package, is necessary to facilitate the project schedule, also identify those long-lead items and how it will assure design integrity of the associated design package to meet the contract requirements (The Contract consists of the Solicitation requirements and the accepted proposal). Once the Government is satisfied that the long-lead items meet the contract requirements, the Contracting Officer will allow the Contractor to procure the items at its own risk.

1.1.3. The Contractor may proceed with the construction work included in a separate design package after the Government has reviewed the final (100%) design submission for that package, review comments have been addressed and resolved to the Government's satisfaction and the Contracting Officer (or the Administrative Contracting Officer) has agreed that the design package may be released for construction.

1.1.4. **INTEGRATED DESIGN.** To the maximum extent permitted for this project, use a collaborative, integrated design process for all stages of project delivery with comprehensive performance goals for siting, energy, water, materials and indoor environmental quality and ensures incorporation of these goals. Consider all stages of the building lifecycle, including deconstruction.

1.2. DESIGNER OF RECORD

Identify, for approval, the Designer of Record ("DOR") that will be responsible for each area of design. One DOR may be responsible for more than one area. Listed, Professional Registered, DOR(s) shall account for all areas of design disciplines shall be accounted for by a listed. The DOR's shall stamp, sign, and date each design drawing and other design deliverables under their responsible discipline at each design submittal stage (see contract clause Registration of Designers). If the deliverables are not ready for release for construction, identify them as "preliminary" or "not for release for construction" or by using some other appropriate designation. The DOR(s) shall also be responsible for maintaining the integrity of the design and for compliance with the contract requirements through construction and documentation of the as-built condition by coordination, review and approval of extensions of design, material, equipment and other construction submittals, review and approval or disapproval of requested deviations to the accepted design or to the contract, coordination with the Government of the above activities, and by performing other typical professional designer responsibilities.

2.0 PRODUCTS (Not Applicable)

3.0 EXECUTION

3.1. PRE-WORK ACTIVITIES & CONFERENCES

3.1.1. Design Quality Control Plan

Submit for Government acceptance, a Design Quality Control Plan in accordance with Section 01 45 04.00 10 CONTRACTOR QUALITY CONTROL before design may proceed.

3.1.2. Post Award Conference

3.1.2.1. The government will conduct a post award contract administration conference at the project site, as soon as possible after contract award. This will be coordinated with issuance of the contract notice to proceed (NTP). The Contractor and major sub-contractor representatives shall participate. All designers need not attend this first meeting. Government representatives will include COE project delivery team members, facility users, facility command representatives, and installation representatives. The Government will provide an agenda, meeting goals, meeting place, and meeting time to participants prior to the meeting.

3.1.2.2. The post award conference shall include determination and introduction of contact persons, their authorities, contract administration requirements, discussion of expected project progress processes, and coordination of subsequent meetings for quality control (see Section 01 45 04.00 10 CONTRACTOR QUALITY CONTROL), Partnering (see below and SCR: Partnering), and the initial design conference (see below).

3.1.2.3. The government will introduce COE project delivery team members, facility users, facility command representatives, and installation representatives. The DB Contractor shall introduce major subcontractors, and other needed staff. Expectations and duties of each person shall be defined for all participants. A meeting roster shall be developed and distributed by the government with complete contact information including name, office, project role, phone, mailing and physical address, and email address.

3.1.3. Partnering & Project Progress Processes

3.1.3.1. The initial Partnering conference may be scheduled and conducted at any time with or following the post award conference. The Government proposes to form a partnership with the DB Contractor to develop a cohesive building team. This partnership will involve the COE project delivery team members, facility users, facility command representatives, installation representatives, Designers of Record, major subcontractors, contractor quality control staff, and contractor construction management staff. This partnership will strive to develop a cooperative management team drawing on the strengths of each team member in an effort to achieve a quality project within budget and on schedule. This partnership will be bilateral in membership and participation will be totally voluntary. All costs, excluding labor and travel expenses, shall be shared equally between the Government and the Contractor. The Contractor and Government shall be responsible for their own labor and travel costs. Normally, partnering meetings will be held at or in the vicinity of the project installation.

3.1.3.2. As part of the partnering process, the Government and Contractor shall develop, establish, and agree to comprehensive design development processes including conduct of conferences, expectations of design development at conferences, fast-tracking, design acceptance, Structural Interior Design (SID)/ Furniture, Fixtures & Equipment (FF&E) design approval, project closeout, etc. The government will explain contract requirements and the DB Contractor shall review their proposed project schedule and suggest ways to streamline processes.

3.1.4. Initial Design Conference

The initial design conference may be scheduled and conducted at the project installation any time after the post award conference, although it is recommended that the partnering process be initiated with or before the initial design conference. Any design work conducted after award and prior to this conference should be limited to site and is discouraged for other items. All Designers of Record shall participate in the conference. The purpose of the meeting is to introduce everyone and to make sure any needs the contractor has are assigned and due dates established as well as who will get the information. See also Attachment F, BUILDING INFORMATION MODELING REQUIREMENTS for discussion concerning the BIM Implementation Plan demonstration at this meeting. The DB Contractor shall conduct the initial design conference.

3.1.5. Pre-Construction Conference

Before starting construction activities, the Contractor and Government will jointly conduct a pre-construction administrative conference to discuss any outstanding requirements and to review local installation requirements for start of construction. It is possible there will be multiple Pre-Construction Conferences based on the content of the design packages selected by the Contractor. The Government will provide minutes of this meeting to all participants.

3.2. STAGES OF DESIGN SUBMITTALS AND OVER THE SHOULDER PROGRESS REVIEWS

The stages of design submittals described below define Government expectations with respect to process and content. The Contractor shall determine how to best plan and execute the design and review process for this project, within the parameters listed below. As a minimum, the Government expects to see at least one interim design submittal, at least one final design submittal before construction of a design package may proceed and at least one Design Complete submittal that documents the accepted design. The Contractor may sub-divide the design into separate packages for each stage of design and may proceed with construction of a package after the Government accepts the final design for that package. See discussion on waivers to submission of one or more intermediate design packages where the parties partner during the design process. See also Attachment F, BUILDING INFORMATION MODELING REQUIREMENTS for discussion concerning BIM and the various stages of design submittals and over-the-shoulder progress reviews.

3.2.1. Site/Utilities

To facilitate fast-track design-construction activities the contractor may submit a final (100%) site and utility design as the first design submittal or it may elect to submit interim and final site and utility design submittals as explained below. Following review, resolution, and incorporation of all Government comments, and submittal of a satisfactory set of site/utility design documents, after completing all other pre-construction requirements in this contract and after the pre-construction meeting, the Government will allow the Contractor to proceed with site development activities, including demolition where applicable, within the parameters set forth in the accepted design submittal. For the first site and utility design submission, whether an interim or final, the submittal review, comment, and resolution times from this specification apply, except that the Contractor shall allow the Government a 14 calendar day review period, exclusive of mailing time. No on-site construction activities shall begin prior to written Government clearance to proceed.

3.2.2. Interim Design Submittals

The Contractor may submit either a single interim design for review, representing a complete package with all design disciplines, or split the interim design into smaller, individual design packages as it deems necessary for fast-track construction purposes. As required in Section 01 32 01.00 10 PROJECT SCHEDULE, the Contractor shall schedule its design and construction packaging plan to meet the contract completion period. This submission is the Government's primary opportunity to review the design for conformance to the solicitation and to the accepted contract proposal and to the Building Codes at a point where required revisions may be still made, while minimizing lost design effort to keep the design on track with the contract requirements. The requirements for the interim design review submittals and review conferences are described hereinafter. This is not necessarily a hold point for the design process; the Contractor may designate the interim design submittal(s) as a snapshot and proceed with design development at its own risk. See below for a waiver, where the parties establish an effective over-the-shoulder progress review procedure through the partnering process that would eliminate the need for or expedite a formal intermediate design review on one or more individual design packages.

3.2.3. Over-the-Shoulder Progress Reviews

To facilitate a streamlined design-build process, the Government and the Contractor may agree to one-on-one reviewer or small group reviews, electronically, on-line (if available within the Contractor's standard design practices) or at the Contractor's design offices or other agreed location, when practicable to the parties. The Government and Contractor will coordinate such reviews to minimize or eliminate disruptions to the design process. Any data required for these reviews shall normally be provided in electronic format, rather than in hard copy. If the Government and Contractor establish and implement an effective, mutually agreeable partnering procedure for regular (e.g., weekly) over-the-shoulder review procedures that allow the Government reviewers the opportunity to keep fully informed of the progress, contents, design intent, design documentation, etc. of the design package, the Government will agree to waive or to expedite the formal intermediate design review period for that package. The Contractor shall still be required to submit the required intermediate design documentation, however the parties may agree to how that material will be provided, in lieu of a formal consolidated submission of the package. It should be noted that Government funding is extremely limited for non-local travel by design reviewers, so the maximum use of virtual teaming methods must be used. Some possible examples include electronic file sharing, interactive software with on-line or telephonic conferencing, televideo conferencing, etc. The Government must still perform its Code and Contract conformance reviews, so the Contractor is encouraged to partner with the reviewers to find ways to facilitate this process and to facilitate meeting or bettering the design-build schedule. The Contractor shall maintain a fully functional configuration management system as described herein to track design revisions, regardless of whether or not there is a need for a formal intermediate design review. The formal intermediate

review procedures shall form the contractual basis for the official schedule, in the event that the partnering process determines that the formal intermediate review process to be best suited for efficient project execution. However, the Government pledges to support and promote the partnering process to work with the Contractor to find ways to better the design schedule.

3.2.4. Final Design Submissions

This submittal is required for each design package prior to Government acceptance of that design package for construction. The requirements for the final design submittal review conferences and the Government's acceptance for start of construction are described herein after.

3.2.5. Design Complete Submittals

After the final design submission and review conference for a design package, revise the design package to incorporate the comments generated and resolved in the final review conferences, perform and document a back-check review and submit the final, design complete documents, which shall represent released for construction documents. The requirements for the design complete submittals are described hereinafter.

3.2.6. Holiday Periods for Government Review or Actions

Do not schedule meetings, Government reviews or responses during the last two weeks of December or other designated Government Holidays (including Friday after Thanksgiving). Exclude such dates and periods from any durations specified herein for Government actions.

3.2.7. Late Submittals and Reviews

If the Contractor cannot meet its scheduled submittal date for a design package, it must revise the proposed submittal date and notify the government in writing, at least one (1) week prior to the submittal, in order to accommodate the Government reviewers' other scheduled activities. If a design submittal is over one (1) day late in accordance with the latest revised design schedule, or if notification of a proposed design schedule change is less than seven (7) days from the anticipated design submission receipt date, the Government review period may be extended up to seven (7) days due to reviewers' schedule conflicts. If the Government is late in meeting its review commitment and the delay increases the Contractor's cost or delays completion of the project, the Suspension of Work and Defaults clauses provide the respective remedy or relief for the delay.

3.3. DESIGN CONFIGURATION MANAGEMENT

3.3.1. Procedures

Develop and maintain effective, acceptable design configuration management (DCM) procedures to control and track all revisions to the design documents after the Interim Design Submission through submission of the As-Built documents. During the design process, this will facilitate and help streamline the design and review schedule. After the final design is accepted, this process provides control of and documents revisions to the accepted design (See Special Contract Requirement: Deviating From the Accepted Design). The system shall include appropriate authorities and concurrences to authorize revisions, including documentation as to why the revision must be made. The DCM data shall be available to the Government reviewers at all times. The Contractor may use its own internal system with interactive Government concurrences, where necessary or may use the Government's "DrChecks Design Review and Checking System" (see below and Attachment C).

3.3.2. Tracking Design Review Comments

Although the Contractor may use its own internal system for overall design configuration management, the Government and the Contractor shall use the DrChecks Design Review and Checking System to initiate, respond to, resolve and track Government design compliance review comments. This system may be useful for other data which needs to be interactive or otherwise available for shared use and retrieval. See Attachment C for details on how to establish an account and set-up the DrChecks system for use on the project.

3.3.3. Design and Code Checklists

Develop and complete various discipline-specific checklists to be used during the design and quality control of each submittal. Submit these completed checklists with each design submittal, as applicable, as part of the project documentation. See Section 01 45 04.00 10 Contractor Quality Control, Attachment D for a Sample Fire Protection and Life Safety Code review checklist and Attachment E for LEED SUBMITTALS.

3.4. INTERIM DESIGN REVIEWS AND CONFERENCES

3.4.1. General

At least one interim design submittal, review and review conference is required for each design package (except that, per paragraph 3.2.1, the Contractor may skip the interim design submission and proceed directly to final design on the sitework and utilities package). The DB Contractor may include additional interim design conferences or over-the-shoulder reviews, as needed, to assure continued government concurrence with the design work. Include the interim submittal review periods and conferences in the project schedule and indicate what part of the design work is at what percentage of completion. The required interim design conferences shall be held when interim design requirements are reached as described below. See also Paragraph: **Over-the-Shoulder Progress Reviews** for a waiver to the formal interim design review.

3.4.2. Procedures

After receipt of an Interim Design submission, allow the Government fourteen (14) calendar days after receipt of the submission to review and comment on the interim design submittal. For smaller design packages, especially those that involve only one or a few separate design disciplines, the parties may agree on a shorter review period or alternative review methods (e.g., over-the-shoulder or electronic file sharing), through the partnering process. For each interim design review submittal, the COR will furnish, to the Contractor, a single consolidated, validated listing of all comments from the various design sections and from other concerned agencies involved in the review process using the DrChecks Design Review and Checking System. The review will be for conformance with the technical requirements of the solicitation and the Contractor's RFP proposal. If the Contractor disagrees technically with any comment or comments and does not intend to comply with the comment, he/she must clearly outline, with ample justification, the reasons for noncompliance within five (5) days after receipt of these comments in order that the comment can be resolved. Furnish disposition of all comments, in writing, through DrChecks. The Contractor is cautioned that if it believes the action required by any comment exceeds the requirements of this contract, that it should take no action and notify the COR in writing immediately. The Interim Review conference will be held for each design submittal at the installation. Bring the personnel that developed the design submittal to the review conference. The conference will take place the week after the receipt of the comments by the Contractor. For smaller fast-track packages that involve only a few reviewers, the parties may agree to alternative conferencing methods, such as teleconferencing, or televideo, where available, as determined through Partnering.

3.4.3. Conference Documentation

3.4.3.1. In order to facilitate and accelerate the Government code and contract conformance reviews, identify, track resolution of and maintain all comments and action items generated during the design process and make this available to the designers and reviewers prior to the Interim and subsequent design reviews.

3.4.3.2. The DB Contractor shall prepare meeting minutes and enter final resolution of all comments into DrChecks. Copies of comments, annotated with comment action agreed on, will be made available to all parties before the conference adjourns. Unresolved problems will be resolved by immediate follow-on action at the end of conferences. Incorporate valid comments. The Government reserves the right to reject design document submittals if comments are significant. Participants shall determine if any comments are critical enough to require further design development prior to government concurrence. Participants shall also determine how to proceed in order to obtain government concurrence with the design work presented.

3.5. INTERIM DESIGN REQUIREMENTS

Interim design deliverables shall include drawings, specifications, and design analysis for the part of design that the Contractor considers ready for review.

3.5.1. Drawings

Include comments from any previous design conferences incorporated into the documents to provide an interim design for the "part" submitted.

3.5.2. Design Analyses

3.5.2.1. The designers of record shall prepare and present design analyses with calculations necessary to substantiate and support all design documents submitted. Address design substantiation required by the applicable codes and references and pay particular attention to the following listed items:

3.5.2.2. For parts including sitework, include site specific civil calculations.

3.5.2.3. For parts including structural work, include structural calculations.

(a) Identify all loads to be used for design.

(b) Describe the method of providing lateral stability for the structural system to meet seismic and wind load requirements. Include sufficient calculations to verify the adequacy of the method.

(c) Provide calculations for all principal roof, floor, and foundation members and bracing and secondary members.

(d) Provide complete seismic analyses for all building structural, mechanical, electrical, architectural, and building features as dictated by the seismic zone for which the facility is being constructed.

(e) Computer generated calculations must identify the program name, source, and version. Provide input data, including loads, loading diagrams, node diagrams, and adequate documentation to illustrate the design. The schematic models used for input must show, as a minimum, nodes/joints, element/members, materials/properties, and all loadings, induced settlements/deflections, etc., and a list of load combinations. Include an output listing for maximum/minimum stresses/forces and deflections for each element and the reactions for each loading case and combination.

(f) See also the Security (Anti-Terrorism) requirements below for members subject to Anti-Terrorist Force Protection (ATFP) and Progressive Collapse requirements.

(g) Fully coordinate and integrate the overall structural design between two different or interfacing construction types, such as modular and stick-built or multistory, stacked modular construction. Provide substantiation of structural, consolidation/settlement analysis, etc., as applicable, through the interfaces.

3.5.2.4. For Security (Anti-Terrorism): Provide a design narrative and calculations where applicable, demonstrating compliance with each of the 22 standards in UFC 4-010-01, which includes Design of Buildings to Resist Progressive Collapse (use the most recent version of UFC 4-023-03, regardless of references to any specific version in UFC 4-010-01). Where sufficient standoff distance is not being provided, show calculations for blast resistance of the structural system and building envelope. Show complete calculations for members subjected to ATFP loads, e.g., support members of glazed items (jambes, headers, sills) connections of windows to support members and connections of support members to the rest of the structure. For 3 story and higher buildings, provide calculations to demonstrate compliance with progressive collapse requirements.

3.5.2.5. For parts including architectural work, include building floor area analysis.

3.5.2.6. For parts including mechanical work, include HVAC analysis and calculations. Include complete design calculations for mechanical systems. Include computations for sizing equipment, compressed air systems, air duct design, and U-factors for ceilings, roofs and exterior walls and floors. Contractor shall employ commercially available energy analysis techniques to determine the energy performance of all passive systems and features. Use of hourly energy load computer simulation is required (see paragraph 3.5.5.2 for list of acceptable software). Based on the results of calculations, provide a complete list of the materials and equipment proposed with the manufacturer's published cataloged product installation specifications and roughing-in data.

3.5.2.7. For parts including life safety, include building code analysis and sprinkler and other suppression systems. Notwithstanding the requirements of the Codes, address the following:

(a) A registered fire protection engineer (FPE) must perform all fire protection analyses. Provide the fire protection engineer's qualifications. See Section 01 10 00, paragraph 5 for qualifications.

- (b) Provide all references used in the design including Government design documents and industry standards used to generate the fire protection analysis.
- (c) Provide classification of each building in accordance with fire zone, building floor areas and height and number of stories.
- (d) Provide discussion and description of required fire protection requirements including extinguishing equipment, detection equipment, alarm equipment and water supply. Alarm and detection equipment shall interface to requirements of Electronic Systems.
- (e) Provide hydraulic calculations based on water flow test for each sprinkler system to insure that flow and pressure requirements can be met with current water supply. Include copies of Contractor's water flow testing done to certify the available water source.

3.5.2.8. For parts including plumbing systems:

- (a) List all references used in the design.
- (b) Provide justification and brief description of the types of plumbing fixtures, piping materials and equipment proposed for use.
- (c) Detail calculations for systems such as sizing of domestic hot water heater and piping; natural gas piping; LP gas piping and tanks, fuel oil piping and tanks, etc., as applicable.
- (d) When the geotechnical report indicates expansive soils are present, indicate in the first piping design submittal how piping systems will be protected against damage or backfall/backflow due to soil heave (from penetration of slab to the 5 foot building line).

3.5.2.9. For elevator systems:

- (a) List all criteria codes, documents and design conditions used.
- (b) List any required permits and registrations for construction of items of special mechanical systems and equipment.

3.5.2.10. For parts including electrical work, include lighting calculations to determine maintained foot-candle levels, electrical load analysis and calculations, electrical short circuit and protective device coordination analysis and calculations and arc fault calculations.

3.5.2.11. For parts including telecommunications voice/data (including SIPRNET, where applicable), include analysis for determining the number and placement of outlets

3.5.2.12. For Cathodic Protection Systems, provide the following stamped report by the licensed corrosion engineer or NACE specialist with the first design submission. The designer must be qualified to engage in the practice of corrosion control of buried or submerged metallic surfaces. He/she must be accredited or certified by the National Association of Corrosion Engineers (NACE) as a NACE Accredited Corrosion Specialist or a NACE certified Cathodic Protection Specialist, or must be a registered professional engineer with a minimum of five years experience in corrosion control and cathodic protection. Clearly describe structures, systems or components in soil or water to be protected. Describe methods proposed for protection of each.

3.5.3. Geotechnical Investigations and Reports:

3.5.3.1. The contractor's licensed geotechnical engineer shall prepare a final geotechnical evaluation report, to be submitted along with the first foundation design submittal. Make this information available as early as possible during the over-the-shoulder progress review process. Summarize the subsurface conditions and provide recommendations for the design of appropriate utilities, foundations, floor slabs, retaining walls, embankments, and pavements. Include compaction requirements for fill and backfill under buildings, sidewalks, other structures and open areas. Recommend foundation systems to be used, allowable bearing pressures for footings, lateral load resistance capacities for foundation systems, elevations for footings, grade beams, slabs, etc. Provide an assessment of post-construction settlement potential including total and differential. Provide recommendations regarding lateral earth pressures (active, at-rest, passive) to be used in the design of retaining walls. Include the recommended spectral accelerations and Site Class for seismic design along with an evaluation of any seismic hazards and recommendations for mitigation, if required. Include calculations to support the recommendations for bearing capacity, settlement, and pavement sections. Include supporting documentation for all recommended

design parameters such as Site Class, shear strength, earth pressure coefficients, friction factors, subgrade modulus, California Bearing Ratio (CBR), etc. Provide earthwork recommendations, expected frost penetration, expected groundwater levels, recommendations for dewatering and groundwater control and the possible presence of any surface or subsurface features that may affect the construction of the project such as sinkholes, boulders, shallow rock, old fill, old structures, soft areas, or unusual soil conditions. Include pH tests, salinity tests, resistivity measurements, etc., required to design corrosion control and grounding systems. Include the raw field data. Arrange a meeting with the Government subsequent to completion and evaluation of the site specific geotechnical exploration to outline any differences encountered that are inconsistent with the Government provided preliminary soils information. Clearly outline differences which require changes in the foundation type, or pavement and earthwork requirements from that possible and contemplated using the Government furnished preliminary soils investigation, which result in a change to the design or construction. Any equitable adjustment is subject to the provisions of the contract's Differing Site Conditions Clause.

3.5.3.2. Vehicle Pavements: The Contractor's geotechnical report shall contain flexible and rigid pavement designs, as applicable for the project, including design CBR and modulus of subgrade reaction and the required compaction effort for subgrades and pavement layers. Provide Information on the types of base course materials available in the area and design strengths.

3.5.3.3. The Contractor and the professional geotechnical engineer consultant shall certify in writing that the design of the project has been developed consistent with the Contractor's final geotechnical report. The certification shall be stamped by the consulting professional geotechnical engineer and shall be submitted with the first design submission. If revisions are made to the initial design submission, a new certification shall be provided with the final design submission.

3.5.4. LEED Documentation:

Assign a LEED Accredited Professional, responsible to track LEED planning, performance and documentation for each LEED credit through construction closeout. Incorporate LEED credits in the plans, specifications and design analyses. Develop LEED supporting documentation as a separable portion of the Design Analysis and provide with each required design submittal. Include the LEED Project checklist for each non-exempt facility (one checklist may be provided for multiple facilities in accordance with the LEED-NC Application Guide for Multiple Buildings and On-Campus Building Projects and the LEED SUBMITTALS (Attachment E, herein) with each submittal. Final design submittal for each portion of the work must include all required design documentation relating to that portion of work (example - all site credit design documents with final site design). Submittal requirements are as indicated in Attachment E, LEED SUBMITTALS. Submit all documentation indicated on Attachment E as due at final design at final design submittal (for fast-track projects with multiple final design submittals, this shall be at the last scheduled final design submittal). All project documentation related to LEED shall conform to USGBC requirements for both content and format, including audit requirements and be separate from other design analyses. Maintain and update the LEED documentation throughout project progress to construction closeout and shall compile product data, receipts, calculations and other data necessary to substantiate and support all credits claimed. The Government may audit any or all individual credits. Audit documentation is not required to be submitted unless requested. These requirements apply to all projects. If the project requires the Contractor to obtain USGBC certification, the Contractor shall also be responsible for obtaining USGBC certification and shall provide written evidence of certification with the construction closeout LEED documentation submittal. Install the USGBC building plaque at the location indicated by the Government upon receipt. If Contractor obtains USGBC interim design review, submit the USGBC review to the Government within 30 days of receipt for information only.

3.5.4.1. LEED Documentation for Technology Solution Set. If the Solicitation provides a Prescriptive Technology Solution Set, use of the Technology Solution set has no effect on LEED documentation requirements. Provide all required LEED documentation, including energy analysis, in accordance with LEED requirements when using the Technology Solution Set.

3.5.5. Energy Conservation:

3.5.5.1. Refer to Section 01 10 00, Paragraph 5. Interim and Final Design submittals shall demonstrate that each building including the building envelope, HVAC systems, service water heating, power, and lighting systems meet the Mandatory Provisions and the Prescriptive Path requirements of ASHRAE 90.1. Use Compliance Documentation forms available from ASHRAE and included in the ASHRAE 90.1 User's Manual for this purpose. The Architectural Section of the Design Analysis shall include completed forms titled "Building Envelope

Compliance Documentation Parts I and II". The Heating Ventilating and Air Conditioning (HVAC) Section of the Design Analysis shall include a completed form titled "HVAC Simplified Approach Option - Part I" if this approach is allowed by the Standard. Otherwise, the HVAC Section of the Design Analysis shall include completed forms titled "HVAC Mandatory Provisions - Part II" and "HVAC Prescriptive Requirements - Part III". The Plumbing Section of the Design Analysis shall include a completed form titled "Service Water Heating Compliance Documentation". The Electrical Section of the Design Analysis shall include an explanatory statement on how the requirements of ASHRAE 90.1-2004 Chapter 8 Power were met. The Electrical Section of the Design Analysis shall also include a completed form titled "Lighting Compliance Documentation".

3.5.5.2. Interim and Final Design submittals which address energy consuming systems, (heating, cooling, service hot water, lighting, power, etc.) must also include calculations in a separate Energy Conservation Section of the Design Analysis which demonstrate and document (a) the baseline energy consumption for the facility or facilities under contract, that would meet the requirements of ANSI/ASHRAE/IESNA Standard 90.1 and (b) the energy consumption of the facility or facilities under contract utilizing the materials and methods required by this construction contract. Use the USGBC Energy and Atmosphere (EA) Credit 1 compliance template / form or an equivalently detailed form for documenting compliance with the energy reduction requirements. This template / form is titled PERFORMANCE RATING METHOD and is available when the project is registered for LEED. The calculation methodology used for this documentation and analysis shall follow the guidelines set forth in Appendix G of ASHRAE 90.1, with two exceptions: a) receptacle and process loads may be omitted from the calculation; and b) the definition of the terms in the formula for Percentage Improvement found in paragraph G1.2 are modified as follows: Baseline Building Performance shall mean the annual energy consumption calculated for a building design intended for use as a baseline for rating above standard design meeting the minimum requirements of the energy standard, and Proposed Building Performance shall mean annual energy consumption calculated for the proposed building design intended for construction. This calculation shall address all energy consuming systems in a single integrated methodology. Include laboratory fume hoods and kitchen ventilation loads in the energy calculation. They are not considered process loads. Individual calculations for heating, cooling, power, lighting, power, etc. systems will not be acceptable. The following building simulation software is acceptable for use in calculating building energy consumption: Hourly Analysis Program (HAP) by Carrier Corp., TRACE 700 by Trane Corp., DOE-2 by US Department of Energy, EnergyPlus by DOD/DOE.

3.5.6. Specifications

Specifications may be any one of the major, well known master guide specification sources (use only one source) such as MASTERSPEC from the American Institute of Architects, SPECTEXT from Construction Specification Institute or Unified Facility Guide Specifications (UFGS using MASTERFORMAT 2004 numbering system), etc. (including specifications from these sources). Manufacturers' product specifications, utilizing CSI's Manu-Spec, three part format may be used in conjunction with the selected specifications. The designers of record shall edit and expand the appropriate Specifications to insure that all project design requirements, current code requirements, and regulatory requirements are met. Specifications shall clearly identify, where appropriate, specific products chosen to meet the contract requirements (i.e., manufacturers' brand names and model numbers or similar product information).

3.5.7. Building Rendering

Present and provide a draft color computer, artist, or hand drawn rendering with the conceptual design submittal of the building exterior. Perspective renderings shall include a slightly overhead view of the entire building to encompass elevations and the roof configuration of the building. After Government review and acceptance, provide a final rendering, including the following:

Three (3) 18" x 24" color prints, framed and matted behind glass with project title underneath the print.

One (1) Image file (high resolution) in JPG format on CD for those in the submittal distribution list.

3.5.8. Interim Building Design Contents

The following list represents what the Government considers should be included in the overall completed design for a facility or project. It is not intended to limit the contractor from providing different or additional information as needed to support the design presented, including the require design analyses discussed above. As the Contractor develops individual design packages and submits them for Interim review, include as much of the applicable

information for an individual design package as is developed at the Interim design level for review purposes. These pieces shall be developed as the design progresses toward the design complete stage.

3.5.8.1. Lawn and Landscaping Irrigation System

3.5.8.2. Landscape, Planting and Turfing

3.5.8.3. Architectural

- (a) Design Narrative
- (b) Architectural Floor Plans, Typical Wall and Roof Sections, Elevations
- (c) Finish schedule
- (d) All required equipment
- (e) Special graphics requirements
- (f) Door and Window Schedules
- (g) Hardware sets using BHMA designations
- (h) Composite floor plan showing all pre-wired workstations
- (i) Structural Interior Design (SID) package: See ATTACHMENT A for specific requirements
- (j) Furniture, Fixtures & Equipment (FF&E) design package: See ATTACHMENT B for specific requirements

3.5.8.4. Structural Systems. Include:

- (a) Drawings showing principal members for roof and floor framing plans as applicable
- (b) Foundation plan showing main foundation elements where applicable
- (c) Typical sections for roof, floor, and foundation conditions

3.5.8.5. Plumbing Systems

- (a) Show locations and general arrangement of plumbing fixtures and major equipment
- (b) Plan and isometric riser diagrams of all areas including hot water, cold water, waste and vent piping. Include natural gas (and meter as required), (natural gas and meter as required), (LP gas), (fuel oil) and other specialty systems as applicable.
- (c) Include equipment and fixture connection schedules with descriptions, capacities, locations, connection sizes and other information as required

3.5.8.6. HVAC Systems

- (a) Mechanical Floor Plans: The floor plans shall show all principle architectural features of the building which will affect the mechanical design. The floor plans shall also show the following:
 - (1) Room designations.
 - (2) Mechanical legend and applicable notes.
 - (3) Location and size of all ductwork and piping.
 - (4) Location and capacity of all terminal units (i.e., registers, diffusers, grilles, hydronic baseboards).
 - (5) Pre-Fabricated Paint Spray Booth (where applicable to project scope)
 - (6) Paint Preparation Area (where applicable to project scope)
 - (7) Exhaust fans and specialized exhaust systems.
 - (8) Thermostat location.
 - (9) Location of heating/cooling plant (i.e., boiler, chiller, cooling tower, etc).
 - (10) Location of all air handling equipment.

- (11) Air balancing information.
- (12) Flue size and location.
- (13) Piping diagram for forced hot water system (if used).
- (b) Equipment Schedule: Provide complete equipment schedules. Include:
 - (1) Capacity
 - (2) Electrical characteristics
 - (3) Efficiency (if applicable)
 - (4) Manufacturer's name
 - (5) Optional features to be provided
 - (6) Physical size
 - (7) Minimum maintenance clearances
- (a) Details: Provide construction details, sections, elevations, etc., only where required for clarification of methods and materials of design.
- (b) HVAC Controls: Submit complete HVAC controls equipment schedules, sequences of operation, wiring and logic diagrams, Input/Output Tables, equipment schedules, and all associated information. See the Statement of Work for additional specific requirements.

3.5.8.7. Fire Protection and Life Safety.

- (a) Provide plan for each floor of each building that presents a compendium of the total fire protection features being incorporated into the design. Include the following types of information:
 - (1) The location and rating of any fire-resistive construction such as occupancy separations, area separations, exterior walls, shaft enclosures, corridors, stair enclosures, exit passageways, etc.
 - (2) The location and coverage of any fire detection systems
 - (3) The location and coverage of any fire suppression systems (sprinkler risers, standpipes, etc.)
 - (4) The location of any other major fire protection equipment
 - (5) Indicate any hazardous areas and their classification
 - (6) Schedule describing the internal systems with the following information: fire hazard and occupancy classifications, building construction type, GPM/square foot sprinkler density, area of operation and other as required
- (b) Working plans and all other materials submitted shall meet NFPA 13 requirements, with respect to required minimum level of detail.

3.5.8.8. Elevators. Provide:

- (a) Description of the proposed control system
- (b) Description, approximate capacity and location of any special mechanical equipment for elevators.

3.5.8.9. Electrical Systems.

- (a) Electrical Floor Plan(s): Show all principle architectural features of the building which will affect the electrical design. Show the following:
 - (1) Room designations.
 - (2) Electrical legend and applicable notes.
 - (3) Lighting fixtures, properly identified.
 - (4) Switches for control of lighting.
 - (5) Receptacles.

- (6) Location and designation of panelboards. Clearly indicate type of mounting required (flush or surface) and reflect accordingly in specifications.
- (7) Service entrance (conduit and main disconnect).
- (8) Location, designation and rating of motors and/or equipment which requires electrical service. Show method of termination and/or connection to motors and/or equipment. Show necessary junction boxes, disconnects, controllers (approximate only), conduit stubs, and receptacles required to serve the motor and/or equipment.
- (b) Building Riser Diagram(s) (from pad-mounted transformer to unit load center panelboard): Indicate the types and sizes of electrical equipment and wiring. Include grounding and metering requirements.
- (c) Load Center Panelboard Schedule(s): Indicate the following information:
 - (1) Panelboard Characteristics (Panel Designation, Voltage, Phase, Wires, Main Breaker Rating and Mounting.
 - (2) Branch Circuit Designations.
 - (3) Load Designations.
 - (4) Circuit Breaker Characteristics. (Number of Poles, Trip Rating, AIC Rating)
 - (5) Branch Circuit Connected Loads (AMPS).
 - (6) Special Features
- (d) Lighting Fixture Schedule(s): Indicate the following information:
 - (1) Fixture Designation.
 - (2) General Fixture Description.
 - (3) Number and Type of Lamp(s).
 - (4) Type of Mounting.
 - (5) Special Features.
- (e) Details: Provide construction details, sections, elevations, etc. only where required for clarification of methods and materials of design.

3.5.8.10. Electronic Systems including the following responsibilities:

- (a) Fire Detection and Alarm System. Design shall include layout drawings for all devices and a riser diagram showing the control panel, annunciator panel, all zones, radio transmitter and interfaces to other systems (HVAC, sprinkler, etc.)
- (b) Fire Suppression System Control. Specify all components of the Fire Suppression (FS) System in the FS section of the specifications. Clearly describe how the system will operate and interact with other systems such as the fire alarm system. Include a riser diagram on the drawings showing principal components and interconnections with other systems. Include FS system components on drawing legend. Designate all components shown on floor plans "FS system components" (as opposed to "Fire Alarm components"). Show location of FS control panels, HVAC control devices, sensors, and 120V power panel connections on floor plans. Indicate zoning of areas by numbers (1, 2, 3) and detectors sub-zoned for cross zoning by letter designations (A and B). Differentiate between ceiling mounted and under floor detectors with distinct symbols and indicate sub-zone of each.
- (c) Public Address System
- (d) Special Grounding Systems. Completely reflect all design requirements in the specifications and drawings. Specifications shall require field tests (in the construction phase), witnessed by the Government, to determine the effectiveness of the grounding system. Include drawings showing existing construction, if any.
- (e) Cathodic Protection.
- (f) Intrusion Detection, Card Access System
- (g) Central Control and Monitoring System
- (h) Mass Notification System
- (i) Electrical Power Distribution Systems

3.5.8.11. Separate detailed Telecommunications drawings for Information Systems including the following responsibilities:

- (a) Telecommunications Cabling
- (b) Supporting Infrastructure
- (a) Outside Plant (OSP) Cabling - Campus or Site Plans - Exterior Pathways and Inter-Building Backbones
 - (a) Include a layout of the voice/data outlets (including voice only wall & pay phones) on telecommunication floor plan drawing, location of SIPRNET data outlets (where applicable), and a legend and symbol definition to indicate height above finished floor. Show size of conduit and cable type and size on Riser Diagram. Do not show conduit runs between backboard and outlets on the floor plans. Show underground distribution conduit and cable with sizing from point of presence to entrance facility of building.
 - (b) Layout of complete building per floor - Serving Zone Boundaries, Backbone Systems, and Horizontal Pathways including Serving Zones Drawings - Drop Locations and Cable ID's
 - (c) Communication Equipment Rooms - Plan Views - Tech and AMEP/Elevations - Racks and Walls. Elevations with a detailed look at all telecomm rooms. Indicate technology layout (racks, ladder-racks, etc.), mechanical/electrical layout, rack elevation and backboard elevation. They may also be an enlargement of a congested area of T1 or T2 series drawing.

3.6. FINAL DESIGN REVIEWS AND CONFERENCES

A final design review and review conference will be held upon completion of final design at the project installation, or – where equipment is available - by video teleconference or a combination thereof, for any design package to receive Government acceptance to allow release of the design package for construction. For smaller separate design packages, the parties may agree on alternative reviews and conferences (e.g., conference calls and electronic file sharing, etc.) through the Partnering process. Include the final design conference in the project schedule and shall indicate what part of the design work is at 100% completion. The final design conference will be held after the Government has had seven (7) calendar days after receipt of the submission to review the final design package and supporting data. For smaller packages, especially those involving only one or a few design disciplines the parties may agree on a shorter period.

3.7. FINAL DESIGN REQUIREMENTS

Final design deliverables for a design package shall consist of 100% complete drawings, specifications, submittal register and design analyses for Government review and acceptance. The 100% design submission shall consist of drawings, specifications, updated design analyses and any permits required by the contract for each package submitted. In order to expedite the final design review, prior to the conference, ensure that the design configuration management data and all review comment resolutions are up-to-date. Include the 100% SID and 100% FF&E binders for government approval. The Contractor shall have performed independent technical reviews (ITR's) and back-checks of previous comment resolutions, as required by Section 01 45 04.00 10 CONTRACTOR QUALITY CONTROL, including providing documentation thereof. Use DrChecks or other acceptable comment tracking system during the ITR and submit the results with each final design package

3.7.1. Drawings

3.7.1.1. Submit drawings complete with all contract requirements incorporated into the documents to provide a 100% design for each package submitted.

3.7.1.2. Prepare all drawings with the Computer-Aided Design and Drafting (CADD)/Computer-Aided Design (CAD) system, organized and easily referenced electronically, presenting complete construction information.

3.7.1.3. Drawings shall be complete. The Contractor is encouraged to utilize graphics, views, notes, and details which make the drawings easier to review or to construct but is also encouraged to keep such materials to those that are necessary.

3.7.1.4. Provide detail drawings that illustrate conformance with the contract. Include room finish schedules, corresponding color/finish/special items schedules, and exterior finish schedules that agree with the submitted SID binders.

3.7.1.5. The design documents shall be in compliance with the latest version of the A/E/C CAD Standard, available at <https://cadbim.usace.army.mil/CAD>. Use the approved vertical Corps of Engineers title blocks and borders on all drawings with the appropriate firm name included within the title block area.

3.7.1.6. CAD System and Building Information Modeling (BIM) (NOTE: If this is a Single Award or Multiple Award, Indefinite Delivery/Indefinite Quantity Contract, this information will be provided for each task order.)

All CAD files shall be fully compatible with MicroStation V8 or higher. Save all design CAD files as MicroStation V8 or higher files. All submitted BIM Models and associated Facility Data shall be fully compatible with Bentley BIM file format and the USACE Bentley BIM v8 Workspace.

(a) CAD Data Final File Format: During the design development capture geo-referenced coordinates of all changes made to the existing site (facility footprint, utility line installations and alterations, roads, parking areas, etc) as a result of this contract. There is no mandatory methodology for how the geo-referenced coordinates will be captured, however, Engineering and Construction Bulletin No. 2006-15, Subject: Standardizing Computer Aided Design (CAD) and Geographic Information Systems (GIS) Deliverables for all Military Design and Construction Projects identifies the format for final as-built drawings and data sets to be delivered to the government. Close-out requirements at the as-built stage; require final geo-referenced GIS Database of the new facility along with all exterior modifications. The Government will incorporate this data set into the Installation's GIS Masterplan or Enterprise GIS System. See also, Section 01 78 02.00 10 Closeout Submittals.

(b) Electronic Drawing Files: In addition to the native CAD design files, provide separate electronic drawing files (in editable CAD format and Adobe Acrobat PDF version 7.0 or higher) for each project drawing.

(c) Each file (both CAD and PDF) shall represent one complete drawing from the drawing set, including the date, submittal phase, and border. Each drawing file shall be completely independent of any data in any other file, including fonts and shapes not included with the basic CAD software program utilized. Fonts that are not included as part of the default CAD software package installation or recognized as an allowable font by the A/E/C CAD Standard are not acceptable in delivered CAD files. All displayed graphic elements on all levels of the drawing files shall be part of the project drawing image. The drawing files shall not contain any graphic element that is not part of the drawing image.

(d) Deliver BIM Model and associated Facility Data files in their native format. At a minimum, BIM files shall address major architecture design elements, major structural components, mechanical systems and electrical/communication distribution and elements as defined in Attachment F. See Attachment F for additional BIM requirements.

(e) Drawing Index: Provide an index of drawings sheet in CAD as part of the drawing set, and an electronic list in Microsoft Excel of all drawings on the CD. Include the electronic file name, the sheet reference number, the sheet number, and the sheet title, containing the data for each drawing.

(f) Hard Copies: Plot submitted hard copy drawings directly from the "electronic drawing files" and copy for quantities and sizes indicated in the distribution list at the end of this specification section. The Designers of Record shall stamp, sign and date original hard copy sheets as Released For Construction, and provide copies for distribution from this set.

3.7.2. Design Analyses

3.7.2.1. The designers of record shall update, finalize and present design analyses with calculations necessary to substantiate and support all design documents submitted.

3.7.2.2. The responsible DOR shall stamp, sign and date the design analysis. Identify the software used where, applicable (name, version, vendor). Generally, provide design analyses, individually, in an original (file copy) and one copy for the assigned government reviewer.

3.7.2.3. All disciplines review the LEED design analysis in conjunction with their discipline-specific design analysis; include a copy of the separable LEED design analysis in all design analysis submittals.

3.7.2.4. Do not combine multi-disciplined volumes of design-analysis, unless multiple copies are provided to facilitate multiple reviewers (one copy per each separate design analysis included in a volume).

3.7.3. Specifications

Specifications shall be 100% complete and in final form.

3.7.4. Submittal Register

Prepare and update the Submittal Register and submit it with the 100% design specifications (see Specification Section 01 33 00, SUBMITTAL PROCEDURES) with each design package. Include the required submittals for each specification section in a design package in the submittal register.

3.7.5. Preparation of DD Form 1354 (Transfer of Real Property)

This form itemizes the types, quantities and costs of various equipment and systems that comprise the project, for the purpose of transferring the new construction project from the Corps Construction Division to the Installation's inventory of real property. The Government will furnish the DB Contractor's design manager a DD Form 1354 checklist to use to produce a draft Form 1354. Submit the completed checklist and prepared draft Form DD 1354 with the 100% design in the Design Analysis. The Corps will use these documents to complete the final DD 1354 upon completion of construction.

3.7.6. Acceptance and Release for Construction

3.7.6.1. At the conclusion of the Final Design Review (after resolutions to the comments have been agreed upon between DOR and Government reviewers), the Contracting Officer or the ACO will accept the Final Design Submission for the design package in writing and allow construction to start for that design package. The Government may withhold acceptance until all major corrections have been made or if the final design submission requires so many corrections, even though minor, that it isn't considered acceptably complete.

3.7.6.2. Government review and acceptance of design submittals is for contract conformance only and shall not relieve the Contractor from responsibility to fully adhere to the requirements of the contract, including the Contractor's accepted contract proposal, or limit the Contractor's responsibility of design as prescribed under Special Contract Requirement: "Responsibility of the Contractor for Design" or limit the Government's rights under the terms of the contract. The Government reserves the right to rescind inadvertent acceptance of design submittals containing contract deviations not separately and expressly identified in the submittal for Government consideration and approval.

3.8. DESIGN COMPLETE CONSTRUCTION DOCUMENT REQUIREMENTS

After the Final Design Submission and Review Conference and after Government acceptance of the Final Design submission, revise the design documents for the design package to incorporate the comments generated and resolved in the final review conference, perform and document a back-check review and submit the final, design complete documents. Label the final design complete documents "FOR CONSTRUCTION" or use similar language. In addition to the final drawings and specifications, the following deliverables are required for distribution and field use. The deliverable includes all documentation and supporting design analysis in final form, as well as the final review comments, disposition and the back-check. As part of the quality assurance process, the Government may perform a back-check of the released for construction documentation. Promptly correct any errors or omissions found during the Government back-check. The Government may withhold retainage from progress payments for work or materials associated with a final design package until this submittal has been received and the Government determines that it is complete.

3.9. SUBMITTAL DISTRIBUTION, MEDIA AND QUANTITIES

3.9.1. Submittal Distribution and Quantities

General: The documents which the Contractor shall submit to the Government for each submittal are listed and generally described in preceding paragraphs in this Section. Provide copies of each design submittal and design substantiation as follows (NOTE: If this is a Single Award or Multiple Award, Indefinite Delivery/Indefinite Quantity Contract, this information will be provided for each task order):

Activity and Address	Drawing Size (Full Size) ANSI D Full Sets/ *Partial Sets	Design Analyses & Specs Full Sets/ *Partial Sets	Drawing Size (Half Size) ANSI B Full Sets/ *Partial Sets	Non-BIM Data CD-ROM or DVD as Necessary (PDF & .dgn)	Furniture Submittal (Per Attachment B)	Structural Interior Design Submittal	BIM Data DVD (Per Attachment F)
Commander, U.S.Army Engineer District Norfolk	1/0	1/0	1/0	2	1	1	2
Commander, U.S.Army Engineer District, Center of Standardization USAESCH	1/0	2/0	2/0	2	N/A	1	2
Installation	1/0	2/0	2/0	2	2	1	1
U.S.Army Corps of Engineers Construction Area Office	1/0	1/0	2/0	2	1	2	1
Information Systems Engineering Command (ISEC)	0/0	0/1	0/0	1	N/A	N/A	1
Other Offices	0/0	0/0	0/0	1	N/A	0	1

***NOTE: For partial sets of drawings, specifications and design analyses, see paragraph 3.9.3.3, below.**

****NOTE: When specified below in 3.9.2, furnish Installation copies of Drawings as paper copies, in lieu of the option to provide secure web-based submittals.**

3.9.2. Web based Design Submittals

Except for full or half-sized drawings for Installation personnel, as designated in the Table above, Web based design submittals will be acceptable as an alternative to the paper copies listed in the Table above, provided a single hard-copy PDF based record set is provided to the Contracting Officer for record purposes. Where the contract requires the Contractor to submit documents to permitting authorities, still provide those authorities paper copies (or in an alternate format where required by the authority). Web based design submittal information shall be provided with adequate security and availability to allow unlimited access those specifically authorized to Government reviewers while preventing unauthorized access or modification. File sizes must be of manageable size for reviewers to quickly download or open on their computers. As a minimum, drawings shall be full scale on American National Standards Institute (ANSI) D sheets (34" x 22"). In addition to the optional website, provide the BIM data submission on DVD to each activity and address noted above in paragraph 3.9.1 for each BIM submission required in Attachment F.

3.9.3. Mailing of Design Submittals

3.9.3.1. Mail all design submittals to the Government during design and construction, using an overnight mailing service. The Government will furnish the Contractor addresses where each copy shall be mailed to after award of the contract (or individual task order if this is an indefinite delivery/indefinite quantity, task order contract). Mail the submittals to nine (9) different addresses. Assemble drawing sheets, specs, design analyses, etc. into individual sets; do not combine duplicate pages from individual sets so that the government has to assemble a set.

3.9.3.2. Each design submittal shall have a transmittal letter accompanying it indicating the date, design percentage, type of submittal, list of items submitted, transmittal number and point of contact with telephone number.

3.9.3.3. Provide partial sets of drawings, specifications, design analyses, etc., as designated in the Table in paragraph 3.9.1, to those reviewers who only need to review their applicable portions of the design, such as the various utilities. The details of which office receives what portion of the design documentation will be worked out after award.

3.10. AS-BUILT DOCUMENTS

Provide as-built drawings and specifications in accordance with Section 01 78 02.00 10, CLOSEOUT SUBMITTALS. Update LEED design phase documentation during construction as needed to reflect construction changes and advancing project completion status (example - Commissioning Plan updates during construction phase) and include updated LEED documentation in construction closeout submittal.

ATTACHMENT A STRUCTURAL INTERIOR DESIGN (SID) REQUIREMENTS

1.0 GENERAL INFORMATION

Structural Interior Design includes all building related elements and components generally part of the building itself, such as wall finishes, ceilings finishes, floor coverings, marker/bulletin boards, blinds, signage and built in casework. Develop the SID in conjunction with the furniture footprint.

2.0 STRUCTURAL INTERIOR DESIGN (SID) REQUIREMENTS FOR THE INTERIM AND FINAL DESIGN SUBMITTALS

2.1. FORMAT AND SCHEDULE

Prepare and submit for approval an interior and exterior building finishes scheme for an interim design submittal. The DOR shall meet with and discuss the finish schemes with the appropriate Government officials prior to preparation of the schemes to be presented. Present original sets of the schemes to reviewers at an interim design conference.

At the conclusion of the interim phase, after resolutions to the comments have been agreed upon between DOR and Government reviewers, the Contractor may proceed to final design with the interior finishes scheme presented.

The SID information and samples are to be submitted in 8 ½" x 11" format using three ring binders with pockets on the inside of the cover. When there are numerous pages with thick samples, use more than one binder. Large D-ring binders are preferred to O-ring binders. Use page protectors that are strong enough to keep pages from tearing out. Anchor large or heavy samples with mechanical fasteners, Velcro, or double-faced foam tape rather than rubber cement or glue. Fold out items must have a maximum spread of 25 ½". Provide cover and spine inserts sheets identifying the document as "Structural Interior Design" package. Include the project title and location, project number, Contractor/A/E name and phone number(s), submittal stage and date.

Design submittal requirements include, but are not limited to:

2.1.1. Narrative of the Structural Interior Design Objectives

The SID shall include a narrative that discusses the building related finishes. Include topics that relate to base standards, life safety, sustainable design issues, aesthetics, durability and maintainability, discuss the development and features as they relate to the occupants requirements and the building design.

2.1.2. Interior Color Boards

Identify and key each item on the color boards to the contract documents to provide a clear indication of how and where each item will be used. Arrange finish samples to the maximum extent possible by room type in order to illustrate room color coordination. Label all samples on the color boards with the manufacturer's name, patterns and colors name and number. Key or code samples to match key code system used on contract drawings.

Material and finish samples shall indicate true pattern, color and texture. Provide photographs or colored photocopies of materials or fabrics to show large overall patterns in conjunction with actual samples to show the actual colors. Finish samples must be large enough to show a complete pattern or design where practical.

Color boards shall include but not be limited to original color samples of the following:

All walls finishes and ceiling finishes, including corner guards, acrylic wainscoting and wall guards/chair rail finishes

All tile information, including tile grout color and tile patterns.

- All flooring finishes, including patterns.
- All door, door frame finishes and door hardware finishes
- All signage, wall base, toilet partitions, locker finishes and operable/folding partitions and trim

- All millwork materials and finishes (cabinets, counter tops, etc.)
- All window frame finishes and window treatments (sills, blinds, etc.)

Color board samples shall reflect all actual finish textures, patterns and colors required as specified. Patterned samples shall be of sufficient size to adequately show pattern and its repeat if a repeat occurs.

2.1.3. Exterior Color Boards

Prepare exterior finishes color boards in similar format as the interior finishes color boards, for presentation to the reviewers during an interim design conference. Provide original color samples of all exterior finishes including but not limited to the following:

- All Roof Finishes
- All Brick and Cast Stone Samples
- All Exterior Insulation and Finish Samples
- All Glass Color Samples
- All Exterior Metals Finishes
- All Window & Door Frame Finishes
- All Specialty Item Finishes, including trim

Identify each item on the exterior finishes color boards and key to the building elevations to provide a clear indication of how and where each item will be used.

2.2. STRUCTURAL INTERIOR DESIGN DOCUMENTS

2.2.1. General

Structural interior design related drawings must indicate the placement of extents of SID material, finishes and colors and must be sufficiently detailed to define all interior work. The following is a list of minimum requirements:

2.2.2. Finish Color Schedule

Provide finish color schedule(s) in the contract documents. Provide a finish code, material type, manufacturer, series, and color designations. Key the finish code to the color board samples and drawings.

2.2.3. Interior Finish Plans

Indicate wall and floor patterns and color placement, material transitions and extents of interior finishes.

2.2.4. Furniture Footprint Plans

Provide furniture footprint plans showing the outline of all freestanding and systems furniture for coordination of all other disciplines.

2.2.5. Interior Signage

Include interior signage plans or schedules showing location and quantities of all interior signage. Key each interior sign to a quantitative list indicating size, quantity of each type and signage text.

2.2.6. Interior Elevations, Sections and Details

Indicate material, color and finish placement.

**ATTACHMENT B
FURNITURE, FIXTURES & EQUIPMENT (FF&E) REQUIREMENTS**

1.0 FF&E REQUIREMENTS FOR THE INTERIM AND FINAL DESIGN SUBMITTALS

1.1. FORMAT AND SCHEDULE

Prepare and submit for approval a comprehensive FF&E scheme for an interim design submittal. The Contractor's interior designer, not a furniture dealer, shall develop the design. FF&E is the selection, layout, specification and documentation of furniture includes but is not limited to workstations, seating, tables, storage and shelving, filing, trash receptacles, clocks, framed artwork, artificial plants, and other accessories. Contract documentation is required to facilitate pricing, procurement and installation. The FF&E package is based on the furniture footprint developed in the Structural Interior Design (SID) portion of the interior design. Develop the FF&E package concurrently with the building design to ensure that there is coordination between the electrical outlets, switches, J-boxes, communication outlets and connections, and lighting as appropriate. In addition, coordinate layout with other building features such as architectural elements, thermostats, location of TV's, GF/GI equipment (for example computers, printers, copiers, shredders, faxes), etc. Locate furniture in front of windows only if the top of the item falls below the window and unless otherwise noted, do not attach furniture including furniture systems to the building. If project has SIPRNET and/or NIPRNET, coordinate furniture layout with SIPRNET and NIPRNET separation requirements. Verify that access required by DOIM for SIPRNET box and conduit is provided. The DOR shall interview appropriate Government personnel to determine FF&E requirements for furniture and furnishings prior to preparation of the scheme to be presented. Determine FFE items and quantities by, but not limited to: (1) the number of personnel to occupy the building, (2) job functions and related furniture/office equipment to support the job function, (3) room functions, (4) rank and grade. Present original sets of the scheme to reviewers at an interim design conference upon completion of the interim architectural submittal or three months prior to the submittal of the final FF&E package (whichever comes first).

Design may proceed to final with the FF&E scheme presented at the conclusion of the interim phase, after resolutions to the comments have been agreed upon between DOR and Government reviewers.

Provide six copies of the electronic versions of all documents upon completion of the final architectural submittal or ten months prior to the contract completion date (whichever comes first), to ensure adequate time for furniture acquisition. Provide unbound, electronic drawings in CAD and BIM. Provide all files needed to view complete drawings. Submit all text documents in Microsoft Word or Excel..

Submit four copies of the final and complete FF&E information and samples in 8 1/2" x 11" format using three ring binders with pockets on the inside of the cover upon completion of the final architectural submittal or ten months prior to the contract completion date (whichever comes first). Use more than one binder when there are numerous pages with thick samples. Large D-ring binders are preferred to O-ring binders. Use page protectors that are strong enough to keep pages from tearing out for upholstery and finish boards. Anchor large or heavy samples with mechanical fasteners, Velcro, or double-faced foam tape rather than rubber cement or glue. Fold out items must have a maximum spread of 25 1/2". Provide cover and spine inserts sheets identifying the document as "Furniture, Fixtures & Equipment" package and include the project title and location, project number, Contractor/A/E name and phone number(s), submittal stage and date.

Provide electronic copies of all documents upon completion of the final architectural submittal or ten months prior to the contract completion date (whichever comes first), to ensure adequate time for furniture acquisition. Provide six compact disks with all drawings files needed to view the complete drawings unbound and in the latest version AutoCAD. Provide six additional compact disks of all text documents in Microsoft Word or Excel.

Design submittal requirements include, but are not limited to:

1.1.1. Narrative of Interior Design Objectives

Provide a narrative description of the furniture, to include functional, safety and ergonomic considerations, durability, sustainability, aesthetics, and compatibility with the building design.

1.1.2. Furniture Order Form

Prepare one Furnishings Order Form for each item specified in the design. This form identifies all information required to order each individual item. In addition to the project name and location, project number, and submittal phase, the order form must include:

- (a) Furniture item illustration and code
- (b) Furniture item name
- (c) Job name, location, and date
- (d) General Services Administration (GSA) FSC Group, part, and section
- (e) Manufacturer, Product name and Product model number or National Stock Number (NSN)
- (f) Finish name and number (code to finish samples)
- (g) Fabric name and number, minimum Wyzenbeek Abrasion Test double rubs (code to fabric samples)
- (h) Dimensions
- (i) Item location by room number and room name
- (j) Quantity per room
- (k) Total quantity
- (l) Special instructions for procurement ordering and/or installation (if applicable)
- (m) Written Product Description: include a non-proprietary paragraph listing the salient features of the item to include but not limited to:
 - (1) required features and characteristics
 - (2) ergonomic requirements
 - (3) functional requirements
 - (4) testing requirements
 - (5) furniture style
 - (6) construction materials
 - (7) minimum warranty

The following is an example for "m" features and characteristics, ergonomic requirements and functional requirements:

Chair Description:

- (1) Mid-Back Ergonomic Task Chair
- (2) Pneumatic Gaslift; Five Star Base
- (3) Mesh Back; Upholstered Seat
- (4) Height and Width Adjustable Task Arms:
 - a. Arm Height: 6" - 11" (+-1/2")
 - b. Arm Width: 2" - 4" adjustment
- (5) Height Adjustable Lumbar Support
- (6) Adjustable Seat Height 16"-21" (+- 1")
- (7) Sliding Seat Depth Adjustment 15"-18" (+-1")
- (8) Standard Hard Casters (for carpeted areas)
- (9) Overall Measurements:
 - a. Overall width: 25" - 27"
 - b. Overall depth: 25" - 28"

- (10) Must have a minimum of the following adjustments (In addition to the above):
- a. 360 Degree Swivel
 - b. Knee-Tilt with Tilt Tension
 - c. Back angle
 - d. Forward Tilt
 - e. Forward Tilt and Upright Tilt Lock

For projects with systems furniture, also provide a written description of the following minimum requirements:

- (1) Type furniture systems (panel, stacking panels, spine wall, desk based system, or a combination)
- (2) Minimum noise reduction coefficient (NRC)
- (3) Minimum sound transfer coefficient (STC)
- (4) Minimum flame spread and smoke development
- (5) UL testing for task lighting and electrical system
- (6) Panel widths and heights and their locations (this may be done on the drawings) Worksurface types and sizes (this may be done on the drawings)
- (7) Worksurface edge type
- (8) Varying panel/cover finish materials and locations (locations may be shown on the drawings)
- (9) Storage requirements
- (10) Keyboard requirements
- (11) Lock and keying requirements
- (12) Accessory components (examples: tack boards, marker boards, paper management)
- (13) Electrical and communication raceway requirement; type, capacity and location (base, bellline, below and/or above bellline)
- (14) Locations of communication cables (base, bellline, below and/or above bellline, top channel)
- (15) Types of electrical outlets
- (16) Types of communication jacks; provided and installed by others
- (17) Locations of electrical outlets and communication jacks (this may be done on the drawings)
- (18) Type of cable (examples: Cat. 5, Cat. 6, fiber optic; UTP or STP, etc.) system needs to support; provided and installed by others

1.1.3. Alternate Manufacturer List

Provide a table consisting of major furniture items that lists the manufacturers products specified on the Order Form and two alternate manufacturers. Major furniture items include, but are not limited to, casegoods, furniture systems, seating, and tables. Organize matrix by item code and item name. Supply alternates that are available on GSA Schedule and meet the requirements of the Furniture Order Form. One of the two alternates must be from UNICOR if possible. Provide manufacturer name address, telephone number, product series and product name for each alternate manufacturer.

1.1.4. FF&E Procurement List

Provide a table that lists all FF&E furniture, mission unique equipment and building Contractor Furnished/Contractor Installed (CF/CI) items. Give each item a code and name and designate whether item will be procured as part of the FF&E furniture, mission unique equipment or the building construction contract. Use the item code to key all FF&E documents including location plans, color boards, data sheets, cost estimate, etc.

1.1.5. Points of Contact (POCs)

Provide a comprehensive list of POCs needed to implement the FF&E package. This would include but not be limited to appropriate project team members, using activity contacts, interior design representatives, construction contractors and installers involved in the project. In addition to name, address, phone, fax and email, include each contact's job function. Divide the FF&E package into different sections based on this listing, applies to order forms and cost estimates.

1.1.6. Color Boards

Provide color boards for all finishes and fabrics for all FF&E items. Finishes to be included but not limited to paint, laminate, wood finish, fabric, etc.

1.1.7. Itemized Furniture Cost Estimate

Provide an itemized cost estimate of furnishings keyed to the plans and specifications of products included in the package. This cost estimate should be based on GSA price schedules. The cost estimate must include separate line items for general contingency, installation, electrical hook-up for systems furniture or other furniture requiring hardwiring by a licensed electrician, freight charges and any other related costs. Installation and freight quotes from vendors should be use in lieu of a percentage allowance when available. Include a written statement that the pricing is based on GSA schedules. An estimate developed by a furniture dealership may be provided as support information for the estimate, but must be separate from the contractor provided estimate.

1.2. INTERIOR DESIGN DOCUMENTS

1.2.1. Overall Furniture and Area Plans

Provide floor Plans showing locations and quantities of all freestanding, and workstation furniture proposed for each floor of the building. Key each room to a large scale Furniture Placement Plan showing the furniture configuration, of all furniture. Provide enlarged area plans with a key plan identifying the area in which the building is located. Key all the items on the drawings by furniture item code. Do not provide manufacturer specific information such as product names and numbers on drawings, Drawings shall be non-proprietary. This is typical for FFE on all plans, including those mentioned below.

1.2.2. Workstation Plans

Show each typical workstation configuration in plan view, elevations or isometric view. Drawings shall illustrate panels and all major components for each typical workstation configuration. Identify workstations using the same numbering system as shown on the project drawings. Key components to a legend on each sheet which identifies and describes the components along with dimensions. Provide the plan, elevations and isometric of each typical workstation together on the same drawing sheet.

1.2.3. Panel Plans

Show panel locations and critical dimensions from finished face of walls, columns, panels including clearances and aisle widths. Key panel assemblies to a legend which shall include width, height, configuration of frames, panel fabric and finishes (if there are different selections existing within a project), powered or non-powered panel and wall mount locations.

1.2.4. Desk Plans

Provide typical free standing desk configurations in plan view, elevation or isometric view and identify components to clearly represent each desk configuration.

1.2.5. Reflected Ceiling Plans

Provide typical plans showing ceiling finishes and heights, lighting fixtures, heating ventilation and air conditioning supply and return, and sprinkler head placement for coordination of furniture.

1.2.6. Electrical and Telecommunication Plans

Show power provisions including type and locations of feeder components, activated outlets and other electrical components. Show locations and quantities of outlets for workstations. Clearly identify different outlets, i.e. electrical, LAN and telecommunication receptacles indicating each type proposed. Show wiring configuration, (circuiting, switching, internal and external connections) and provide as applicable.

1.2.7. Artwork Placement Plans

Provide an Artwork Placement Plan to show location of artwork, assign an artwork item code to each piece of artwork. As an alternative, artwork can be located on the Furniture Plans. Provide a schedule that identifies each piece by room name and number. Provide installation instructions; include mounting height.

1.2.8. Window Drapery Plans

Provide Interior Window Drapery Plans. Key each drapery treatment to a schedule showing color, pattern, material, drapery size and type, draw direction, location and quantities.

1.3. FURNITURE SELECTION

1.3.1. Select furniture from the GSA Schedules. Specify furniture available open market when an item is not available on the GSA Schedules. Provide justification for items not available on the GSA Schedules.

1.3.2. To the greatest extent possible when specifying furniture work within a manufacturer's family of furniture for selections, example: Steelcase, Turnstone, Brayton International, Metro, and Vecta are all Steelcase companies. Each alternate should also be specified from a manufacturer's family of furniture, example: first set of alternates would be specified from Knoll's family of furniture and the second from Herman Miller family of furniture. It may be necessary to make some selections from other than a manufacturer's family of furniture if costs are not reasonable for particular items, some items are not available or appropriate for the facility or the items are not on GSA Schedule. If this occurs, consider specifying product from an open line that is accessible by numerous dealerships. Select office furniture including case goods, tables, storage, seating, etc. that is compatible in style, finish and color. Select furniture that complies with ANSI/BIFMA and from manufacturer's standard product line as shown in the most recent published price list and/or amendment and not custom product.

1.4. CONSTRUCTION

1.4.1. Provide knee space at workstations and tables that is not obstructed by panels/legs that interfere with knee space of seated person and specify modesty panels at walls to be of a height or be hinged to allow access to building wall electrical outlets and communication jacks. Provide desks, storage and tables with leveling devices to compensate for uneven floors.

1.4.2. Specify workstations and storage of steel construction. Provide worksurface tops constructed to prevent warpage. Provide user friendly features such as radius edges. Do not use sharp edges and exposed connections and ensure the underside of desks, tables and worksurfaces are completely and smoothly finished. Provide abutting worksurfaces that mate closely and are of equal heights when used in side-by-side configurations in order to provide a continuous and level worksurface.

1.4.3. Drawers shall stay securely closed when in the closed position and protect wires from damage during drawer operation. Include a safety catch to prevent accidental removal when fully open

1.4.4. Unless otherwise noted, provide lockable desks and workstations, filing cabinets and storage. Key all locks within a one person office the same; key all one person offices within a building differently. If an office or open office area has more than one workstation, key all the workstations differently, but key all locks within an individual workstation the same. Use tempered glass glazing when glazing is required. Use light-emitting diode (LED)/solid state lighting where task lighting is required in furniture.

1.5. FINISHES AND UPHOLSTERY

1.5.1. Specify neutral colors for casegoods, furniture systems, storage and tables. Specify desk worksurfaces and table tops that are not too light or too dark in color and have a pattern to help hide soiling. Accent colors are

allowed in break and lounge areas. Keep placement of furniture systems panel fabric accent colors to a minimum. All finishes shall be cleanable with ordinary household cleaning solutions.

1.5.2. Use manufacturer's standard fabrics; including textile manufacturers fabrics that have been graded into the furniture manufactures fabric grades and are available through their GSA Schedule. Customers Own Material (COM) can be used in headquarter buildings in command suites with executive furniture. Coordinate specific locations with Corps of Engineers Interior Designer.

1.5.3. Specify seating upholstery that meets Wyzenbeek Abrasion Test, 55,000 minimum rubs. Specify a soil retardant finish for woven fabrics if Crypton or vinyl upholstery is not provided for seating in dining areas. Use manufacturer's standard fabrics. This includes textile manufacturers fabrics that have been graded into the furniture manufactures fabric grades and are available through their GSA Schedule. Specify upholstery and finish colors and patterns that help hide soiling. Specify finishes that can be cleaned with ordinary household cleaning solutions.

1.6. ACCESSORIES

1.6.1. Specify all accessories required for completely finished furniture installation. Provide filing cabinets and storage for office supplies. Provide tack surfaces at workstations with overhead storage. Provide tackable surfaces at workstations with overhead storage.

1.6.2. Not Used.

1.6.3. Workstations are to be equipped with stable keyboard trays that have height adjustability, tilting capability, including negative tilt, have a mouse pad at same height as the keyboard tray that can accommodate both left and right handed users, and retractable under worksurface.

1.7. MISSION UNIQUE EQUIPMENT

Funding for FF&E furniture items and mission unique equipment (MUE) items are from two different sources. Separate the designs and procurement documentation for FFE items and MUE. MUE includes, but is not limited to, items such as industrial shelving, workbenches, appliances, fitness equipment, IT equipment and supporting carts. The User will purchase and install mission unique equipment items, unless otherwise noted. Identify locations of known MUE items such as industrial shelving, workbenches, appliances, etc. for space planning purposes.

1.8. SUSTAINABILITY

1.8.1. For all designs provided regardless of facility type, make every effort to implement all aspects of sustainability to the greatest extent possible for all the selections made in the FF&E package. This includes but is not limited to the selection of products that consider: **Material Chemistry and Safety of Inputs** (What chemicals are used in the construction of the selections?); **Recyclability** (Do the selections contain recycled content?); **Disassembly** (Can the selections be disassembled at the end of their useful life to recycle their materials?).

1.8.2. Make selections to the greatest extent possible of products that possess current McDonough Braungart Design Chemistry ([MBDC](#)) certification or other "third-party" certified Cradle to Cradle program, Forest Stewardship Council (FSC) certification, GREENGAURD certification or similar "third-party" certified products consisting of low-emitting materials.

1.9. FURNITURE SYSTEMS

1.9.1. General.

Where appropriate, design furniture systems in open office areas. Coordinate style and color of furniture systems with other storage, seating, etc. in open office areas. Minimize the number of workstation typicals and the parts and pieces required for the design to assist in future reconfiguration and inventorying.

1.9.2. Connector Systems.

Specify a connector system that allows removal of a single panel or spine wall within a typical workstation configuration without requiring disassembly of the workstation or removal of adjacent panels. Specify connector

system with tight connections and continuous visual seals. When Acoustical panels are used, provide connector system with continuous acoustical seals. Specify concealed clips, screws, and other construction elements, where possible.

1.9.3. Panels and Spine Walls

Specify panels and spine walls with hinged or removable covers that permit easy access to the raceway when required but are securely mounted and cannot be accidentally dislodged under normal conditions. Panels shall be capable of structurally supporting more than 1 fully loaded component per panel per side. Raceways are to be an integral part of the panel and must be able to support lay-in cabling and have a large capacity for electrical and IT. Do not thread cables through the frame.

1.9.4. Electrical And Information/Technology (IT)

Design furniture with electrical systems that meets requirements of UL 1286 when powered panels are required and UL approved task lights that meet requirements of NFPA 70. Dependent on user requirements and Section 01 10 00, paragraph 3 requirements, it is recommended that workstation electrical and IT wiring entry come from the building walls to eliminate the use of power poles and access at the floor. Design electrical and IT systems that are easily accessed in the spine wall and panels without having to move return panels and components. Electrical and IT management will be easily accessible by removable wall covers which can be removed while workstation components are still attached. Specify connector system that has continuation of electrical and IT wiring within workstations and workstation to workstation.

1.9.5. Pedestals

Specify pedestals that are interchangeable from left to right, and right to left, and retain pedestal locking system capability.

1.10. EXECUTIVE FURNITURE

1.10.1. Design for executive furniture in command areas, coordinate specific locations with Corps of Engineers Interior Designer. Use upgraded furniture, upholsteries and finishes in command suites. This includes but is not limited to wood casegoods, seating and tables. Select executive furniture casegoods from a single manufacturer and style line, to include workstations, credenzas, filing, and storage, etc.

1.10.2. Specify furniture with wood veneer finish (except worksurfaces) with mitered solid wood edge of same wood type. Provide worksurface plastic laminate that closely matches adjacent wood veneer. Other executive office furniture such as seating, tables, executive conference room furniture, etc. shall be compatible in style, finish and color with executive furniture casegoods.

1.11. SEATING

1.11.1. General

Specify appropriate chair casters and glides for the floor finish where the seating is located. Universal casters that are appropriate for both hard surface flooring and carpet are preferred. All seating shall support up to a minimum of 250 lbs.

1.11.2. Desk and Guest Seating

Select ergonomic desk chairs with casters, non-upholstered adjustable arms, waterfall front, swivel, tilt, variable back lock, adjustable back height or adjustable lumbar support, pneumatic seat height adjustment, and padded, contoured upholstered seat and back. Desk and guest chair backs may be other than upholstered such as mesh fabric if it is ergonomically designed, forms to back and is comfortable. Depending on scale of desk chair provide seat pan forward and back adjustment to increase or decrease depth of seat pan. All desk chairs shall have an adjustable seat height range of 4 1/2", range to include 16 1/2-20". Select guest chairs that are compatible in style, finish and color with the desk chairs.

1.11.3. Conference Room Seating

At tables, select ergonomic conference seating with casters, non-upholstered arms, waterfall front, swivel, tilt, pneumatic seat height adjustment, and padded, contoured seat and back, unless otherwise noted. Select arm height and/or design that allows seating to be moved up closely to the table top. Conference chair backs may be other than upholstered such as mesh fabric if it is ergonomically designed, forms to back and is comfortable. Perimeter conference chairs shall be compatible in style, finish and color with conference seating at the tables.

1.11.4. Lounge, Waiting and Reception Area Seating

Select seating with arms and cushioned, upholstered seat and back. In heavy use areas, arms shall be easily cleaned such as non-upholstered arms or upholstered arms with wood arm caps unless otherwise noted.

1.11.5. Break Room Seating

Select stackable seating that is easily cleaned. Seating shall be appropriate for table and counter heights as applicable with non-upholstered arms if arms are required. Chairs shall have metal legs and composite materials for seats.

1.11.6. Lounge, Waiting and Reception Furniture.

Design for end and coffee tables with plastic laminate tops that are compatible in style finish and color with the seating.

1.12. FILING AND STORAGE.

Select storage and shelving units that meet customer's functional load requirements for stored items. Specify counterweights for filing cabinets when required by the manufacturer for stability. File drawers shall allow only one drawer to be opened at a time. Provide heavy duty storage and shelving if information is not available.

1.13. TRAINING TABLES.

Don't use plastic laminate self edge. Training tables shall be reconfigurable, moveable and storable; lighter weight folding with dollies or casters as necessary. Specify dollies if required.

1.14. FURNITURE WARRANTIES.

Specify manufacturer's performance guarantees or warranties that include parts, labor and transportation as follows:

- Furniture System, unless otherwise noted – 10 year minimum
- Furniture System Task Lights – 2 year minimum, excluding bulbs
- Furniture System Fabric – 3 year minimum
- Desks - 10 year minimum
- Seating, unless otherwise noted - 10 year minimum
- Seating Mechanisms and Pneumatic Cylinders - 10 years
- Fabric - 3 years minimum
- Filing and Storage - 10 year minimum
- Tables, unless otherwise noted - 10 year minimum
- Table Mechanisms – 5 year
- Table Ganging Device - 1 year
- Items not listed above - 1 year minimum

ATTACHMENT C TRACKING COMMENTS IN DRCHECKS

1.0 General

The Government and DB Contractor shall set up the project in Dr Checks. Throughout the design process, the parties shall enter, track, and back-check comments using the DrChecks system. Government reviewers enter design review comments into DrChecks. Designers of Record shall annotate comments timely and specifically to indicate exactly what action will be taken or why the action is not required. Comments considered critical by the conference participants shall be flagged as such.

2.0 DrChecks Review Comments

The Contractor and the Government shall monitor DrChecks to assure all comments are annotated and agreed to by the designers and reviewers prior to the next submittal. The DrChecks comments and responses shall be printed and included in the design analysis for record.

2.1. Conference participants (reviewers) will expect coordination between Design Analysis calculations and the submitted design. Reviewers will also focus on the design submittal's satisfaction of the contract requirements.

2.2. The Designers of Record shall answer each comment in DrChecks with a formal response prior to the next submittal, clearly indicating what action will be taken and what drawing/spec will change. Designers of Record are encouraged to directly contact reviewers to discuss and agree to the formal comment responses rather than relying only on DrChecks and review meetings to discuss comments. With the next design conference, reviewers will back-check answers to the comments against the submittal, in addition to reviewing additional design work.

2.3. Comments that, in the DB Contractor's opinion, require effort outside the scope of the contract shall be clearly indicated as such in DrChecks. The DB Contractor shall not proceed with work outside the contract until a modification to the contract is properly executed, if one is necessary.

3.0 DrChecks Initial Account Set-Up

To initialize an office's use of DrChecks, choose a contact person within the office to call the DrChecks Help Desk at 800-428-HELP, M-F, 8AM-5PM, Central time. This POC will be given an office password to distribute to others in the office. Individuals can then go to the hyperlink at <http://www.projnet.org> and register as a first time user. Upon registration, each user will be given a personal password to the DrChecks system.

3.1. Once the office and individuals are registered, the COE's project manager or lead reviewer will assign the individuals and/or offices to the specific project for review. At this point, persons assigned can make comments, annotate comments, and close comments, depending on their particular assignment.

4.0 DrChecks Reviewer Role

The Contractor is the technical reviewer and the Government is the compliance reviewer of the DB designers design documents. Each reviewer enters their own comments into the Dr Checks system. To enter comments:

4.1. Log into DrChecks.

4.2. Click on the appropriate project.

4.3. Click on the appropriate review conference. An Add comment screen will appear.

4.4. Select or fill out the appropriate sections (particularly comment discipline and type of document for sorting) of the comment form and enter the comment in the space provided.

4.5. Click the Add Comment button. The comment will be added to the database and a fresh screen will appear for the next comment you have.

4.6. Once comments are all entered, exit DrChecks by choosing "My Account" and then Logout.

5.0 DrChecks Comment Evaluation

The role of the designers of record is to evaluate and respond to the comments entered by the Government reviewers and by the DB Contractor. To respond to comments:

5.1. Log into DrChecks.

5.2. Click on the appropriate project.

5.3. Under "Evaluate" click on the number under "Pending".

5.4. Locate the comments that require your evaluation. (Note: If you know the comment number you can use the Quick Pick window on your home page in DrChecks; enter the number and click on go.)

5.5. Select the appropriate evaluation (concur, non-concur, for information only, or check and resolve) and add the response.

5.6. Click on the Add button. The evaluation will be added to the database and a fresh screen will appear with the next comment.

5.7. Once evaluations are all entered, exit DrChecks by choosing "My Account" and then Logout.

6.0 DrChecks Back-check

At the following design conference, participants will back-check comment annotations against newly presented documents to verify that the designers' responses are acceptable and completed. The Contractor and Government reviewers shall either enter additional back-check comments, as necessary or close those that are resolved as a result of the design conferences:

6.1. Log into DrChecks.

6.2. Click on the appropriate project.

6.3. Under "My Backcheck" click on the number under "Pending".

6.4. If you agree with the designer's response select "Close Comment" and add a closing response if desired.

6.5. If you do not agree with the designer's response or the submittal does not reflect the response given, select "Issue Open", enter additional information.

6.6. Click on the Add button. The back-check will be added to the database and a fresh screen will appear with the next comment.

6.7. Once back-checks are all entered, exit DrChecks by choosing "My Account" and then Logout. The design is completed and final when there are no pending comments to be evaluated and there are no pending or open comments under back-check.

**ATTACHMENT D
SAMPLE FIRE PROTECTION AND LIFE SAFETY CODE REVIEW**

Instructions: Use the information outlined in this document to provide the minimum requirement for development of Fire Protection and Life Safety Code submittals for all building projects. Additional and supplemental information may be used to further develop the code review. Insert N/A after criteria, which may be "not applicable".

1.0 SAMPLE FIRE PROTECTION AND LIFE SAFETY CODE REVIEW

- 1.1. Project Name (insert name and location)
- 1.2. Applicable Codes and Standards
 - 1.2.1. Unified Facilities Criteria (UFC): 3-600-01, Design: Fire Protection Engineering For Facilities
 - 1.2.2. International Building Code (IBC) for fire resistance requirements, allowable floor area, building height limitations and building separation distance requirements, except as modified by UFC 3-600-01.
 - 1.2.3. National Fire Protection Association (NFPA) 101 Life Safety Code (latest edition), for building egress and life safety and applicable criteria in UFC 3-600-01.
 - 1.2.4. ADA and ABA Accessibility Guidelines. For Buildings and Facilities See Section 01 10 00, Paragraph 3 for facility specific criteria.
- 1.3. Occupancy Classification
IBC chapters 3 and 4
- 1.4. Construction Type
IBC chapter 6
- 1.5. Area Limitations
IBC chapter 5, table 503
- 1.6. Allowable Floor Areas
IBC section 503, 505
- 1.7. Allowable area increases
IBC section 506, 507
- 1.8. Maximum Height of Buildings
IBC section 504
- 1.9. Fire-resistive substitution
- 1.10. Occupancy Separations
IBC table 302.3.2
- 1.11. Fire Resistive Requirements
 - 1.11.1. Exterior Walls - [] hour rating, IBC table 601, 602
 - 1.11.2. Interior Bearing walls - [] hour rating
 - 1.11.3. Structural frame - [] hour rating
 - 1.11.4. Permanent partitions - [] hour rating

- 1.11.5. Shaft enclosures - [] hour rating
- 1.11.6. Floors & Floor-Ceilings - [] hour rating
- 1.11.7. Roofs and Roof Ceilings - [] hour rating
- 1.12. Automatic Sprinklers and others used to determine the need for automatic Extinguishing Equipment, Extinguishing Systems, Foam Systems, Standpipe
 - 1.12.1. UFC 3-600-01, chapters 4 and 6 systems, wet chemical systems, etc. State which systems are required and to what criteria they will be designed.
 - 1.12.2. UFC 3-600-01, Appendix B Occupancy Classification. Note the classification for each room. This may be accomplished by classifying the entire building and noting exceptions for rooms that differ (E.g. The entire building is Light Hazard except boiler room and storage rooms which are [], etc.)
 - 1.12.3. UFC 3-600-01, Chapter 3 Sprinkler Design Density, Sprinkler Design Area, Water Demand for Hose Streams (supply pressure and source requirements).
 - 1.12.4. UFC 3-600-01, Chapter 4 Coverage per sprinkler head. Extended coverage sprinkler heads are not permitted.
 - 1.12.5. Available Water Supply. Provide the results of the water flow tests showing the available water supply static pressure and residual pressure at flow. Based on this data and the estimated flow and pressure required for the sprinkler system, determine the need for a fire pump.
 - 1.12.6. NFPA 13, Para. 8.16.4.6.1. Provide backflow preventer valves as required by the local municipality, authority, or water purveyor. Provide a test valve located downstream of the backflow preventer for flow testing the backflow preventer at full system demand flow. Route the discharge to an appropriate location outside the building.
- 1.13. Kitchen Cooking Exhaust Equipment
Describe when kitchen cooking exhaust equipment is provided for the project. Type of extinguishing systems for the equipment should be provided. per NFPA 96. Show all interlocks with manual release switches, fuel shutoff valves, electrical shunt trips, exhaust fans, and building alarms.
- 1.14. Portable Fire Extinguishers, fire classification and travel distance. per NFPA 10
- 1.15. Enclosure Protection and Penetration Requirements. - Opening Protectives and Through Penetrations
 - 1.15.1. IBC Section 712, 715 and Table 715.3. Mechanical rooms, exit stairways, storage rooms, janitor [] hour rating. IBC Table 302.1.1
 - 1.15.2. Fire Blocks, Draft Stops, Through Penetrations and Opening Protectives
- 1.16. Fire Dampers. Describe where fire dampers and smoke dampers are to be used (IBC Section 716 and NFPA 90A). State whether isolation smoke dampers are required at the air handler.
- 1.17. Detection Alarm and Communication. UFC 3-600-01, (Chapter 5); NFPA 101 para. 3.4 (chapters 12-42); NFPA 72
- 1.18. Mass Notification. Describe building/facility mass notification system (UFC 4-021-01) type and type of base-wide mass notification/communication system. State whether the visible notification appliances will be combined with the fire alarm system or kept separate. (Note: Navy has taken position to combine visible notification appliances with fire alarm).
- 1.19. Interior Finishes (classification). NFPA 101.10.2.3 and NFPA 101.7.1.4
- 1.20. Means of Egress

- 1.20.1. Separation of Means of Egress, NFPA 101 chapters 7 and 12-42; NFPA101.7.1.3
- 1.20.2. Occupant Load, NFPA101.7.3.1 and chapters 12-42.
- 1.20.3. Egress Capacity (stairs, corridors, ramps and doors) NFPA101.7.3.3
- 1.20.4. Number of Means of Egress, NFPA101.7.4 and chapters 12-42.
- 1.20.5. Dead end limits and Common Path of Travel, NFPA 101.7.5.1.6 and chapters 12-42.
- 1.20.6. Accessible Means of Egress (for accessible buildings), NFPA101.7.5.4
- 1.20.7. Measurement of Travel Distance to Exits, NFPA101.7.6 and chapters 12-42.
- 1.20.8. Discharge from Exits, NFPA101.7.7.2
- 1.20.9. Illumination of Means of Egress, NFPA101.7.8
- 1.20.10. Emergency Lighting, NFPA101.7.9
- 1.20.11. Marking of Means of Egress, NFPA101.7.10
- 1.21. Elevators, UFC 3-600-01, Chapter 6; IBC and ASME A17.1 - 2000,(Safety Code for Elevators and Escalators)
- 1.22. Accessibility Requirements, ADA and ABA Accessibility Guidelines for Buildings and Facilities
- 1.23. Certification of Fire Protection and Life Safety Code Requirements. (Note: Edit the Fire team membership if necessary). Preparers of this document certify the accuracy and completeness of the Fire Protection and Life Safety features for this project in accordance with the attached completed form(s).
- 1.24. Designer of Record. Certification of Fire protection and Life Safety Code Requirements. (Note: Edit the Fire team members if necessary). Preparers of this document certify the accuracy and completeness of the Fire Protection and Life Safety features of this project.

Fire Protection Engineer of Record:

Signature and Stamp

Date

OR

Architect of Record:

Signature and Stamp

Date

Mechanical Engineer of Record:

Signature and Stamp

Date

Electrical Engineer of Record:

Signature/Date

**ATTACHMENT E
LEED SUBMITTALS**

LEED Credit Paragraph	Contractor Check Here if Credit is Claimed	LEED-NC v3 Submittals (OCT09)	Provide for Credit Audit Only	REQUIRED DOCUMENTATION	Date Submitted (to be filled in by Contractor)	Government Reviewer's Use
PAR		FEATURE	DUE AT		DATE	REV
GENERAL						
		GENERAL - All calculations shall be in accordance with LEED 2009 Reference Guide.				
		GENERAL: Obtain excel version of this spreadsheet at http://en.sas.usace.army.mil/enWeb , "Engineering Criteria".				
		GENERAL - For all credits, narrative/comments may be added to describe special circumstances or considerations regarding the project's credit approach.				
		GENERAL - Include all required LEED drawings indicated below in contract drawings with applicable discipline drawings, labeled For Reference Only.				
		NOTE: Each submittal indicated with "****" differs from LEED certified project submittals by either having a different due date or being an added submittal not required by GBCI.				
		NOTE: Projects seeking LEED certification need only submit to GBCI whatever documentation is acceptable to GBCI (for example, licensed professional certifications). This checklist identifies what must be submitted to the Government for internal review purposes. Government review of LEED documentation in no way supercedes or modifies the requirements and rulings of GBCI for purposes of compliance with project requirement to obtain LEED certification.				
		GENERAL - Audit documentation may include but is not limited to what is indicated in this table.				
			Closeout	List of all Final Design submittals revised after final design to reflect actual closeout conditions. Revised Final Design submittals. - OR - Statement confirming that no changes have been made since final design that effect final design submittal documents.		Proj Engr (PE)
CATEGORY 1 - SUSTAINABLE SITES						
SSPR1		Construction Activity Pollution Prevention (PREREQUISITE)	**Final Design	List of drawings and specifications that address the erosion control, particulate/dust control and sedimentation control measures to be implemented.		CIV
			**Final Design	Delineation and labeling of "LEED Project site boundary" on site plan.		CIV
			**Final Design	Narrative that indicates which compliance path was used (NPDES or Local standards) and describes the measures to be implemented on the project. If a local standard was followed, provide specific information to demonstrate that the local standard is equal to or more stringent than the NPDES program.		CIV
SS1		Site Selection	Final Design	Statement confirming that project does not meet any of the prohibited criteria.		CIV
			**Final Design	Delineation and labeling of "LEED Project site boundary" on site plan.		CIV
			Final Design	X LEED Site plan drawing that shows all proposed development, line depicting boundary of all bodies of water and/or wetlands within 100 feet of project boundary and a line depicting 5' elevation above 100 year flood line that falls within project boundary. Not required if neither condition applies.		CIV
SS2		Development Density & Community Connectivity	Final Design	Option 1: LEED Site vicinity plan showing project site and surrounding development. Show density boundary or note drawing scale.		CIV
			**Final Design	Delineation and labeling of "LEED Project site boundary" on site plan.		CIV
			Final Design	Option 1: Table indicating, for project site and all surrounding sites within density radius (keyed to site vicinity plan), site area and building area. Project development density calculation. Density radius calculation. Development density calculation within density radius.		CIV
			Final Design	Option 2: LEED Site vicinity plan showing project site, the 1/2 mile community radius, pedestrian walkways and the locations of the residential development(s) and Basic Services surrounding the project site.		CIV
			Final Design	Option 2: List (including business name and type) of all Basic Services facilities within the 1/2 mile radius, keyed to site vicinity plan.		CIV
SS3		Brownfield Redevelopment	Final Design	Narrative describing contamination and the remediation activities included in project. Include statement indicating how site was determined to be a brownfield.		CIV
			**Final Design	Delineation and labeling of "LEED Project site boundary" on site plan.		CIV
SS4.1		Alternative Transportation: Public Transportation Access	Final Design	Statement indicating which option for compliance applies. State whether public transportation is existing or proposed and, if proposed, cite source of this information.		CIV
			**Final Design	Delineation and labeling of "LEED Project site boundary" on site plan.		CIV
			Final Design	Option 1: LEED Site vicinity plan showing project site, mass transit stops and pedestrian path to them with path distance noted.		CIV
			Final Design	Option 2: LEED Site vicinity plan showing project site, bus stops and pedestrian path to them with path distance noted.		CIV
SS4.2		Alternative Transportation: Bicycle Storage & Changing Rooms	Final Design	FTE calculation. Bicycle storage spaces calculation. Shower/changing facilities calculation.		CIV
			Final Design	List of drawings that show the location(s) of bicycle storage areas. Statement indicating distance from building entrance.		CIV
			Final Design	List of drawings that show the location(s) of shower/changing facilities and, if located outside the building, statement indicating distance from building entrance.		CIV

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SS4.3		Alternative Transportation: Low Emitting & Fuel Efficient Vehicles	Final Design	Statement indicating which option for compliance applies. FTE calculation. Statement indicating total parking capacity of site.		CIV
			**Final Design	Delineation and labeling of "LEED Project site boundary" on site plan.		CIV
			Final Design	Option 1: Low-emission & fuel-efficient vehicle calculation.		CIV
			Final Design	Option 1: List of drawings and specification references that show location and number of preferred parking spaces for low-emission & fuel-efficient vehicles and signage.		CIV
			Final Design	Option 1: Statement indicating quantity, make, model and manufacturer of low-emission & fuel-efficient vehicles to be provided. Statement confirming vehicles are zero-emission or indicating ACEEE vehicle scores.		CIV
			Final Design	Option 2: Low-emission & fuel-efficient vehicle parking calculation.		CIV
			Final Design	Option 2: List of drawings and specification references that show location and number of preferred parking spaces and signage.		CIV
			Final Design	Option 3: Low-emission & fuel-efficient vehicle refueling station calculation.		CIV
			Final Design	Option 3: List of drawings and specifications indicating location and number of refueling stations, fuel type and fueling capacity for each station for an 8-hour period.		CIV
			Closeout	X Option 3: Construction product submittals indicating what was provided and confirming compliance with respect to fuel type and fueling capacity for each station for an 8-hour period.		CIV
SS4.4		Alternative Transportation: Parking Capacity	Final Design	Statement indicating which option for compliance applies.		CIV
			**Final Design	Delineation and labeling of "LEED Project site boundary" on site plan.		CIV
			Final Design	Option 1: Preferred parking calculation including number of spaces required, total provided, preferred spaces provided and percentage.		CIV
			Final Design	Option 2: FTE calculation. Preferred parking calculation including number of spaces provided, preferred spaces provided and percentage.		CIV
			Final Design	Options 1 and 2: List of drawings and specification references that show location and number of preferred parking spaces and signage.		CIV
			Final Design	Option 3: Narrative indicating number of spaces required and provided and describing infrastructure and support programs with description of project features to support them.		CIV
SS5.1		Site Development: Protect or Restore Habitat	**Final Design	Option 1: List of drawing and specification references that convey site disturbance limits.		CIV
			**Final Design	Delineation and labeling of "LEED Project site boundary" on site plan.		CIV
			**Final Design	Option 2: LEED site plan drawing that delineates boundaries of each preserved and restored habitat area with area (sf) noted for each.		CIV
			**Final Design	Option 2: Percentage calculation of restored/preserved habitat to total site area. List of drawings and specification references that convey restoration planting requirements.		CIV
SS5.2		Site Development: Maximize Open Space	Final Design	Option 2: LEED site plan drawing delineating boundary of vegetated open space adjacent to building with areas of building footprint and designated open space noted.		CIV
			**Final Design	Delineation and labeling of "LEED Project site boundary" on site plan.		CIV
SS6.1		Stormwater Design: Quantity Control	Final Design	Statement indicating which option for compliance applies.		CIV
			**Final Design	Delineation and labeling of "LEED Project site boundary" on site plan.		CIV
			Final Design	Option 1: Indicate pre-development and post-development runoff rate(cfs) and runoff quantity (cf) -OR - Narrative describing site conditions, measures and controls to be implemented to prevent excessive stream velocities and erosion.		CIV
			Final Design	Option 2: Indicate pre-development and post-development runoff rate(cfs) and runoff quantity (cf). Indicate percent reduction in each.		CIV
SS6.2		Stormwater Design: Quality Control	Final Design	For non-structural controls, list all BMPs used and, for each, describe the function of the BMP and indicate the percent annual rainfall treated. List all structural controls and, for each, describe the pollutant removal and indicate the percent annual rainfall treated.		CIV
			**Final Design	Delineation and labeling of "LEED Project site boundary" on site plan.		CIV
SS7.1		Heat Island Effect: Non-Roof	**Final Design	LEED site plan drawing indicating locations and quantities of each paving type, including areas of shaded pavement. Percentage calculation indicating percentage of reflective/shaded/open grid area.		CIV
			**Final Design	Delineation and labeling of "LEED Project site boundary" on site plan.		CIV

Thursday, November 04, 2010

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SS7.2		Heat Island Effect: Roof	Final Design	Option 1: Percentage calculation indicating percentage of SRI compliant roof area. List of drawings and specification references that convey SRI requirements and roof slopes.		ARC
			Final Design	Option 1: List of specified roof materials indicating, for each, type, manufacturer, product name and identification if known, SRI value and roof slope.		ARC
			**Closeout	Option 1: List of installed roof materials indicating, for each, manufacturer, product name and identification, SRI value and roof slope.		PE
			Closeout	X Option 1: Manufacturer published product data or certification confirming SRI		PE
			Final Design	Option 2: Percentage calculation indicating percentage of vegetated roof area.		ARC
			Final Design	Option 3: Combined reflective and green roof calculation.		ARC
			Final Design	Option 3: List of specified roof materials indicating, for each, type, manufacturer, product name and identification if known, SRI value and roof slope.		ARC
			**Closeout	Option 3: List of installed roof materials indicating, for each, manufacturer, product name and identification, SRI value and roof slope.		PE
			Closeout	X Option 3: Manufacturer published product data or certification confirming SRI		PE
SS8		Light Pollution Reduction	Final Design	Interior Lighting: List of drawings and specification references that convey interior lighting requirements (location and type of all installed interior lighting, location of non-opaque exterior envelope surfaces, allowing confirmation that maximum candela value from interior fixtures does not intersect non-opaque building envelope surfaces). - OR - List of drawings and specification references that show automatic lighting controls compliance with credit requirement.		ELEC
			**Final Design	Delineation and labeling of "LEED Project site boundary" on site plan.		ELEC
			Final Design	Exterior Lighting: List of drawings and specification references that convey exterior lighting requirements (location and type of all site lighting and building facade/landscape lighting).		ELEC
			Final Design	Exterior Site Lighting Power Density (LPD): Tabulation for exterior site lighting indicating, for each location identification or description, units of measure, area or distance of the location, actual LPD using units consistent with ASHRAE 90.1, and the ASHRAE allowable LPD for that type of location. Percentage calculation of actual versus allowable LPD for all site lighting.		ELEC
			Final Design	Exterior Building Facade/Landscape Lighting Power Density (LPD): Tabulation for exterior building facade/landscape lighting indicating, for each location identification or description, units of measure, area or distance of the location, actual LPD using units consistent with ASHRAE 90.1, and the ASHRAE allowable LPD for that type of location. Percentage calculation of actual versus allowable LPD for all building facade/landscape lighting.		ELEC
			Final Design	Exterior Lighting IESNA Zone: Indicate which IESNA zone is applicable to the project.		ELEC
			Final Design	Exterior Lighting Site Lumen table indicating, for each fixture type, quantity installed, initial lamp lumens per luminaire, initial lamp lumens above 90 degrees from Nadir, total lamp lumens and total lamp lumens above 90 degrees. Percentage of site lamp lumens above 90 degrees from nadir to total lamp lumens.		ELEC
			Final Design	Exterior Lighting Narrative describing analysis used for addressing requirements for light trespass at site boundary and beyond.		ELEC
CATEGORY 2 – WATER EFFICIENCY						
WEPR1		Water Use Reduction: 20% Reduction	Final Design	Statement confirming which occupancy breakdown applies (default or special). For special occupancy breakdown, indicate source and explanation for ratio.		MEC
			Final Design	Occupancy calculation including male/female numbers for FTEs, visitors, students, customers, residential and other type occupants/users		MEC
			Final Design	Statement indicating percent of male restrooms with urinals. Statement indicating annual days of operation.		MEC

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				Baseline flush fixture calculation spreadsheet indicating, for each fixture type, gender, flush rate, daily uses per person for each occupant type identified in occupancy calculation and annual baseline flush fixture water usage.		MEC
				Design case flush fixture calculation spreadsheet indicating, for each fixture type, gender, fixture manufacturer, fixture model number, flush rate, percent of occupants using this fixture type, daily uses per person for each occupant type identified in occupancy calculation and annual design case flush fixture water usage.		MEC
			Closeout	X Manufacturer published product data or certification confirming fixture water usage.		PE
WE1.1		Water Efficient Landscaping: Reduce by 50%	Final Design	Statement indicating which option for compliance applies.		CIV
			**Final Design	Delineation and labeling of "LEED Project site boundary" on site plan.		CIV
			Final Design	Calculation indicating, for baseline and design case, total water applied, total potable water applied, total non-potable water applied. Design case percent potable water reduction. If nonpotable water is used, indicate source of nonpotable water.		CIV
			Final Design	List of landscape plan drawings.		CIV
			Final Design	Narrative describing landscaping and irrigation design strategies, including water use calculation methodology used to determine savings and, if non-potable water is used, specific information about source and available quantity.		CIV
WE1.2		Water Efficient Landscaping: No Potable Water Use or No Irrigation	Same as WE1.1	Same as WE1.1		CIV
WE2		Innovative Wastewater Technologies	Final Design	Statement confirming which option for compliance applies.		MEC
			Final Design	Statement confirming which occupancy breakdown applies (default or special). For special occupancy breakdown, indicate source and explanation for ratio.		MEC
			Final Design	Occupancy calculation including male/female numbers for FTEs, visitors, students, customers, residential and other type occupants/users		MEC
			Final Design	Statement indicating percent of male restrooms with urinals. Statement indicating annual days of operation.		MEC
			Final Design	Baseline flush fixture calculation spreadsheet indicating, for each fixture type, gender, flush rate, daily uses per person for each occupant type identified in occupancy calculation and annual baseline flush fixture water usage.		MEC
			Final Design	Design case flush fixture calculation spreadsheet indicating, for each fixture type, gender, fixture manufacturer, fixture model number, flush rate, percent of occupants using this fixture type, daily uses per person for each occupant type identified in occupancy calculation and annual design case flush fixture water usage.		MEC
			Final Design	Option 1: If onsite non-potable water is used, identify source(s), indicate annual quantity from each source and indicate total annual quantity from all onsite non-potable water sources.		MEC
			Final Design	Option 1: Summary calculation indicating baseline annual water consumption, design case annual water consumption, non-potable annual water consumption and total percentage annual water savings.		MEC
			Final Design	Option 2: Statement confirming on-site treatment of all generated wastewater to tertiary standards and all treated wastewater is either infiltrated or used on-site.		MEC
			Final Design	Option 2: List of drawing and specification references that convey design of on-site wastewater treatment features.		CIV
			Final Design	Option 2: On-site water treatment quantity calculation indicating all on-site wastewater source(s), annual quantity treated, annual quantity infiltrated and annual quantity re-used on site from each source and totals for annual quantity treated, annual quantity infiltrated and annual quantity re-used on site from all sources.		CIV
			Final Design	Option 2: Wastewater summary calculation indicating design case annual flush fixture water usage, annual on-site water treatment and percentage sewage conveyance reduction.		MEC
			Final Design	Narrative describing project strategy for reduction of potable water use for sewage conveyance, including specific information on reclaimed water usage and treated wastewater usage.		MEC
WE3		Water Use Reduction: 30% - 40% Reduction	Same as WEPR1	Same as WEPR1		MEC

CATEGORY 3 – ENERGY AND ATMOSPHERE

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EAPR1		Fundamental Commissioning of the Building Energy Systems (PREREQUISITE)	**Final Design	**Owner's Project Requirements document				ALL
			**Final Design	**Basis of Design document for commissioned systems				MEC, ELEC
			**Final Design	**Commissioning Plan				MEC, ELEC
			Closeout	Statement confirming all commissioning requirements have been incorporated into construction documents.				PE
			Closeout	Commissioning Report				PE
EAPR2		Minimum Energy Performance (PREREQUISITE)	Final Design	Statement listing the mandatory provisions of ASHRAE 90.1 that project meets relative to compliance with this prerequisite and indicating which compliance path was used.				MEC ELEC ARC
			Final Design	Statement indicating which compliance path option applies.				MEC
			Final Design	Option 1: Statement confirming simulation software capabilities and confirming assumptions and methodology.				MEC
			Final Design	Option 1: General information including simulation program, principal heating source, percent new construction and renovation, weather file, climate zone and Energy Star Target Finder score.				MEC
			Final Design	Option 1: Space summary listing, for each building use, the conditioned area, unconditioned area and total area and include total area for each category				MEC
			Final Design	Option 1: List of all simulation output advisory message data and show difference between baseline and proposed design				MEC
			Final Design	Option 1: Comparison summary for energy model inputs including description of baseline and design case energy model inputs, showing both by element type				MEC
			Final Design	Option 1: Energy type summary listing, for each energy type, utility rate description, units of energy and units of demand				MEC
			Final Design	Option 1: Statement indicating whether project uses on-site renewable energy. If yes, list all sources and indicate, for each source, backup energy type, annual energy generated, rated capacity and renewable energy cost				MEC
			Final Design	Option 1: If analysis includes exceptional calculation methods, statement describing how exceptional calculation measure cost savings is determined				MEC
			Final Design	Option 1: If analysis includes exceptional calculation methods, for each exceptional calculation method indicate energy types and, for each energy type, annual energy savings, annual cost savings, and brief descriptive narrative				MEC
			Final Design	Option 1: Baseline performance rating compliance report table indicating, for each energy end use, whether it is a process load, energy type, annual and peak energy demand for all four orientations. For each orientation indicate total annual energy use for each orientation and total annual process energy use.				MEC
			Final Design	Option 1: Baseline energy cost table indicating, for each energy type, annual cost for all four orientations and building total energy cost.				MEC
			Final Design	Option 1: Proposed Design performance rating compliance report table indicating, for each energy end use, whether it is a process load, energy type, annual and peak energy demand, baseline annual and peak energy demand and percent savings. Indicate total annual energy use and total annual process energy use for both proposed design and baseline and percent savings.				MEC
			Final Design	Option 1: Proposed Design energy cost table indicating, for each energy type, annual cost for all four orientations and building total energy cost.				MEC
			Final Design	Option 1: Energy cost and consumption by energy type report indicating, for each energy type, proposed design and baseline annual use and annual cost, percent savings annual use and annual cost. Indicate for renewable energy annual energy generated and annual cost. Indicate exceptional calculations annual energy savings and annual cost savings. Indicate building total annual energy use, annual energy cost for proposed design and baseline and indicate percent savings annual energy use and annual energy cost.				MEC

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			Final Design	Option 1: Compliance summaries from energy simulation software. If software does not produce compliance summaries provide output summaries and example input summaries for baseline and proposed design supporting data in the tables. Output summaries must include simulated energy consumption by end use and total energy use and cost by energy type. Example input summaries should represent most common systems and must include occupancy, use pattern, assumed envelope component sizes and descriptive features and assumed mechanical equipment types and descriptive features		MEC
			Final Design	Option 1: Energy rate tariff from project energy providers (only if not using LEED Reference Guide default rates)		MEC
EAPR3		Fundamental Refrigerant Management (PREREQUISITE)	Final Design	Statement indicating which option for compliance applies.		MEC
			Final Design	Option 2: Narrative describing phase out plan, including specific information on phase out dates and refrigerant quantities.		MEC
EA1		Optimize Energy Performance	Final Design	Statement indicating which compliance path option applies.		MEC
			Final Design	Option 1: Statement confirming simulation software capabilities and confirming assumptions and methodology.		MEC
			Final Design	Option 1: General information including simulation program, principal heating source, percent new construction and renovation, weather file, climate zone and Energy Star Target Finder score.		MEC
			Final Design	Option 1: Space summary listing, for each building use, the conditioned area, unconditioned area and total area and include total area for each category		MEC
			Final Design	Option 1: List of all simulation output advisory message data and show difference between baseline and proposed design		MEC
			Final Design	Option 1: Comparison summary for energy model inputs including description of baseline and design case energy model inputs, showing both by element type		MEC
			Final Design	Option 1: Energy type summary listing, for each energy type, utility rate description, units of energy and units of demand		MEC
			Final Design	Option 1: Statement indicating whether project uses on-site renewable energy. If yes, list all sources and indicate, for each source, backup energy type, annual energy generated, rated capacity and renewable energy cost		MEC
			Final Design	Option 1: If analysis includes exceptional calculation methods, statement describing how exceptional calculation measure cost savings is determined		MEC
			Final Design	Option 1: If analysis includes exceptional calculation methods, for each exceptional calculation method indicate energy types and, for each energy type, annual energy savings, annual cost savings, and brief descriptive narrative		MEC
			Final Design	Option 1: Baseline performance rating compliance report table indicating, for each energy end use, whether it is a process load, energy type, annual and peak energy demand for all four orientations. For each orientation indicate total annual energy use for each orientation and total annual process energy use.		MEC
			Final Design	Option 1: Baseline energy cost table indicating, for each energy type, annual cost for all four orientations and building total energy cost.		MEC
			Final Design	Option 1: Proposed Design performance rating compliance report table indicating, for each energy end use, whether it is a process load, energy type, annual and peak energy demand, baseline annual and peak energy demand and percent savings. Indicate total annual energy use and total annual process energy use for both proposed design and baseline and percent savings.		MEC
			Final Design	Option 1: Proposed Design energy cost table indicating, for each energy type, annual cost for all four orientations and building total energy cost.		MEC
			Final Design	Option 1: Energy cost and consumption by energy type report indicating, for each energy type, proposed design and baseline annual use and annual cost, percent savings annual use and annual cost. Indicate for renewable energy annual energy generated and annual cost. Indicate exceptional calculations annual energy savings and annual cost savings. Indicate building total annual energy use, annual energy cost for proposed design and baseline and indicate percent savings annual energy use and annual energy cost.		MEC

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			Final Design	Option 1: Compliance summaries from energy simulation software. If software does not produce compliance summaries provide output summaries and example input summaries for baseline and proposed design supporting data in the tables. Output summaries must include simulated energy consumption by end use and total energy use and cost by energy type. Example input summaries should represent most common systems and must include occupancy, use pattern, assumed envelope component sizes and descriptive features and assumed mechanical equipment types and descriptive features				MEC
			Final Design	Option 1: Energy rate tariff from project energy providers (only if not using LEED Reference Guide default rates)				MEC
EA2.1		On-Site Renewable Energy	Final Design	Statement indicating which compliance path option applies.				ELEC
			Final Design	List all on-site renewable energy sources and indicate, for each source, backup energy type, annual energy generated, rated capacity and renewable energy cost. Indicate total annual energy use (all sources), total annual energy cost (all sources) and percent renewable energy cost.				ELEC MEC
			Final Design	Option 1: Indicate, for renewable energy, proposed design total annual energy generated and annual cost.				ELEC MEC
			Final Design	Option 2: Indicate CBECS building type and building gross area. Provide the following CBECS data: median annual electrical intensity, median annual non-electrical fuel intensity, average electric energy cost, average non-electric fuel cost, annual electric energy use and cost, annual non-electric fuel use and cost.				ELEC MEC
			Final Design	Option 2: Narrative describing renewable systems and explaining calculation method used to estimate annual energy generated, including factors influencing performance.				ELEC MEC
EA2.2		On-Site Renewable Energy	Same as EA2.1	Same as EA2.1				ELEC MEC
EA2.3		On-Site Renewable Energy	Same as EA2.1	Same as EA2.1				ELEC MEC
EA3		Enhanced Commissioning	**Final Design	**Owner's Project Requirements document (OPR)				ALL
			**Final Design	**Basis of Design document for commissioned systems (BOD)				ELEC MEC
			**Final Design	**Commissioning Plan				ELEC MEC
			Closeout	Statement confirming all commissioning requirements have been incorporated into construction documents.				PE
			Closeout	**Commissioning Report				PE
			**Final Design	Statement by CxA confirming Commissioning Design Review				
			Closeout	Statement by CxA confirming review of Contractor submittals for compliance with OPR and BOD				PE
			Closeout	**Systems Manual				PE
			Closeout	Statement by CxA confirming completion of O&M staff and occupant training				PE
			Closeout	**Scope of work for post-occupancy review of building operation, including plan for resolution of outstanding issues				PE
			**Predesign	Statement confirming CxA qualifications and contractual relationships relative to work on this project, demonstrating that CxA is an independent third party.				MEC
EA4		Enhanced Refrigerant Management	Final Design	Refrigerant impact calculation table with all building data and calculation values as shown in LEED 2009 Reference Guide Example Calculations				MEC
			Final Design	Narrative describing any special circumstances or explanatory remarks				
			Closeout	X Cut sheets highlighting refrigerant data for all HVAC components.				PE
EA5		Measurement & Verification	Closeout	Statement indicating which compliance path option applies.				PE
			Closeout	Measurement and Verification Plan including Corrective Action Plan				PE
			Closeout	**Scope of work for post-occupancy implementation of M&V plan including corrective action plan.				PE
EA6		Green Power	Closeout	Statement indicating which compliance path option applies.				PE
			Closeout	Option 1: Indicate proposed design total annual electric energy usage				PE
			Closeout	Option 2: Indicate actual total annual electric energy usage				PE
			Closeout	Option 3: Calculation indicating building type, total gross area, median electrical intensity and annual electric energy use				PE

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			Closeout	Green power provider summary table indicating, for each purchase type, provider name, annual quantity green power purchased and contract term. Indicate total annual green power use and indicate percent green power		PE
			Closeout	Narrative describing how Green Power or Green Tags are purchased		PE
CATEGORY 4 – MATERIALS AND RESOURCES						
MRPR1		Storage & Collection of Recyclables (PREREQUISITE)	Final Design	Statement confirming that recycling area will accommodate recycling of plastic, metal, paper, cardboard and glass. Narrative indicating any other materials addressed and coordination with pickup.		ARC
MR1.1		Building Reuse: Maintain 55% of Existing Walls, Floors & Roof	**Final Design	If project includes a building addition, confirm that area of building addition does not exceed 2x the area of the existing building.		ARC
			**Final Design	Spreadsheet listing, for each building structural/envelope element, the existing area and reused area. Total percent reused.		ARC
MR1.2		Building Reuse: Maintain 75% of Existing Walls, Floors & Roof	Same as MR1.1	Same as MR1.1		ARC
MR1.3		Building Reuse: Maintain 95% of Existing Walls, Floors & Roof	Same as MR1.1	Same as MR1.1		ARC
MR1.4		Building Reuse: Maintain 50% of Interior Non-Structural Elements	**Final Design	If project includes a building addition, confirm that area of building addition does not exceed 2x the area of the existing building.		ARC
			**Final Design	Spreadsheet listing, for each building interior non-structural element, the existing area and reused area. Total percent reused.		ARC
MR2.1		Construction Waste Management: Divert 50% From Disposal	**Preconstruction	Waste Management Plan		PE
			**Construction Quarterly and Closeout	Spreadsheet calculations indicating material description, disposal/diversion location (or recycling hauler), weight, total waste generated, total waste diverted, diversion percentage		PE
			**Construction Quarterly and Closeout	Receipts/tickets for all items on spreadsheet		PE
MR2.2		Construction Waste Management: Divert 75% From Disposal	Same as MR2.1	Same as MR2.1		PE
MR3.1		Materials Reuse: 5%	Closeout	Statement indicating total materials value and whether default or actual.		PE
			Closeout	Spreadsheet calculations indicating, for each reused/salvaged material, material description, source or vendor, cost. Total reused/salvaged materials percentage.		PE
MR3.2		Materials Reuse: 10%	Same as MR3.1	Same as MR3.1		PE
MR4.1		Recycled Content: 10% (post-consumer + 1/2 pre-consumer)	Closeout	Statement indicating total materials value and whether default or actual.		PE
			Closeout	Spreadsheet calculations indicating, for each recycled content material, material name/description, manufacturer, cost, post-consumer recycled content percent, pre-consumer recycled content percent, source of recycled content data. Total post-consumer content materials cost, total pre-consumer content materials cost, total combined recycled content materials cost, recycled content materials percentage.		PE
			Final Design or NLT Preconstruction	**Purchasing Plan consisting of spreadsheet indicated above, filled in with estimated quantities to show strategy for achieving goal.		PE
			Closeout	Manufacturer published product data or certification, confirming recycled content percentages in spreadsheet		PE
MR4.2		Recycled Content: 20% (post-consumer + 1/2 pre-consumer)	Same as MR4.1	Same as MR4.1		PE
MR5.1		Regional Materials: 10% Extracted, Processed & Manufactured Regionally	Closeout	Statement indicating total materials value and whether default or actual.		PE
			Closeout	Spreadsheet calculations indicating, for each regional material, material name/description, manufacturer, cost, percent compliant, harvest distance, manufacture distance, source of manufacture and harvest location data. Total regional materials cost, regional materials percentage.		PE
			Preconstruction	**Purchasing Plan consisting of spreadsheet indicated above, filled in with estimated quantities to show strategy for achieving goal.		PE
			Closeout	Manufacturer published product data or certification confirming regional material percentages in spreadsheet		PE

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MR5.2		Regional Materials:20% Extracted, Processed & Manufactured Regionally	Same as MR5.1	Same as MR5.1		PE
MR6		Rapidly Renewable Materials	Closeout	Statement indicating total materials value and whether default or actual.		PE
			Closeout	Spreadsheet calculations indicating, for each rapidly renewable material, material name/description, manufacturer, cost, rapidly renewable content percent, rapidly renewable product value. Total rapidly renewable product value, rapidly renewable materials percentage.		PE
			Final Design	**Purchasing Plan consisting of spreadsheet indicated above, filled in with estimated quantities to show strategy for achieving goal.		ARC
			Closeout	X Manufacturer published product data or certification confirming rapidly renewable material percentages in spreadsheet		PE
MR7		Certified Wood	Closeout	Statement indicating total materials value and whether default or actual.		PE
			Closeout	Spreadsheet calculations indicating, for each certified wood material, material name/description, vendor, cost, wood component percent, certified wood percent of wood component, FSC chain of custody certificate number. Total certified wood product value, certified wood materials percentage.		PE
			Final Design or NLT Preconstruction	**Purchasing Plan consisting of spreadsheet indicated above, filled in with estimated quantities to show strategy for achieving goal.		PE
			Closeout	X Vendor invoices, FSC chain of custody certificates and manufacturer published product data or certification confirming all certified wood materials percentages in spreadsheet.		PE
INDOOR ENVIRONMENTAL QUALITY						
EQPR1		Minimum IAQ Performance (PREREQUISITE)	Final Design	Statement indicating which option for compliance applies, stating applicable criteria/requirement, and confirming that project has been designed to meet the applicable requirements.		MEC
			Final Design	Narrative describing the project's ventilation design, including specifics about fresh air intake volumes and special considerations.		MEC
EQPR2		Environmental Tobacco Smoke (ETS) Control (PREREQUISITE)	Final Design	Statement indicating which option for compliance applies, stating applicable criteria/requirement, and confirming that project has been designed to meet the applicable requirements.		ARC
			Final Design	List of drawing and specification references that convey conformance to applicable requirements (signage, exhaust system, room separation details, etc).		ARC
EQ1		Outdoor Air Delivery Monitoring	Final Design	Statement indicating which option for compliance applies and confirming that project has been designed to meet the applicable requirements.		MEC
			Final Design	List of drawing and specification references that convey conformance to applicable requirements.		MEC
			Final Design	Narrative describing the project's ventilation design and CO2 monitoring system, including specifics about monitors, operational parameters and setpoints.		MEC
			Closeout	X Cut sheets for CO2 monitoring system.		PE
EQ2		Increased Ventilation	Final Design	Statement indicating which option for compliance applies and confirming that project has been designed to meet the applicable requirements.		MEC
			Final Design	Narrative describing the project's ventilation design, including specifics about zone fresh air intake volumes and demonstrating compliance.		MEC
			Final Design	Option 2: Narrative describing design method used for determining natural ventilation design, including calculation methodology/model results and demonstrating compliance.		MEC
			Final Design	List of drawing and specification references that convey conformance to applicable requirements.		MEC
EQ3.1		Construction IAQ Management Plan: During Construction	**Preconstruction	Construction IAQ Management Plan		PE
			Closeout	Statement confirming whether air handling units were operated during construction		PE
			Closeout	Dated jobsite photos showing examples of IAQ management plan practices being implemented. Label photos to indicate which practice they demonstrate. Minimum one photo of each practice at each building.		PE

LEED Credit Paragraph	Contractor Check Here if Credit is Claimed	LEED-NC v3 Submittals (OCT09)	Provide for Credit Audit Only	REQUIRED DOCUMENTATION	DATE	REV
PAR		FEATURE	DUE AT			
			Closeout	Spreadsheet indicating, for each filter installed during construction, the manufacturer, model number, MERV rating, location installed, and if it was replaced immediately prior to occupancy.		PE
EQ3.2		Construction IAQ Management Plan: Before Occupancy	**Preconstruction	Construction IAQ Management Plan		PE
			Closeout	Statement indicating which option for compliance applies and confirming that required activities have occurred that meet the applicable requirements.		PE
			Closeout	Option 1a: Narrative describing the project's flushout process, including specifics about temperature, airflow and duration, special considerations (if any) and demonstrating compliance.		PE
			Closeout	Option 1b: Narrative describing the project's pre-occupancy and post-occupancy flushout processes, including specifics about temperature, airflow and duration, special considerations (if any) and demonstrating compliance.		PE
			Closeout	Option 2: Narrative describing the project's IAQ testing process, including specifics about contaminants tested for, locations, remaining work at time of test, retest parameters and special considerations (if any).		PE
			Closeout	Option 2: IAQ testing report demonstrating compliance.		PE
EQ4.1		Low Emitting Materials: Adhesives & Sealants	Closeout	Spreadsheet indicating, for each applicable indoor adhesive, sealant and sealant primer used, the manufacturer, product name/model number, VOC content, LEED VOC limit, and source of VOC data.		PE
			Closeout	Spreadsheet indicating, for each applicable indoor aerosol adhesive, the manufacturer, product name/model number, VOC content, LEED VOC limit, and source of VOC data - OR - Statement confirming no indoor aerosol adhesives were used for the project.		PE
			Closeout	Manufacturer published product data or certification confirming material VOCs in spreadsheet	X	PE
EQ4.2		Low Emitting Materials: Paints & Coatings	Closeout	Spreadsheet indicating, for each applicable indoor paint and coating used, the manufacturer, product name/model number, VOC content, LEED VOC limit, and source of VOC data.		PE
			Closeout	Spreadsheet indicating, for each applicable indoor anti-corrosive/anti-rust paint and coating used, the manufacturer, product name/model number, VOC content, LEED VOC limit, and source of VOC data - OR - Statement confirming no indoor anti-corrosive/anti-rust paints were used for the project .		PE
			Closeout	Manufacturer published product data or certification confirming material VOCs in spreadsheet	X	PE
EQ4.3		Low Emitting Materials: Flooring Systems	Closeout	Spreadsheet indicating, for each indoor flooring system used, the manufacturer, product name/model number, if it meets LEED requirement (yes/no) and source of LEED compliance data.		PE
			Closeout	Spreadsheet indicating, for each indoor carpet cushion used, the manufacturer, product name/model number, if it meets LEED requirement (yes/no) and source of LEED compliance data - OR - Statement confirming no indoor carpet cushion was used for the project.		PE
			Closeout	Manufacturer published product data or certification confirming material compliance label in spreadsheet	X	PE
EQ4.4		Low Emitting Materials: Composite Wood & Agrifiber Products	Closeout	Spreadsheet indicating, for each indoor composite wood and agrifiber product used, the manufacturer, product name/model number, if it contains added urea formaldehyde (yes/no) and source of LEED compliance data.		PE
			Closeout	Manufacturer published product data or certification confirming material urea formaldehyde in spreadsheet	X	PE
EQ5		Indoor Chemical & Pollutant Source Control	Closeout	Spreadsheet indicating, for each permanent entryway system used, the manufacturer, product name/model number and description of system.		PE
			Final Design	List of drawing and specification references that convey locations and installation methods for entryway systems.		ARC
			Final Design	Spreadsheet indicating, for each chemical use area, the room number, room name, description of room separation features (walls, floor/ceilings, openings) and pressure differential from surrounding spaces with doors closed - OR - Statement confirming that project includes no chemical use areas and that no hazardous cleaning materials are needed for building maintenance.		ARC MEC
			Final Design	If project includes chemical use areas: List of drawing and specification references that convey locations of chemical use areas, room separation features and exhaust system.		ARC

LEED Credit Paragraph	Contractor Check Here if Credit is Claimed	LEED-NC v3 Submittals (OCT09)	Provide for Credit Audit Only	REQUIRED DOCUMENTATION	DATE	REV
			Final Design	If project includes places where water and chemical concentrate mixing occurs: List of drawing and specification references that convey provisions for containment of hazardous liquid wastes OR - Statement confirming that project includes no places where water and chemical concentrate mixing occurs.		ARC MEC
			Closeout	If project includes chemical use areas: Spreadsheet indicating, for AHUs/mechanical ventilation equipment serving occupied areas, the manufacturer, model number, MERV rating, location installed, and if it was replaced immediately prior to occupancy (yes/no) - OR - Statement confirming that project does not use mechanical equipment for ventilation of occupied areas.		PE
EQ6.1		Controllability of Systems: Lighting	Final Design	Calculation indicating total number of individual workstations, number of workstations with individual lighting controls and the percentage of workstations with individual lighting controls.		ELEC
			Final Design	For each shared multi-occupant space, provide a brief description of lighting controls.		ELEC
			Final Design	Narrative describing lighting control strategy, including type and location of individual controls and type and location of controls in shared multi-occupant spaces.		ELEC
EQ6.2		Controllability of Systems: Thermal Comfort	Final Design	Calculation indicating total number of individual workstations, number of workstations with individual thermal comfort controls and the percentage of workstations with individual thermal comfort controls.		MEC
			Final Design	For each shared multi-occupant space, provide a brief description of thermal comfort controls.		MEC
			Final Design	Narrative describing thermal comfort control strategy, including type and location of individual and shared multi-occupant controls.		MEC
EQ7.1		Thermal Comfort: Design	Final Design	Design criteria spreadsheet indicating, for spring, summer, fall and winter, maximum indoor space design temperature, minimum indoor space design temperature and maximum indoor space design humidity.		MEC
			Final Design	Narrative describing method used to establish thermal comfort control conditions and how systems design addresses the design criteria, including compliance with the referenced standard.		MEC
EQ7.2		Thermal Comfort: Verification	Final Design	Narrative describing the scope of work for the thermal comfort survey, including corrective action plan development		MEC
			Final Design	List of drawing and specification references that convey permanent monitoring system.		MEC
EQ8.1		Daylight & Views: Daylight 75% of Spaces	Final Design	Option 2: Table indicating all regularly occupied spaces with space area and space area with compliant daylight zone. Sum of regularly occupied areas and regularly occupied areas with compliant daylight zone. Percentage calculation of areas with compliant daylight zone to total regularly occupied areas.		ARC
			Final Design	Option 1: Simulation model method, software and output data		ELEC
			Final Design	Option 1: Table indicating all regularly occupied spaces with space area, space area with minimum 25 footcandles daylighting illumination, and method of providing glare control. Sum of regularly occupied areas and regularly occupied areas with 25 fc daylighting. Percentage calculation of areas with 25 fc daylighting to total regularly occupied areas.		ELEC
			Final Design	For all occupied spaces excluded from the calculation, provide narrative indicating reasons for excluding the space.		ARC
			Final Design	List of drawing and specification references that convey exterior glazed opening head and sill heights, glazing performance properties and glare control/sunlight redirection devices.		ARC
			Closeout	X Manufacturer published product data or certification confirming glazing Tvis in spreadsheet		PE
EQ8.2		Daylight & Views: Views for 90% of Spaces	Final Design	Table indicating all regularly occupied spaces with space area and space area with access to views. Sum of regularly occupied areas and regularly occupied areas with access to views. Percentage calculation of areas with views to total regularly occupied areas.		ARC
			Final Design	For all occupied spaces excluded from the calculation, provide narrative indicating reasons for excluding the space.		ARC
			Final Design	LEED Floor plan drawings showing line of sight diagramming of views areas in each regularly occupied space. List of drawing/specification references that convey exterior glazed opening head and sill heights.		ARC

INNOVATION & DESIGN PROCESS

LEED Credit Paragraph	Contractor Check Here if Credit is Claimed	LEED-NC v3 Submittals (OCT09)	Provide for Credit Audit Only	REQUIRED DOCUMENTATION	Date Submitted (to be filled in by Contractor)	Government Reviewer's Use
PAR		FEATURE	DUE AT		DATE	REV
IDc1.1		Innovation in Design	Final Design	Narrative describing intent, requirement for credit, project approach to the credit. List of drawings and specification references that convey implementation of credit. All other documentation that validates claimed credit.		
IDc1.2		Innovation in Design	Final Design			
IDc1.3		Innovation in Design	Final Design			
IDc1.4		Innovation in Design	Final Design			
IDc2		LEED Accredited Professional	Final Design	Narrative indicating name of LEED AP, company name of LEED AP, description of LEED AP's role and responsibilities in the project.		ARC

ATTACHMENT F
Version 07-07-2010

BUILDING INFORMATION MODELING REQUIREMENTS

1.0 Section 1 - Submittal Format

1.1. Design Deliverables. Develop all designs using Building Information Modeling (BIM) and Computer Aided Design (CAD) software. Design submittal drawings shall be ANSI D size, suitable for half-size scaled reproduction.

2.0 Section 2 – Design Requirements

2.1. BIM Model and Facility Data. Contractor shall use BIM application(s) and software(s) to develop project designs. “Facility Data” is defined as associated intelligent attribute data. The “Model” is defined as 3D graphics that includes Facility Data and output as described in the paragraph ‘Output’ below. Contractors will use the Model to produce accurate Construction Documents. For each Center of Standardization (CoS) facility type included in this project, all BIM Models and associated Facility Data shall be submitted in Bentley Systems BIM 08.05.02.55 with associated USACE Bentley BIM Workspace (which includes specific standard BIM libraries and definitions). This Workspace can be downloaded from the CAD/BIM Technology Center. [Where available, the workspace will be specific to this CoS Facility Standard Design. The Contractor will be provided a baseline multi-discipline BIM Project Model for the CoS Facility Standard Design type, where such a model exists (for the purposes of site adaptation).] The USACE Bentley BIM Workspace is dependent on specific versions of the Bentley BIM suite of products and only the versions of the software that are listed in the Contractor instructions included with the USACE BIM Workspace are permitted to be used.

2.1.1. Reference. Refer to ERDC TR-06-10, “U.S. Army Corps of Engineers Building Information Modeling Road Map” from the CAD/BIM Technology Center website for more information on the USACE BIM implementation goals.

2.2. Drawings. Deliver CAD files used for the creation of the Construction Documents Drawings per requirements in Section 01 33 16, the criteria of the USACE Norfolk District, and as noted herein. Specification of a CAD file format for these Drawings does not limit which BIM application(s) or software(s) may be used for project development and execution.

2.2.1. IFC Support. The Contractor’s selected BIM application(s) and software(s) must support the IFC (Industry Foundation Class - see www.iai-tech.org). Submit any deviations from or additions to the IFC property sets for any new spaces, systems, and equipment for Government approval.

2.2.2. Submittal Requirements. BIM submittals shall be fully interoperable, compatible, and editable with the Bentley BIM tools. Use the specified version of the USACE Bentley BIM Workspace and conform to the requirements of **Sections 3 and 4 below**.

2.2.3. BIM Project Execution Plan.

2.2.3.1. Develop a BIM Project Execution Plan (“Plan” or “PxP”) documenting the BIM and analysis technologies selected for the Project Model (integrated with the AEC CAD Standard) from concept development through As-Builts as a design, production, coordination, construction, and documentation tool and the collaborative process by which it shall be executed. See Section 7 for additional guidance on developing the Plan.

2.2.4. BIM Requirements..

2.2.4.1. Facility Data. Develop the Facility Data consisting of a set of intelligent elements for the Model (e.g., doors, air handlers, electrical panels). This Facility Data shall include all material definitions and attributes that are necessary for the Project facility design and construction. Additional data in support of Section 6 Contractor Electives is encouraged.

2.2.4.2. Model Content. The Model and Facility Data shall include, at a minimum, the requirements of Section 4 below.

2.2.4.3. Model Granularity. Models may vary in level of detail for individual elements within a model, but at a minimum must include all features that would be included on a quarter inch (1/4" = 1'0") scaled drawing (e.g. at least 1/16th, 1/8th and 1/4th), or appropriately scaled civil drawings.

2.2.4.4. Output. Submitted CAD drawings (e.g., plans, elevations, sections, schedules, details, etc.) shall be derived (commonly known as extractions, views or sheets) and maintained from the submitted Model and Facility Data.

2.3. Quality Control. Implement quality control (QC) parameters for the Model, including:

2.3.1. Model Standards Checks. QC validation used to ensure that the Project Facility Data set has no undefined, incorrectly defined or duplicated elements. Report non-compliant elements and corrective action plan to correct non-compliant elements. Provide the government with detailed justification and request government approval for any non-compliant element which the contractor proposes to be allowed to remain in the Model.

2.3.2. CAD Standards Checks. QC checking performed to ensure that the fonts, dimensions, line styles, levels and other construction document formatting issues are followed per the A/E/C CADD Standard.

2.3.3. Other Parameters. Develop such other QC parameters as Contractor deems appropriate for the Project and provide to the Government for concurrence.

2.4. Design and Construction Reviews. Perform design and construction reviews at each submittal stage under Section 3 to test the Model, including:

2.4.1. Visual Checks. Checking to ensure the design intent has been followed and that there are no unintended elements in the Model.

2.4.2. Interference Management Checks. Locate conflicting spatial data in the Model where two elements are occupying the same space. Log hard interferences (e.g., mechanical vs. structural or mechanical vs. mechanical overlaps in the same location) and soft interferences, (e.g., conflicts regarding equipment clearance, service access, fireproofing, insulation) in a written report and resolve.

2.4.3. IFC Coordination View. Provide an IFC Coordination View in IFC Express format for all deliverables. Provide exported property set data for all IFC supported named building elements.

2.4.4. Other Parameters. Develop such other Review parameters as the Contractor deems appropriate for the Project and provide to the Government for concurrence..

3.0 Section 3 – Design Stage Submittal Requirements

3.1. General Submittal Requirements.

3.1.1. Provide submittals in compliance with BIM Project Execution Plan deliverables at stages as described hereinafter.

3.1.2. At each Stage in Paragraphs 3.3 through 3.6, provide a Contractor-certified written report confirming that consistency checks as identified in Paragraphs 2.3 and 2.4 have been completed. This report shall be discussed as part of the review process and shall address cross-discipline interferences, if any.

3.1.3. At each Stage in Paragraphs 3.3 through 3.6, provide the Government with:

- The Model, Facility Data, Workspace and CAD Data files in native Bentley BIM/CAD.

- A 3-D interactive review format of the Model in Bentley Navigator, Autodesk Navisworks, Adobe 3D PDF 7.0 (or later), Google Earth KMZ or other format per Plan requirements. The file format for reviews can change between submittals.

- A list of all submitted files. The list should include a description, directory, and file name for each file submitted. For all CAD sheets, include the sheet title and sheet number. Identify files that have been produced from the submitted Model and Facility Data.

3.1.4. The Government will confirm acceptability of all submittals identified in Section 3 in coordination with the USACE Norfolk BIM Manager

3.2. Initial Design Conference Submittal.

3.2.1. Submit a digital copy of the Plan where, in addition to Paragraph 3.1.4, the USACE Geographic District BIM Manager will coordinate with the USACE CoS BIM Manager to confirm acceptability of the Plan or advise as to additional processes or activities necessary to be incorporated.

3.2.2. Within thirty (30) days after the approval of the Plan, conduct a demonstration to review the Plan for clarification, and to verify the functionality of Model technology workflow and processes. If modifications are required, the Contractor shall complete the modifications and resubmit the Plan and perform subsequent demonstration for Government acceptance. There will be no payment for design or construction until the Plan is acceptable to the Government. The Government may also withhold payment for design and construction for unacceptable performance in executing the approved Plan.

3.3. Interim Design Submittals.

3.3.1. BIM and CAD Data. The Model shall include the requirements identified in Paragraph 2.2.4 as applicable to the Interim Design package(s).

3.4. Final Design Submissions and Design Complete Submittals.

3.4.1. BIM and CAD Data. The Model shall include the requirements identified in Paragraph 2.2.4. Acceptance according to Paragraph 3.1.4 is required before commencement of construction, as described in Paragraph 3.7.6 of Section 01 33 16.

3.5. Construction Submittals – Over-The-Shoulder Progress Reviews. Periodic quality control meetings or construction progress review meetings shall include quality control reviews on the implementation and use of the Model, including interference management and design change tracking information.

3.6. Final As-Builts BIM and CAD Data Submittal. Submit the final Model, Facility Data, and CAD files reflecting as-built conditions for Government Approval, as specified in Section 01 78 02.00 10, PROJECT CLOSEOUT.

4.0 Section 4 – BIM Model Minimum Requirements and Output

4.1. General Provisions. The deliverable Model shall be developed to include the systems described below as they would be built and the processes of installing them, and to reflect final as-built conditions. The deliverable model at the interim design stage and at the final design stage (“released for construction”) shall be developed to include as many of the systems described below as are necessary and appropriate at that design stage.

4.2. Architectural/Interior Design. The Architectural systems Model may vary in level of detail for individual elements, but at a minimum must include all features that would be included on a quarter inch (1/4”=1’0”) scaled drawing. Additional minimum Model requirements include:

4.2.1. Spaces. The Model shall include spaces defining accurate net square footage and net volume, and holding data for the room finish schedule for including room names and numbers. Include Programmatic Information provided by the Government or validated program to verify design space against programmed space, using this information to validate area quantities.

4.2.2. Walls and Curtain Walls. Each wall shall be depicted to the exact height, length, width and ratings (thermal, acoustic, fire) to properly reflect wall types. The Model shall include all walls, both interior and exterior, and the necessary intelligence to produce accurate plans, sections and elevations depicting these design elements.

- 4.2.3. Doors, Windows and Louvers. Doors, windows and louvers shall be depicted to represent their actual size, type and location. Doors and windows shall be modeled with the necessary intelligence to produce accurate window and door schedules.
- 4.2.4. Roof. The Model shall include the roof configuration, drainage system, penetrations, specialties, and the necessary intelligence to produce accurate plans, building sections and generic wall sections where roof design elements are depicted.
- 4.2.5. Floors. The floor slab shall be developed in the structural Model and then referenced by the architectural Model for each floor of the Project building.
- 4.2.6. Ceilings. All heights and other dimensions of ceilings, including soffits, ceiling materials, or other special conditions shall be depicted in the Model with the necessary intelligence to produce accurate plans, building sections and generic wall sections where ceiling design elements are depicted.
- 4.2.7. Vertical Circulation. All continuous vertical components (i.e., non-structural shafts, architectural stairs, handrails and guardrails) shall be accurately depicted and shall include the necessary intelligence to produce accurate plans, elevations and sections in which such design elements are referenced.
- 4.2.8. Architectural Specialties and Woodwork. All architectural specialties (i.e., toilet room accessories, toilet partitions, grab bars, lockers, and display cases) and woodwork (i.e., cabinetry and counters) shall be accurately depicted with the necessary intelligence to produce accurate plans, elevations and sections in which such design elements are referenced.
- 4.2.9. Signage. The Model shall include all signage and the necessary intelligence to produce accurate plans and schedules.
- 4.2.10. Schedules. Provide door, window, hardware sets using BHMA designations, flooring, wall finish, and signage schedules from the Model, indicating the type, materials and finishes used in the design.
- 4.3. Furniture. The furniture systems Model may vary in level of detail for individual elements within a Model, but at a minimum must include all features that would be included on a quarter inch (1/4"=1'0") scaled drawing, and have necessary intelligence to produce accurate plans. Representation of furniture elements is to be 2D. Contractor may provide a minimal number of 3D representations as examples. Examples of furniture include, but are not limited to, desks, furniture systems, seating, tables, and office storage.
- 4.3.1. Furniture Coordination. Furniture that makes use of electrical, data or other features shall include the necessary intelligence to produce coordinated documents and data.
- 4.4. Equipment. The Model may vary in level of detail for individual elements within a Model. Equipment shall be depicted to meet layout requirements with the necessary intelligence to produce accurate plans and minimum schedules depicting their configuration. Examples of equipment include but are not limited to copiers, printers, refrigerators, ice machines and microwaves.
- 4.4.1. Schedules. Provide furniture and equipment schedules from the model indicating the materials, finishes, mechanical, and electrical requirements.
- 4.5. Structural. The structural systems Model may vary in level of detail for individual elements, but at a minimum must include all features that would be included on a quarter inch (1/4"=1'0") scaled drawing. Additional minimum Model requirements include:
- 4.5.1. Foundations. All necessary foundation and/or footing elements, with necessary intelligence to produce accurate plans and elevations
- 4.5.2. Floor Slabs. Structural floor slabs shall be depicted, including all necessary recesses, curbs, pads, closure pours, and major penetrations accurately depicted.

4.5.3. Structural Steel. All steel columns, primary and secondary framing members, and steel bracing for the roof and floor systems (including decks), including all necessary intelligence to produce accurate structural steel framing plans and related building/wall sections.

4.5.4. Cast-in-Place Concrete. All walls, columns, and beams, including necessary intelligence to produce accurate plans and building/wall sections depicting cast-in-place concrete elements.

4.5.5. Expansion/Contraction Joints. Joints shall be accurately depicted.

4.5.6. Stairs. The structural Model shall include all necessary openings and framing members for stair systems, including necessary intelligence to produce accurate plans and building/wall sections depicting stair design elements.

4.5.7. Shafts and Pits. The structural Model shall include all necessary shafts, pits, and openings, including necessary intelligence to produce accurate plans and building/wall sections depicting these design elements.

4.6. Mechanical. The mechanical systems Model may vary in level of detail for individual elements, but at a minimum must include all features that would be included on a quarter inch (1/4"=1'0") scaled drawing. Small diameter (less than 1-1/2" NPS) field-routed piping is not required in the model. Additional minimum Model requirements include:

4.6.1. HVAC. All necessary heating, ventilating, air-conditioning and specialty equipment, including air distribution ducts for supply, return, and ventilation and exhaust ducts, including control system, registers, diffusers, grills and hydronic baseboards with necessary intelligence to produce accurate plans, elevations, building/wall sections and schedules.

4.6.1.1. Mechanical Piping. All necessary piping and fixture layouts, and related equipment, including necessary intelligence to produce accurate plans, elevations, building/wall sections, and schedules.

4.6.2. Plumbing. All necessary plumbing piping and fixture layouts, floor and area drains, and related equipment, including necessary intelligence to produce accurate plans, elevations, building/wall sections, riser diagrams, and schedules.

4.6.3. Equipment Clearances. All HVAC and Plumbing equipment clearances shall be modeled for use in interference management and maintenance access requirements.

4.6.4. Elevator Equipment. The Model shall include the necessary equipment and control system, including necessary intelligence to produce accurate plans, sections and elevations depicting these design elements.

4.7. Electrical/Telecommunications. The electrical systems Model may vary in level of detail for individual elements, but at a minimum must include all features that would be included on a quarter inch (1/4"=1'0") scaled drawing. Small diameter (less than 1-1/2"Ø) field-routed conduit is not required in the model. Additional minimum Model requirements include:

4.7.1. Interior Electrical Power and Lighting. All necessary interior electrical components (i.e., lighting, receptacles, special and general purpose power receptacles, lighting fixtures, panelboards, cable trays and control systems), including necessary intelligence to produce accurate plans, details and schedules. Lighting and power built into furniture/equipment shall be modeled.

4.7.2. Special Electrical Systems. All necessary special electrical components (i.e., security, Mass Notification, Public Address, nurse call and other special occupancies, and control systems), including necessary intelligence to produce accurate plans, details and schedules.

4.7.3. Grounding Systems. Grounding Systems. All necessary grounding components (i.e., lightning protection systems, static grounding systems, communications grounding systems, bonding), including necessary intelligence to produce accurate plans, details and schedules.

- 4.7.4. Communications. All existing and new communications service controls and connections, both above ground and underground with necessary intelligence to produce accurate plans, details and schedules. Cable tray routing shall be modeled without detail of cable contents.
- 4.7.5. Exterior Building Lighting. All necessary exterior lighting with necessary intelligence to produce accurate plans, elevations and schedules. The exterior building lighting Model shall include all necessary lighting, relevant existing and proposed support utility lines and equipment required with necessary intelligence to produce accurate plans, details and schedules.
- 4.7.6. Equipment Clearances. The model shall incorporate and define all electrical and communications working spaces, clearances, and required access
- 4.8. Fire Protection. The fire protection system Model may vary in level of detail for individual elements, but at a minimum must include all features that would be included on a quarter inch (1/4"=1'0") scaled drawing. Additional minimum Model requirements include:
- 4.8.1. Fire Protection System. All relevant fire protection components (i.e., branch piping, sprinkler heads, fittings, drains, pumps, tanks, sensors, control panels) with necessary intelligence to produce accurate plans, elevations, building/wall sections, riser diagrams, and schedules. All fire protection piping shall be modeled.
- 4.8.2. Fire Alarms. Fire alarm/mass notification devices and detection system shall be indicated with necessary intelligence to produce accurate plans depicting them.
- 4.9. Civil. The civil Model may vary in level of detail for individual elements, but at a minimum must include all features that would be included on a one inch (1"=100') scaled drawing. Additional minimum Model requirements include:
- 4.9.1. Terrain (DTM). All relevant site conditions and proposed grading, including necessary intelligence to produce accurate Project site topographical plans and cross sections.
- 4.9.2. Drainage. All existing and new drainage piping, including upgrades thereto, including necessary intelligence to produce accurate plans and profiles for the Project site.
- 4.9.3. Storm Water and Sanitary Sewers. All existing and new sewer structures and piping, including upgrades thereto, on the Project site with necessary connections to mains or other distribution points as appropriate, including necessary intelligence to produce accurate plans and profiles for the Project site.
- 4.9.4. Utilities. All necessary new utilities connections from the Project building(s) to the existing or newly-created utilities, and all existing above ground and underground utility conduits, including necessary intelligence to produce accurate plans and site-sections.
- 4.9.5. Roads and Parking. All necessary roadways and parking lots or parking structures, including necessary intelligence to produce accurate plans, profiles and cross-sections.

5.0 Section 5 - Ownership and Rights in Data

- 5.1. Ownership. The Government has ownership of and rights at the date of Closeout Submittal to all CAD files, BIM Model, and Facility Data developed for the Project in accordance with FAR Part 27, clauses incorporated in Section 00 72 00, Contract Clauses and Special Contract Requirement 1.14 GOVERNMENT RE-USE OF DESIGN (Section 00 73 00). The Government may make use of this data following any deliverable.

6.0 Section 6 – Contractor Electives

- 6.1. Applicable Criteria. If the Contractor elected to include one or more of the following features as an elective in its accepted contract proposal for additional credit during the source selection, as described in the proposal submission requirements and evaluation criteria, the following criteria are requirements, as applicable to those elective feature(s).

6.2. COBIE Compliance. The Model and Facility Data for the Project shall fulfill Construction Operations Building Information Exchange (COBIE) requirements as defined by the Whole Building Design Guide organization, including all requirements for the indexing and submission of Portable Document Format (PDF) and other appropriate file formats that would otherwise be printed and submitted in compliance with Project operations and maintenance handover requirements.

6.3. Project Scheduling using the Model. In the BIM Execution Plan and during the Preliminary BIM Execution Plan Review, provide an overview of the use of BIM in the development and support of the project construction schedule.

6.3.1. Submittal Requirements. During the Submittal stages, the Contractor shall deliver the construction schedule with information derived from the Model.

6.3.1.1. Construction Submittals – Over-The-Shoulder Progress Reviews. Periodic quality control meetings or construction progress review meetings shall include quality control reviews on the implementation and use of the Model for project scheduling.

6.4. Cost Estimating. In the BIM Execution Plan and during the Preliminary BIM Execution Plan Review, provide an overview of the use of BIM in the development and support of cost estimating requirements, or other applications such as cost analysis and estimate validation.

6.4.1. Submittal Requirements. During the Submittal stages, the Contractor shall deliver cost estimating information derived from the Model.

6.4.2. Project completion. At project completion, the Contractor shall provide an MII (Micro Computer Aided Cost Estimating System Generation II) Cost Estimate which follows the USACE Cost Engineering Military Work Breakdown System (WBS), a modified Unifomat, to at least the sub-systems level and uses quantity information supplied directly from BIM output to the maximum extent possible, though other "Gap" quantity information will be included as necessary for a complete and accurate cost estimate.

6.4.2.1. Sub system level extracted quantities from the BIM for use within the estimate shall be provided according to how detailed line items or tasks should be installed/built so that accurate costs can be developed and/or reflected. Therefore, when developing a BIM, the designer shall be cognizant of what tasks need to be separated appropriately at the beginning stages of model development, such as tasks done on the first floor versus the same task on higher floors that will be more labor intensive and therefore need to have a separate quantity and be priced differently. Tasks and their extracted quantities from the BIM shall be broken down by their location (proximity in the structure) as well as the complexity of its installation.

6.4.2.2. At all design stages it shall be understood that BIM output as described in this document will not generate all quantities that are necessary in order to develop a complete and accurate cost estimate of the project based on the design. An example of this would be plumbing that is less than 1.5" diameter and therefore not expected to be modeled due to granularity; this information is commonly referred to as The Gap. Quantities from The Gap and their associated costs shall be included in the final project actual cost estimates as well.

6.5. Other Analyses and Reports. Structural, energy and efficiency, EPACT 2005 & EISA 2007, lighting design, daylighting, electrical power, psychrometric processing, shading, programming, LEED, fire protection, code compliance, Life Cycle Cost, acoustic, plumbing.

7.0 Section 7 – BIM Project Execution Plan Template

7.1. Contractors will utilize the latest version of the USACE BIM PROJECT EXECUTION PLAN (USACE PxP) Template to develop an acceptable Plan. The template can be downloaded from the CAD/BIM Technology Center website.

ATTACHMENT G**DESIGN SUBMITTAL DIRECTORY AND SUBDIRECTORY FILE ARRANGEMENT**

Organize electronic design submittal files in a subdirectory/file structure in accordance with the following table. The Contractor may suggest a slightly different structure, subject to the discretion of the government.

Design Submittal Directory and Subdirectory File Arrangement.

Directory	Sub-Directory	Sub-Directory or Files	Files
Submittal/Package Name	Narratives	PDF file or files with updated design narrative for each applicable design discipline	
	Drawings	PDF (subdirectory)	Single PDF file with all applicable drawing sheets - bookmarked by sheet number and name
		BIM (subdirectory) See Attachment F.	BIM project folder (with files) per the USACE Workspace. Include an Excel drawing index file with each drawing sheet listed by sheet #, name and corresponding dgn file name (Final Design & Design Complete only)
	Design Analysis & Calculations	Individual PDF files containing design analysis and calculations for each discipline applicable to the submittal	
		PDF file with Fire Protection and Life Safety Code Review checklist	
	LEED	PDF file with updated Leed Check List	
		PDF file or files with LEED Templates for each point with applicable documentation included in each file.	
		LEED SUBMITTALS	
	Energy Analysis	PDF with baseline energy consumption analysis	
		PDF with actual building energy consumption analysis	
	Specifications	Single PDF file with table of contents and all applicable specifications sections.	
		Submittal Register (Final Design & Design Complete submittal only)	
	Design Quality Control	PDF file or files with DQC checklist(s) and/or statements	
	Building Rendering(s)	PDF file of rendering for each building type included in contract (Final Design & Design Complete).	

**SECTION 01 45 04.00 10
CONTRACTOR QUALITY CONTROL**

1.0 GENERAL

1.1. REFERENCES

1.2. PAYMENT

2.0 PRODUCTS (NOT APPLICABLE)

3.0 EXECUTION

3.1. GENERAL REQUIREMENTS

3.2. QUALITY CONTROL PLAN

3.3. COORDINATION MEETING

3.4. QUALITY CONTROL ORGANIZATION

3.5. SUBMITTALS AND DELIVERABLES

3.6. CONTROL

3.7. TESTS

3.8. COMPLETION INSPECTION

3.9. DOCUMENTATION

3.10. NOTIFICATION OF NONCOMPLIANCE

1.0 GENERAL

1.1. REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only. Refer to the latest edition, as of the date of the contract solicitation.

- ASTM INTERNATIONAL (ASTM)
- ASTM D 3740 Minimum Requirements for Agencies
Engaged in the Testing and/or Inspection
of Soil and Rock as Used in Engineering
Design and Construction
- ASTM E 329 Agencies Engaged in the Testing
and/or Inspection of Materials Used in
Construction
- U.S. ARMY CORPS OF ENGINEERS (USACE)
ER 1110-1-12 Quality Management

1.2. PAYMENT

There will be no separate payment for providing and maintaining an effective Quality Control program. Include all costs associated therewith in the applicable unit prices or lump-sum prices contained in the Contract Line Item Schedule.

2.0 PRODUCTS (Not Applicable)

3.0 EXECUTION

3.1. GENERAL REQUIREMENTS

The Contractor is responsible for quality control and shall establish and maintain an effective quality control system in compliance with the Contract Clause titled "Inspection of Construction." The quality control system shall consist of plans, procedures, and organization necessary to produce an end product, which complies with the contract requirements. The system shall cover all design and construction operations, both onsite and offsite, and shall be keyed to the proposed design and construction sequence. The site project superintendent is responsible for the quality of work on the job and is subject to removal by the Contracting Officer for non-compliance with the quality requirements specified in the contract. The site project superintendent in this context shall be the highest level manager responsible for the overall construction activities at the site, including quality and production. The site project superintendent shall maintain a physical presence at the site at all times, except as otherwise acceptable to the Contracting Officer, and shall be responsible for all construction and construction related activities at the site.

3.2. QUALITY CONTROL PLAN

Furnish for Government review, not later than 30 days after receipt of notice to proceed, the Contractor Quality Control (CQC) Plan proposed to implement the requirements of the Contract Clause titled "Inspection of Construction." The plan shall identify personnel, procedures, control, instructions, tests, records, and forms to be used. The Government will consider an interim plan for the first 30 days of operation. Design and construction may begin only after acceptance of the CQC Plan or acceptance of an interim plan applicable to the particular feature of work to be started. The Government will not permit work outside of the features of work included in an accepted interim plan to begin until acceptance of a CQC Plan or another interim plan containing the additional features of work to be started. Where the applicable Code issued by the International Code Council calls for an inspection by the Building Official, the Contractor shall include the inspections in the Quality Control Plan and shall perform the inspections. The Designer of Record shall develop a program for any special inspections required by the applicable International Codes and the Contractor shall perform these inspections, using qualified inspectors. Include the special inspection plan in the QC Plan.

3.2.1. Content of the CQC Plan

The CQC Plan shall include, as a minimum, the following to cover all design and construction operations, both onsite and offsite, including work by subcontractors, fabricators, suppliers, and purchasing agents subcontractors, designers of record, consultants, architect/engineers (AE), fabricators, suppliers, and purchasing agents:

3.2.1.1. A description of the quality control organization. Include a chart showing lines of authority and an acknowledgment that the CQC staff shall implement the three phase control system for all aspects of the work specified. A CQC System Manager shall report to the project superintendent or someone higher in the contractor's organization.

3.2.1.2. The name, qualifications (in resume format), duties, responsibilities, and authorities of each person assigned a CQC function. Also include those responsible for performing and documenting the inspections required by the International Codes and the special inspection program developed by the designer of record.

3.2.1.3. A copy of the letter to the CQC System Manager, signed by an authorized official of the firm, which describes the responsibilities and delegates sufficient authorities to adequately perform the functions of the CQC System Manager, including authority to stop work which is not in compliance with the contract. The CQC System Manager shall issue letters of direction to all other various quality control representatives outlining duties, authorities, and responsibilities. Furnish copies of these letters.

3.2.1.4. Procedures for scheduling, reviewing, certifying, and managing submittals, including those of subcontractors, offsite fabricators, suppliers, and purchasing agents subcontractors, designers of record, consultants, architect engineers (AE), offsite fabricators, suppliers, and purchasing agents. These procedures shall be in accordance with Section 01 33 00 SUBMITTAL PROCEDURES.

3.2.1.5. Control, verification, and acceptance testing procedures for each specific test to include the test name, specification paragraph requiring test, feature of work to be tested, test frequency, and person responsible for each test. Use only Government approved Laboratory facilities.

3.2.1.6. Procedures for tracking preparatory, initial, and follow-up control phases and control, verification, and acceptance tests including documentation.

3.2.1.7. Procedures for tracking design and construction deficiencies from identification through acceptable corrective action. These procedures shall establish verification that identified deficiencies have been corrected.

3.2.1.8. Reporting procedures, including proposed reporting formats.

3.2.1.9. A list of the definable features of work. A definable feature of work is a task, which is separate and distinct from other tasks, has separate control requirements, and may be identified by different trades or disciplines, or it may be work by the same trade in a different environment. Although each section of the specifications may generally be considered as a definable feature of work, there are frequently more than one definable feature under a particular section. This list will be agreed upon during the coordination meeting.

3.2.1.10. A list of all inspections required by the International Codes and the special inspection program required by the code and this contract.

3.2.2. Additional Requirements for Design Quality Control (DQC) Plan

The following additional requirements apply to the Design Quality Control (DQC) plan:

3.2.2.1. The Contractor's QCP Plan shall provide and maintain a Design Quality Control (DQC) Plan as an effective quality control program which will assure that all services required by this design-build contract are performed and provided in a manner that meets professional architectural and engineering quality standards. As a minimum, competent, independent reviewers identified in the DQC Plan shall review all documents. Use personnel who were not involved in the design effort to produce the design to perform the independent technical review (ITR). The ITR is intended as a quality control check of the design. Include, at least, but not necessarily limited to, a review of the contract requirements (the accepted contract or task order proposal and amended RFP), the basis of design, design calculations, the design configuration management documentation and check the design documents for

errors, omissions, and for coordination and design integration. The ITR team is not required to examine, compare or comment concerning alternate design solutions but should concentrate on ensuring that the design meets the contract requirements. Correct errors and deficiencies in the design documents prior to submitting them to the Government.

3.2.2.2. Include in the DQC Plan the discipline-specific checklists to be used during the design and quality control of each submittal. Submit these completed checklists at each design phase as part of the project documentation.

3.2.2.3. A Design Quality Control Manager, who has the responsibility of being cognizant of and assuring that all documents on the project have been coordinated, shall implement the DQC Plan. This individual shall be a person who has verifiable engineering or architectural design experience and is a registered professional engineer or architect. Notify the Government, in writing, of the name of the individual, and the name of an alternate person assigned to the position.

3.2.3. Acceptance of Plan

Government acceptance of the Contractor's plan is required prior to the start of design and construction. Acceptance is conditional and will be predicated on satisfactory performance during the design and construction. The Government reserves the right to require the Contractor to make changes in his CQC Plan and operations including removal of personnel, as necessary, to obtain the quality specified.

3.2.4. Notification of Changes

After acceptance of the CQC Plan, notify the Government in writing of any proposed change. Proposed changes are subject to Government acceptance.

3.3. COORDINATION MEETING

After the Postaward Conference, before start of design or construction, and prior to acceptance by the Government of the CQC Plan, the Contractor and the Government shall meet and discuss the Contractor's quality control system. Submit the CQC Plan for review a minimum of 7 calendar days prior to the Coordination Meeting. During the meeting, a mutual understanding of the system details shall be developed, including the forms for recording the CQC operations, design activities, control activities, testing, administration of the system for both onsite and offsite work, and the interrelationship of Contractor's Management and control with the Government's Quality Assurance. The Government will prepare minutes of the meeting for signature by both parties. The minutes shall become a part of the contract file. There may be occasions when either party will call for subsequent conferences to reconfirm mutual understandings and/or address deficiencies in the CQC system or procedures which may require corrective action by the Contractor.

3.4. QUALITY CONTROL ORGANIZATION

3.4.1. Personnel Requirements

The requirements for the CQC organization are a CQC System Manager, a Design Quality Manager, and sufficient number of additional qualified personnel to ensure contract compliance. The CQC organization shall also include personnel identified in the technical provisions as requiring specialized skills to assure the required work is being performed properly. The Contractor's CQC staff shall maintain a presence at the site at all times during progress of the work and have complete authority and responsibility to take any action necessary to ensure contract compliance. The CQC staff shall be subject to acceptance by the Contracting Officer. Provide adequate office space, filing systems and other resources as necessary to maintain an effective and fully functional CQC organization. Promptly furnish complete records of all letters, material submittals, shop drawing submittals, schedules and all other project documentation to the CQC organization. The CQC organization shall be responsible to maintain these documents and records at the site at all times, except as otherwise acceptable to the Contracting Officer.

3.4.2. CQC System Manager

Identify as CQC System Manager an individual within the onsite work organization who shall be responsible for overall management of CQC and have the authority to act in all CQC matters for the Contractor. The CQC System

Manager shall be a graduate engineer, graduate architect, or a BA/BS graduate of an ACCE accredited construction management college program. The CQC system Manager may alternately be an engineering technician with at least 2 years of college and an ICC certification as a Commercial Building Inspector (Residential Building Inspector certification will be required for Military Family Housing projects). In addition, the CQC system manager shall have a minimum of 5 years construction experience on construction similar to this contract. The CQC System Manager shall be on the site at all times during construction and shall be employed by the prime Contractor. Assign the CQC System Manager no other duties (except may also serve as Safety and Health Officer, if qualified and if allowed by Section 00 73 00). Identify an alternate for the CQC System Manager in the plan to serve in the event of the System Manager's absence. The requirements for the alternate shall be the same as for the designated CQC System Manager but the alternate may have other duties in addition to serving in a temporary capacity as the acting QC manager.

3.4.3. CQC Personnel

3.4.3.1. In addition to CQC personnel specified elsewhere in the contract provide specialized CQC personnel to assist the CQC System Manager in accordance with paragraph titled Area Qualifications.

3.4.3.2. These individuals may be employees of the prime or subcontractor; be responsible to the CQC System Manager; **are not intended to be full time, but must be physically present at the construction site during work on their areas of responsibility**; have the necessary education and/or experience in accordance with the experience matrix listed herein. These individuals may perform other duties but must be allowed sufficient time to perform their assigned quality control duties as described in the Quality Control Plan. **One person may cover more than one area, provided that they are qualified to perform QC activities for the designated areas below and provided that they have adequate time to perform their duties:**

3.4.4. Experience Matrix

3.4.4.1. Area Qualifications

3.4.4.1.1. Civil - Graduate Civil Engineer or (BA/BS) graduate in construction management with 4 years experience in the type of work being performed on this project or engineering technician with 5 yrs related experience.

3.4.4.1.2. Mechanical - Graduate Mechanical Engineer or (BA/BS) graduate in construction management with 4 yrs related experience or engineering technician with an ICC certification as a Commercial Mechanical Inspector with 5 yrs related experience.

3.4.4.1.3. Electrical - Graduate Electrical Engineer or (BA/BS) graduate in construction management with 4 yrs related experience or engineering technician with an ICC certification as a Commercial Electrical Inspector with 5 yrs related experience.

3.4.4.1.4. Structural - Graduate Structural Engineer or (BA/BS) graduate in construction management with 4 yrs related experience or person with an ICC certification as a Reinforced Concrete Special Inspector and Structural Steel and Bolting Special Inspector (as applicable to the type of construction involved) with 5 yrs related experience.

3.4.4.1.5. Plumbing - Graduate Mechanical Engineer or (BA/BS) graduate in construction management with 4 yrs related experience, or person with an ICC certification as a Commercial Plumbing Inspector with 5 yrs related experience.

3.4.4.1.6. Concrete, Pavements and Soils Materials Technician (present while performing tests) with 2 yrs experience for the appropriate area

3.4.4.1.7. Testing, Adjusting and Balancing Specialist must be a member (TAB) Personnel of AABC or an experienced technician of the firm certified by the NEBB (present while testing, adjusting, balancing).

3.4.4.1.8. Design Quality Control Manager Registered Architect or Professional Engineer (not required on the construction site)

3.4.4.1.9. Registered Fire Protection Engineer with 4 years related experience or engineering technician with 5 yrs related experience (but see requirements for Fire Protection Engineer of Record to witness final testing in Section 01 10 00, paragraph 5.10, Fire Protection).

3.4.4.1.10. QC personnel assigned to the installation of the telecommunication system or any of its components shall be Building Industry Consulting Services International (BICSI) Registered Cabling Installers, Technician Level. Submit documentation of current BICSI certification. In lieu of BICSI certification, QC personnel shall have a minimum of 5 years experience in the installation of the specified copper and fiber optic cable and components. They shall have factory or factory approved certification from each equipment manufacturer indicating that they are qualified to install and test the provided products. QC personnel shall witness and certify the testing of telecommunications cabling and equipment.

3.4.5. Additional Requirement

In addition to the above experience and/or education requirements the CQC System Manager shall have completed the course entitled "Construction Quality Management for Contractors". This course is periodically offered at [Not Supplied - ConstructionReqQC : COURSE_LOCATION]. Inquire of the District or Division sponsoring the course for fees and other expenses involved, if any, for attendance at this course.

3.4.6. Organizational Changes

When it is necessary to make changes to the CQC staff, the Contractor shall revise the CQC Plan to reflect the changes and submit the changes to the Contracting Officer for acceptance.

3.5. SUBMITTALS AND DELIVERABLES

Make submittals as specified in Section 01 33 00 **SUBMITTAL PROCEDURES**. The CQC organization shall certify that all submittals and deliverables are in compliance with the contract requirements.

3.6. CONTROL

Contractor Quality Control is the means by which the Contractor ensures that the construction, to include that of subcontractors and suppliers, complies with the requirements of the contract. The CQC organization shall conduct at least three phases of control for each definable feature of the construction work as follows:

3.6.1. Preparatory Phase

Perform this phase prior to beginning work on each definable feature of work, after all required plans/documents/materials are approved/accepted, and after copies are at the work site. This phase shall include:

3.6.1.1. A review of each paragraph of applicable specifications, reference codes, and standards. Make a copy of those sections of referenced codes and standards applicable to that portion of the work to be accomplished in the field at the preparatory inspection. Maintain these copies in the field, available for use by Government personnel until final acceptance of the work.

3.6.1.2. A review of the contract drawings.

3.6.1.3. A check to assure that all materials and/or equipment have been tested, submitted, and approved.

3.6.1.4. Review of provisions that have been made to provide required control inspection and testing.

3.6.1.5. Examination of the work area to assure that all required preliminary work has been completed and is in compliance with the contract.

3.6.1.6. A physical examination of required materials, equipment, and sample work to assure that they are on hand, conform to approved shop drawings or submitted data, and are properly stored.

3.6.1.7. A review of the appropriate activity hazard analysis to assure safety requirements are met.

3.6.1.8. Discussion of procedures for controlling quality of the work including repetitive deficiencies. Document construction tolerances and workmanship standards for that feature of work.

3.6.1.9. A check to ensure that the portion of the plan for the work to be performed has been accepted by the Contracting Officer.

3.6.1.10. Discussion of the initial control phase.

3.6.1.11. Notify the Government at least 24 hours in advance of beginning the preparatory control phase. This phase shall include a meeting conducted by the CQC System Manager and attended by the superintendent, other CQC personnel (as applicable), and the foreman responsible for the definable feature. Document the results of the preparatory phase actions by separate minutes prepared by the CQC System Manager and attached to the daily CQC report. The Contractor shall instruct applicable workers as to the acceptable level of workmanship required in order to meet contract specifications.

3.6.2. Initial Phase

Accomplish this phase at the beginning of a definable feature of work. Include the following actions:

3.6.2.1. Check work to ensure that it is in full compliance with contract requirements. Review minutes of the preparatory meeting.

3.6.2.2. Verify adequacy of controls to ensure full contract compliance. Verify required control inspection and testing.

3.6.2.3. Establish level of workmanship and verify that it meets minimum acceptable workmanship standards. Compare with required sample panels as appropriate.

3.6.2.4. Resolve all differences.

3.6.2.5. Check safety to include compliance with and upgrading of the Accident Prevention plan and activity hazard analysis. Review the activity analysis with each worker.

3.6.2.6. Notify the Government at least 24 hours in advance of beginning the initial phase. The CQC System Manager shall prepare and attach to the daily CQC report separate minutes of this phase. Indicate exact location of initial phase for future reference and comparison with follow-up phases.

3.6.2.7. Repeat the initial phase any time acceptable specified quality standards are not being met.

3.6.3. Follow-up Phase

Perform daily checks to assure control activities, including control testing, are providing continued compliance with contract requirements, until completion of the particular feature of work. The checks shall be made a matter of record in the CQC documentation. Conduct final follow-up checks and correct deficiencies prior to the start of additional features of work which may be affected by the deficient work. Do not build upon nor conceal non-conforming work.

3.6.4. Additional Preparatory and Initial Phases

Conduct additional preparatory and initial phases on the same definable features of work if: the quality of on-going work is unacceptable; if there are changes in the applicable CQC staff, onsite production supervision or work crew; if work on a definable feature is resumed after a substantial period of inactivity; or if other problems develop.

3.7. TESTS

3.7.1. Testing Procedure

Perform specified or required tests to verify that control measures are adequate to provide a product which conforms to contract requirements and project design documents. Upon request, furnish to the Government

duplicate samples of test specimens for possible testing by the Government. Testing includes operation and/or acceptance tests when specified. The Contractor shall procure the services of a Corps of Engineers approved testing laboratory, or establish an approved testing laboratory at the project site. The Contractor may elect to use a laboratory certified and accredited by the Concrete and cement Reference Laboratory (CCRL) or by AASHTO Materials Reference Laboratory (AMRL) for testing procedures that those organizations certify. The Contractor shall perform the following activities and record and provide the following data:

3.7.1.1. Verify that testing procedures comply with contract requirements and project design documents.

3.7.1.2. Verify that facilities and testing equipment are available and comply with testing standards.

3.7.1.3. Check test instrument calibration data against certified standards.

3.7.1.4. Verify that recording forms and test identification control number system, including all of the test documentation requirements, have been prepared.

3.7.1.5. Include results of all tests taken, both passing and failing tests, recorded on the CQC report for the date taken. Include specification paragraph reference, location where tests were taken, and the sequential control number identifying the test. If approved by the Contracting Officer, actual test reports may be submitted later with a reference to the test number and date taken. Provide an information copy of tests performed by an offsite or commercial test facility directly to the Contracting Officer. Failure to submit timely test reports as stated may result in nonpayment for related work performed and disapproval of the test facility for this contract.

3.7.2. Testing Laboratories

3.7.2.1. Capability Check

The Government reserves the right to check laboratory equipment in the proposed laboratory for compliance with the standards set forth in the contract specifications and to check the laboratory technician's testing procedures and techniques. Laboratories utilized for testing soils, concrete, asphalt, and steel shall meet criteria detailed in ASTM D 3740 and ASTM E 329.

3.7.2.2. Capability Recheck

If the selected laboratory fails the capability check, the Government will assess the Contractor a charge of \$1,375 to reimburse the Government for each succeeding recheck of the laboratory or the checking of a subsequently selected laboratory. Such costs will be deducted from the contract amount due the Contractor.

3.7.3. Onsite Laboratory

The Government reserves the right to utilize the Contractor's control testing laboratory and equipment to make assurance tests, and to check the Contractor's testing procedures, techniques, and test results at no additional cost to the Government.

3.7.4. Furnishing or Transportation of Samples for Government Quality Assurance Testing

The Contractor is responsible for costs incidental to the transportation of samples or materials. Deliver samples of materials for test verification and acceptance testing by the Government to the Corps of Engineers Laboratory, f.o.b., at the following address:

- For delivery by mail:
[Not Supplied - ConstructionReqQC : LAB_NAME]
.
.
.
- For other deliveries:
[Not Supplied - ConstructionReqQC : LAB_NAME_OTHER]

The area or resident office will coordinate, exact delivery location, and dates for each specific test.

3.8. COMPLETION INSPECTION

3.8.1. Punch-Out Inspection

Near the end of the work, or any increment of the work established by a time stated in the SPECIAL CONTRACT REQUIREMENTS Clause, "Commencement, Prosecution, and Completion of Work", or by the specifications, the CQC Manager shall conduct an inspection of the work. Prepare a punch list of items which do not conform to the approved drawings and specifications and include in the CQC documentation, as required by paragraph DOCUMENTATION. The list of deficiencies shall include the estimated date by which the deficiencies will be corrected. The CQC System Manager or staff shall make a second inspection to ascertain that all deficiencies have been corrected. Once this is accomplished, the Contractor shall notify the Government that the facility is ready for the Government Pre-Final inspection.

3.8.2. Pre-Final Inspection

As soon as practicable after the notification above, the Government will perform the pre-final inspection to verify that the facility is complete and ready to be occupied. A Government Pre-Final Punch List may be developed as a result of this inspection. The Contractor's CQC System Manager shall ensure that all items on this list have been corrected before notifying the Government, so that a Final inspection with the customer can be scheduled. Correct any items noted on the Pre-Final inspection in a timely manner. Accomplish these inspections and any deficiency corrections required by this paragraph within the time slated for completion of the entire work or any particular increment of the work if the project is divided into increments by separate completion dates.

3.8.3. Final Acceptance Inspection

The Contractor's Quality Control Inspection personnel, plus the superintendent or other primary management person, and the Contracting Officer's Representative shall attend the final acceptance inspection. Additional Government personnel including, but not limited to, those from Base/Post Civil Facility Engineer user groups and major commands may also attend. The Government will formally schedule the final acceptance inspection based upon results of the Pre-Final inspection. Provide notice to the Government at least 14 days prior to the final acceptance inspection and include the Contractor's assurance that all specific items previously identified to the Contractor as being unacceptable, along with all remaining work performed under the contract, will be complete and acceptable by the date scheduled for the final acceptance inspection. Failure of the Contractor to have all contract work acceptably complete for this inspection will be cause for the Contracting Officer to bill the Contractor for the Government's additional inspection cost in accordance with the contract clause titled "Inspection of Construction".

3.9. DOCUMENTATION

3.9.1. Maintain current records providing factual evidence that required quality control activities and/or tests have been performed. These records shall include the work of subcontractors and suppliers using government-provided software, QCS (see Section 01 45 01.10). The report includes, as a minimum, the following information:

3.9.1.1. Contractor/subcontractor and their area of responsibility.

3.9.1.2. Operating plant/equipment with hours worked, idle, or down for repair.

3.9.1.3. Work performed each day, giving location, description, and by whom. When Network Analysis (NAS) is used, identify each phase of work performed each day by NAS activity number.

- 3.9.1.4. Test and/or control activities performed with results and references to specifications/drawings requirements. Identify the applicable control phase (Preparatory, Initial, Follow-up). List deficiencies noted, along with corrective action.
- 3.9.1.5. Quantity of materials received at the site with statement as to acceptability, storage, and reference to specifications/drawings requirements.
- 3.9.1.6. Submittals and deliverables reviewed, with contract reference, by whom, and action taken.
- 3.9.1.7. Offsite surveillance activities, including actions taken.
- 3.9.1.8. Job safety evaluations stating what was checked, results, and instructions or corrective actions.
- 3.9.1.9. Instructions given/received and conflicts in plans and/or specifications.
- 3.9.1.10. Provide documentation of design quality control activities. For independent design reviews, provide, as a minimum, identity of the ITR team, the ITR review comments, responses and the record of resolution of the comments.
- 3.9.2. Contractor's verification statement.

These records shall indicate a description of trades working on the project; the number of personnel working; weather conditions encountered; and any delays encountered. These records shall cover both conforming and deficient features and shall include a statement that equipment and materials incorporated in the work and workmanship comply with the contract. Furnish the original and one copy of these records in report form to the Government daily within 24 hours after the date covered by the report, except that reports need not be submitted for days on which no work is performed. As a minimum, submit one report for every 7 days of no work and on the last day of a no work period. Account for all calendar days throughout the life of the contract. The first report following a day of no work shall be for that day only. The CQC System Manager shall sign and date reports. The report shall include copies of test reports and copies of reports prepared by all subordinate quality control personnel. The Contractor may submit these forms electronically, in lieu of hard copy.

3.10. NOTIFICATION OF NONCOMPLIANCE

The Contracting Officer will notify the Contractor of any detected noncompliance with the foregoing requirements. The Contractor shall take immediate corrective action after receipt of such notice. Such notice, when delivered to the Contractor at the work site, shall be deemed sufficient for the purpose of notification. If the Contractor fails or refuses to comply promptly, the Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No part of the time lost due to such stop orders shall be made the subject of claim for extension of time or for excess costs or damages by the Contractor.

End of Section 01 45 04.00 10

**SECTION 01 50 02.0001
TEMPORARY CONSTRUCTION FACILITIES**

1.0 OVERVIEW

1.1. GENERAL REQUIREMENTS

1.3. BULLETIN BOARD, PROJECT SIGN, AND PROJECT SAFETY SIGN

1.0 OVERVIEW

1.1. GENERAL REQUIREMENTS

1.1.1. This section contains requirements specifically applicable to this task order. The requirements of Base ID/IQ contract Section 01 50 02 apply to this task order, except as otherwise specified herein.

1.3. BULLETIN BOARD, PROJECT SIGN, AND PROJECT SAFETY SIGN

1.3.1. Bulletin Board (As Specified in Base contract)

1.3.2. Project and Safety Signs (Added to Stress standardization of signs, in the event that the Base ID/IQ Section 01 50 02 does not contain this information)

Erect a project sign and a site safety sign with informational details as provided by the Government at the Post award conference, within 15 days prior to any work activity on project site. Update the safety sign data daily, with light colored metallic or non-metallic numerals. Remove the signs from the site upon completion of the project. Engineer Pamphlet EP 310-1-6a contains the standardized layout and construction details for the signs. It can be found through a GOOGLE Search or try <http://www.usace.army.mil/publications/eng-pamphlets/ep310-1-6a/s-16.pdf>.

End of Section 01 50 02.0001



REPORT OF SUBSURFACE EXPLORATION
AND
GEOTECHNICAL ENGINEERING SERVICES

**Training Support Center-PN 71114-Feasibility Study
Fort Lee, Virginia**

**G E T Project No: VB09-281G
August 19, 2010**

Prepared for:

AECOM
448 Viking Drive, Suite 145
Virginia Beach, VA 23452

204 Grayson Road, Virginia Beach, VA 23462
Phone 757-518-1703 ♦ Fax 757-518-1704 ♦ www.getsolutionsinc.com



August 19, 2010

TO: **AECOM**
448 Viking Drive, Suite 145
Virginia Beach, VA 23452

Attn: Mr. Paul T. Garrison, PE, CEM, LEED AP

RE: Report of Subsurface Investigation & Geotechnical Engineering Services
Training Support Center-PN 71114-Feasibility Study
Fort Lee, Virginia
G E T Project No: VB09-281G

Dear Mr. Garrison:

In compliance with your instructions, we have completed our Subsurface Investigation and Geotechnical Engineering Services for the referenced project. The results of this feasibility study, together with our recommendations, are presented in this report.

Often, because of design and construction details that occur on a project, questions arise concerning subsurface conditions. **G E T Solutions, Inc.** would be pleased to continue its role as Geotechnical Engineer during the project implementation.

Thank you for the opportunity to work with you on this project. We trust that the information contained herein meets your immediate need, and should you have any questions or if we could be of further assistance, please do not hesitate to contact us.

Respectfully Submitted,
G E T Solutions, Inc.

A handwritten signature in black ink that reads "Maria E. Murdock".

Maria E. Murdock, P.E.
Project Engineer
VA Lic. #039988

A handwritten signature in black ink that reads "D. Mark Schofield".

D. Mark Schofield, P.E.
Senior Geotechnical Engineer
VA Lic. # 033932

Copies: (3) Client

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EXECUTIVE SUMMARY

This project consists of constructing a standard medium Training Aids Support Center (TSC) located in Fort Lee, Virginia. It is assumed that the proposed building will be one-story high. Also, new paved driveways and parking areas along with other pertinent infrastructure components will also be constructed at this site.

Our field exploration program included two (2) 50-foot deep, two (2) 35-foot deep and two (2) 15-foot deep Standard Penetration Test (SPT) borings drilled within the project site. Additionally, two (2) bulk soil samples were collected from the subgrade elevation for CBR testing.

A brief description of the subsurface soil conditions at the site is presented below.

AVERAGE DEPTH (Feet)	STRATUM	DESCRIPTION	RANGES OF SPT ⁽¹⁾ N-VALUES
0 to 0.5	Topsoil	3 to 6 inches of topsoil	--
0.5 to 2-4	Possible Fill	CLAY (CL) and SAND (SC, SM) at the location of borings B-1, B-3, B-4 and B-6	2 - 11
0.3-4 to 6-8	I	CLAY (CH) with varying amounts of Sand. <i>* This layer was not encountered at the location of boring B-6</i>	7 - 27
6-8 to 34-44	II	SAND (SM, SP-SM, SC) with varying amounts of Silt and Clay. <i>* Deposits of medium stiff to very stiff CLAY (CL, CH) were recovered from this layer from borings B-4 and B-6. * Borings B-4 through B-6 were terminated within this layer.</i>	2 - 35
34-44 to 35-50	III	CLAY (CL, CL-ML) with varying amounts of Sand <i>* A deposit of medium dense to very dense SAND (SP-SM) and very stiff SILT (MH) was recovered from this layer at the location of boring B-3.</i>	10 - 26

Note (1) SPT = Standard Penetration Test, N-Values in Blows-per-foot

The groundwater level was recorded at the boring locations and as observed through the relative wetness of the recovered soil samples during the drilling operations. Groundwater was encountered at a depth of roughly 23 feet below grades at the boring locations.

The following evaluations and recommendations were developed based on our field exploration and laboratory-testing program:

- A field testing program is recommended during construction. This testing program should include as a minimum, subgrade load testing (proofrolling), compaction testing, test pits, and foundation inspections.
- Some subgrade improvements should be expected to improve unstable subgrade or remove unstable fill.
- Shallow foundations designed using a net allowable bearing capacity of 2,500 psf (48-inch embedment, 24-inch width).

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- Estimated total and differential settlements up to 1-inch and ½-inch, respectively.
- The first floor slab may be constructed as a slab-on-grade member.
- The CLAY (CL) and SAND (SC) soils and Possible FILL material recovered from the upper 4 to 6 feet below grades did not appear to meet the criteria recommended in this report for reuse as structural fill.
- The pavements should be designed using a design CBR Value of 7.3.
- Based on our experience with similar projects in the general area, the recovered soils are indicative of a seismic site class 'D' as determined in accordance with Table 1615.1.1 of the 2006 International Building Code.

This summary briefly discusses some of the major topics mentioned in the attached report. Accordingly, this report should be read in its entirety to thoroughly evaluate the contents.

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1.0 PROJECT INFORMATION

1.1 Project Authorization

G E T Solutions, Inc. has completed our subsurface investigation and geotechnical engineering services for the Training Support Center-PN 71114 in Fort Lee, Virginia. The geotechnical engineering services were conducted in general accordance with the **G E T** Proposal No. PVB09-469G dated October 2, 2009. Authorization to proceed with our services was received from Mr. Paul Garrison, PE, CEM, LEED AP, with AECOM in the form of a signed Agreement of Subconsulting Services dated October 19, 2009.

1.2 Project Description

This project consists of constructing a standard medium Training Aids Support Center (TSC) located in Fort Lee, Virginia. It is assumed that the proposed building will be one-story high and will be used as a warehouse. Associated paved parking areas, roadways and other infrastructure components will also be constructed at the site. The maximum column and wall foundation loads associated with the structure are expected to be on the order of 50 kips and 2 kips per linear foot, respectively. The floor loads are expected to be on the order of about 150 PSF. It is assumed that 1 to 2 feet of fill will be required in order to establish the finish floor elevation.

If any of the noted information is incorrect or has changed, please inform **G E T Solutions, Inc.** so that we may amend the recommendations presented in this report, if appropriate.

1.3 Purpose and Scope of Services

The purpose of this feasibility study was to obtain information on the general subsurface conditions at the proposed project site. The subsurface conditions encountered were then evaluated with respect to the available project characteristics. In this regard, engineering assessments for the following items were formulated:

1. General assessment of the soils revealed by the borings performed at the proposed development.
2. General location and description of potentially deleterious material encountered in the borings that may interfere with construction progress or structure performance, including existing fills or surficial/subsurface organics.
3. Soil subgrade preparation, including stripping, grading and compaction. Engineering criteria for placement and compaction of approved structural fill material.
4. Construction considerations for fill placement, subgrade preparation, and foundation excavations.

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5. Evaluation of the on-site soils for re-use as structural fill.
6. Feasibility of utilizing a shallow foundation system for support of the proposed structure. Preliminary design parameters required for the foundation system, including foundation sizes, allowable bearing pressures, foundation levels and expected total and differential settlements.
7. Typical pavement sections based on the field exploration activities (2 CBR tests and associated soil borings) and our experience with similar soil conditions.
8. Seismic site class determination in accordance with the 2006 International Building Code.

The scope of services did not include an environmental assessment for determining the presence or absence of wetlands or hazardous or toxic material in the soil, bedrock, surface water, groundwater or air, on or below or around this site. Prior to development of this site, an environmental assessment is advisable.

2.0 FIELD AND LABORATORY PROCEDURES

2.1 Field Exploration

In order to explore the general subsurface soil types and to aid in developing associated foundation and pavement design parameters, the following exploration was performed in the proposed construction area:

- Four (4) 35- and 50-foot deep Standard Penetration Test (SPT) borings (designated as B-1 through B-4) were drilled within the vicinity of the proposed structure.
- Two (2) 15-foot deep SPT borings (designated as B-5 and B-6) were drilled within the proposed parking areas. In addition one bulk soil sample was collected at each boring location from the approximate subgrade elevations, corresponding to depths ranging from about 0.3 to 2 feet below existing grades. The bulk soil samples were returned to our laboratory and subjected to CBR testing in accordance with VTM standards.
- One (1) 25-foot deep temporary groundwater well was installed to determine static groundwater level.

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The SPT borings were performed with the use of rotary wash “mud” drilling procedures in general accordance with ASTM D 1586. The tests were performed continuously from the existing ground surface to depths of 12 feet, and at 5-foot intervals thereafter. The soil samples were obtained with a standard 1.4” I.D., 2” O.D., 30” long split-spoon sampler. The sampler was driven with blows of a 140 lb. hammer falling 30 inches. The number of blows required to drive the sampler each 6-inch increment of penetration was recorded and is shown on the boring logs. The sum of the second and third penetration increments is termed the SPT N-value. A representative portion of each disturbed split-spoon sample was collected with each SPT, placed in a glass jar, sealed, labeled, and returned to our laboratory for review.

One (1) thin-walled tube sample Shelby tube was attempted to be extracted from the very stiff CLAY stratum at depths ranging from 6 to 8 feet below grades at the location of boring B-5. However, due to the very stiff consistency of the CLAY stratum the Shelby tube could not be extracted.

The boring locations were established and staked in the field by a representative of **G E T Solutions, Inc.** The approximate boring locations are shown on the attached “Boring Location Plan” (Appendix I), which was reproduced based on the site plan provided by the client.

2.2 Laboratory Testing

Representative portions of all soil samples collected during drilling were sealed in glass jars, labeled and transferred to our laboratory for classification and analysis. The soil classification was performed by a Geotechnical Engineer in accordance with ASTM D2488.

Four (4) representative soil samples were selected and subjected to laboratory testing which included natural moisture, -#200 sieve wash and Atterberg Limits testing and analysis, in order to corroborate the visual classification. These test results are provided in the following table (Table I) and are presented on the “Log of Boring” sheets (Appendix II), included with this report.

Table I - Laboratory Test Results

Location	Depth (feet)	Natural Moisture (%)	% Passing #200	Atterberg Limits (LL/PL/PI)	USCS Classification
B-1	13-15	26	21	Non-Plastic	SM
B-2	2-4	28	70	66/27/39	CH
B-3	38-40	33	80	55/33/22	MH
B-4	13-15	27	85	42/17/25	CL

In addition, the bulk soil samples were subjected to Atterberg Limits, natural moisture content, - # 200 sieve, standard Proctor, and CBR testing in accordance with ASTM and VTM standards. A summary of the CBR test results and the moisture density relationship curves (Proctor Curves) are presented in Appendix IV

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3.0 SITE AND SUBSURFACE CONDITIONS**3.1 Site Location and Description**

The project site is located in a wooded area on the eastern quadrant of the intersection of Byrd Avenue and 1st Street, adjacent to Building # 1107, in Fort Lee, Virginia. The project site currently consists of grassy areas, a parking area and sidewalks. The site is relatively level with elevation changes of less than 1 vertical foot per 50 horizontal feet.

3.2 Site Geology

The project site lies within a major physiographic province called the Atlantic Coastal Plain. Numerous transgressions and regressions of the Atlantic Ocean have deposited marine, lagoonal, and fluvial (stream lain) sediments. The regional geology is very complex, and generally consists of interbedded layers of varying mixtures of sands, silts and clays. Based on our review of existing geologic and soil boring data, the geologic stratigraphy encountered in our subsurface explorations generally consisted of marine deposited sands and clays.

3.3 Subsurface Soil Conditions

A summary of the subsurface soil conditions at the site is presented in Table II.

Table II - Subsurface Soil Conditions

AVERAGE DEPTH (Feet)	STRATUM	DESCRIPTION	RANGES OF SPT ⁽¹⁾ N-VALUES
0 to 0.5	Topsoil	3 to 6 inches of topsoil	--
0.5 to 2-4	Possible Fill	CLAY (CL) and SAND (SC, SM) at the location of borings B-1, B-3, B-4 and B-6	2 - 11
0.3-4 to 6-8	I	CLAY (CH) with varying amounts of Sand. <i>* This layer was not encountered at the location of boring B-6</i>	7 - 27
6-8 to 34-44	II	SAND (SM, SP-SM, SC) with varying amounts of Silt and Clay. <i>* Deposits of medium stiff to very stiff CLAY (CL, CH) were recovered from this layer from borings B-4 and B-6. * Borings B-4 through B-6 were terminated within this layer.</i>	2 - 35
34-44 to 35-50	III	CLAY (CL, CL-ML) with varying amounts of Sand <i>* A deposit of medium dense to very dense SAND (SP-SM) and very stiff SILT (MH) was recovered from this layer at the location of boring B-3.</i>	10 - 26

Note (1) SPT = Standard Penetration Test, N-Values in Blows-per-foot

The subsurface description is of a generalized nature provided to highlight the major soil strata encountered. The records of the subsurface exploration are included in Appendix II (Log of Boring sheets) and in the Generalized Soil Profile presented in Appendix III, which should be reviewed for specific information as to the individual borings. The stratifications shown on the records of the subsurface exploration represent the conditions only at the actual boring locations. Variations may occur and should be expected between boring locations. The stratifications represent the approximate boundary between subsurface materials and the transition may be gradual.

3.4 Shrink/Swell Characteristics

The soils recovered during our field exploration were tested and evaluated for their potential to expand or contract with moisture changes (typically termed shrink-swell). Shallow foundations constructed on expansive soils (Clays) at certain depths may be subjected to detrimental uplift forces caused by the swelling of these soils as a result of an increase in the moisture content. As these clays loose moisture they may conversely shrink. This situation can adversely affect the foundation.

The most important fact to remember is that swelling and shrinking will only take place if moisture changes occur, which can be induced by change in weather conditions, leaky pipes, poor drainage and site layout (i.e. reduction of trees, elevation change etc.). The depth of the soil influenced by weather conditions is termed the "active depth", which will vary due to weather changes, locality and the presence or absence of ground water. Soils encountered below the active zone may possess the characteristics for potential shrink/swell, but since the water content of the soil is constant volume changes will not take place. The local active depth associated with the change in weather conditions generally extends to about 3 to 10 feet below existing grades depending on the region, and site topography.

Many researchers have developed relationships between the shrink/swell potential and various soil properties. Liquid Limit (LL) and Plasticity Index (PI) testing are commonly used as indicators of shrink/swell potential, with the higher PI's resulting in higher shrink/swell potential. Several publications recognize soils with PI's of 25 or more as marginal to high potential shrink/swell soils, conversely soils with PI's of 24 or less are considered to be of low shrink/swell potential.

3.5 On-site Shrink/Swell Properties

The cohesive soils encountered at depths up to 10 feet below existing grades are considered to have a moderate to high shrink/swell potential as indicated by the classification testing of the recovered soils. Accordingly, the foundation design criteria required to accommodate shrink/swell concerns consists of embedding the footings beneath the active zone, as presented in this report (footing embedment of 48 inches or more).

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In order to minimize shrink/swell concerns and possibilities, the following preventive measures are typically practiced:

- Do not plant deep-rooted trees and shrubs within 10 feet of the foundations.
- Moderately moisten the soils within 5 feet of the foundations during hot weather conditions.
- Tie roof drains to the storm water system and situate downspouts in such a manner as to prevent ponding water near the foundation.

3.6 Groundwater Information

The groundwater level was recorded at the boring locations and as observed through the relative wetness of the recovered soil samples during the drilling operations. The initial groundwater table was determined to occur at a depth of roughly 23 feet below current grades at the boring locations at the time of our site reconnaissance. The groundwater table was not observed at the location of borings B-5 and B-6 (boring termination depth of 15 feet below grades). As an exception, the groundwater table reading measured at boring B-3 was 13 feet below grades. This groundwater reading seems relatively shallow compared to the other measurements. This shallow measurement could be the result of perched groundwater conditions. The boreholes were backfilled upon completion for safety considerations, thus these readings may not be indicative of the static groundwater level.

A 25-foot groundwater monitoring well was installed at the location of boring B-6. The 24-hour groundwater depth reading at this boring location was measured to be 19 feet below grades.

As subsurface soils begin to dry moisture moves upwards through the soil profile by means of capillary action. Based on the subsurface soil composition (soils containing more than 30% of fines by weight), these initial groundwater readings (based on the relative wetness of the soils) could be in part attributed to the capillary action of the soils. As such, if the static groundwater elevation is critical to the design of the proposed structure and site infrastructure it is recommended to install temporary groundwater monitoring wells to substantiate these initial readings.

Groundwater conditions will vary with environmental variations and seasonal conditions, such as the frequency and magnitude of rainfall patterns, as well as man-made influences, such as existing swales, drainage ponds, underdrains and areas of covered soil (paved parking lots, side walks, etc.). In the project's area, seasonal groundwater fluctuations of ± 2 feet are common; however, greater fluctuations have been documented. We recommend that the contractor determine the actual groundwater levels at the time of the construction to determine groundwater impact on the construction procedures, if necessary.

4.0 PRELIMINARY EVALUATION AND RECOMMENDATIONS

Our recommendations are based on the previously discussed project information, our interpretation of the soil test borings, laboratory data and our observations during our site reconnaissance. If the proposed construction should vary from what was described, we request the opportunity to review our recommendations and make any necessary changes.

4.1 Clearing and Grading

The proposed construction areas should be cleared by means of removing all topsoil, root mat, and any otherwise unsuitable materials. It is estimated that a cut of up to 8 inches in depth will be required to remove the topsoil materials. This cut is expected to extend deeper in isolated areas to remove deeper deposits of unsuitable soils, which become evident during the clearing. It is recommended that the clearing operations extend laterally at least 5 feet beyond the perimeter of the proposed construction area.

The results of our field exploration program indicated that the surface soils were comprised of soils containing appreciable amounts of fines (Silt and Clay). Accordingly, combinations of excess surface moisture from precipitation ponding on the site and the construction traffic, including heavy compaction equipment, may create pumping and general deterioration of the bearing capabilities of the surface soils. Therefore, undercutting to remove very soft soils should be anticipated. The extent of the undercut will be determined in the field during construction based on the outcome of the field testing procedures (subgrade proofroll). In this regard, and in order to reduce undercutting, care should be exercised during the grading and construction operations at the site.

Inherently wet subgrade soils combined with potential poor site drainage make this site particularly susceptible to subgrade deterioration. Thus, grading should be performed during a dry season if at all possible. This should minimize these potential problems, although they may not be eliminated. The project's budget should include an allowance for subgrade improvements (undercut and backfill with structural fill or aggregate base in the building and pavement areas).

4.2 Subgrade Preparation

Following the clearing operation, the exposed subgrade soils should be densified with a large static drum roller. After the subgrade soils have been densified, they should be evaluated by **G E T Solutions, Inc.** for stability. Accordingly, the subgrade soils should be proofrolled to check for pockets of loose material hidden beneath a crust of better soil. Several passes should be made by a large rubber-tired roller or loaded dump truck over the construction areas, with the successive passes aligned perpendicularly. The number of passes will be determined in the field by the Geotechnical Engineer depending on the soils conditions. Any pumping and unstable areas observed during proofrolling (beyond the initial cut) should be undercut and/or stabilized at the directions of the Geotechnical Engineer.

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In addition to the proofroll, several 2- to 6-foot deep test pits should be excavated in the vicinity of boring locations B-1, B-3, B-4 and B-6. The test pits are considered necessary to determine the thickness and composition of the Possible FILL material. The test pits should be performed under the observation of a representative **G E T Solutions, Inc.**, who will evaluate the composition of the recovered soils. Considering the cohesive nature of the subsurface soils some improvements should be anticipated. Recommendations concerning the subgrade improvements will be provided in the field following the testing procedures. These improvements generally consist of subgrade undercut and replacement with structural fill or aggregate base material.

4.3 Structural Fill and Placement

Following the approval of the natural subgrade soils by the Geotechnical Engineer, the placement of the fill required to establish the design grades may begin. Any material to be used for structural fill should be evaluated and tested by **G E T Solutions, Inc.** prior to placement to determine if they are suitable for the intended use. Suitable structural fill material should consist of sand or gravel containing less than 25% by weight of fines (SP, SM, SW, GP, GW), having a liquid limit less than 20 and plastic limit less than 6, and should be free of rubble, organics, clay, debris and other unsuitable material.

All structural fill should be compacted to a dry density of at least 98 percent of the Modified Proctor maximum dry density (ASTM D1557). In general, the compaction should be accomplished by placing the fill in maximum 10-inch loose lifts and mechanically compacting each lift to at least the specified minimum dry density. A representative of **G E T Solutions, Inc.** should perform field density tests on each lift as necessary to assure that adequate compaction is achieved.

Backfill material in utility trenches within the construction areas should consist of structural fill (as previously described), and should be compacted to at least 98 percent of ASTM D1557. This fill should be placed in 4 to 6 inch loose lifts when hand compaction equipment is used.

Care should be used when operating the compactors near existing structures to avoid transmission of the vibrations that could cause settlement damage or disturb occupants. In this regard, it is recommended that the vibratory roller remain at least 25 feet away from existing structures; these areas should be compacted with small, hand-operated compaction equipment.

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4.4 Suitability of On-site Soils

The shallow subsurface CLAY (CL), SAND (SC) soils and Possible FILL material encountered at the boring locations do not appear to meet the criteria recommended in this report for reuse as structural fill, but may be used as fill within green areas. The subsurface SAND (SM) soils encountered at the location of borings B-1, B-2, B-5 and B-6 at depths below 6 to 8 feet below grades appear suitable for reuse as structural fill. Further classification testing (natural moisture content, gradation analysis, and Proctor testing) should be performed in the field during construction to evaluate the suitability of excavated soils for reuse as fill within building and pavement areas.

4.5 Foundation Design Recommendations

Provided that the construction procedures are properly performed, the proposed structure can be supported by shallow spread footings bearing upon firm natural soil or well compacted structural fill material. Depending on the outcome of the field testing procedures some foundation undercut may be required to penetrate Possible FILL materials (please see Section 4.7 for further information concerning the foundation undercut). The footings can be designed using a net allowable soil pressure of 2,500 pounds per square foot (psf). In using net pressures, the weight of the footings and backfill over the footings, including the weight of the floor slab, need not be considered. Hence, only loads applied at or above the finished floor need to be used for dimensioning the footings.

In order to develop the recommended bearing capacity of 2,500 pounds per square foot (psf), the base of the footings should have an embedment of at least 48 inches beneath finished grades and wall footings should have a minimum width of 24 inches. In addition, isolated square column footings are recommended to be a minimum of 3 feet by 3 feet in area for bearing capacity consideration. The recommended 48-inch footing embedment is considered sufficient to provide adequate cover against frost penetration to the bearing soils and for shrink/swell considerations.

4.6 Settlements

It is estimated that, with proper site preparation, the maximum resulting total settlement of the foundations should be up to 1 inch. The maximum differential settlement magnitude is expected to be less than 1/2-inch between adjacent footings (wall footings and column footings of widely varying loading conditions). The settlements were estimated on the basis of the results of the field penetration tests. Careful field control will contribute substantially towards minimizing the settlements.

4.7 Foundation Excavations

In preparation for shallow foundation support, the footing excavations should extend into firm natural soil or well compacted structural fill (all unsuitable fill soils should be removed from beneath the base of the footings). All foundation excavations should be observed by **G E T Solutions, Inc.** At that time, the Geotechnical Engineer should also explore the extent of excessively loose, soft, or otherwise unsuitable material within the exposed excavations. Also, at the time of the footing observations, the Geotechnical Engineer may find it necessary to make hand auger borings or use a hand penetration device in the bases of the foundation excavations. The necessary depth of penetration will be established during the subgrade observations. As such, undercutting some of the Possible FILL/FILL materials present at the base of the proposed footings (up to 6 feet in some cases) should be expected.

If pockets of unsuitable soils requiring undercut are encountered in the footing excavations, the proposed footing elevation should be re-established by means of backfilling with "flowable fill" or a suitable structural fill material compacted to a dry density of at least 98 percent of the Modified Proctor maximum dry density (ASTM D1557), as described in Section 4.3 of this report, prior to concrete placement. This construction procedure will provide for a net allowable bearing capacity of 2,500 psf.

Immediately prior to foundation concrete placement, it is suggested that the bearing surfaces of all foundation be compacted using hand operated mechanical tampers. In this manner, any localized areas, which have been loosened by excavation operations, should be adequately recompacted. The compaction testing in the base of the foundation may be waived by the Geotechnical Engineer, where firm bearing soils are observed during the foundation inspections.

Soils exposed in the bases of all satisfactory foundation excavations should be protected against any detrimental change in condition such as from physical disturbance, rain or frost. Surface run-off water should be drained away from the excavations and not be allowed to pond. If possible, all footing concrete should be placed the same day the excavation is made. If this is not possible, the footing excavations should be adequately protected.

4.8 Slab-on-Grade

The floor slab may be constructed as a slab-on-grade member provided the previously recommended earthwork activities and evaluations are carried out properly. It is recommended that all ground floor slabs be directly supported by at least a 4-inch layer of relatively clean, compacted, poorly graded sand (SP) or gravel (GP) with less than 5% passing the No. 200 Sieve (0.074 mm). The purpose of the 4-inch layer is to act as a capillary barrier and equalize moisture conditions beneath the slab.

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Fort Lee, Virginia

G E T Project No: VB09-281G

It is recommended that all ground floor slabs be "floating". That is, generally ground supported and not rigidly connected to walls or foundations. This is to minimize the possibility of cracking and displacement of the floor slabs because of differential movements between the slab and the foundation.

It is also recommended that the floor slab bearing soils be covered by a vapor barrier or retarder in order to minimize the potential for floor dampness, which can affect the performance of glued tile and carpet. Generally, use a vapor retarder for minimal vapor resistance protection below the slab on grade. When floor finishes, site conditions or other considerations require greater vapor resistance protection; consideration should be given to using a vapor barrier. Selection of a vapor retarder or barrier should be made by the architect based on project requirements.

4.9 Pavement Design

The California Bearing Ratio (CBR) test results indicated an average soaked CBR value of 11.0. The average soaked CBR value was multiplied by a factor of two-thirds to determine a pavement design CBR value. The two-thirds factor provides the necessary safety margin to compensate for some non-uniformity of the soil. Therefore, a CBR value of 7.3 should be used in designing the pavement sections. The following pavement sections are typically used in this area:

Flexible Pavement:

Light Duty

SUBGRADE:	Stable, compacted to at least 95% of the standard Proctor maximum dry density, lined with Geotextile Fabric (Mirafi 500x or equivalent) and approved by the Geotechnical Engineer.
AGGREGATE BASE:	Minimum 8.0 inches of Aggregate Base Material meeting 21-A of 21-B gradation.
ASPHALT SURFACE:	Minimum 2.0 inches of Asphalt Concrete, SM-9.5A.

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Fort Lee, Virginia

G E T Project No: VB09-281G

Heavy Duty

SUBGRADE: Stable, compacted to at least 95% of the standard Proctor maximum dry density, lined with Geotextile Fabric (Mirafi 500x or equivalent) and approved by the Geotechnical Engineer.

AGGREGATE BASE: Minimum 8.0 inches of Aggregate Base Material meeting 21-A of 21-B gradation.

ASPHALT BASE: Minimum 3.0 inches of Asphalt Concrete, BM-25.0.

ASPHALT SURFACE: Minimum 2.0 inches of Asphalt Concrete, SM-9.5A.

Actual pavement section thickness should be provided by the design civil engineer based on traffic loads, volume, and the owners design life requirements. The above sections correspond to thickness representative of typical local construction practices and as such periodic maintenance should be anticipated.

In preparation for a stable subgrade support for the pavement section, the following construction steps are recommended:

1. Following pavement rough grading operations, the exposed subgrade should be observed under proofrolling. This proofrolling should be accomplished with a fully loaded dump truck or 7 to 10 ton drum roller to check for pockets of soft material hidden beneath a thin crust of better soil. Any unsuitable materials thus exposed should be removed and replaced with a well-compacted material. The inspection of these phases should be performed by the Geotechnical Engineer or his representative. Based on our laboratory test results and our experience with similar subgrade soils, some subgrade improvements are anticipated and a contingency fund to handle undercutting and backfilling should be included in the budget (unit rates for undercut and backfill with compacted structural fill, compacted aggregate base and compacted base mix asphalt).
2. Where excessively unstable subgrade soils are observed during proofrolling and/or fill placement, it is expected that these weak areas can be stabilized by means of adding geotextile fabric and/or thickening the base course layer to 10 to 12 inches (i.e. placement of 2 to 4 inches of additional aggregate base over fabric). Another option consists of undercutting the unstable area 12 to 18 inches and backfilling with select fill. These alternates are to be addressed by the Geotechnical Engineer during construction, if necessary, who will recommend the most economical approach at the time.

Report of Subsurface Investigation & Geotechnical Engineering Services

Training Support Center-PN 71114-Feasibility Study

Fort Lee, Virginia

G E T Project No: VB09-281G

4.10 Seismic Evaluation

Based on our experience with neighboring projects, the subject project sites can be considered as a Site Class "D", in accordance with Table 1615.1.1 of the 2006 International Building Code.

5.0 CONSTRUCTION CONSIDERATIONS**5.1 Drainage and Groundwater Concerns**

It is expected that dewatering may be required for excavations that extend near or below the existing groundwater table. Dewatering above the groundwater level could probably be accomplished by pumping from sumps. Dewatering at depths below the groundwater level may require well pointing.

It would be advantageous to construct all fills early in the construction. If this is not accomplished, disturbance of the existing site drainage could result in collection of surface water in some areas, thus rendering these areas wet and very loose. Temporary drainage ditches should be employed by the contractor to accentuate drainage during construction. We recommend that the contractor determine the actual groundwater levels at the time of construction to determine groundwater impact on this project.

5.2 Site Utility Installation

The base of the utility trenches should be observed by a qualified inspector prior to the pipe and structure placement to verify the suitability of the bearing soils. Based on the results of our field exploration program it is expected that the utilities and structures located at depths greater than about 23 feet below current grades will bear in wet granular soils. In these instances the bearing soils will likely require some stabilization to provide suitable bedding. This stabilization is typically accomplished by providing additional bedding materials (VDOT No. 57 stone). In addition depending on the depth of the utility trench excavation, some means of dewatering may be required to facilitate the utility installation and associated backfilling.

The resulting excavations should be backfilled with structural fill, as described in Section 4.3 of this report. The granular soils encountered at depths in excess of 6 feet at some of the boring locations are expected to be suitable for backfill; however, the soils within the upper 6 feet do not appear to meet the select fill criteria presented in this report.

Report of Subsurface Investigation & Geotechnical Engineering Services

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Fort Lee, Virginia

G E T Project No: VB09-281G

5.3 Excavations

In Federal Register, Volume 54, No. 209 (October, 1989), the United States Department of Labor, Occupational Safety and Health Administration (OSHA) amended its "Construction Standards for Excavations, 29 CFR, part 1926, Subpart P". This document was issued to better insure the safety of workmen entering trenches or excavations. It is mandated by this federal regulation that all excavations, whether they be utility trenches, basement excavation or footing excavations, be constructed in accordance with the new (OSHA) guidelines. It is our understanding that these regulations are being strictly enforced and if they are not closely followed, the owner and the contractor could be liable for substantial penalties.

The contractor is solely responsible for designing and constructing stable, temporary excavations and should shore, slope, or bench the sides of the excavations as required to maintain stability of both the excavation sides and bottom. The contractor's responsible person, as defined in 29 CFR Part 1926, should evaluate the soil exposed in the excavations as part of the contractor's safety procedures. In no case should slope height, slope inclination, or excavation depth, including utility trench excavation depth, exceed those specified in local, state, and federal safety regulations.

We are providing this information solely as a service to our client. **G E T Solutions, Inc.** is not assuming responsibility for construction site safety or the contractor's activities; such responsibility is not being implied and should not be inferred.

6.0 REPORT LIMITATIONS

The recommendations submitted are based on the available soil information obtained by **G E T Solutions, Inc.** and the information supplied by the client and their consultants for the proposed project. If there are any revisions to the plans for this project or if deviations from the subsurface conditions noted in this report are encountered during construction, **G E T Solutions, Inc.** should be notified immediately to determine if changes in the foundation recommendations are required. If **G E T Solutions, Inc.** is not retained to perform these functions, **G E T Solutions, Inc.** can not be responsible for the impact of those conditions on the geotechnical recommendations for the project.

The Geotechnical Engineer warrants that the findings, recommendations, specifications or professional advice contained herein have been made in accordance with generally accepted professional geotechnical engineering practices in the local area. No other warranties are implied or expressed.

Report of Subsurface Investigation & Geotechnical Engineering Services

Training Support Center-PN 71114-Feasibility Study

Fort Lee, Virginia

G E T Project No: VB09-281G

After the plans and specifications are more complete the Geotechnical Engineer should be provided the opportunity to review the final design plans and specifications to assure our engineering recommendations have been properly incorporated into the design documents, in order that the earthwork and foundation recommendations may be properly interpreted and implemented. At that time, it may be necessary to submit supplementary recommendations. This report has been prepared for the exclusive use of the client and their consultants for the specific application to the proposed Training Support Center-PN 71114 in Fort Lee, Virginia.

APPENDICES

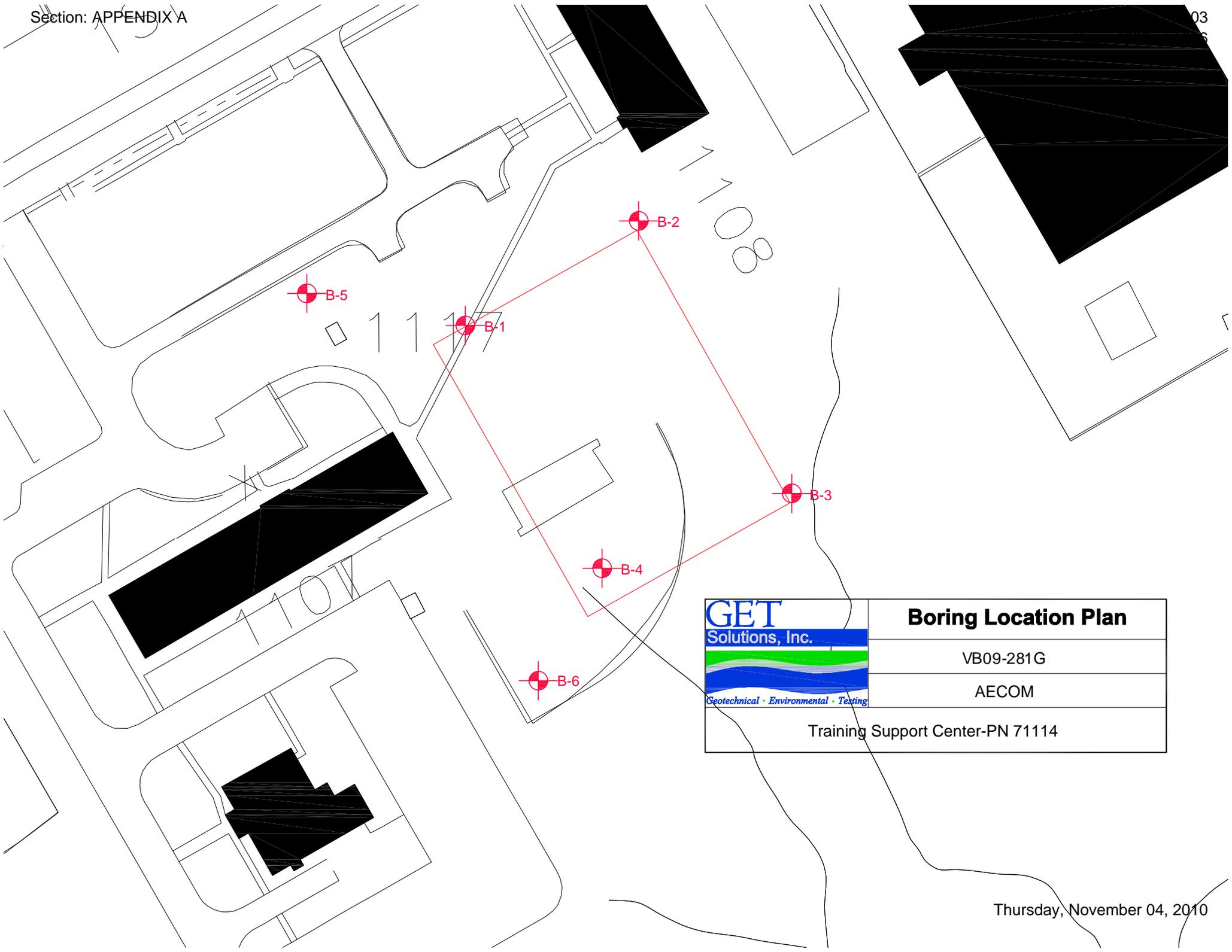
I.
BORING LOCATION PLAN

II.
LOG OF BORINGS

III.
GENERALIZED SOIL PROFILE

IV.
SUMMARY OF CBR TEST RESULTS

APPENDIX I
BORING LOCATION PLAN



Boring Location Plan

VB09-281G

AECOM

Training Support Center-PN 71114

APPENDIX II
LOG OF BORINGS



PROJECT: Training Support Center-PN 71114

CLIENT: AECOM

PROJECT LOCATION: Fort Lee, Virginia

PROJECT NO.: VB09-281G

BORING LOCATION: See Attached Boring Location Plan

SURFACE ELEVATION:

DRILLER: GET Solutions, Inc.

LOGGED BY: J. Robinson, EIT

DRILLING METHOD: Rotary Wash "Mud" Drilling

DATE: 11/9/2009

DEPTH TO WATER - INITIAL*: ∇ 23 AFTER 24 HOURS: ∇

CAVING: C

BORING LOG B-1

This information pertains only to this boring and should not be interpreted as being indicative of the site.

Elevation (MSL) (ft)	Depth (meters)	Depth (feet)	Description	Graphic	Sample No.	Sample Recovery	Sample Type	Blows per 6"	N-Value	% < #200	TEST RESULTS	
											Plastic Limit	Liquid Limit
0	0	0	3" Topsoil					4				
		0.3	Orange, moist, Lean CLAY (CL) with trace to little fine Sand, medium stiff		1	19	SS	5 3 3	8			
			Possible FILL					4				
		2	Mottled orange and tan, moist, Fat CLAY (CH) with trace fine Sand, stiff to very stiff		2	20	SS	5 7 8	12			
	5				3	24	SS	6 7 10 12	17			
	2	6	Mottled orange and tan, moist, Clayey fine SAND (SC), medium dense		4	22	SS	12 12 13 12	25			
		9	Orange, moist to wet, Silty fine to medium SAND (SM) with varying amounts of Clay, loose to medium dense		5	20	SS	10 10 10 12	20			
	10				6	20	SS	6 5 6 9	11			
	4				7	20	SS	4 4 3 3	7	21	●	
	15											
	6	20			8	17	SS	6 6 7 7	13			
					9	17	SS	2 3 5 8	8			
	8	25										
			Mottled orange and gray, wet, Poorly graded fine to coarse SAND (SP-SM) with Silt, medium dense		10	18	SS	3 4 7 6	11			
	30											
	10		Mottled orange and tan, wet, Silty fine SAND (SM), loose to medium dense		11	20	SS	5 7 10 11	17			
	35											
								3 3				

Notes:

*The initial groundwater reading may not be indicative of the static groundwater level.

SS = Split Spoon Sample
ST = Shelby Tube Sample
BS = Bulk Sample
WOH = Weight of Hammer

Thursday, November 05, 2010



PROJECT: Training Support Center-PN 71114

CLIENT: AECOM

PROJECT LOCATION: Fort Lee, Virginia

PROJECT NO.: VB09-281G

BORING LOCATION: See Attached Boring Location Plan

SURFACE ELEVATION:

DRILLER: GET Solutions, Inc.

LOGGED BY: J. Robinson, EIT

DRILLING METHOD: Rotary Wash "Mud" Drilling

DATE: 11/10/2009

DEPTH TO WATER - INITIAL*: 23 AFTER 24 HOURS:

CAVING: C

BORING LOG B-2

This information pertains only to this boring and should not be interpreted as being indicative of the site.

Elevation (MSL) (ft)	Depth (meters)	Depth (feet)	Description	Graphic	Sample No.	Sample Recovery	Sample Type	Blows per 6"	N-Value	% < #200	TEST RESULTS	
											Plastic Limit	Liquid Limit
0	0	0	3" Topsoil					3				
		0.3	Mottled orange and gray, moist, Fat CLAY (CH) with trace to some fine Sand, stiff to very stiff		1	19	SS	6	9			
					2	22	SS	7	23			
		4	Mottled orange and gray, moist, Clayey fine to medium SAND (SC), medium dense		3	21	SS	10	15			
	5				4	20	SS	12	23			
	2		Mottled orange and gray, moist, Silty fine to medium SAND (SM) with varying amounts of Clay, loose to medium dense		5	21	SS	11	22			
		6			6	20	SS	9	14			
	10				7	17	SS	11	9			
	4				8	15	SS	11	8			
	15				9	20	SS	6	7			
	6				10	18	SS	4	13			
	20				11	20	SS	4	7			
	23		Mottled orange and gray, wet, Poorly graded fine to coarse SAND (SP-SM) with Silt, loose to medium dense		9	20	SS	4	7			
	8				10	18	SS	4	13			
	25				11	20	SS	8	18			
	30							9	18			
	10		Mottled orange and gray, wet, Lean CLAY (CL) with trace fine Sand, very stiff					7	18			
	35		Boring terminated at 35 ft.					11				

Notes:

*The initial groundwater reading may not be indicative of the static groundwater level.

SS = Split Spoon Sample
ST = Shelby Tube Sample
BS = Bulk Sample
WOH = Weight of Hammer

Thursday, November 10, 2009



PROJECT: Training Support Center-PN 71114

CLIENT: AECOM

PROJECT LOCATION: Fort Lee, Virginia

PROJECT NO.: VB09-281G

BORING LOCATION: See Attached Boring Location Plan

SURFACE ELEVATION:

DRILLER: GET Solutions, Inc.

LOGGED BY: J. Robinson, EIT

DRILLING METHOD: Rotary Wash "Mud" Drilling

DATE: 11/10/2009

DEPTH TO WATER - INITIAL*: 13 AFTER 24 HOURS:

CAVING: C

BORING LOG B-3

This information pertains only to this boring and should not be interpreted as being indicative of the site.

Elevation (MSL) (ft)	Depth (meters)	Depth (feet)	Description	Graphic	Sample No.	Sample Recovery	Sample Type	Blows per 6"	N-Value	% < #200	TEST RESULTS	
											Plastic Limit	Liquid Limit
0	0	0	6" Topsoil									
		0.5	Brown, moist, Sandy lean CLAY (CL) with fibrous organics, soft Possible FILL		1	20	SS	1 2 2 1	4			
		2	Brown, moist, Clayey fine to medium SAND (SC), very loose Possible FILL		2	19	SS	1 1 1 1	2			
		4	Mottled orange and gray, moist, Fat CLAY (CH) with trace to little fine Sand, medium stiff		3	24	SS	1 3 4 6	7			
	2	6	Mottled orange and gray, moist, Clayey fine to medium SAND (SC), medium dense		4	24	SS	7 7 9 10 10 8	16			
		10			5	24	SS	10 10 8 7 8	20			
		13	Mottled orange and gray, wet, Silty fine to medium SAND (SM) with trace Clay, very loose to loose		6	24	SS	8 8 7 8	15			
	4	15			7	17	SS	4 5 5 6	10			
		20			8	21	SS	2 1 1 2	2			
	6	25			9	18	SS	3 4 4 5	8			
	8	30	Mottled orange and gray, wet, Poorly graded fine to coarse SAND (SP-SM) with Silt and trace fine to coarse Gravel, dense		10	18	SS	20 20 14 12	34			
		33	Dark gray, wet, Silty Lean CLAY (CL-ML) with trace fine Sand and trace fine to coarse Gravel, stiff		11	10	SS	2 5 5 3	10			
		38	Dark gray, wet, Elastic SILT (MH) with little fine Sand, very stiff					8 11	80			

Notes:

*The initial groundwater reading may not be indicative of the static groundwater level.

SS = Split Spoon Sample
ST = Shelby Tube Sample
BS = Bulk Sample
WOH = Weight of Hammer

Thursday, November 10, 2009



BORING LOG B-3

PROJECT: Training Support Center-PN 71114

PROJECT NO.: W912DY-10-R-0024-003
 VB09-281G
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CLIENT: AECOM

PROJECT LOCATION: Fort Lee, Virginia

LOCATION: See Attached Boring Location Plan

ELEVATION:

DRILLER: GET Solutions, Inc.

LOGGED BY: J. Robinson, EIT

DRILLING METHOD: Rotary Wash "Mud" Drilling

DATE: 11/10/2009

DEPTH TO - WATER> INITIAL: 13

AFTER 24 HOURS: 13

CAVING> C

This information pertains only to this boring and should not be interpreted as being indicative of the site.

Elevation (MSL) (ft)	Depth (meters)	Depth (feet)	Description	Graphic	Sample No.	Sample Recovery	Sample Type	Blows per 6"	N-Value	% < #200	TEST RESULTS	
											Plastic Limit	Liquid Limit
12		40			12	19	SS	16 18	27			
14	45		Light gray, wet, Poorly graded fine to medium SAND (SP-SM) with Silt, medium dense to very dense		13	19	SS	14 26 38 51	64			
16		50	Boring terminated at 50 ft.		14	6	SS	2 4 7 16	11			

Notes:

*The initial groundwater reading may not be indicative of the static groundwater level.

SS = Split Spoon Sample
 ST = Shelby Tube Sample
 BS = Bulk Sample
 WOH = Weight of Hammer
 Thursday, November 10, 2009



PROJECT: Training Support Center-PN 71114

CLIENT: AECOM

PROJECT LOCATION: Fort Lee, Virginia

PROJECT NO.: VB09-281G

BORING LOCATION: See Attached Boring Location Plan

SURFACE ELEVATION:

DRILLER: GET Solutions, Inc.

LOGGED BY: J. Robinson, EIT

DRILLING METHOD: Rotary Wash "Mud" Drilling

DATE: 11/10/2009

DEPTH TO WATER - INITIAL*: 23 AFTER 24 HOURS:

CAVING: C

BORING LOG B-4

This information pertains only to this boring and should not be interpreted as being indicative of the site.

Elevation (MSL) (ft)	Depth (meters)	Depth (feet)	Description	Graphic	Sample No.	Sample Recovery	Sample Type	Blows per 6"	N-Value	% < #200	TEST RESULTS	
											Plastic Limit	Liquid Limit
0	0	0	3" Topsoil					2				
		0.3	Brown, moist, Silty fine SAND (SM) with fibrous organics, loose Possible FILL		1	13	SS	2 3 4	5			
		2	Mottled orange and gray, moist, Fat CLAY (CH) with trace to little fine Sand, very stiff		2	19	SS	9 10 10	20			
	5	4	Mottled orange and gray, moist, Silty fine to medium SAND (SM) with varying amounts of Clay, medium dense		3	19	SS	9 13 16 18	29			
	2				4	20	SS	10 13 12	25			
		8	Mottled orange and gray, moist, Clayey fine to medium SAND (SM), medium dense		5	24	SS	9 10 10	20			
	10	10	Mottled orange and gray, moist, Lean CLAY (CL) with trace to little fine Sand, medium stiff to stiff		6	24	SS	8 7 6 7	13			
	4				7	24	SS	2 3 5 6	8	85		
	15											
		18	Mottled orange and gray, moist to wet, Silty fine to medium SAND (SM), loose to medium dense		8	19	SS	5 5 4 7	9			
	6	20										
		25			9	19	SS	2 4 4 9	8			
	8											
		30			10	20	SS	6 6 5 4	11			
	10											
		35			11	24	SS	2 2 5 6	7			
			Boring terminated at 35 ft.									

Notes:

*The initial groundwater reading may not be indicative of the static groundwater level.

SS = Split Spoon Sample
ST = Shelby Tube Sample
BS = Bulk Sample
WOH = Weight of Hammer

Thursday, November 10, 2010



PROJECT: Training Support Center-PN 71114

CLIENT: AECOM

PROJECT LOCATION: Fort Lee, Virginia

PROJECT NO.: VB09-281G

BORING LOCATION: See Attached Boring Location Plan

SURFACE ELEVATION:

DRILLER: GET Solutions, Inc.

LOGGED BY: J. Robinson, EIT

DRILLING METHOD: Rotary Wash "Mud" Drilling

DATE: 11/10/2009

DEPTH TO WATER - INITIAL*: - AFTER 24 HOURS: -

CAVING: C

BORING LOG B-5

This information pertains only to this boring and should not be interpreted as being indicative of the site.

Elevation (MSL) (ft)	Depth (meters)	Depth (feet)	Description	Graphic	Sample No.	Sample Recovery	Sample Type	Blows per 6"	N-Value	% < #200	TEST RESULTS		
											Plastic Limit	Liquid Limit	
0	0	0	3" Topsoil										
			Tan, moist, Sandy Lean CLAY (CL), medium stiff to very stiff		1	22	SS	4	8	51			
					2	24	SS	4	22				
					3	24	SS	4	22				
	5				4	24	SS	4	27				
					5	24	SS	4	20				
	2				6	19	SS	4	16				
					7	16	SS	3	9				
			Boring terminated at 15 ft.										

Notes:

*The initial groundwater reading may not be indicative of the static groundwater level.

SS = Split Spoon Sample
 ST = Shelby Tube Sample
 BS = Bulk Sample
 WOH = Weight of Hammer

Thursday, November 10, 2009



PROJECT: Training Support Center-PN 71114

CLIENT: AECOM

PROJECT LOCATION: Fort Lee, Virginia

PROJECT NO.: VB09-281G

BORING LOCATION: See Attached Boring Location Plan

SURFACE ELEVATION:

DRILLER: GET Solutions, Inc.

LOGGED BY: J. Robinson, EIT

DRILLING METHOD: Rotary Wash "Mud" Drilling

DATE: 11/10/2009

DEPTH TO WATER - INITIAL*: - AFTER 24 HOURS: -

CAVING: C

BORING LOG B-6

This information pertains only to this boring and should not be interpreted as being indicative of the site.

Elevation (MSL) (ft)	Depth (meters)	Depth (feet)	Description	Graphic	Sample No.	Sample Recovery	Sample Type	Blows per 6"	N-Value	% < #200	TEST RESULTS	
											Plastic Limit	Liquid Limit
0	0	0	4" Topsoil					2		37		
			Tan, moist, Clayey fine to medium SAND (SC), medium dense Possible FILL	0.3	1	24	SS	4 7 8	11			
			Mottled orange and tan, moist, Clayey fine to medium SAND (SC), medium dense	2	2	24	SS	12 11 13 12	24			
	5				3	24	SS	8 10 12 11	22			
	2		Mottled orange and tan, moist, Silty fine to medium SAND (SM) with trace Clay, medium dense to dense	6	4	24	SS	11 17 18 17	35			
	10				5	20	SS	9 14 14 13	28			
	4				6	24	SS	13 15 14 13	29			
	15		Mottled orange and gray, moist, Fat CLAY (CH) with trace fine Sand, stiff	13	7	24	SS	5 5 6 8	11			
			Boring terminated at 15 ft.									

Notes:

*The initial groundwater reading may not be indicative of the static groundwater level.

SS = Split Spoon Sample
ST = Shelby Tube Sample
BS = Bulk Sample
WOH = Weight of Hammer

Thursday, November 10, 2010

Strata symbols

 Topsoil

 Fill

 Fat Clay

 Clayey Sand

 Silty Sand

 Poorly graded Sand
with Silt

 Lean Clay

 Silty Clay

 Elastic Silt

Misc. Symbols

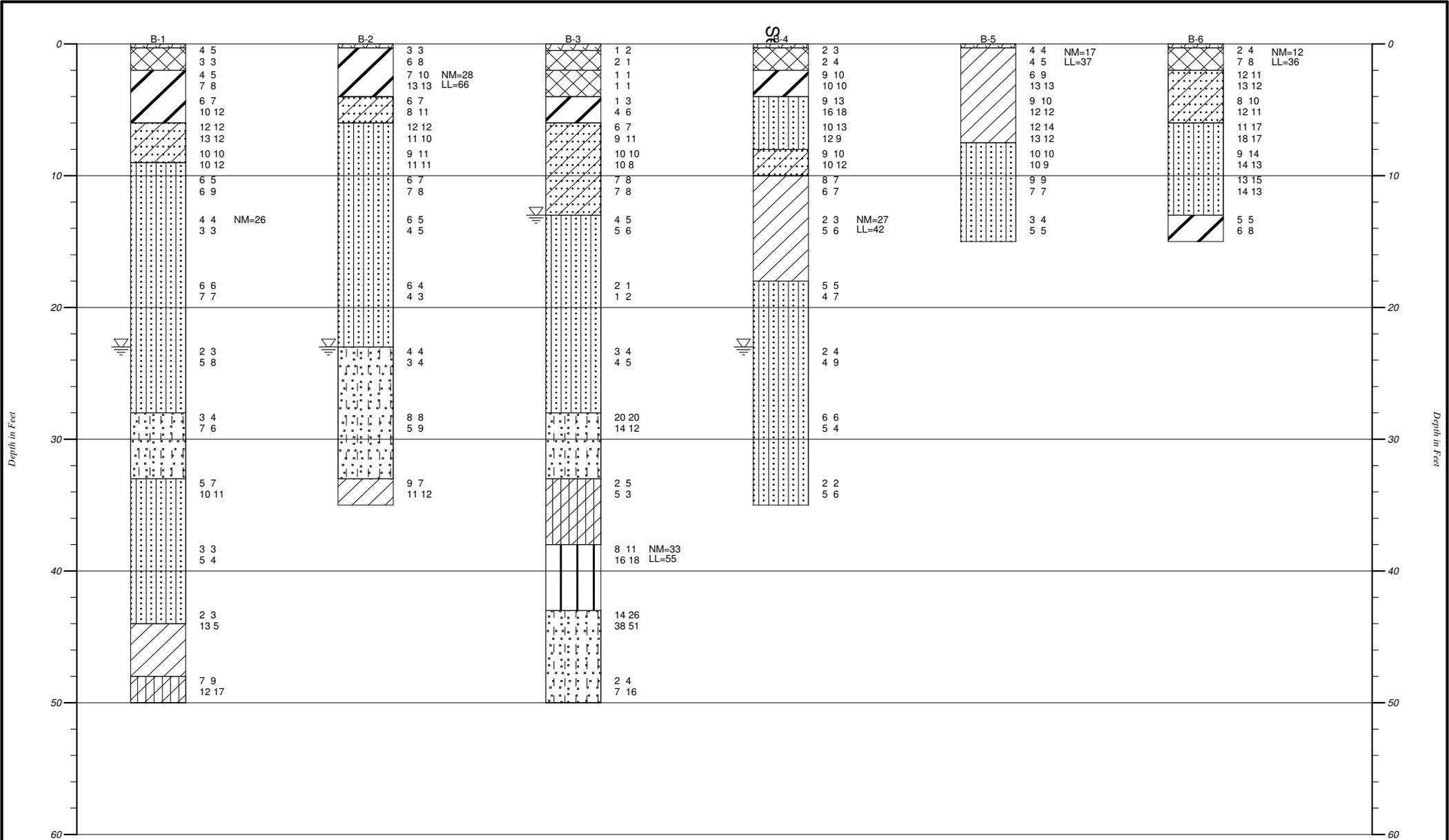
 Water table during
drilling

Notes:

1. Exploratory borings were drilled on 11/10/2009 using a 4-inch diameter continuous flight power auger.
2. No free water was encountered at the time of drilling or when re-checked the following day.
3. Boring locations were taped from existing features and elevations extrapolated from the final design schematic plan.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.

APPENDIX III

GENERALIZED SOIL PROFILE



- Strata symbols**
- Topsoil
 - Fill
 - Fat Clay
 - Clayey Sand
 - Silty Sand
 - Poorly graded Sand with Silt
 - Lean Clay
 - Silty Clay
 - Elastic Silt

GET Solutions, Inc.		
GENERALIZED SOIL PROFILE		
HORIZONTAL SCALE:	DRAWN BY/APPROVED BY	DATE DRAWN
VERTICAL SCALE: 1"=10'	MEM, PE	1/19/2010
Training Support Center-PN 71114		
PROJECT NO. VB09-281G		FIGURE NUMBER

APPENIDIX IV

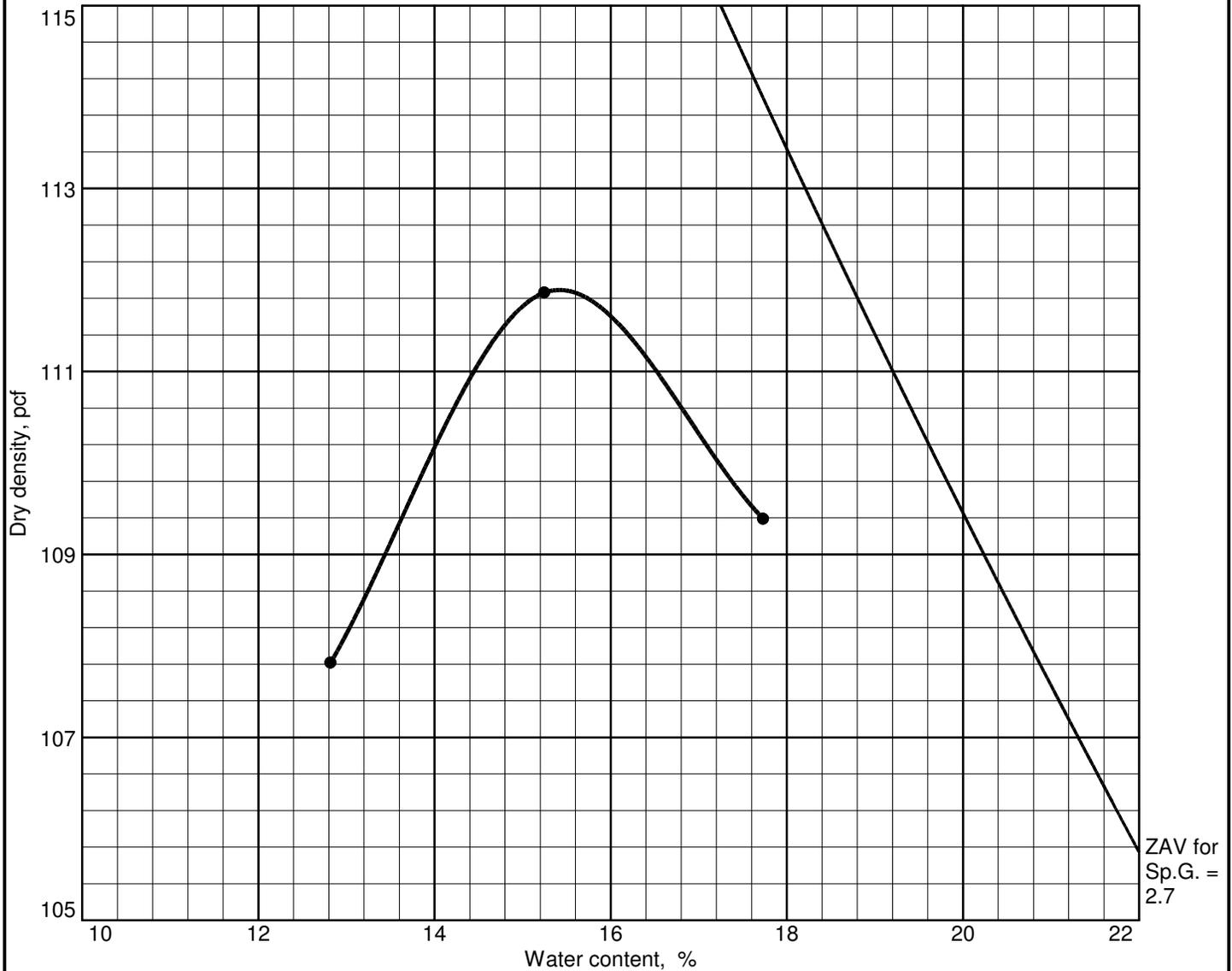
SUMMARY OF CBR TEST DATA

SUMMARY OF CBR TEST RESULTS

Sample Number	CBR-5	CBR-6
Sample Depth (ft.)	0.3-2	0.3-2
Unified Soil Classification Symbol	CL	SC
Natural Moisture Content (%)	17	12
Atterberg Limits LL/PL/PI	37/21/16	36/16/20
% Passing #200 Sieve	51	37
Maximum Dry Density, pcf	111.9	113.8
Optimum Moisture %	15.4	14.6
Soaked CBR Value	10.8	11.2
Resiliency Factor	2.5	3.0

Training Support Center-PN 71114
Feasibility Study
 Fort Lee, Virginia
 G E T Project No: VB09-281G

MOISTURE DENSITY RELATIONSHIP (PROCTOR CURVE)



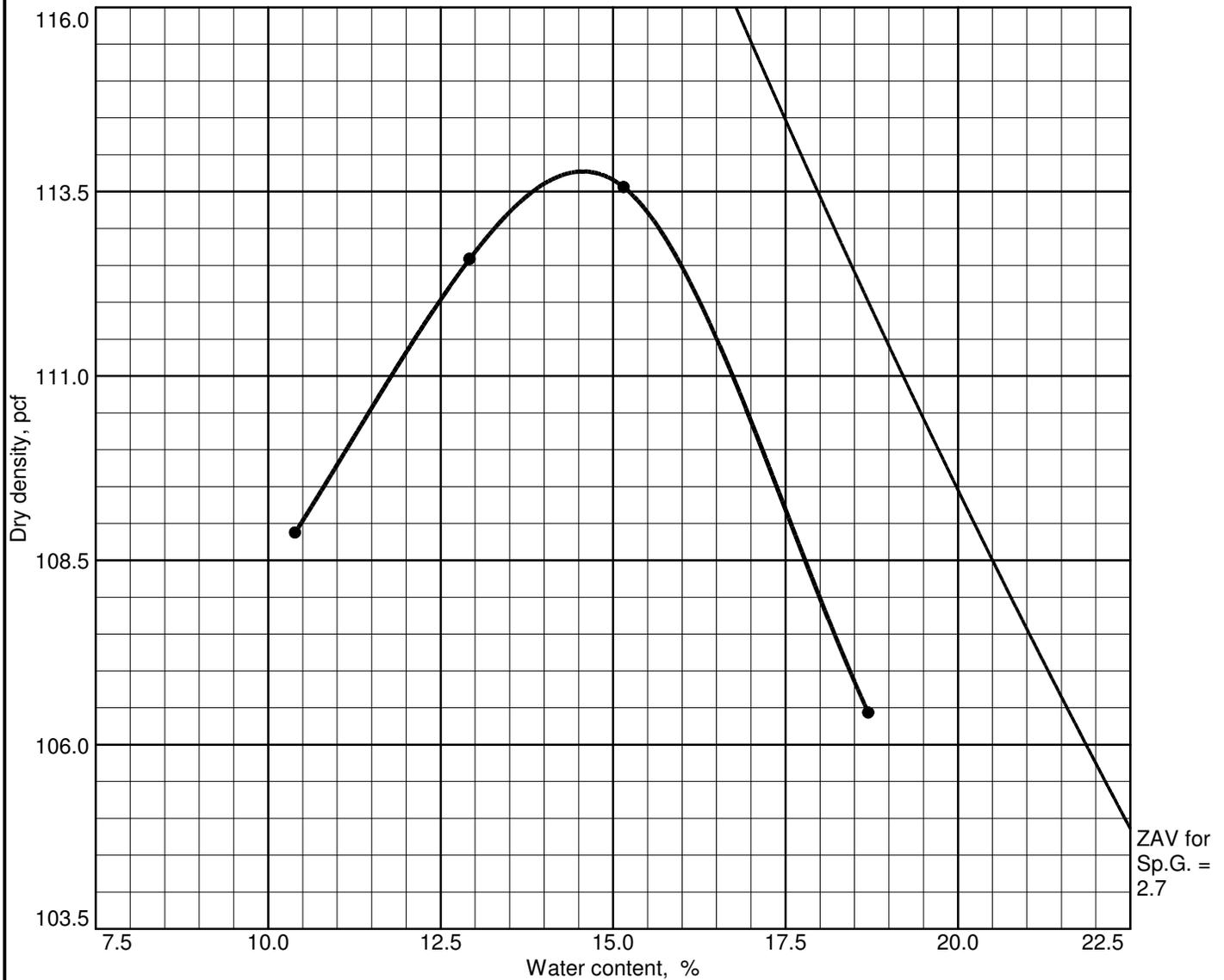
Test specification: ASTM D 698-00a Method A Standard

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > No.4	% < No.200
	USCS	AASHTO						
0.3-2 ft.	CL	A-6(5)	17		37	16	0.0	51

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 111.9 pcf Optimum moisture = 15.4 %	Tan, Sandy Lean CLAY
Project No. VB09-281G Client: AECOM Project: Training Support Center-PN 71114 Location: B-5 (See Plans)	Remarks: CBR-5 Sample Obtained 11/10/09 Soaked CBR Value=10.8 Resiliency Factor=2.5
MOISTURE DENSITY RELATIONSHIP (PROCTOR CURVE) GET SOLUTIONS, INC.	

Figure 1

MOISTURE DENSITY RELATIONSHIP (PROCTOR CURVE)



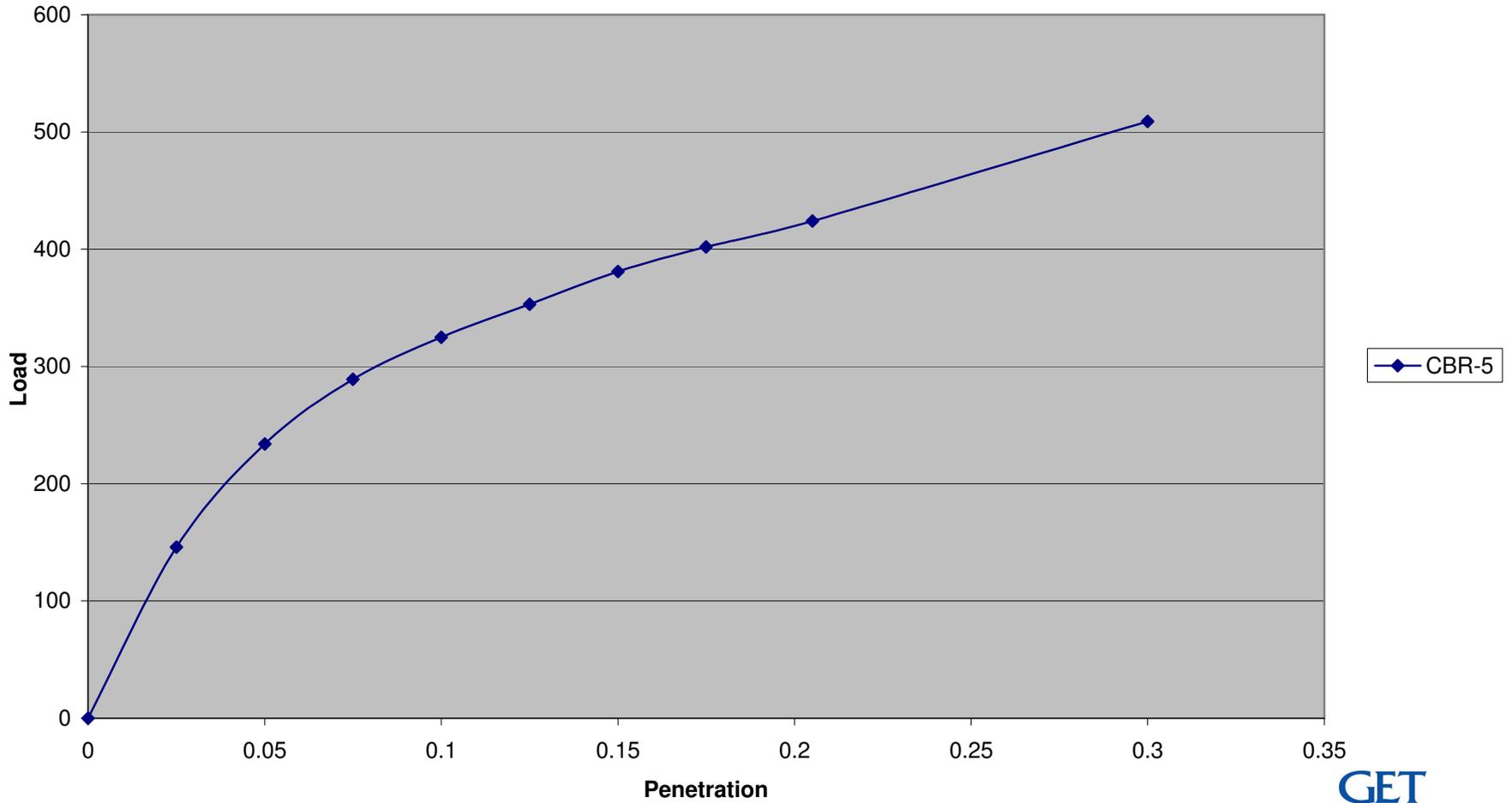
Test specification: ASTM D 698-00a Method A Standard

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > No.4	% < No.200
	USCS	AASHTO						
0.3-2 ft.	SC	A-6(3)	12		36	20	0.0	37

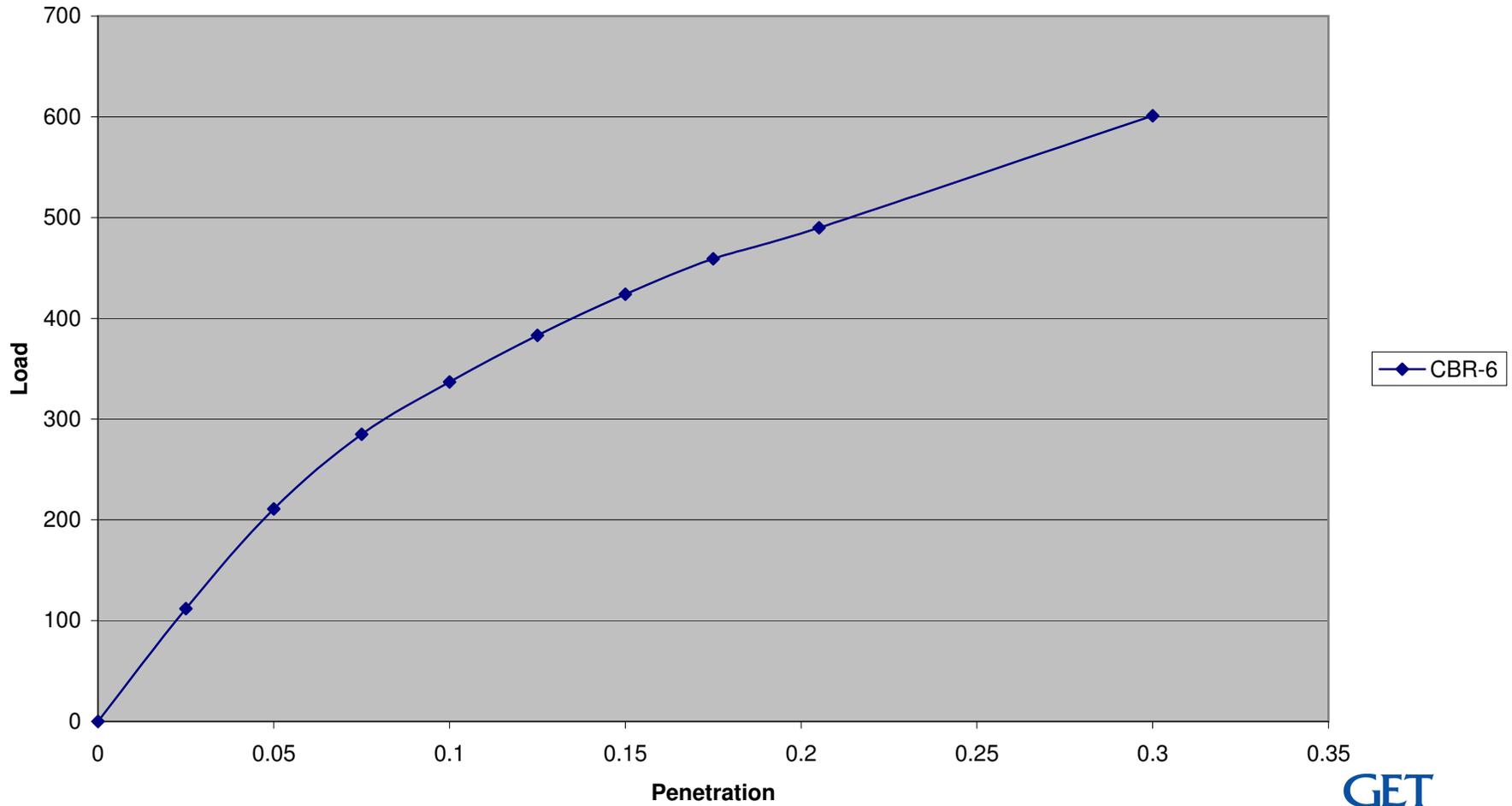
TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 113.8 pcf Optimum moisture = 14.6 %	Tan, Clayey SAND
Project No. VB09-281G Client: AECOM Project: Training Support Center-PN 71114 Location: B-6 (See Plans)	Remarks: CBR-6 Sample Obtained 11/10/09 Soaked CBR Value=11.2 Resiliency Factor=3.0
MOISTURE DENSITY RELATIONSHIP (PROCTOR CURVE) GET SOLUTIONS, INC.	

Figure 2

CBR Curve
Ft. Lee Training Support Center
PN71114
GET Project # VB09-281G



CBR Curve
Ft. Lee Training Support Center
PN71114
GET Project # VB09-281G



APPENDIX B
List of Drawings

Not Used

Norfolk District Model RFP Support
Fort Lee, Virginia

Appendix C
3 March 2009

UTILITY CONTACT INFORMATION

Sanitary Sewer

Johnny Butler, City Engineer
300 North Main Street
Hopewell, VA 23860
(804) 541-2319

Mark Haley
Hopewell Regional Wastewater Treatment Facility
HRWTF
P.O. Box 969
Hopewell, VA 23860
(804) 541-2210

Larry Malcolm (Ft. Lee Sewer System Operator)
Old Dominion Utility Services Inc.
757-888-0485
lmalcom@odus.asusinc.com

Water Supply

Tim Sheppard (Ft. Lee Water Supply Operator)
Virginia American Water Co
804-397-0121

Mike Youshock
Virginia American Water Co
804-458-420

Steve McBride
Price George County, County Engineer
804-722-8687

Electrical Supply

Dominion Virginia Power - Fort Lee Privatized Activities On Post

Dennis Collins
Dominion Virginia Power
1340 East Washington Street
Petersburg, VA 23803
804 862-6010
dennis.collins@dom.com

Dominion Virginia Power - Traditional Activities Outside Fort Lee

Shaun Reilly
Dominion Virginia Power
1340 East Washington Street
Petersburg, VA 23803
804 862-6034
shaun.reilly@dom.com

Natural Gas

Daryl Ecklund
Columbia Gas of Virginia
9001 Arboretum Parkway, P.O.Box 35674
Richmond, VA 23235-0674
(757) 638-2414
decklund@nisource.com

Christian Griffin
Columbia Gas of Virginia
(804) 768-6407
cgriffin@nisource.com

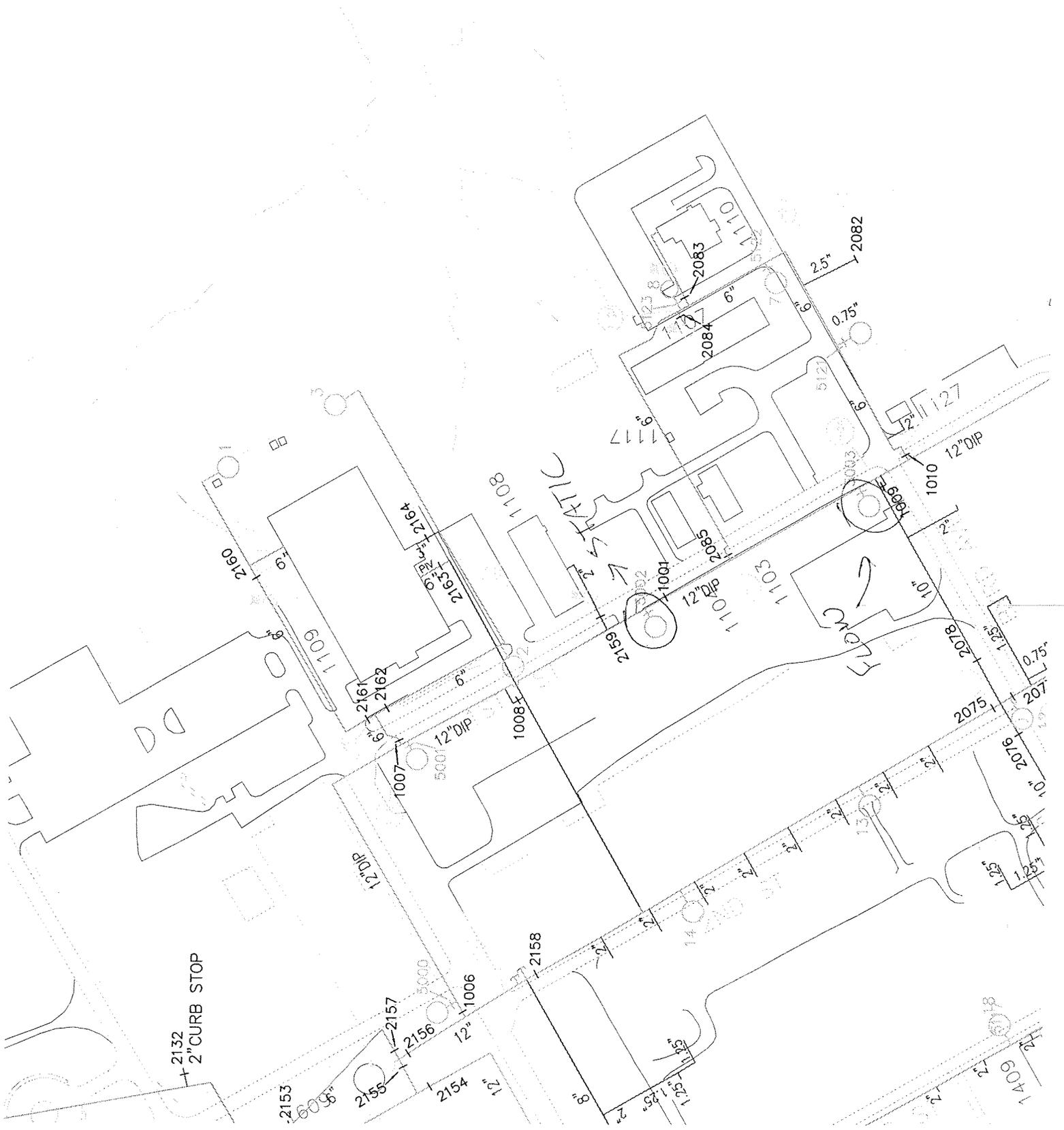
Andrew Watson
Columbia Gas of Virginia
(804) 768-6430
awatson@nisource.com

Rob Mooney
Columbia Gas of Virginia
(804) 768-6429
rmooney@nisource.com

VDOT Highway Crossing

Debbie Williams
Highway Permits Specialist
Virginia Department of transportation
4608 Boydton Plank Road
Petersburg, VA 23803
(804) 863-4009

30 Aug 2010 1300 hrs
Static - 84 psi
Residual - 82 psi
Flow - 1455 gpm



SECTION 01 35 40.00 50
FORT LEE ENVIRONMENTAL SPECIAL CONDITIONS

Revision Date: **8/12/10**

PART 1 GENERAL

Environmental Protection - All work is to be performed in a manner that prevents pollution, protects the environment, and conserves natural and cultural resources.

Federal agencies are required by the Energy Policy Act of 2005 (P.L. 109-58), Executive Order 13423, Energy Independence and Security Act (EISA) of 2007, and Federal Acquisition Regulation (FAR) Section 23.203 to incorporate the performance criteria used for ENERGY STAR®-qualified and FEMP-designated products into procurement contracts for energy consuming products and systems. Criteria for ENERGY STAR Qualified products are attached or can be viewed at: http://www.energystar.gov/index.cfm?c=products.pr_find_es_products

All work performed under this contract shall be carried out in accordance with all applicable Federal, state, and local laws, ordinances, regulations, Executive Orders, court orders, and other types of rules or rulings having the same effect of law and USAG Fort Lee Policies. These include but are not limited to:

- a) EO 13423, Strengthening Federal Government, Energy, and Transportation Management, 26 Jan 07
- b) Resource Conservation and Recovery Act (RCRA) (40 CFR 260-270)
- c) Federal Water Pollution Control Act, as amended (33 USC Sec 1251 ET SEQ)
- d) The Clean Air Act, as amended (42 USC Sec 1857 ET SEQ)
- e) The Endangered Species Act, as amended (16 USC Sec 1531, ET SEQ)
- f) The Toxic Substances Control Act, as amended (15 USC Sec 2601, ET SEQ)
- g) The Solid Waste Disposal Act, as amended (42 USC 6901 ET SEQ)
- h) The Archaeological and Historic Preservation Act, as amended (16 USC Sec 469, ET SEQ),
- i) The Energy Policy Act of 2005
- j) The Energy Independence and Security Act of 2007, 19 Dec 07
- k) The Virginia Solid Waste Management Regulations (9VAC 20-80)
- l) DOD 4170.11, Installation Energy Management, 22 Nov 05
- m) Memorandum, Assistance Chief of Staff for Installation Management, Sustainable Management of Waste in Military Construction, Renovation and Demolition Activities, 6 Feb 06
- n) AR 415-15, Army Military Construction & Non-Appropriated Funded Construction Program Development and Execution, 12 Jun 06
- o) Department of the Army Memorandum: Requirements for Sustainable Management of Waste in Military Construction, Renovation, and Demolition Activities (5 July 2006)
- p) Memorandum, Sustainable Design and Development Policy Update (Environmental and Energy Performance), 8 Jul 10
- q) Memorandum, Constructive Use of FY10 and Future Bid Savings, 12 May 10
- r) Memorandum, Energy and Water Conservation Design Guide for Sustainment, Restoration and Modernization (SRM) and MILCON Projects, 11Jan 10
- s) AR 200-1 Environmental Protection & Enhancement
- t) DOD 4150.07 DOD Pest Management Program

u) EO 13514 Federal Leadership in Environmental Energy and Economic Performance

1.1 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01 33 00.00 50 SUBMITTAL PROCEDURES:

SD-03 Product Data

- Pollutant Emitting Equipment;
- Boilers;
- Hot Water/Steam Boilers and/or Water Heaters;

SD-07 Certificates

- Asbestos Abatement Plan;
- Asbestos Abatement or Removal Notification;
- Asbestos Manifests;
- Borrow Source;
- Borrow Source Sampling Plan;
- Environmental Protection Plan
- Erosion and Sediment Control Plan;
- Hazardous Materials Usage and Reporting;
- Hazardous Materials Management Program;
- Lead Abatement Plan;
- Manifests;
- Pest Management Plan;
- Re-Use, Recycling and Disposal Reporting;
- Stormwater Permit;
- Trip Tickets;
- Waste Soil;

1.2 WASTE DISPOSAL

1.2.1 Solid Waste Re-Use, Recycling, and Disposal

1.2.1.1 Compliance with Regulations

The Contractor shall collect all solid wastes generated during the performance of the contract in a container located in an area designated by the Contracting Officer. The Contractor shall provide appropriate containers for the collection and segregation of solid wastes, recyclables, and C&D debris generated directly and indirectly by work under this Contract. The Contractor is prohibited from using Installation dumpsters or other government owned/leased waste receptacles for the disposal of any solid wastes. All solid wastes shall be re-used, recycled, or disposed of prior to completion of work at Fort Lee.

The Contractor must, prior to removing any waste from Fort Lee, properly classify each waste stream. Classification can be made based on generator knowledge or through laboratory analysis. The identification and classification of each waste stream shall be shown in the waste management plan. If the government has previously identified and classified the waste stream, that fact should be noted in the waste management plan. All hazardous waste removed from Fort Lee must be accompanied by a Uniform Hazardous

Waste Manifest, including Fort Lee's EPA ID number and must be signed by the Fort Lee Hazardous Waste Manager, 804-734-3811 or 804-734-3772.

Under no circumstances will any solid wastes, hazardous materials, or hazardous wastes be left at Fort Lee at the end of the project. Before the project is turned over to the government, the contractor will remove all solid wastes, hazardous materials, and hazardous wastes from the installation. Those items include, but are not limited to, dirt piles, concrete piles, asphalt piles, and rubbish piles. No materials will be left for the future use of the government UNLESS instructed to do so in writing by the government. This is to include the before mentioned items and also regular or touch-up paint, plaster, solvents, etc. If it is determined that the contractor left materials/wastes behind, services may be terminated and/or a penalty payment to include the cost of disposal of the material by the government may be withheld from the project payment.

Hazardous materials are different from hazardous wastes. Hazardous wastes shall not be removed from the installation without the Hazardous Waste Manager or other qualified EMO personnel signing the Hazardous Waste Manifest. The Fort Lee Hazardous Waste Managers can be contacted at 734-3881/3772 and (cell) 400-5538/6104 if needed.

1.2.1.2 Construction/Demolition Debris Diversion

As good stewards of the environment, the government is committed to diverting its waste away from landfills to the greatest extent possible. This can be done through:

- 1) Re-using (when authorized and directed by the government)
- 2) Recycling
- 3) Donating construction and demolition debris materials.

The contractor shall recycle all construction/demolition debris to the maximum extent possible. The Contractor shall make every effort to recycle materials such as, but not limited to, concrete (including concrete with rebar), brick, asphalt, all metals, including piping, building insulation, wood, wood paneling and wainscoting, roofing materials, wallboard, carpet, ceiling tiles, floor tiles, cardboard, and similar that do not constitute, in and of themselves, or in combination with other materials, hazardous materials. With prior coordination through the CO, Fort Lee Recycle Center, and DPW-EMO, the contractor may take scrap metals to the Fort Lee Recycling Center for recycling.

Refer to Appendix EE "List of Local Recyclers" for some suggested local sites for recycling of construction and demolition debris. The Government does not warrant that these facilities will, in fact, accept any particular materials. The Government does not warrant that any or all of these entities are still in operation.

1.2.1.3 Re-Use, Recycling and Disposal Reporting

The Contractor shall report on a monthly basis the tonnage of items re-used, recycled, land-filled, and disposed by regular or waste-to-energy incineration to the Contracting Officer and the Environmental Management Office's Pollution Prevention Manager, Fort Lee Recycling Coordinator by the 10th day of each month during the period of performance. This report will be for the previous month. The report shall list the title of the project, the contract number, the Contractor's company name and point-of-contact, phone number, the type of items (i.e. concrete, concrete with rebar, asphalt, brick, scrap metals, wood, wallboard, etc), and the tonnage of those items re-used and recycled. For all items that can not be re-used or recycled, the contractor shall provide justification.

For items disposed of, a total tonnage shall be provided for items land-filled and a separate total tonnage provided for items incinerated, (specify waste incinerator or waste-to-energy incinerator), unless the contractor prefers to report disposal figures for the various items. For items that cannot be accurately measured, estimates will be sufficient. Use the form at Attachment 1 to report this information to the Contracting Officer and the Environmental Management Office's Pollution Prevention Manager, Fort Lee Recycling Coordinator, office phone 804-734-3766.

DPW-EMO
Attn: Recycling Coordinator Manager
1816 Shop Road, Bldg 6206
Fort Lee, VA 23801

1.2.1.4 Contain Loose Debris

Loose debris on trucks leaving the site shall be loaded in a manner that shall prevent dropping of materials on streets and conform to local ordinances/laws. Fasten a suitable cover, such as a tarpaulin, over the load before entering surrounding streets.

1.2.1.5 Trip Tickets

Contractor shall submit all trip tickets from the landfill facility, incinerators, and recycling companies to show all debris is being land-filled, incinerated, re-used, or recycled in accordance with all Federal requirements and in an approved location. These trip tickets will be submitted to the Contracting Officer.

1.2.2 Petroleum Contaminated Waste

1.2.2.1 Contaminated Absorbents

All petroleum spills must be cleaned up using absorbent materials. Spills caused by the contractor will be the contractor's responsibility to containerize and dispose of the contaminated absorbent material. Spills caused by the government will be the responsibility of the government. Contact the Hazardous Waste Manager at 804-734-3811/3772 to arrange for pick-up of contaminated absorbent resulting from Government actions.

1.2.2.2 Waste Soil

Suspect soil must be tested to determine if it contains any contaminants prior to relocating it. Testing and disposal of soil shall follow Virginia Solid Waste Management Regulations 9VAC-20-80-700 (soil contaminated with petroleum products). Testing shall include: Total Petroleum Hydrocarbon (TPH) Gasoline Range Organics (GRO) and Diesel Range Organics (DRO), Benzene, Toluene, Ethyl Benzene, and Xylene (BTEX), Total Organic Halides (TOX) and a Paint Filter Test. If test results determine "other than clean", the material will have to be transported to an appropriate landfill or processing center based on the contaminants identified. Contaminated soils, in sludge or slurry form, shall be containerized and managed as either hazardous waste or non-regulated waste, depending on what contaminate was spilled. The containerized contaminated soil shall be the responsibility of the contractor to dispose of such. DPW-EMO must review the sample results and sign all hazardous/non hazardous waste manifests prior to disposal. Contact the DPW-EMO Hazardous Waste Program Managers for additional information.

Under No Circumstances will soil, clean or contaminated, from Fort Lee be delivered to or donated to off-base sources (other than an appropriate landfill or processing center based on the contaminants identified) for use.

1.2.3 Universal Waste

1.2.3.1 Fluorescent Lamps

Upon removal of old lamps and high intensity bulbs, the contractor will box the lamps and manage them as universal waste. Contact the Fort Lee Hazardous Waste Manager at 804-734-3811/3772 for information on recycling.

1.2.4 Ballasts

Upon removal of fluorescent light ballasts, contractor will separate PCB and non-PCB ballasts and place them in DOT-approved containers suitable for shipment. Contact the Fort Lee Hazardous Waste Manager to arrange for disposal/recycling, (804) 734-3811/3772.

1.2.5 Hazardous Waste Management

1.2.5.1 Site Management

All material containers must be closed when not in use. Materials are to be covered for protection from the weather. Each container is to be properly labeled. Do not store hazardous materials or portable toilets near storm drains. Upon completion of this project the contractor shall remove all hazardous materials and hazardous waste (for associated manifest requirements see paragraph 1.1.5.3.)

1.2.5.2 Hazardous Waste in Excess of 55 Gallons

Hazardous waste in excess of 55-gallons must be manifested off Fort Lee within 72 hours of generation, in order to comply with the requirements of the satellite accumulation rule. If, in an emergency, waste in excess of 55-gallons must be stored on site for more than 72 hours, arrangements must be made to use Fort Lee's 90-day storage site. Contact Hazardous Waste Manager (804) 734-3772/3811.

1.2.5.3 Manifests

DPW-EMO will review all lab analysis or MSDS of wastes prior to signing manifests. All hazardous waste manifests must be signed by DPW-EMO prior to removal of such waste from the base. The generator copy of the manifest must be returned to DPW-EMO, 1816 Shop Road, Fort Lee VA 23801 within 10 days of removal of waste from the installation.

1.3 FUEL, SEWAGE, and OTHER SPILLS

In the event of a fuel, sewage, and other toxic spillage during the performance of this contract, the Contractor shall be responsible for its containment, clean up, disinfection/sterilization, and related disposal costs and will notify the Fort Lee Fire Department immediately by calling 911, then immediately notify the Contracting Officer and DPW-EMO (804-734-3772/3811). The contractor shall have sufficient spill response supplies readily available on the pumping vehicle and/or at the site to contain any spillage and disinfect contaminated areas. In the event of a Contractor-related release, the Contractor shall immediately notify the Fort Lee Environmental Management Office and the Contracting Officer (These individuals are the only people to report to the National Response Center) and take appropriate actions to correct its cause and prevent future occurrences. If the federal, state, or local authorities assess any monetary fine, penalty, or assessment related to the release of any substance by the Contractor, his/her employees, or agents during the performance of this contract, the Contractor shall be solely liable for its payment, authorizes the United States Army to withhold such from payment, and otherwise indemnify and hold the United States Army harmless.

1.4 ASBESTOS OR LEAD BASED PAINT

Asbestos containing building materials may not be used on the project. Contact DPW-EMO to determine the extent of Asbestos Containing Materials or Lead Based Paint present.

1.4.1 Asbestos Presence

If asbestos not previously known to exist is exposed, the Contractor shall cease work in the affected area and notify the Contracting Officer immediately.

1.4.1.1 Asbestos Abatement Plan

The Contractor will submit abatement plans that include but not be limited to the following elements: (a) location, quantity, description of how abatement is to be accomplished; (b) required notifications and schedule Contractor will use to comply with notification deadlines, requirements; (c) Contractor's and subcontractor's current licensing, certifications, fit test, safety requirements and air sampling documentation; and (d) drawings of the locations of negative air machines, decontamination units, and waste dumpsters. As soon as practicable, Contractor will submit final air clearance results to the USACE Contracting Officer for forwarding to DPW-EMO. Upon review of final air clearance results, DPW-EMO will notify the USACE COR whereupon the Contractor will receive formal communication originated by DPW-EMO that sample results meet the applicable performance standards prior to containment teardown for work area re-occupancy. Contractor will submit the Abatement Plan, revisions, and all other associated documentation requested by DPW-EMO to the COR and Installation Asbestos Program Manager (APM) prior to the initiation of work. The plan must be approved by the APM.

1.4.1.2 Asbestos Abatement or Removal Notification

If project requires asbestos removal the contractor is responsible for disposal of Asbestos waste and debris. Contractor is subject to OSHA, EPA and Commonwealth of Virginia compliance and inspection for asbestos removal. Contractor must perform asbestos removal work in accordance with these specifications and EPA National Emissions Standards for Hazardous Air Pollutants (NESHAPs) for asbestos and any subsequent updates thereto. This includes state and EPA Region 3 notifications that shall be accomplished at least 20 days prior to starting any asbestos abatement or removal. A copy of the notification shall be submitted to the Contracting Officer and Installation Asbestos Program Manager.

1.4.1.3 Asbestos Manifests

If the project requires asbestos removal, all asbestos waste manifests shall be signed by DPW-EMO prior to removal of such waste from the base. A copy of the completed manifest (signed by the receiving landfill) shall be submitted to DPW-EMO within 10 days of removal of the waste from the Installation.

1.4.2 Lead Based Paint Presence

If lead based paint not previously known to exist is exposed, the Contractor shall cease work in the affected area and notify the Contracting Officer.

1.4.2.1 Lead Renovation/Abatement Plan

If project requires lead based paint renovation, removal, abatement, the Contractor will submit work plans to include, but not limited to, the following elements: (a) location, quantity and description of how abatement / renovation is to be accomplished; (b) required notifications and schedule Contractor will use to comply with notification deadlines, requirements; (c) Contractor's and subcontractor's current licensing, certifications, fit test, safe work practices, safety requirement and air sampling; and (d) drawings of the locations of negative air machines, decontamination units, and hazardous waste containers. As soon as practicable, Contractor will submit final wipe sample results to the USACE Contracting Officer for forwarding to DPW-EMO. Upon review of final wipe sample results, DPW-EMO will notify the USACE COR whereupon the Contractor will receive formal communication originated by DPW-EMO that sample results meet the applicable performance standards prior to containment teardown for work area re-occupancy.

1.4.2.2 Lead Based Paint Disposal

Lead contaminated debris must be sampled to determine the level of lead. Lead paint waste and lead contaminated debris must be sampled to determine the level of lead. DWPL-EMO will inform the Contractor on management procedures. If wastes are determined to be hazardous by regulatory criteria, the containers cannot leave the installation until a completed manifest is reviewed and signed by DPW-EMO. If the contractor knows a quantity of hazardous waste will be generated he must arrange to have that material removed from the installation within 72 hours of generation. If this cannot be accomplished, the Contractor must contact the Hazardous Wastes Manager to store full drums of lead contaminated waste at the site for less than 90 day, if necessary. The drums must be in good condition, labeled properly and closed. Storage of contractor containers will only be provided on an emergency basis.

1.5 AIR QUALITY

1.5.1 Pollutant Emitting Equipment

To assure the submittals for pollutants-emitting equipment meets the EMO's air quality reporting requirements, the Contractor shall submit the following information in the following 3 phases. Only pollutant-emitting equipment for which USAG-Fort Lee assumes full ownership and complete guiding, managing, and regulatory control will be included in USAG-Fort Lee's Air Permit. Should USAG-Fort Lee assume full ownership and complete guiding, managing, and regulatory control, the following three-phased approach regarding equipment addition shall be followed.

The following equipment would be required for inclusion in the Three-Phased Approach:

- Gas Fired Heating Equipment
- Fuel Fired Domestic Water Heaters
- Indoor, Direct Gas-Fired Heating and Ventilating Units
- Unit Heaters (if changed to fuel-burning from electric)
- Any other equipment that emits pollutants.

DPW-EMO is required to have and submit supporting documentation to regulators verifying equipment specifications and emissions (e.g. manufacturer's stack testing / emissions certifications / not to exceed emissions data). Accordingly, ensure submittal of

this manufacturer's information to DPW-EMO Air Quality Program for each piece of equipment per the Three-Phased Approach (except engine testing equipment). For copies of the Three-Phased Approach, speak with your USACE PM or call 804-734-5061. Information to be sent to Air Quality Program at 804-734-5061 [phone] or emofflee@conus.army.mil with the subject line: Air Quality Program & reason for email or arrangements can be made to pick up the information at the site.

If there is uncertainty as to the ownership or operational control assignment of pollutant-emitting equipment, contact the -EMO Air Quality Program for guidance.

Phase 1 - Prior to ordering equipment, the Contractor shall provide the information required in Attachment 6. The data reported will be estimated if actual data is unavailable and so noted with an asterisk. If the information is to be determined it will be entered as "TBD".

Phase 2 - Prior to equipment delivery, the Contractor shall provide all of the information in Attachment 6. The data reported shall be actual data; no estimated data will be accepted in this phase. Submit supporting documentation verifying rated capacity and emissions rates (e.g. manufacturer's stack testing/emissions certifications/not to exceed emissions data) to DPW-EPO Air Quality Program for each fuel burning piece of Equipment. Contact the EMO Air Quality Program Manager to make arrangements to deliver information.

Phase 3 - Prior to Equipment Startup, the Contractor shall include as part of his schedule the following notifications to the Contracting Officer:

1. 5 day notification prior to the date that equipment is installed.
2. 45 day notification prior to the date the Contractor anticipates starting the equipment
3. 5 day notification prior to the date the equipment is actually started.

1.5.2 Volatile Organic Compounds

All coatings and solvents used in the performance of this contract shall meet the required performance specifications and shall not exceed the volatile organic compound limits of the Air Pollution Control Districts where they are used.

1.5.3 VOC Work Practice Standards

Volatile organic compounds shall not be intentionally spilled, discarded in sewers, or stored in open containers, or handled in any other manner that would result in evaporation beyond that consistent with air pollution practices for minimizing emissions.

If the contractor anticipates a significant amount of the material is to be used during the course of the project, the contractor shall maintain Material Safety Data Sheets (MSDS) or other vendor information showing VOC content of each resin, catalyst, solvent, cleaning solution or other substance used.

1.5.4 Solvent Use

Depending on the type of solvent cleaning equipment, Fort Lee will be subject to 9 VAC 5-40-3260 (Rule 4-24), Emission Standards for Solvent Metal Cleaning Operations Using Non-Halogenated Solvents. As part of an effective ozone control strategy, operations that use solvents (e.g., hand wiping, immersion, or vapor degreasing for surface cleaning, paint clean up, and general maintenance activities) should employ pollution prevention measures such as use of non- or low-VOC content solvents. As well, HAP emissions can be reduced by substituting very low HAP (less than five percent) or HAP-free exempt products. A HAP-free water reducible product should be used for cleaning paint guns and lines. Notably, the decision and authority to use an alternative product must follow the appropriate implementation route. Although methyl

ethyl ketone (MEK) was recently delisted as HAP, it is not to be considered a viable alternative solvent. ODC solvents shall not be used without the approval of the Environmental Support Office of the Assistant Secretary of the Army (Acquisition, Logistics and Technology). Solvent Distillers should be used wherever possible to reduce solvent materials by reusing the solvent.

1.5.5 Fugitive Dust Emissions Control

Contractor shall not cause or permit any materials or property to be handled, transported, stored, used, constructed, altered, repaired or demolished without taking reasonable precautions to prevent particulate matter from becoming airborne. Such reasonable precautions include, but are not limited to, the following:

- a. Use, where possible, of water or chemicals for control of dust in the demolition of existing buildings or structures, construction operations, the grading of roads or the clearing of land.
- b. Application of asphalt, water, or suitable chemicals on dirt roads, materials stockpiles and other surfaces which may create airborne dust or the paving of roadways and maintaining them in a clean condition.
- c. Installation and use of hoods, fans and fabric filters to enclose and vent the handling of dusty materials. Adequate containment methods shall be employed during sandblasting or other similar operations.
- d. Open equipment for conveying or transporting materials likely to create objectionable air pollution when airborne shall be covered or treated in an equally effective manner at all times when in motion.
- e. The prompt removal of spilled or tracked dirt or other materials from paved streets and of dried sediments resulting from soil erosion. (9 VAC 5-40-90)

1.5.6 Boilers/Generators/Miscellaneous Emissions Units

The contractor shall provide the following information regarding boilers, generators and other miscellaneous emissions units that would fall under the phased approach described in Section 1.5.1; including, but not limited to, woodworking operations, pars washers, brass deformer/recycler, light sets, above-ground storage tanks, underground storage tanks, landfills, blasting operations, x-ray operations, multiple pumps, engine test cells and other proposed operations.

- a. Equipment Manufacturer, Type, and Model Number
- b. Date of Manufacturer
- c. Fuel type (natural gas / distillate oil / dual-fuel)
- d. Output Brake Horsepower (in BHP)
- e. Heat Input / Output (btu/hr or mmbtu/hr)
- f. Manufacturer-Specific Emission Factors (if available)
- g. Low NOx Manufacturer Support Documentation (if applicable)
- h. Anticipated Operating Schedule (broken down by annual quarters in percentage format; put EMERG if to be used as only an emergency generator)
- i. Name, Address, Phone Number, Facsimile Number, Position Title of Point-of-Contact and Responsible Official as defined by 9 VAC 5-80-60.C.
- j. Other relevant activity, emission rate information if miscellaneous emissions unit

1.5.7 Hot Water/Steam Boilers and/or Water Heaters, Furnaces/Make-Up Air Units/Unit Heaters/Roof Top Units

Emission control requirements refer to Section 1.5.1 for the three-phased approach for adding this equipment: These units shall be fired with natural gas, and when necessary with No.2 fuel

oil as a back-up fuel, and designed to be high efficiency units. They shall be equipped with a low nitrogen oxide (NOx) burner system for guaranteed NOx performance when using natural gas at no greater than 30 parts per million (ppm), dry volume basis and corrected to 3% excess oxygen (O₂).

The contractor shall provide the following information regarding boilers:

- a. Equipment Manufacturer, Type, and Model Number
- b. Date of Manufacturer
- c. Fuel type (natural gas / distillate oil / dual-fuel)
- d. Maximum Rated Input Heat Capacity and Output Capacity (in mmbtu/hr)
- e. Output Brake Horsepower (in BHP)
- f. Electrical Power (kW)
- g. Steam Quantity (in lb/hr)
- h. Vent Stack Configuration, Height, Velocity
- i. Manufacturer-Specific Emission Factors (if available)
- j. Low NOx Manufacturer Support Documentation (if applicable)
- k. Anticipated Operating Schedule (broken down by annual quarters in percentage format)
- k. Name, Address, Phone Number, Facsimile Number, Position Title of Point-of-Contact and Responsible Official as defined by 9 VAC 5-80-60.C.

Burner, boiler/water heater, and low NOx system shall be manufactured as a package by a single manufacturer. Only low NOx (less than 30ppm) fuel-burning heating and water heating equipment shall be installed. The unit's nameplate shall include the approved Underwriter's Laboratory (UL) low NOx model designation. The manufacturer shall provide the customer with a copy of the most recent stack testing results to demonstrate compliance with the 30ppm NOx guarantee. Test results shall be submitted to Air Quality Program at emoflee@conus.army.mil with the subject line: Air Quality Program & reason for email. After boiler installation is completed, the manufacturer shall provide the services of a field representative for starting the unit and training the operator(s) at no additional cost. A factory-approved and authorized start-up report shall be submitted to the customer at the time of start-up.

When steam generating units are used, install steam generating units that are less than 10 million British thermal units per hour.

1.5.8 Emergency/Non-Emergency Generators

1.5.8.1 Emission control requirements

Standards for exhaust emissions from stationary diesel generator sets used for back-up emergency power, peaking power, and other on-site power generation applications shall adhere to the following standards.

No CI ICE shall be installed at USAG-Fort Lee that is unable to demonstrate compliance with the tiered emission limits set forth by NSPS Subpart IIII corresponding to either the actual year of physical installation or a year subsequent to the actual year of physical installation, unless the emission standards for a previous model year are equivalent in magnitude. This requirement applies to emergency, non-emergency (including peak-shaving), or any combination thereof regardless of the following: project gained approval by the permitting authority, controlling entity assignment, percentages of output agreements, pattern of ownership agreements, status as mobile/stationary source, or any contractual language that proposes circumvention of this requirement.

1.5.8.1.1 Tier 2 Emission Standards

Regardless of the engine's power, all air emission sources whose construction, modification, or reconstruction commenced after July 11, 2005 shall be in accordance with 40 CFR 60, Subpart IIII, and be certified to Tier 2 emission standards for all projects commenced after July 1, 2005.

1.5.8.1.2 Tier 4 Emission Standards

Regardless of the engine's power, all air emission sources whose construction, modification, or reconstruction commenced after January 2011 shall be in accordance with 40 CFR 60, Subpart IIII, and be certified to Tier 4 emission standards regardless of model year of the engine.

1.5.8.2 Fuel Requirements

As of 1 October 2007, diesel stationary engines must use diesel fuel with a maximum sulfur content of 500 parts per million (ppm).

Beginning 1 October 2010, diesel stationary engines with a displacement of less than 30 liters per cylinder must use diesel fuel with a maximum sulfur content of 15 parts per million (ppm).

1.5.9 Pollutant Emitting Equipment/Vehicles

All pollutant emitting equipment shall operate in strict accordance with Virginia Regulation 9VAC 5-40-5670 PART II Emission Standards, ARTICLE 41 "Emission Standards For Mobile Sources (Rule 4-41)".

In the event a unit fails to meet these criteria, the operator must shutdown the unit immediately and in a manner that ensures safety; the operator must perform repairs or replace the unit with a unit that can be operated in a manner that adheres to this regulation.

1.5.10 Ozone Depleting Substances (ODS)

The contract shall comply with the USEPA regulations issued under Sections 601-607 of the Clean Air Act pertaining to ODS.

The contractor shall not employ or provide Class I ODS on Ft. Lee, Virginia. Contracts may not include any specification, standard, drawing, or other document that requires the use of a Class I ODS in the design, manufacture, test, operation or maintenance of any system, subsystem, item, component, or process. Contracts may not require the delivery of any items of supply that contains a Class I ODS or any service that includes the use of a Class I ODS.

The Contractor shall return all R-22 to the Installation's ozone depleting substance (ODS) collection point for cascading back into DoD comfort cooling systems. Should the Installation formally indicate R-22 will not be required for use on Installation comfort cooling systems, the Contractor will coordinate with the COR who will coordinate with the Installation's Air Quality Program or other applicable Directorate of Public Works point-of-contact for Instructions on how to return the ODS to the local Defense Supply Center or equivalent ODS Reserve organization. The Contractor will follow these Instructions and return all recovered R-22 accordingly to the Governments possession. The Contractor will not, under any circumstance, including defraying contract costs, retain any R-22 for their own use, and the Government will not construct, agree to, or abide by such an arrangement. Any requirement set forth within a Statement of Objective, Performance Work Statement, or other contract instrument contrary to this requirement is non-binding on the Government.

1.5.11 Open Burning

Open Burning is not permitted on Fort Lee property.

1.5.12 Asphalt Cutbacks

Use of asphalt cutbacks is not permitted on Fort Lee property.

1.6 WATER QUALITY

1.6.1 Erosion and Sediment Control Plan

All land disturbing activities must comply with the Virginia Erosion & Sediment Control Law and Regulations, Virginia Stormwater Management Act and Regulations, Virginia Stormwater Management Program General Permit, and the Chesapeake Bay Act and Regulations.

Plans must be prepared in accordance to the Virginia Erosion & Sediment Control Handbook and the Virginia Stormwater Management Handbook, Volumes I and II.

All Erosion & Sediment Plans and Stormwater Management Plans must be reviewed by a Department of Conservation and Recreation (DCR) Certified Plan Reviewer to ensure compliance with the State Laws and Regulations and the Fort Lee MS4 Permit.

Prior to beginning land disturbing activities, applicable DCR permit authorization must be received and copies provided to the Corps. Also the following list of items is typically required:

- Permit application
 - Permit fees
 - Calculations
 - Certified reviewed plans
 - Responsible Land Disturber (RLD) Certification
 - The Plan Reviewers Certification
- Provide two copies of each of items 1-6 above to the Corps of Engineers (the Corps will then submit one set to EMO)."

1.6.2 Stormwater Permit

Contractor shall prepare a stormwater design and Stormwater Pollution Prevention Plan (SWP3) in accordance with the requirements of the Virginia Stormwater Management Law (Title 10.1, Chapter 6, Article 1.1) and the Virginia Stormwater Management Regulations (4VAC3-20). The entire Stormwater Management Handbook may be found at: http://www.dcr.virginia.gov/soil_&_water/stormwat.shtml).

All stormwater management actions must conform to standards outlined in Fort Lee's integrated SWP3. Sufficient rationale must be provided for any deviations from these standards. Fort Lee's Integrated SWP3 may be obtained from the DPW-EMO Stormwater Program Manager at 804-734-3772/5352.

For land disturbing activities one acre or larger in size (2500 square feet or larger in an area covered by the Chesapeake Bay Preservation Act), the contractor shall apply to the Virginia Department of Conservation and Recreation (DCR) for coverage under the Construction General Permit. The contractor shall be responsible for all fees associated with obtaining General Permit coverage. The contractor shall provide a postmarked copy of the submitted DCR stormwater permit application, to include stormwater design and SWP3, to the Contracting Officer and DPW-EMO within 2 days of submission to DCR. Prior to commencement of land disturbing activities, the contractor shall provide evidence of coverage by submitting a copy of DCR coverage letter under the Construction General Permit to the Contracting Officer and DPW-EMO.

1.6.2.1 Oil-Water Separators

For maintenance and service areas where a floor drain is required, all such drains shall discharge to an appropriately-sized and designed gravity oil-water separator. No coalescing media will be allowed. Separator shall discharge treated effluent to the sanitary sewer system, unless no sewer service is provided to the facility.

Oil-water separator shall be located such that it provides convenient access to waste oil recycler truck. Drains, such as those at wash racks, which are exposed to rainwater, shall be bermed to prevent the entrance of storm water, and either covered with a canopy or provided with a system to divert storm water to the storm sewer system after the first flush of storm water is treated by the oil-water separator."

1.6.3 Wetlands Protection

The Contractor shall not enter, disturb, destroy, or allow discharge of contaminants into any wetlands or Resource Protection Areas as defined by the Chesapeake Bay Preservation Act of 1988.

No land disturbance shall occur within 100 ft of existing wetlands or stream channels as defined by the Chesapeake Bay Preservation Act. This 100 ft buffer is referred to as the Resource Protection Area (RPA) and is shown on all environmental constraints maps as provided by Fort Lee Environmental Management Office.

All Best Management Practices (BMP's) must be shown on the Sediment & Erosion Control drawings or the Detail drawings. A Responsible Land Disturber (RLD) shall be on site for all ground disturbance activity and must have an original current validated certificate on site and received by Environmental Management Office (EMO).

1.7 HAZARDOUS MATERIALS MANAGEMENT

1.7.1 Hazardous Materials Usage and Reporting

All contractors are required to report the usage of all hazardous materials to the government for all projects and contracts including service contracts executed on Fort Lee. In accordance with FAR Clause 52.223-3, each offeror (Contractor) must provide the Contracting Office with a list of proposed HAZMAT that it plans to use on the installation during the performance of the contract and must provide copies of all MSDS's to the HMCC (Hazardous Material Control Center). Prior to bringing any HAZMAT on to Fort Lee, a detailed summary of the HAZMAT must be provided to the HMCC (see Attachment 2).

Spills and/or releases of hazardous materials must be reported immediately to the Contracting Officer, Fort Lee Fire and Emergency Services and the Environmental Management Office (EMO).

Hazardous materials are any substance defined by OSHA as a hazardous substance requiring a Material Safety Data Sheet (MSDS). Hazardous materials that need to be reported include but are not limited to chemicals, paints, thinners, sealing compounds, strippers, glues, solvents, all petroleum products including oils, hydraulic fluids, and fuels stored on-site (fuels in vehicles are exempt), pesticides, adhesives, acids, flammables, corrosives, oxidizers, compressed gases (such as but not limited to oxygen, acetylene, propane, flammable and non-flammable gases), all aerosols, and all materials containing hazardous substances.

1.7.2 Hazardous Materials Management Program (HMMP)

No contractor (including sub-contractors) shall bring hazardous materials onto Fort Lee without coordination with the HMCC.

The Fort Lee HMCC will notify the project manager and the Contracting Officer (CO) if extremely hazardous materials are being used by the contractor. The contractor shall not bring any extremely hazardous chemicals on Fort Lee without prior approval from the HMCC.

Contractors are not allowed to have more than a 14-day supply of HAZMAT on the installation at any time. A monthly account of HAZMAT used must be provided to the Contracting Officer and the HMCC for tracking purposes (see Attachment 3). A final report must be submitted to the KO and HMCC upon project completion. Contractors must ensure that any unused HAZMAT is removed from the installation prior to final inspection and project completion.

If it is determined at any time that hazardous materials are on site that were not reported in advance, the CO will be notified and the project may be stopped until the materials are submitted as stated above.

1.7.3 Hazardous Material Storage

Hazardous materials shall be managed properly at all times while on Fort Lee. Containers must be in good condition and properly labeled with the contents and hazard class (flammable, corrosive, oxidizer, etc) at all times. Containers will be closed at all times when not in use, hazardous materials will be kept under cover to protect them from the elements and to prevent stormwater runoff contamination, and tanks and 55-gallon liquid drums will have secondary containment. Gas cylinders will be maintained in the upright position with caps on and will be secured with chains and locks to prevent tampering and to prevent them from falling over. Gas storage areas will have signs indicating what type gases are stored in the area (i.e., flammable, oxidizer, non-flammable, etc). NO SMOKING signs will be posted in all hazardous materials storage areas. In addition, all hazardous materials will be segregated in storage according to

compatibility (i.e. flammables will not be stored with corrosives, corrosives will not be stored with oxidizers, flammable gases will not be stored with flammable liquids, etc). Fort Lee is subject to inspections at any time from outside agencies (EPA, Virginia Dept of Environmental Quality, and OSHA) and any violations by the contractor will be the responsibility of the contractor and any fines associated with the violations will be resolved at the contractor's expense.

1.7.3.1 Petroleum, Oil, Lubricants (POL) Storage

Containers 55-gallons or larger must be provided with secondary containment. Double-wall fuel tanks meet secondary containment requirements.

1.7.3.2 Gas Cylinders

Gas cylinders will be stored in the shade or under cover and maintained in the upright position with caps on and will be secured with chains and locks to prevent tampering and to prevent them from falling over. Gas storage areas shall have signs indicating what type gases are stored in the area (i.e., flammable, oxidizer, non-flammable, etc).

1.8 USE OF RECYCLED-CONTENT PRODUCTS: (GREEN PROCUREMENT)

Whenever the potential for use of non-recycled content products exists during the construction stage of the project, the Contractor shall incorporate in this project, as a substitute, recycled-content products that are listed and identified in the Environmental Protection Agency (EPA) Comprehensive Procurement Guidelines (CPG) for recycled-content products. The Contractor shall use recycled-content products as required by EPA and other governmental agencies and Federal Acquisition Regulation (FAR) clauses.

It is mandated by Executive Order 13423 Strengthening Federal Environmental, Energy and Transportation management, and Section 6002 of the Resource Conservation and Recovery Act (RCRA) that the Federal Government use recycled-content products in the construction and/or renovation of facilities. It is the intent of the Government to comply with the Environmental Protection Agency (EPA) requirement 100% of the time and use as many of the applicable listed recycled-content products as feasible and economically practical. The Contractor shall consider this a standard requirement for all aspects of the project construction.

The recycled-content products listed in the CPG can be found in the EPA website at www.epa.gov/cpg/products.htm. These products are also listed at Attachment 4 "CONTRACT SUBMITTAL AND CONTRACTOR REPORTING FORM" located at the end of this section. This list is subject to change at any time so it is the Contractor's responsibility to be aware of any updates or additions.

Such products shall also comply with the requirements of the EPA Recovered Materials Advisory Notice (RMAN). The RMANs recommend recycled-content ranges for CPG products based on current information on commercially available recycled-content products. The recommended recovered materials content percentage can be obtained by clicking on the product on the website.

With regard to all project reporting deliverables, reports, preliminary deliverables, draft deliverables, final deliverables, and copies thereof will be printed double-sided on 100% recycled paper with a matte finish. Exceptions include large maps where, because of printer limitations, it is inherently difficult to print double-sided, as well as for some unique presentation materials.

1.8.1 Green Procurement Forms

Before starting the project, the Contractor shall complete Attachment 4 "CONTRACT SUBMITTAL AND CONTRACTOR REPORTING FORM" indicating the items he plans to use. The Contractor will provide this to the Contracting Officer, the project manager, and the EMO Pollution Prevention Manager. During the accomplishment of the project construction, the Contractor shall complete the form again indicating the use and non-use of products that are contained in the CPG and will list the recycled-content percentage for the applicable item. In each instance where a recycled-content construction product is not used, the Contractor shall provide to the Contracting Officer (or his/her designated representative), the project manager, and the EMO Pollution Prevention Manager a completed Exemption Form, Attachment 5, "RECOVERED MATERIALS DETERMINATION FORM" located at the end of this section.

The Contractor shall sign the form as the "Procurement Originator" and the completed form shall also be signed by the EMO Pollution Prevention Manager. These forms shall be kept in the project folder indefinitely.

1.9 INSTALLATION RESTORATION PROGRAM (IRP) REQUIREMENTS

1.9.1 Contaminated Soil and Free Product

Any material (soil) that is suspected of containing petroleum products shall be reported to the Contracting Officer or his/her designated representative. If discovered, the Contractor shall mitigate any potential threat to the workers, public and environment. The area that will be disturbed under this contract has the potential to have free product migrate into and under the construction site. Comply with VR-680 and record the quantity of any fuel removed.

Contaminated soil and/or free product shall not be used for backfill or removed from the base without written approval from the Contracting Officer. Once removal is approved, Contractor shall dispose of material under guidance of the Hazardous Waste Managers. All hazardous waste manifests shall be prepared by the Contractor and shall be coordinated, approved and signed by DWPL-EMO Hazardous Waste Manager prior to removal of such waste from the base (804-734-3881/3722).

1.9.2 Site Safety

Ensure workers are informed of potential hazardous exposures from working at IRP sites, and that the appropriate precautions are followed to minimize hazards to human health and the environment. Personnel working at these sites shall have 40-hour HAZWOPER Training. At least one individual on site should have completed the OSHA 8-hour supervisor training course. The plans identify the boundary of applicable IRP sites. To perform work at these sites, the Contractor must have a Health and Safety Plan and Hazardous Waste Disposal Plan for proper disposal of all regulated materials generated during execution of this project.

1.9.3 Monitoring Wells

There may be monitoring wells installed in and around a proposed construction area. Site maps and construction drawings provide the location of these wells. The Contractor shall take all precautions to prevent any damage to wells. If the wells and associated structures are damaged during the project, the Contractor shall repair/replace all damages at no additional expense to the Government. Contractor shall dispose of all regulated materials during repair of the damaged structures and remove any free product as required by VDEQ regulations.

1.9.4 Additional Excavation

Prior to any excavation beyond the immediate area or boundary of the construction site, the Contractor shall coordinate with DPW, EMO and the Project Manager and obtain the Contracting Officer's approval and may be required to obtain additional digging permits.

1.10 SOIL SUPPORT PROGRAM (SSP) ACCEPTABILITY

The soils obtained from off-base sources shall meet the criteria outlined below.

1.10.1 Clean Soil

Projects requiring clean soil, including but not limited to top soil and backfill materials, to be brought onto Fort Lee or relocated within base property must meet minimum standards based on results of physical (geotechnical) and chemical testing. All materials will meet physical (geotechnical) specifications appropriate for the type of project being accomplished and are typically identified elsewhere in the project specifications. The intent of this section is to prevent contamination from borrowed sources (i.e. planned excavation) and define clean soil based on chemical specifications. Levels of chemical contamination will be determined to ensure borrow soils may be used for the current and future use of the project location. The contractor shall implement a plan and confirm the proposed borrow soils meet clean soil requirements. The plan should incorporate borrow source information, sampling data, and testing results. As a minimum, the following standards must be met.

1.10.2 Borrow Source

The contractor shall provide detailed borrow source information (e.g., location, owner, operator, past and current land use, previous chemical testing results) at the point of planned excavation to the Contracting Officer's Representative, the DPW and EMO to determine chemical testing requirements. The contractor shall also submit a certification stating the materials contain no asbestos, no gross contamination have been discerned by visual or olfactory observations, and no spills of a listed hazardous waste (40 CFR 261) have occurred at the borrow site. If previous chemical testing results exist and are provided, DPW-EMO will evaluate those results to determine if they are sufficient and the proposed borrow soils meet clean soil requirements. If testing is incomplete, the COR with assistance from DPW-EMO, will review borrow source information to determine chemical sample requirements.

1.10.2.1 On-Base Soil Sources

Unless otherwise provided in the contract, the contractor shall bear all expenses of developing the source. For the site where soil is reclaimed from government land, the contractor may be required to perform final grade and seeding according to project requirements.

1.10.2.2 Excess Soil Work

Acceptable excess soil shall be delivered to the designated location(s) following approved haul routes. For the site where excess soil is deposited on government land, the contractor may be required to perform final grade and seeding according to project requirements.

1.10.3 Borrow Source Sampling Plan

At least one composite sample (6-8 grabs) for each undisturbed borrow source would be taken from the original point of excavation and required for each 5,000 CY of soil. For soil taken from disturbed borrow sources, samples are required for each 1,000 CY of soil. The nature of the borrow source is to be considered when determining the quantity and depth of the samples. Additional samples may be required to adequately characterize the proposed borrow source

(i.e. laterally and vertically). The contractor shall submit a Sample Plan (to include site map, excavation area, location and depth of samples) for DPW and EMO review and approval.

1.10.4 Chemical Testing Standards

The analysis must be performed by a laboratory approved by the U.S. Environmental Protection Agency. Submit a copy of the chain of custody and complete validated report of analysis to DPW-EMO for review and approval 30-days prior to use of any borrow soils. Chemical testing of any borrow source shall include sampling for the following suite of contaminants (test requirements may be reduced based on borrow source information):

Total Petroleum Hydrocarbons (TPH) to include Gasoline Range Organics (GRO) and Diesel Range Organics (DRO); Volatile Organic Compounds (VOCs) [EPA method 8260B] to include Benzene, Toluene, Ethylbenzene, and Xylene (BTEX);

The soil support test suite shall also include unless generator knowledge suggests otherwise:

1. Semi-volatile Organic Compounds (SVOCs) [EPA method 8270];
2. Pesticides [EPA method 8081A];
3. Polychlorinated Biphenyls (PCBs) [EPA method 8082]; and
4. Target Analyte List (TAL) metals (including Mercury) [EPA method 6010B/7470A]
5. Volatile Organic Compounds (VOCs) [EPA Method 8260] other than BTEX compound reference in the preceding paragraph

1.10.5 Clean Soil Determination

Soils testing under the EPA screening levels and/or base "background" levels will be considered acceptable "clean" soil. Generally, acceptable clean soil must not exceed EPA Region III "Residential" Risk Based Concentrations (RBC) and the LAFB Upper Tolerance Limit (UTL) background soil concentrations. For use in current and future industrial areas, EPA Region III "Industrial" RBCs may be considered but shall not exceed UTL background levels.

1.10.6 Excavation and Delivery Screening

Common to any multiple point sampling, composite testing may not accurately characterize the entire site. Should contamination be detected (e.g. free product, stained soils, chemical odors) during excavation or delivery, soil operations shall be immediately discontinued, the Contracting Officer notified, and remain discontinued pending DPW-EMO notification, resolution, and approval of the Contracting Officer of the Contractor's plan to eliminate contamination from the work area. Additional soil testing and screening may be required to determine if continued use of the borrow site is acceptable.

1.11 PEST MANAGEMENT

The contractor shall be required to submit a pest management plan to the Installation Pest Management Coordinator (IPMC) before any use of pesticides/herbicides.

It is a requirement to apply termicide for new building construction.

The pest management plan must include all the information that is required in the Installation Pest Management Plan, AR 200-1, Fort Lee Policy 17-03, and any other applicable state or federal requirements.

1. Before the application can be scheduled the Contractor must have an approved pest management plan by Fort Lee Environmental Management Office and have an Authorization To Treat Form 316.

2. The Contractor must be on the Fort Lee Pest Contractor approved list, as provided by EMO.
3. The Contractor must use a pesticide from the Fort Lee approved pesticide list.
4. After product is applied submit amount of concentrated quantity applied on DA 1532 or approved format to Fort Lee EMO.

In addition to these requirements, the Contractor must submit in his Pesticide Application Submittal the following Information:

1. Name of the pest company and applicator name with Virginia Approved License in the appropriate category
2. MSDS & Label of Product that is being applied.
3. Area that product will be applied with square footage.
4. Notification to Fort Lee Environmental Management Office at least 48 hours before application date.

1.12 Cross Connection Control and Backflow Prevention

In accordance with Safe Drinking Water Act, Cross Connection Control and Backflow Prevention in Waterworks of the Commonwealth of Virginia, State Board of Health, Waterworks Regulations 1993, as amended and to include all site specific requirements. Domestic water main entering the building shall be provided with a Reduced Pressure backflow preventer. If the backflow is greater than 3 inches, the contract will require the use of a manifold system with the main line utilizing two smaller backflows that will provide the same amount of water with the ability to isolate each one independently for servicing. Additionally, domestic water systems shall be protected from contamination by hydronic water systems and other HVAC systems via a Reduced Pressure backflow preventer and any mechanical equipment that may potentially contaminate the public water system.

1.13 INADVERTENT DISCOVERY OF ARCHAEOLOGICAL ARTIFACTS

1.13.1 Overview:

This procedure covers all situations when a survey has been conducted, and deeply buried archaeological deposits have not been discovered at that time; however during later construction or other ground disturbances inadvertent archaeological resources are found. Failure to comply with these procedures could result in fines and penalties under 36 CFR §800.

1.13.2 Policy:

Upon inadvertent discovery of archaeological artifacts, the ground disturbing activity must immediately be halted, and the CRM contacted. The requirements of ARPA and NAGPRA will be followed in any excavation of the artifacts.

1.13.3 Procedures:

1. Work will cease in the area of any discovery and the CRM must be notified within 24 hours of the discovery. The CRM and/or archaeologist will visit the site within 24 hours after notification and examine the excavated artifacts, as well as any surrounding deposits. Failure to cease work prior to examination and evaluation subjects Fort Lee to liability under ARPA.
 2. The CRM will determine whether the artifacts are covered under NAGPRA; if a positive determination is made, based on whether the material contains human remains, funerary objects, sacred objects, or objects of cultural patrimony, the CRM will implement the procedures set forth in NAGPRA.
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3. If the determination by the CRM is that the artifacts are not covered by NAGPRA, the following procedures will be followed:
 - a. If the CRM concludes that the material, although not Native American, is nonetheless human in origin, (s)he will analyze the context, probable age, and significance of the deposit;
 - b. If the CRM concludes that the material is not of human origin, the project will resume;
 - c. Should the artifacts be of human origin, but not related to a burial or other associated artifacts, the CRM will recommend that the project be relocated until the site can be completely evaluated. If this relocation is impossible, the CRM will notify the SHPO regarding the discovery, as set forth in 36 CFR 800.6. Unless the work that threatens the artifacts is of an emergency nature, it must continue to be suspended until the consultation is concluded. If the SHPO and the CRM mutually conclude that the excavated material and surrounding deposit are not eligible for the NRHP, the CRM will summarize the consultation in writing and attach the summary to the site record. The CRM will then advise the project manager that the work may proceed, with the understanding that a qualified archaeologist will continue to monitor the project to make certain that any NHRP eligible material is not endangered.
 - d. If either the CRM or the SHPO concludes that the recovered material cannot lead to a determination of significance because insufficient quantities exist, or the nature of the material does not assist such a determination, they may develop an emergency testing plan for the site. During the implementation of the plan, site activities involving excavation must cease.
 - e. If the CRM and the SHPO determine that the site is eligible for the NRHP, or if they cannot agree on its eligibility, one of the following procedures can be followed:
 - i. The project may be relocated;
 - ii. Fort Lee and the SHPO should conclude an MOA that details further evaluation of the site sufficient to alleviate adverse impacts by the project. If Fort Lee and the SHPO cannot agree on the extent of further evaluation, they shall request comments from the ACHP;
 - iii. Fort Lee may dispense with an MOA if further evaluation of the site will be limited in scope and the SHPO agrees; however, the results of the evaluation shall be documented and communicated to the SHPO;
 - iv. Fort Lee may follow NAGPRA and related state and federal laws, if it is believed that human remains may be discovered. In that case, the CRM will consult with the SHPO and affected Native American tribes;
 - v. Fort Lee may choose to follow 36 CFR §800.11(b), and use documentation prepared to comply with other laws to fulfill the requirements of the procedures in that section; however, any documentation must meet the standards of the regulation. When using this approach, Fort Lee must also consult with the SHPO and ACHP regarding the actions taken, in accordance with 36 CFR §800.6.

1.13.4 Notification:

Before projects that could involve excavation are approved, the project manager must be notified of this SOP and, in particular, the requirement to cease work immediately and notify the CRM when archeological artifacts are encountered.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

SECTION 3

DESIGN GUIDE ANALYSIS CRITERIA

3.1 INTRODUCTION

3.1.1 The Army Installation Design Guide process depends upon the development of visual goals and objectives and the identification of visual elements. Goals and objectives provide the desired visual context of the installation.

3.1.2 Basic design principles are used to assess, define, and classify visual elements. This assessment becomes the design criteria used to determine the visual character of the installation. These design criteria are used for design decisions in the review of existing visual context and determination of project recommendation.

3.2 GOALS, OBJECTIVES, AND RECOMMENDATIONS

[Chapter 4](#) of the UFC 2-600-01 discusses the goals, objectives, and recommendations process and gives examples.

3.2.1 The visual image of Fort Lee is the product of a multitude of decisions affecting the built environment made over a long period of time by many individuals at various levels of responsibility (Fig. 3.1). This continuous decision-making process must be directed by an overall long-range strategy aimed at developing a coordinated image of quality and excellence (Fig. 3.2). This strategy must consider not only the activities and physical features that exist on the installation today, but also future programs that will be developed. BRAC, RCI and PAL will need to be included in any future development as well. This IDG is directed by the following goals and objectives,



Fig. 3.1 - Include positive visual elements.



Fig. 3.2 - Develop an image of quality and excellence at Fort Lee.

which represent an overall strategy for installation design at Fort Lee, and are prioritized in the following manner.

Goal No. 1. Develop a living-training “campus” environment that is cohesive, efficient, and attractive (Fig. 3.3).

The barracks and training areas along Adams Avenue, Byrd Avenue and Carver Avenue, and north of Route 36, constitute the core of Fort Lee where living and training activities take place in an integrated cluster of facilities. The spatial relationships of barracks buildings to surrounding open training fields, parade grounds, support facilities, access roads, parking lots, and athletic fields must be carefully coordinated to best accommodate important functional relationships and to enhance the visual image. The U.S. Army Corp of Engineers, Fort Worth District is responsible for barracks standard designs for basic and advanced training. A 312-person three story building and a 624-person five story design has been created to standardize these training activities. However, the exterior façade designs will reflect Fort Lee architectural requirements for color and materials.

To achieve this goal a general Development Concept Plan should be produced for the crescent area, so that each individual improvement project, such as the redevelopment of the various barracks, is conceived as part of an overall unified scheme.

Goal No. 2a. Develop a discrete pedestrian/troop movement network south and (Fig. 3.4) north of Route 36, and an open space system, based on the crescent “spine” organization that now exists.

Byrd Avenue should be converted to a troop movement and pedestrian circulation spine linking together all living-training activities along the crescent area. This spine should be appropriately paved and landscaped to provide a linear focal space for pedestrian movement, as well as for group activities such as troop mustering, parading, and everyday physical training exercises. This linear spine should be the focus of the living-training campus area, and buildings should be oriented to emphasize this focus.



Fig. 3.3 - Barracks of the northern crescent area are important elements of the Living-Training Area environment.



Fig. 3.4 - A network of pedestrian pathways links the Living-Training Area with the Community Services Areas.

Vehicular access to buildings lying between Adams and Carver Avenues should be organized so that traffic across the Byrd Avenue spine is minimized. When minor cross traffic is required, the pedestrian should have right of-way and the spine treatment should be carried across the road. Parking areas should be kept close to Adams and Carver Avenues, which will become the major vehicular circulation elements.

The character of this pedestrian spine should also be extended along routes linking other significant activity centers on the post, such as the Community Services Areas. Points where these well traveled routes cross roadways should be well marked.

Goal No. 2b. Establish Adams Avenue as the primary vehicular circulation spine to create a strong linear unifying element.

The roadway should appear as a consistent element linking together the various areas of the post from First Street through the Sisisky Boulevard, Lee, and Mahone Avenues gateway intersections to the CASCOM building (Fig. 3.5) at Sisisky Boulevard. The hierarchy of primary, secondary, and tertiary road types should be reinforced through the uniform treatment of landscaping, roadway cross section and building setbacks and orientation. Gateway intersections should appear as important nodes with generous building setbacks and large-scale monuments where appropriate, as well as clear and efficient directional signage. Redundant parallel streets should be minimized and eliminated where possible to allow larger contiguous spaces for development and simplified traffic patterns.

Goal No. 3. Improve the visual quality of the Community Services Areas (Fig. 3.6) and the PX/ Commissary area.

Vehicular access to and circulation through parking areas should be better organized. Adequate planting buffers should separate parking areas from the main roads, and appropriate landscaping should be added within the parking areas. Pedestrian zones should be established and linked with pedestrian routes leading



Fig. 3.5 - The CASCOM building with its generous building setback and landscape treatment marks the intersection of Adams Avenue and Sisisky Boulevard.



Fig. 3.6 - Improve the visual quality of the Community Services Buildings.



Fig. 3.7 - Orient the building entrances and service areas to eliminate conflicts and to correct visual image.

to barracks and housing areas. Orientation of building entrances and service areas should be coordinated (Fig. 3.7) to eliminate conflicts and to correct unsightly conditions.

Goal No. 4. Develop a strong identity and high quality visual image for the Bldg. 1109 / 1st Street area.

Major renovation of Bldg. 1109, known as the “blockhouse”, (Fig. 3.8) provides an opportunity to address a serious visual liability. The renovated blockhouse, on 1st Street, will form the anchor for a cluster of related facilities that should formally establish a northeastern terminus of the Adams, Byrd and Carver Avenues corridor. A unified image should be developed for this area through coordinated design and siting of buildings, roadways, and parking areas, establishing a focal open space surrounded by functionally related buildings. Vehicular circulation should be organized to link the area with the Sisisky Boulevard gateway via Adams Avenue (Fig 3.9). The end of Adams Avenue should be designed as a significant terminus and linked with Carver Avenue along a realigned street which allows for a generous setback at the expanded blockhouse.

Goal No. 5. Develop attractive “gateway” environments at all primary and secondary entrance areas. (Fig. 3.10)

Reinforce the existing positive image along the Route 36 corridor and along the Lee Avenue entrance. Visual screening should continue to be improved by allowing further under-story growth to develop beneath the tall loblolly pines which form a buffer strip between the highway and the industrial area.

The loblolly pine or other Fort Lee approved landscape highway buffer strip should be extended along both sides of Sisisky to establish a tree-lined boulevard image similar to that of Lee Avenue, and to screen views to the adjacent industrial area.

The visual quality of secondary entrances at Mahone Avenue, Adams Avenue, and Shop Road should be



Fig. 3.8 - The “blockhouse” Bldg. 1109, on 1st Street forms the anchor of the northeastern terminus for the Adams/Byrd/Carver Avenues corridor.



Fig. 3.9 - Adams Avenue forms a vehicular spine extending the length of the “crescent” cantonment area.



Figure 3.10 – Proposed new layout in the Tenant area is a result of BRAC.

improved through coordinated signage and appropriate landscaping.

Goal No. 6. Improve the visual quality of the tenant areas, establishing a strong focus for each cluster of related facilities (Fig. 3.10).

An overall area development concept plan should be produced for the Petroleum and Water Department and tenant facilities that will be developed in the 38th Street area. The abundance of mature canopy trees in this area is a unique asset and should be preserved. The current program of removing aged frame structures should be continued. Unnecessary or redundant streets should be removed to create greater flexibility for siting new facilities and to consolidate and simplify traffic patterns. The access road to the Army Logistics Management Center (ALMC) building should be realigned to lead directly to the entrance, and parking areas should be organized and landscaped throughout.

Goal No. 7. Enhance quality of residential areas through improvements to the streetscape, yard areas, and building exteriors. RCI assumed responsibility for all family housing located at Fort Lee in September 2007.

The construction of new housing is an opportunity to significantly improve the visual image of the residential streets, as exemplified by the Phase I redevelopment of Jackson Circle (Fig. 3.11 and Fig. 3.12) and the new family housing in Jefferson Terrace.

Phase I at Jackson Circle and at Harrison Villa have been completed. Proposed Phase II development at Jackson Circle would result in more housing units, as will the proposed and funded Phase II development soon to begin at Harrison Villa. Additional units would also result from Phase III development currently proposed for Harrison Villa.



Fig. 3.11 - Jackson Circle housing area.



Fig. 3.12 - Attached housing units in Jackson Circle.



Fig 3.13 - Entry gate at the battlefield park on Highway 36 near Lee Avenue entry gate.

Goal No. 8. Protect and improve woodland environment.

Enhance the quality of woodland areas as natural settings for troop training and as visual amenities for adjacent facilities and residential neighborhoods. Allow the natural understory growth to develop at the forest edge along a consistent mow line. Restrict tree harvesting to areas out of view from roadways or from active areas of the post and leave a buffer when possible. Maintain pathways through the woodlands, converting derelict paved roadways to gravel paths suitable for troop movements. Finally, minimize adverse effects of soil erosion on Bailey Creek by using adequate storm water management techniques. Preserve the natural habitat and character of the Petersburg National Battlefield that abuts the Jackson Circle residential community and the western side of Fort Lee (Figs. 3.13, 3.14, and 3.15).

Goal No. 9. Enhance the image of field training areas.

Design of field training facilities should be coordinated to develop a distinctive and identifiable image. TA-5 will be excluded due to the requirements of BRAC which brings the Army Ordnance School facilities to the site. Outdoor instruction areas should be located and designed with careful consideration of sun orientation, wind and other microclimatic conditions to support the training activity. Finally, routes used for troop movements should be suitably paved and graded for foot traffic (Figs. 3.16, 3.17, and 3.18).



Fig 3.14 - Sign at the battlefield park.



Fig. 3.15 - Adjacent Petersburg National Battlefield represents an exemplary treatment of woodland.



Fig. 3-16 - Sign that blends with setting.



Fig. 3-17 - Equipment sited to protect trees.

3.3 IDENTIFICATION AND CLASSIFICATION OF VISUAL ELEMENTS

3.3.1 Basic design principles define visual elements and assess their character.

3.3.2 The assessment and classification of visual elements follows basic design principles describing “good” and “not so good” design. Their assessment becomes the design criteria used to determine the visual character of the installation.

3.4 DESIGN PRINCIPLES

The visual inventory and analysis requires an understanding of basic design principles. The primary principles are:

- **Scale** - The proportional relationship of humans to their spatial environment. The scale should result in a comfortable relationship for the user and will vary as space, size and activities vary (Fig. 3.19).
- **Form** - The size and shape of mass. Individual forms should be designed to complement one another and the environment.
- **Function** - The use of a space or an area. Function is gauged by the degree to which the space works for its intended purpose.
- **Color** - All elements of the visual environment have color. The use and arrangement of colors greatly determine the visual impact of all elements.
- **Texture** - All elements of the visual environment have texture. The use and blending of textures greatly impact the visual environment.
- **Unity** - All elements of the visual environment should blend to complement one another. Repetition of scale, form,



Fig. 3.18 - Field training facilities planned with consideration for environmental factors.



Fig 3.19 - Building 1109 and example of Monumental Scale needing a Human scale veneer.

color, and texture results in a unified visual impression.

- **Framing** - All views include a ground plane, side planes, and overhead plane. The relationship of planes changes as the individual moves through the environment.
- **Axis** - An axis is a linear progression of space connecting two or more dominant features (Fig. 3.20).
- **Terminus** - A terminus is the end of an axis and is typically defined by a dominant feature such as a building.
- **Balance** - Visual elements are composed to be symmetrical or asymmetrical. In either case, visual elements should be sized and located in order to provide visual balance (Fig. 3.21).
- **Sustainability** - Practicing the principles of sustainable design in the planning, design, construction, and operation of infrastructure and facilities is a smart business practice. ([See Appendix D](#)).

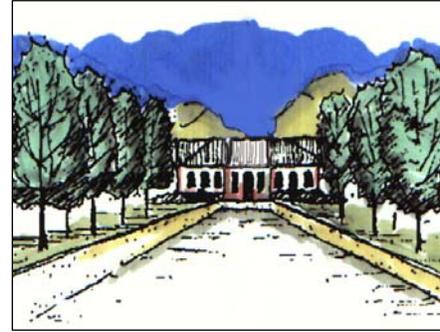


Fig 3.20 - Parade Ground Axis with Building as Terminus.

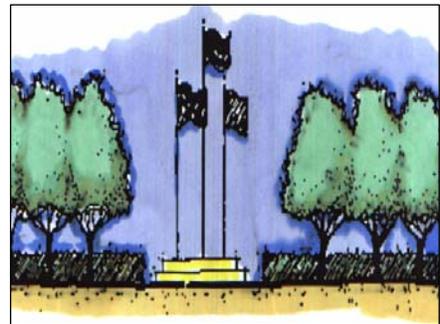


Figure 3.21 - Symmetrical Elements.

3.5 VISUAL ELEMENTS

The visual elements, described below, elements include manmade and natural features and their inter-relationship. This Army IDG provides guidance on how to recognize the visual impacts of the installation and how to improve upon them if warranted.

- **Natural Characteristics** - Regional and site characteristics that have been preserved and enhanced as a part of the installation.
- **Edges and Boundaries** - Linear elements such as walls, fences, or trees create separation of use and activities.

- **Buildings and Structures** - Typically the most dominant features of an installation. Their location and design characteristics determine the primary visual image (Fig. 3.22).
- **Activity Nodes** - Centers of activity that attract people on a daily basis.
- **Landmarks** - Visually or historically prominent features such as towers, statues, static displays, or buildings that provide identity and orientation of place (Fig. 3.23).
- **Entrances and Gates** - Provide the first and last impression of the installation.
- **Circulation System** - Includes streets, railroad tracks, trails, sidewalks, parking lots, driveways, delivery areas, and bicycle paths. The circulation system utilizes a large amount of space and creates significant visual impact.
- **Trees and Other Vegetation** - Trees and other vegetation frame views, provide visual screens, shade, color, and interest in the installation.
- **Street Trees** - Street trees soften, complement, and define the road hierarchy, and improve the overall visual quality of the installation (Fig. 3.24).
- **Views and Vistas** - Scenic and attractive views and vistas should be enhanced. Unattractive views should be screened.
- **Open Spaces** - Open space areas create visual impact and can be designed to either separate or integrate adjacent uses.



Fig. 3.22 - Buildings are typically the dominant feature on an installation.



Fig. 3.23 - Landmarks provide orientation of place.



Fig. 3.24 - Street trees improve the overall visual quality of the installation.

- **Signage** - A coordinated installation signage plan, addressing both exterior and interior signage, should be developed to facilitate circulation and provide useful information (Fig. 3.25).
- **Utility Corridors** - Utilities should be in corridors and unsightly above ground utilities minimized.
- **Other Elements** - Visual elements other than those above may occur within an installation and should be noted.



Fig. 3.25 - Signs are prominent features on the installation.

Links

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SECTION 5

VISUAL THEMES AND ZONES

5.1 INTRODUCTION

5.1.1 Visual themes and zones are determined after performing the two surveys mentioned in [paragraph 2.2](#). These surveys were conducted using existing installation maps, visual inspection, interviews, questionnaires, and photographs to record impressions of visual and spatial impacts.

The visual character of Fort Lee is a result of several phases of development over a period of nine decades, each phase being a response to programmatic needs and the inherent opportunities of the site. With each major build-up, previous development was almost entirely replaced with new facilities. As a result, Fort Lee has few historical structures and continues to be a forward looking installation where future development will play a major role in determining the visual environment.

The street grid pattern that forms Fort Lee's characteristic crescent-shaped cantonment area was established in the first major build-up for World War II in 1917 and continues to serve as a framework for development today (Fig. 5.1). Adams Avenue forms a crescent-shaped spine, linking clusters of facilities from the Blockhouse at the north end to the CASCOM building in the south.

Grids of temporary wooden buildings dominated the physical design of Fort Lee after the massive build-ups for World War I, World War II and the Korean War (Fig. 5.2). Although few of these original buildings remain today, their linear grid pattern is still apparent in remnant street locations.



Fig. 5.1 - The crescent-shaped cantonment is clearly established by 1917. (Source: Archeological and Historical Survey of Fort Lee, 1985.)



Fig. 5.2 - Typical frame structures of the WWI building campaign, circa 1917. (Source: Quartermaster Museum photographic collection.)

Route 36 provides the public face of Fort Lee (Fig. 5.3). The heavily used highway corridor passes through the installation and is flanked by tall loblolly pines. These pines buffer the views into the post and create an institutional environment along the highway. This character contrasts dramatically with the nearby strip commercial development in the adjacent municipalities. The two primary gates at Lee Avenue and Sisisky Boulevard establish the beginning and end of this corridor and lead to the Adams Avenue spine.



Fig. 5.3 - The Lee Club provides a visual terminus for the tree-lined Lee Avenue.

Lee Avenue intersects Adams Avenue, bisecting the spine at its mid-point where the straight northern section meets the curved southern section. The point where Lee Avenue passes through the crescent gives a dramatic impression because Lee Avenue and the intersection with Adams Avenue is surrounded by large open lawn areas with mature street trees along both sides of the avenue. The axis of this approach is visually and physically terminated by the Lee Club.

Along the length of the Adams Avenue spine is the training campus, integrating living and training facilities. This campus environment is composed of modern barracks, buildings, and open training grounds. Nearby training buildings include classroom buildings, industrial scale shops, food service buildings, and administrative buildings. The present appearance of this area is significantly upgraded from prior times with the renovation of barracks and construction of a new dining hall, Soldier One Stop, Air Delivery Training Facility, a new PXtra (Fig. 5.4) and Commissary and the Military Entrance Processing Service building (Fig. 5.5).



Fig. 5.4 - The recently expanded PXtra and Commissary complex, with its expansive parking lots, is a hub of activity, much like a commercial shopping center.

The crescent wraps around the forested stream valley of Bailey Creek. This woodland area provides a natural setting for training activities, forms a forested edge along many areas of the post, and buffers the family housing areas. These housing areas have the appearance of suburban neighborhoods. The streetscape and front lawns form the public spaces, and the edge of the forest forms an important visual amenity. The golf course nearby provides a park-like setting for the Adams Avenue gate.



Fig. 5.5 - The newly developed Soldier One Stop serves as the in-processing center for the installation.

Fort Lee as a whole is a composite of the individual visual zones, each having its own individual character. Identifying these visual zones allows design criteria to respond appropriately to the particular characteristics of each area within Fort Lee. In some areas a specific type of activity or land use is the factor which distinguishes one zone from another. More often, however, a visual zone encompasses an area much larger than one single land use area and is defined by landscape elements, hills and stream valleys, patterns of roadways, and the clustering of buildings.

The data captured in the visual analysis was used to define the visual themes and zones of the installation. Map 5.1 shows the locations and extent of the seven visual zones identified at Fort Lee.

- **Gateways**, including the Route 36 corridor as well as all entry areas.
- **Living-Training Campus**, extending the length of the crescent (Fig. 5.6).
- **Industrial Areas**, in the Shop Road / Railroad Avenue area.
- **Community Services Areas**, including athletic facilities and Lee Club areas as well as the Central Post Exchange Complex and Northern PXtra/Commissary areas.
- **Tenant Facilities Campus**, including the ALMC area, Petroleum and Water Department School, and other facilities in the Thirty-Eighth Street area.
- **Family Housing**, including Jackson Circle, Central, Madison, Monroe neighborhoods.
- **Open Space and Field Training Areas** including the Bailey Creek Valley Golf Course as well as key training areas north of Route 36.



Fig 5.6 - Barracks and operation land uses in the Living-Training Zone.

5.2 VISUAL THEMES

5.2.1 Visual themes create a perception of unification within the installation. These themes create design consistency that provides orientation and a "sense of place."

The visual image of Fort Lee has evolved through cycles of war-time buildup and the transition to permanent facility development since the early 1950's. The continuous street grids, forming the crescent-shaped Living/Training Campus are punctuated by the open lawns of the parade grounds both at Mifflin Hall and within the barracks areas. (Fig. 5.7) The forest edge provides a visual amenity throughout, defining the Bailey Creek stream valley and the edges of the historic Petersburg battlefield. Open meadows, where World War II era wooden structures once stood in rigid formation, now bloom with tall native grasses and provide space for recreation or potential mobilization. In essence, Fort Lee is a training campus surrounded by the pine forests and rolling hills of the Virginia peninsula.

The visual themes of Fort Lee are:

- Campus Environment
- Crescent Cantonment
- Woodland Setting

Themes and Zones Strongly Influenced by Transportation System

The main circulation routes within Fort Lee form the primary organizing element of the installation and to a large extent are major determinants of the visual quality of the visual zones (Fig. 5.8). Adams Avenue forms a continuous spine, linking the various parts of the installation. Along this spine, key intersections and entry gateways form traffic nodes which orient movement to the surrounding facilities. These nodes include the intersections at Sisisky Boulevard, Lee Avenue and Mahone Avenue. Sisisky Boulevard links the two ends of the crescent through the Bailey Creek forested stream valley and serves as a VIP route from the helipad at Third Street to the CASCOM building.



Fig. 5.7 - The formal parade ground at Mifflin Hall is a highly visible and symbolic open space.



Fig. 5.8 - Troop movement is highly visible in the Living-Training Visual Zone.

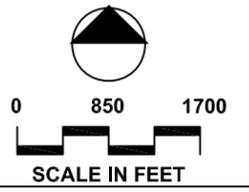
INSTALLATION DESIGN GUIDE

Fort Lee, Virginia



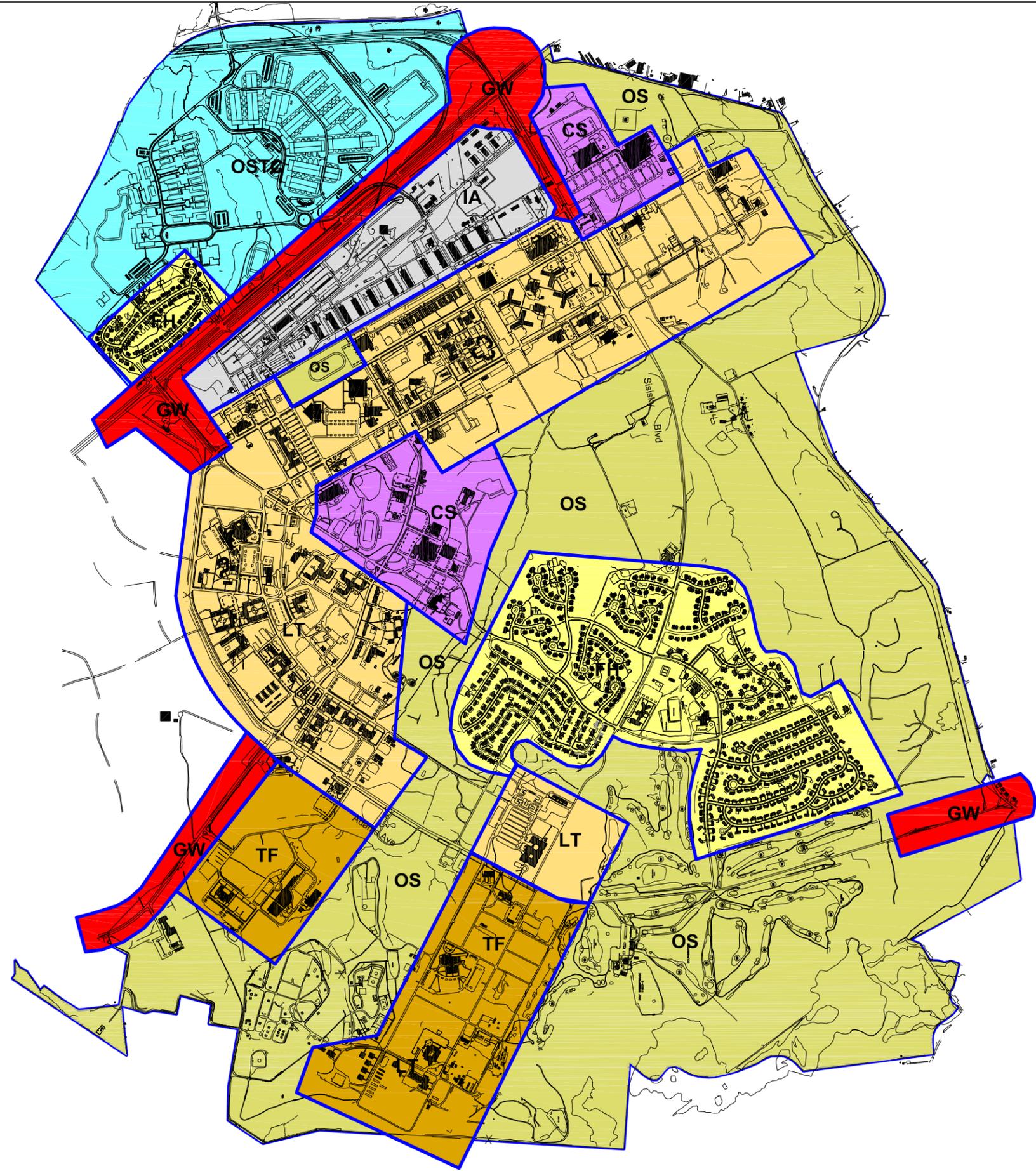
LEGEND

- CS Community Services Areas
- FH Family Housing
- GW Gateway
- IA Industrial Area
- LT Living-Training
- OS Open Space and Field Training
- TF Tenant Facilities
- OTSC Ordnance School Training Complex

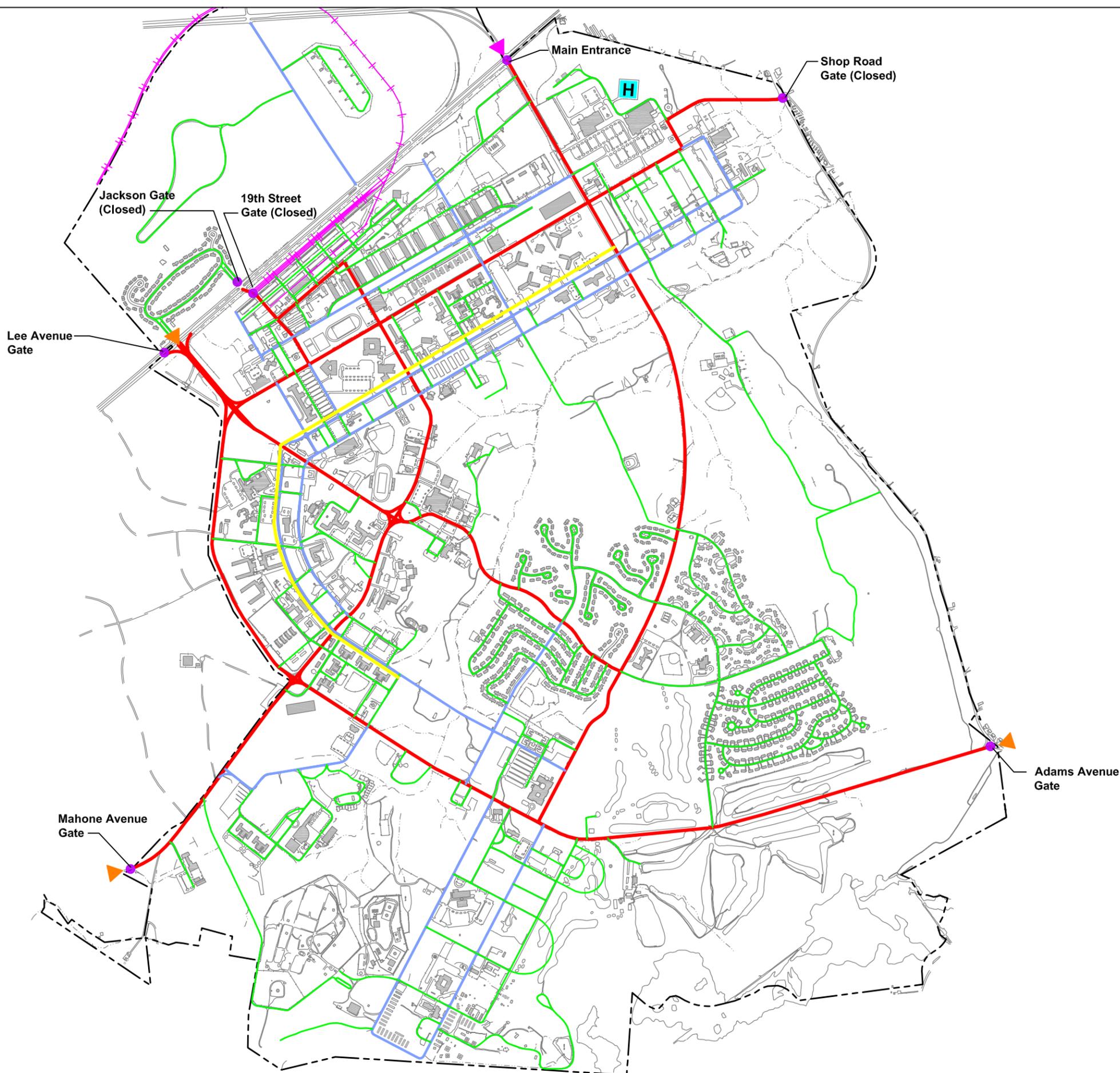


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Map 5.1
Visual Zones



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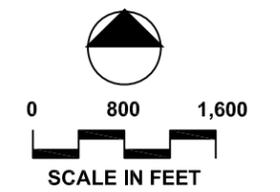


**INSTALLATION
DESIGN GUIDE**
Fort Lee, Virginia



LEGEND

- Garrison Boundary
- Primary Entrance
- Secondary Entrance
- Troop Movement Spine
- Gate Location
- Helipad
- Primary Road
- Secondary Road
- Tertiary Road
- Railroad



UNITED STATES ARMY GARRISON PARSONS

Map 5.2:
Circulation System

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Troop circulation on foot is extremely important at Fort Lee because of the number of student groups that are processed through the training facilities. Troops move in company formation, platoons, small irregular groups and as individuals. Troops assemble outside barracks and march across Adams Avenue to training areas and classroom buildings, or run in formation for group physical exercise, mixing with vehicular traffic along Byrd Avenue (Figures 5.9, 5.10).



Fig. 5.9 - Daily physical training brings platoons of runners onto Bvrd Avenue.

Smaller groups and individual soldiers regularly walk from the barracks areas to the athletic/community facilities or Post Exchange.

5.2.2 Visual themes are generalized groupings of visual zones that provide the same general use and visual characteristics. Visual themes include broad scale activities that occur on the installation. These activities typically include similar design and layout characteristics. Table 5-1 shows the theme/visual zone relationship throughout the installation.



Fig. 5.10 - Individuals and small groups of soldiers after normal duty hours mix with vehicular traffic along Byrd Avenue.

TABLE 5- 1 THEME/ZONE RELATIONSHIP

CAMPUS ENVIRONMENT THEME	CRESCENT CANTONMENT THEME	WOODLAND SETTING THEME
GW Gateway Visual Zone	LT Living - Training Visual Zone	FH Family Housing Visual Zone
TF Tenant Facilities Visual Zone	CS Community Services Areas Visual Zone	OS Open Space and Field Training Visual Zone
IA Industrial Area Visual Zone		
OSTC Ordnance School Training Complex		

5.3 VISUAL ZONES

5.3.1 Visual zones are areas within the installation that include similar visual characteristics. Visual characteristics define a "look and feel" of an area together with the dominant features that define its image. Typical visual characteristics include unique buildings, vehicular and pedestrian corridors, natural features and spatial relationships (Fig. 5.11).

Seven distinct visual zones have been identified that make up the Fort Lee environment. Often a specific type of activity or land use is what distinguishes one zone from another; however, a visual zone encompasses an area larger than one single land use area and is defined by the positions of buildings, roadways and landscape elements (Fig. 5.12). In these cases, to achieve a visual sense of orderliness, facility design must be coordinated for the entire visual zone. For this reason the design criteria of the IDG are presented according to their visual zone appropriateness.

5.3.2 The following paragraphs present a functional analysis of each of the visual zones. This analysis includes a description of the visual character, a visual analysis map, assets, liabilities and recommendations for each zone (Fig. 5.13).

5.3.3 The visual analysis maps graphically illustrate the features and constraints that affect the visual character of the zone (Fig. 5.14).

5.3.4 Assets and liabilities are determined according to the following criteria: installation visual goals and objectives ([Section 3, para 3.2](#)), design principles ([Section 3, para 3.3](#)) and visual elements ([Section 3, para 3.4](#)) in relationship to the six design components described in Sections 7 through 12 of this IDG.

A clear understanding of the strengths and weaknesses of the existing visual environment at Fort Lee is essential to target future efforts to improve the quality of the installation's design. The following subsections identify the most significant visual assets and liabilities for each visual zone. The assets



Fig. 5.11 - The removal of older frame structures provides opportunities for future development sites.



Fig. 5.12 - Forested areas throughout Fort Lee provide a rich natural setting.



Fig. 5.13 - The ALMC Center projects the image of a research and administrative campus.



Fig. 5.14 - The Quartermaster Museum represents a unique visual asset.

represent positive features which should be preserved and enhanced because they contribute to an image of quality, while the liabilities represent negative aspects which detract and should be corrected.

5.3.5 Recommendations are made to correct the liabilities or enhance the assets. These recommendations are used to generate projects that are listed in [Section 6, Improvement Projects](#).

5.4 GATEWAYS VISUAL ZONE

5.4.1 Visual Character

Fort Lee's two primary gateways at Lee Avenue and Sisisky Boulevard make Route 36 the "front door" to the post. The forested edges along both sides of this arterial roadway are a major asset and give this section of Route 36 a distinctive institutional image, in contrast to the strip commercial development east and west of the installation. For some time the visual screening provided by the tall loblolly pines has been augmented by allowing the natural understory growth to develop along this public edge of the installation. As a result, except during winter when the leaves have dropped, service buildings and storage yards are fairly well screened from the highway and entrance roads.

The goal of the design criteria provided for this area is to continue to enhance the natural forested edge as a visual buffer and further develop the Sisisky Boulevard gateway with a lush forested buffer on both sides of the entrance roadway. Adjacent service buildings, motor pools and storage yards have been modified and improved, but additional enhancements to create a continuous buffer zone of trees to screen views and frame the entrance roadway are needed. The entrance treatment should extend onto the installation all the way to Adams Avenue and should include preservation of the existing forested area at Shop Road.

The positive image of secondary entrances at Mahone Avenue, Adams Avenue, and Shop Road gates is largely due to the rich natural forest areas flanking the roadways. Continued improvements to the gate houses, median and lighting will further contribute to this image. While preserving the forested edge, these entrances should be enhanced by coordinated directional signage, as well as landscaping and military monuments where appropriate.

5.4.2 Gateways Visual Zone Analysis

5.4.2.1 Main Entrance

- 1** Forested edges at Lee Avenue entrance gives positive institutional image.
- 2** New iron fence enhances the formality of the Lee Avenue entrance drive.

5.4.2.2 Circulation

- 3** Traffic control barricades detract from the visual quality of all of the entrance to the installation.
- 4** Traffic can back up to the Route 36 intersections during periods of high security.
- 5** The troop crossing at 19th street has been improved to allow safe passage of soldiers from Main Post to the training areas north of Route 36.

5.4.2.3 Focal Points

- 6** There are no prominent focal points immediately inside the two primary gateways. The Lee Avenue gateway leads to a generous area of open space, which is attractive, but as the primary entrance gateway, it would benefit from having a strong focal point on axis with the entrance drive. The other major gates all have high visual quality; Adams Avenue gate leads into the golf course, the Bayscapes wetland park on the north side of the Sisisky Boulevard entrance is a significant open space feature and the Mahone Avenue entrance is dramatic due to the flanking forested areas on Fort Lee and in the adjacent National Park. Even the Shop Road gateway, a service entrance, has attractive vegetation along the entrance route.

5.4.2.4 Open Space

7 The major open spaces related to entrance gateways are those that flank Lee Avenue inside the installation. The open areas of lawn are vast and accented with many mature street trees and groves. In fact, the open space so dominates the arrival experience that visitors must rely on signs and street names to become oriented as there are no buildings to provide a sense of location and order.

8 Landscaped and forested open space greets visitors at the other gateways. All but Sisisky Boulevard gateway with its dense plantings of trees and shrubs are naturally wooded. All gateways provide a very positive image of Fort Lee as a lush and well-managed installation.

5.4.2.5 Buffers

9 A developing understory of deciduous trees and shrubs along VA Route 36 is developing to provide significant screening of industrial buildings in spring and summer. The screen is not as effective during fall and winter months when the leaves have fallen. Screening by the trees and understory on the north side of VA Route 36 is deeper and completely screens the facilities beyond.

10 All the other gates have effective buffers between the entrance roadway and adjacent land uses. The Sisisky Boulevard entrance has the added feature of the Bayscapes wetland park which offers a limited view of open space, but effectively screens the side and rear of the adjacent Commissary.

5.4.2.6 Primary Road

11 Forested edges at Lee Avenue entrance gives positive institutional image, but it would be further distinguished if a prominent landmark were to be more centrally featured on axis with the entrance roadway.

- 12** New iron fencing and signs further enhance this primary formal entrance to Fort Lee.

5.4.2.7 Secondary Roads

- 13** All secondary entrances are attractively flanked by wooded open space or landscaping and convey a positive image of Fort Lee.

5.4.2.8 Significant Vegetation

- 14** Forested edges occur all along the VA Route 36 frontage and flanking secondary entrance gateway roadways.

- 15** Landscaping added to the Lee Avenue and Sisisky Boulevard gateways is maturing and produces a very positive image of the installation.

5.4.2.9 Good Views

- 16** The most dramatic views encountered upon entering Fort Lee are of the open space flanking Lee Avenue and the golf course near the Adams Avenue gateway.

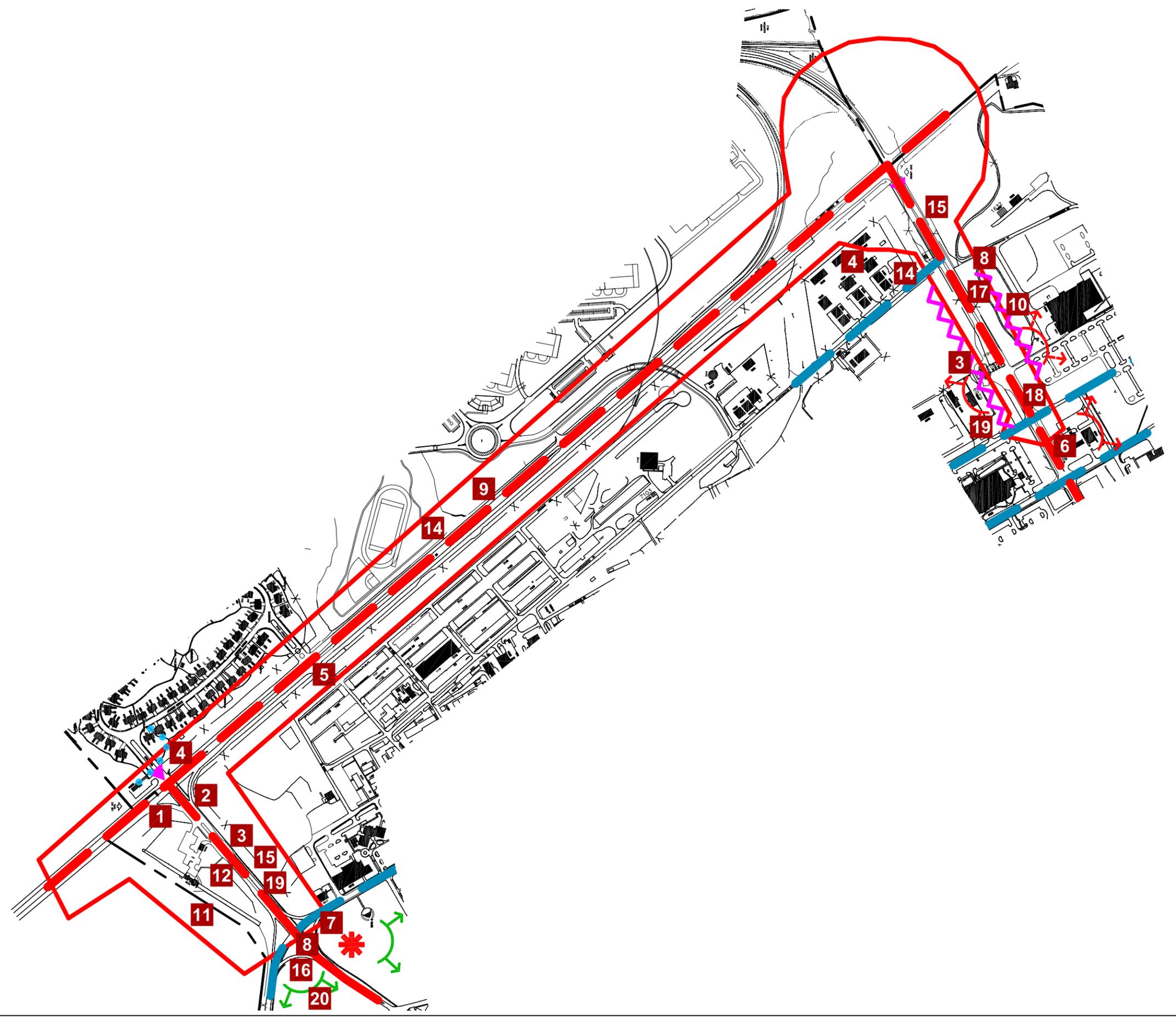
- 17** The Sisisky Boulevard gateway has been enhanced by its adjacency to the Bayscapes park on the north side of the roadway. As this park matures it will provide interesting views as well as screening the Commissary loading docks.

- 18** Entrance gateway improvements have not yet been extended beyond the Bayscapes Park to Adams Avenue as has been the intention, so there is a stretch of Sisisky Boulevard which detracts from the otherwise positive impression. The significant negative features along this unimproved section are the barricades along the AAFES gas station frontage and the unscreened motorpool parking lot in the next block.

5.4.2.10 Historical and/or Architecturally Significant Features

19 The permanent security buildings located at the gateways have been upgraded and generally create a positive impression. Hastily installed additional structures, such as the bunkers and vehicle inspection shelters associated with heightened security since the 9/11 attacks detract substantially from the positive appearance. However, these features do convey the reassuring fact that traffic entering the installation is more thoroughly checked.

20 The most significant features encountered near the gateways occur inside the Lee Avenue gateway. Within one block lies Mifflin Hall, the headquarters of the Quartermaster Corps, the Quartermaster Museum, the Women's Museum and the ceremonial shell at the west end of the parade ground. Farther along Lee Avenue, the Lee Club visually terminates the axis established by the entrance road. To the southwest, across a large open lawn is the Kenner Army Medical Clinic. All of these features are define the periphery of the open space that dominates the Lee Avenue arrival experience.

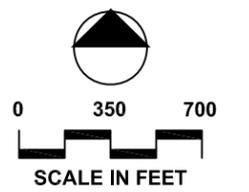


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LEGEND

- Garrison Boundary
- Primary Entrance
- Secondary Entrance
- Pedestrian Circulation
- Focal Point
- Visual Conflict
- Primary Road
- Secondary Road
- Good Views
- Bad Views
- Edge to be Buffered



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**Map 5.3:
Sisisky Gate Visual Zone
Analysis Map**

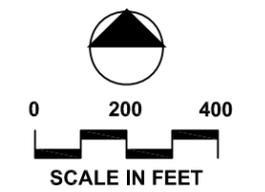
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Fort Lee, Virginia



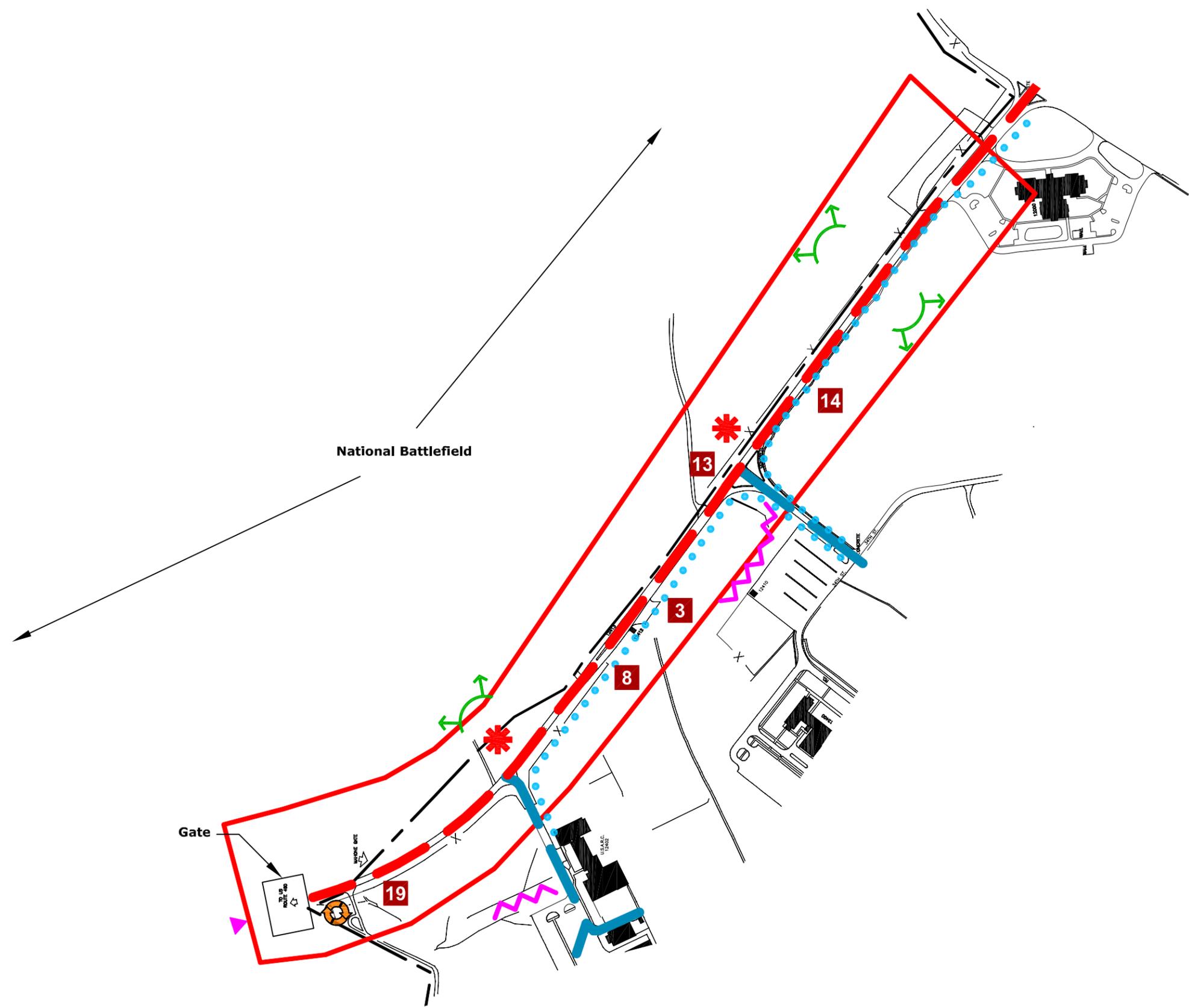

LEGEND

-  Garrison Boundary
-  Primary Entrance
-  Secondary Entrance
-  Pedestrian Circulation
-  Focal Point
-  Visual Conflict
-  Primary Road
-  Secondary Road
-  Good Views
-  Bad Views
-  Edge to be Buffered



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Map 5.4:
Mahone Gate Visual Zone Analysis Map

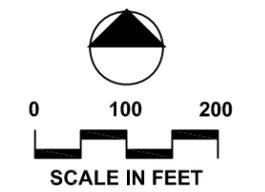


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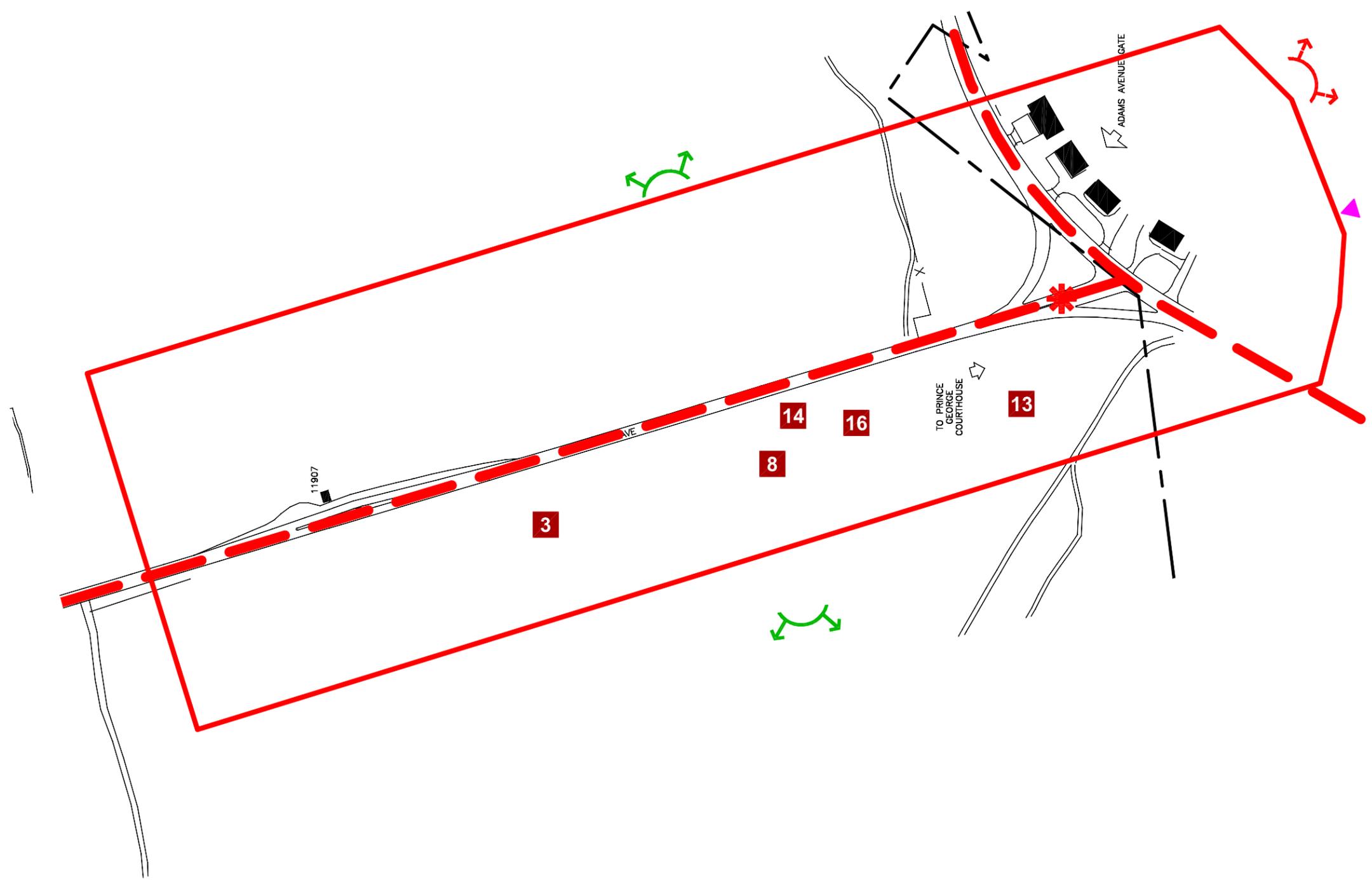
LEGEND

-  Garrison Boundary
-  Primary Entrance
-  Secondary Entrance
-  Pedestrian Circulation
-  Focal Point
-  Visual Conflict
-  Primary Road
-  Secondary Road
-  Good Views
-  Bad Views
-  Edge to be Buffered



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Map 5.5
Adams Avenue Gate Visual Zone Analysis Map



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5.4.3 Assets

5.4.3.1 Site Planning

- There is a clear institutional image presented to the public along Route 36 and at Lee Avenue and Sisisky Boulevard gateways which has been improved in FY07 (Fig. 5.15).
- Open space and forests flanking Mahone Avenue, Adams Avenue and Shop Road gateways convey a positive impression for those arriving at Fort Lee.

5.4.3.2 Buildings

- The Lee Avenue gatehouse and Visitor Center and the Sisisky Boulevard gatehouses produce a positive impression of Fort Lee (Fig. 5.16).

5.4.3.3 Circulation

- The most publicly oriented entrance to Fort Lee at Lee Avenue is clearly visible and identifiable from Route 36.

5.4.3.4 Plant Material

- The vegetative buffer along Route 36 has developed an understory of shrubs and small trees that screen views of the industrial buildings for most of the year (Fig. 5.17).
- Vegetation planted along the Sisisky Boulevard gateway approach is maturing to form an effective visual buffer.

5.4.3.5 Site Elements

- The iron fencing at the intersection of Lee Avenue and Route 36 contributed to the formal institutional image of Fort Lee (Fig. 5.18).
- Monument signs are used at Fort Lee gateways to present a formal institutional image to the public.



Fig 5.15 - Visitor Center/Pass Office at the Lee Avenue gateway.



Fig 5.16 - Sisisky Boulevard Gatehouse



Fig 5.17 - Vegetative buffer along Route 36.



Fig 5.18 - Iron fencing at the intersection of Lee Avenue and Route 36.

5.4.3.6 Force Protection

- Concentration of access in a few lanes enhances control and visibility of approaching vehicles (Fig. 5.19).

5.4.4 Liabilities

5.4.4.1 Site Planning

N/A

5.4.4.2 Buildings

- Temporary shelters detract from the otherwise improved appearance of entrance gateways (Fig. 5.20).

5.4.4.3 Circulation

- Some existing roads have mismatched lane configurations in some intersections (Fig. 5.21).

5.4.4.4 Plant Material

- Warehouse buildings and storage yards are visible through the trees from Route 36 during winter months.
- The areas at the intersection of Mahone and Adams Avenues need to be reforested, now that removal of World War II buildings has been accomplished (Fig. 5.22).

5.4.4.5 Site Elements

- Straight approaches from Route 36 to Lee and Sisisky gates means force protection must be provided by highly visible barriers.



Fig 5.19 - Formal tree plantings along the Sisisky Boulevard approach to the gate.



Fig. 5.20 - Temporary bunkers and lighting detract from the appearance of gateways.



Fig. 5.21 - Temporary vehicle inspection shelter.



Fig. 5.22 - Misaligned lanes at the intersection of Mahone and Carver Avenues.

5.4.4.6 Force Protection

- Concentration of traffic in few lanes can quickly cause backups when vehicle inspections increase (Fig. 5.23).

5.4.5 Recommendations for Gateways Visual Zone

Note: Item numbers correspond to the locations of the recommendations on Map Figure 5.6.

5.4.5.1 Site Planning

- 1 Develop the new Sisisky Boulevard gate with a street cross-section similar to Lee Avenue, featuring a landscaped median, and stands of loblolly pines on both sides of the roadway. Maintain 200-foot setbacks on both sides of roadway for both fences and buildings; 50-foot setback for parking areas (other than fenced motor-pools). Provide adequate directional and identification signage in accordance with sign design criteria.

5.4.5.2 Buildings

- 2 New sentry stations that conform to the design criteria should replace those that do not. A project is planned for a new Access Control Point along Sisisky Boulevard.

5.4.5.3 Circulation

- 3 Provide special highway treatment at major troop crossing points along Route 36 as part of the overall troop pathway system. Sisisky Gate was been widened in 2007.

5.4.5.4 Plant Material

- 4 Continue to encourage understory growth to develop within the stands of loblolly pines along the Route 36 edge. Add plantings of evergreen indigenous species to



Fig. 5.23 – Traffic congestion at Lee Avenue Main entrance off of Route 36.

develop a natural edge of growth that will screen the view of the warehouses from the public highway.

5.4.5.5 Site Elements

5 Provide post identification signs of appropriate design at each primary and secondary gate. See Sign Design Criteria.

6 Improve the appearance of Mahone Avenue from the gate to Adams Avenue by consistent curbing grading and landscaping along the roadway. Correct misalignments of curbs and embankments.

5.4.5.6 Force Protection

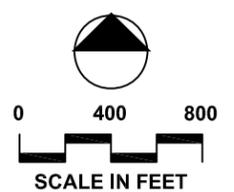
7 Establish permanent barriers and inspection facilities that conform to the design criteria.

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Map 5.6:
**Gateways Zone
Recommendations**

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5.5 LIVING-TRAINING VISUAL ZONE

5.5.1 Visual Character

Most of the main cantonment crescent-shaped area is dedicated to barracks and training facilities related to the Quartermaster Corps, the hospital, or permanent party personnel. These training functions are the most significant and highly visible activities on the installation. The Living-Training visual zone represents the essential image of Fort Lee as an orderly and attractive training campus. Training Area 5, north of the main cantonment will be developed for the Ordnance School as a result of BRAC. Several other BRAC construction projects will occur on the main cantonment as well (Fig. 5.24).

The strong spatial organization of the area is one of its assets. Adams Avenue forms a clear vehicular spine, providing an overall linear orientation to the zone. Carver Avenue complements Adams Avenue by providing vehicular access along the east side of the zone. Byrd Avenue, aligned near the center of the zone, allows vehicular traffic into the core where large and small groups of troops move between barracks, dining halls and training buildings. Along Byrd Avenue the greatest number of conflict points between vehicles and troops occur. Cross streets, many only remnants of the former street patterns that served the large number of smaller World War II buildings, are somewhat redundant and could be closed and incorporated into new development sites.

With the removal of the temporary buildings, this area has provided sites for recent development. Because some of the redevelopment is new, some areas retain a somewhat barren appearance because they were not planted trees along streets and throughout the parking lots. Additional future development will provide new opportunities to further improve the image of these sparse areas.

To reduce roadway redundancy, and to reinforce the image of the area as a troop training campus, Byrd Avenue should be converted to a troop movement and pedestrian circulation spine. This spine would



Fig. 5.24 - Construction of the Ordnance School and training facilities will begin in TA-5.

link all living-training activities within the crescent area. The spine should be appropriately paved and landscaped to produce a linear circulation corridor that gives the priority to pedestrian movement. It should also accommodate areas for group activities such as troop mustering, parading, and everyday physical training exercises. This linear spine should be the focus of the living/ training campus area, and buildings should be oriented to emphasize this focus. Vehicular access to buildings lying between Adams Avenue and Carver Avenue should be organized so that traffic across the Byrd Avenue spine is minimized. When minor cross traffic is required, pedestrian traffic should have the right-of-way. This can be visually reinforced by carrying the spine pedestrian paving surface across the road. Parking areas should be kept close to Adams Avenue and Carver Avenue. These roads will be retained and marked as the major vehicular circulation routes for the Living-Training Zone.

5.5.2 Living-Training Visual Zone Analysis

5.5.2.1 Main Entrance

1 The primary entrance to the Living-Training visual zone is from the Lee Avenue gateway. This entry point provides the most formal and attractive approach to both the north and south halves of the crescent. These two halves of the zone are also entered from the opposite ends with entry to the northern half from the Sisisky Boulevard gateway and to the southern half from the Adams Avenue gateway.

5.5.2.2 Circulation

2 Vehicular circulation in the zone is concentrated along Adams Avenue and Carver Avenue. These two streets run the length of the zone and provide good access to the facilities included within it.

3 Pedestrian circulation consists primarily of large and small groups of troops moving between barracks, dining halls, classroom building, fitness facilities and other points outside the Living-Training Zone. This troop pedestrian circulation is concentrated along Byrd Avenue, but also occurs along Adams Avenue and Carver Avenue.

5.5.2.3 Focal Points

4 The Living-Training Zone has at its center point the dominant focal point of the installation, the Quartermaster Corps Headquarters and parade ground. The Quartermaster Museum and the Army Women's Museum are also located at this point as is the Kenner Army Medical Clinic. These buildings surround the parade ground and associated open space and create a dramatic focal point just inside the main gate. The new Air Delivery Training Facility near the Sisisky Avenue gateway is a dramatic building that is a landmark due to its architectural form as well as its size and location.

5 Secondary focal points are located at the four barracks complexes; two in the northern part of the crescent and two in the southern end.

6 The CASCOM Headquarters is an integral part of the Living-Training Zone, but it is separated from the rest of the zone by a portion of the Open Space and Field Training visual zone. Because it possesses such strong architectural character it fairly clearly reads as a continuation of the zone.

5.5.2.4 Open Space

7 The dominant open space in this zone is the parade ground and adjacent lawns, groves of trees and landscaped areas at the fronts of the surrounding buildings.

8 Forested open space occurs along the eastern side of the northern end of the crescent where the Living-Training Zone abuts the Open Space and Field Training Zone and along the western side of the southern crescent area where the national park lies beyond the installation boundary. Forested open space also lies between the southern end of the zone and the separated CASCOM Headquarters site.

5.5.2.5 Buffer

9 All portions of the Living-Training Zone are well buffered by vegetation or topography from adjacent visual zones except for along the boundary with the Industrial Area visual zone. Some vegetative buffer has been established along the boundary but where the boundary follows Shop Road the buffering is weakest.

5.5.2.6 Primary Roads

10 The primary roads in the zone are Adams Avenue running lengthwise and Sisisky, Mahone and Lee Avenues, which cross the zone and intersect with Adams Avenue.

5.5.2.7 Secondary Roads

11 The secondary roads are Carver and Byrd Avenues which run lengthwise along the east side and down the center of the zone, respectively, and 1st, 11th and 19th Streets, which cross the zone and intersect with Carver and Byrd Avenues.

5.5.2.8 Significant Vegetation

12 Much of Adams Avenue is lined with street trees, many of them having reached substantial height and spread. Byrd and Carver Avenues also have several blocks that are lined with mature trees. Of the cross streets, Lee and Mahone Avenues have the most well-developed street tree plantations.

13 The open space in the vicinity of Lee Avenue and Mifflin Hall has a number of well-established stands of large trees. They provide dramatic views when seen across the wide lawn areas at this location.

14 The barracks complex at 27th Street and the Army Lodging complex immediately to the east are heavily wooded with large, mature deciduous trees.

15 The two barracks complexes in the northern end of the crescent have been landscaped and the trees planted there are beginning to mature to the point where they produce significant visual effect and shade.

16 The un-redeveloped area north of Sisisky Boulevard is developing some significant stands of pine since the World War II buildings were removed and the land allowed to revert to a natural condition.

5.5.2.9 Good Views

17 The most dramatic views in the Living-Training Zone are in the vicinity of the

parade ground and the cluster of landmark buildings that surround it. These views are predominantly of wide lawn areas, groves of mature trees and the facades of distinctive buildings.

18 Views into some of the barracks and lodging complexes are interesting as they clearly convey the overall campus atmosphere that characterizes Fort Lee.

19 Views of the new Aerial Delivery Training Facility are dramatic because of the size and form of the building.

20 The view of the Lee Club that one sees upon reaching the intersection of Lee Avenue and Carver Avenue is strong because the building is on axis. This is one of the most prominent visual relationships on the installation, but the building is too small and distant to take full advantage of the axis. A larger building or one located closer to the intersection would contribute significantly to the visual order of Fort Lee.

5.5.2.10 Historical and Architecturally Significant Features

21 Mifflin Hall, the Quartermaster Museum and the shell at the parade field are architecturally significant buildings that relate well to each other and to the open space that connects them. The Army Women's Museum is also architecturally significant, but not well-related to the others in this formal complex. This is mostly due to the separation of this building from the others by a parking lot.

22 The three large training buildings in the block between 16th and 19th Streets are architecturally significant in that they all have interesting forms and details. They are not significant as a complex because they are not related to each other architecturally or in the way they are arranged on the site.

23 The Blockhouse is an architecturally significant building in that it is very unique and unusual.

24 Buildings 3206 and 10000 are the only historic buildings in the Living-Training Zone. Building 3206 is on 13th Street at Adams Avenue and Building 10000 is in the vicinity of CASCOM Headquarters off of Sisisky Boulevard. Both buildings are identified as eligible for listing on the National Register of Historic Places.

25 Two barracks complexes, one in the southern crescent and one in the northern crescent are architecturally significant but detract from the overall image of Fort Lee. This is primarily due to their antiquated styling, materials and colors. The northern complex is at 11th Street and Byrd Avenue. The southern one is located between Mahone Avenue and 34th Street.

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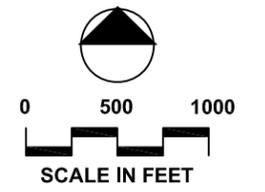


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LEGEND

- Garrison Boundary
- Primary Entrance
- Secondary Entrance
- Pedestrian Circulation
- Focal Point
- Visual Conflict
- Primary Road
- Secondary Road
- Good Views
- Bad Views
- Edge to be Buffered



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Map 5.7:
Living-Training Visual Zone Analysis Map-1

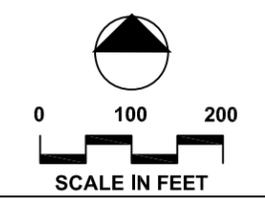
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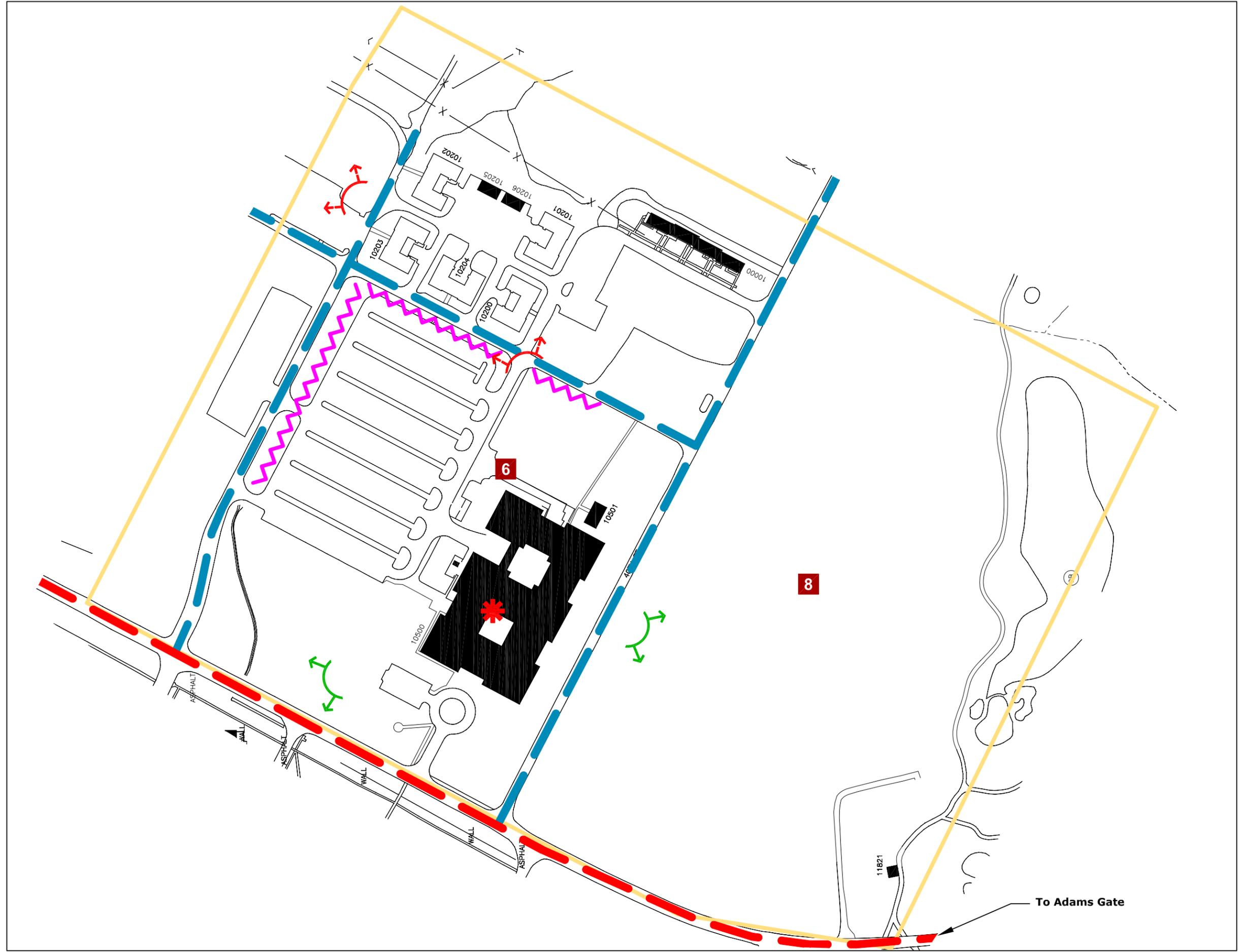

LEGEND

-  Garrison Boundary
-  Primary Entrance
-  Secondary Entrance
-  Pedestrian Circulation
-  Focal Point
-  Visual Conflict
-  Primary Road
-  Secondary Road
-  Good Views
-  Bad Views
-  Edge to be Buffered



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Map 5.8:
Living-Training Visual Zone Analysis Map-2



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5.5 ASSETS

5.5.3.1 Site Planning

- Future Development plans provide opportunities for significant improvements.
- There is strong spatial organization in this zone along the linear spine.

5.5.3.2 Buildings

- Several new and upgraded buildings add quality and character to the area (Figs. 5.25, and 5.26).

5.5.3.3 Circulation

- Troops in small groups and in formation use the spine to move from barracks to classes and between classroom buildings.

5.5.3.4 Plant Material

- Street trees thrive along the main streets in this visual zone (Fig. 5.27).

5.5.3.5 Site Elements

- Recent buildings and other improvements have included new elements that enhance the appearance of the Living-Training Visual Zone (Fig. 5.28).

5.5.3.6 Force Protection

- Somewhat limited vehicular access in the area reduces troop exposure to accidents as well as attacks.



Fig. 5.25 - The NCO Academy classroom building visually enlivens the zone.



Fig. 5.26 - The newly renovated NCO Academy barracks expresses traditional regional architectural



Fig. 5.27 - There are many mature street trees along Adams Avenue.



Fig. 5.28 - The NCO Academy has added a colorful façade and landscaping to the zone.

5.5.4 Liabilities

5.5.4.1 Site Planning

- Lack of overall area development concept plan can lead to appearance of uncoordinated development (Fig. 5.29).

5.5.4.2 Buildings

- Some older and unattractive buildings remain and interrupt the improving visual quality of the area.

5.5.4.3 Circulation

- Lack of circulation hierarchy allows redundant roadways to disrupt the cohesive campus area (Fig. 5.30).

5.5.4.4 Plant Material

- The area north of Lee Avenue has fewer trees and wooded areas.

5.5.4.5 Site Elements

- There are fewer human scale elements north of Lee Avenue making it seem less hospitable than the southern end of the crescent (Fig. 5.31).

5.5.4.6 Force Protection

- Many building have facades that are exposed to long, unobstructed sightlines from distant points on the installation.
- Some buildings lack barriers separating them from roadways (Fig. 5.32).
- Some driveways and parking lot travel lanes are aligned directly towards buildings.



Fig. 5.29 - The barracks at 11th Street is aged and lack effective landscaping.



Fig. 5.30 - The parking lot at 11th Street lacks trees or landscaping.



Fig. 5.31 - This barracks complex has few pedestrian amenities other than shade trees.



Fig. 5.32 - No barriers stand between the street and this barracks.

5.5.5 Recommendations for the Living-Training Visual Zone

Note: Item numbers correspond to the locations of the recommendations on Map Figure 5.9.

5.5.5.1 Site Planning

- 1 Remove unnecessary cross streets to allow for larger contiguous sites for future development.
- 2 Develop an overall detailed site master plan to coordinate the siting of all new buildings within this complex.
- 3 Where strong orthogonal street pattern exists, orient new structures square with street grid.
- 4 Group new and existing buildings to create courtyard areas which can produce outdoor space for study, socializing and relaxation.

5.5.5.2 Buildings

- 5 New barracks should be designed according to the architectural design criteria; interior as well as exterior. [Section 8, Buildings](#)
- 6 Demolish or upgrade World War II wood and other old or non-contributing buildings in the area.

5.5.5.3 Circulation

- 7 Convert Byrd Avenue to a central troop movement spine. Redirect vehicular traffic onto Adams and Carver Avenues. Allow only local service traffic into barracks vicinity to minimize conflicts between through traffic and troop movements.

- 8 Upgrade Adams Avenue as the major arterial street extending the length of the crescent area. Adams Avenue should be a boulevard that links all the major functions of the installation. Each major facility should be identified with directional signage along Adams Avenue. Other streets are to be utilized for more local traffic. Troop crossings are to be provided at major crossing points as part of the troop movement network.
- 9 Remove unnecessary roads wherever current development plans do not require them for access. Consolidate traffic flow on the remaining upgraded streets. Discourage through traffic on roadways other than Adams Avenue, Sisisky Boulevard and Lee and Mahone Avenues.
- 10 Develop a comprehensive troop movement pathway system, linking troop barracks with major training activity areas, such as the warehouses, range area, petroleum school and field training areas. Byrd Avenue should be the focus of this network.
- 11 Install barriers to eliminate the use of lawn areas by vehicles for shortcuts between parking lots and to streets.

5.5.5.4 Plant Material

- 12 Upgrade barracks grounds with landscaping to improve the living environment and to mitigate heat gain and wind chill.
- 13 Maintain the natural edge of the forest. Minimize removal of trees wherever new development is planned.
- 14 Parade ground planned for 1st-2nd Street area is to be framed with a double row of canopy trees.

- 15 Plant street trees to fill in gaps along the main avenues with a priority on Adams Avenue.
- 16 Plant hedges and tree rows to eliminate vehicle shortcuts across lawn areas.

5.5.5.5 Site Elements

- 17 Upgrade barracks grounds with paving and site furnishings to better support the intense troop activities there.
- 18 Remove deep open drainage ditches. Provide site drainage through either shallow swales or inlets and underground pipes. These improvements are to be part of a post-wide storm-water management plan.
- 19 Complete installation of elements (pedestrian paving, signs, bollards, lighting, etc.) along the Troop Movement Spine to clarify its establishment and to accommodate the users.
- 20 Install barriers to eliminate the use of lawn areas by vehicles for shortcuts between parking lots and to streets.

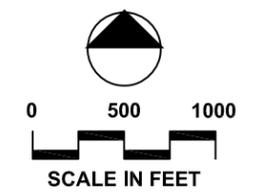
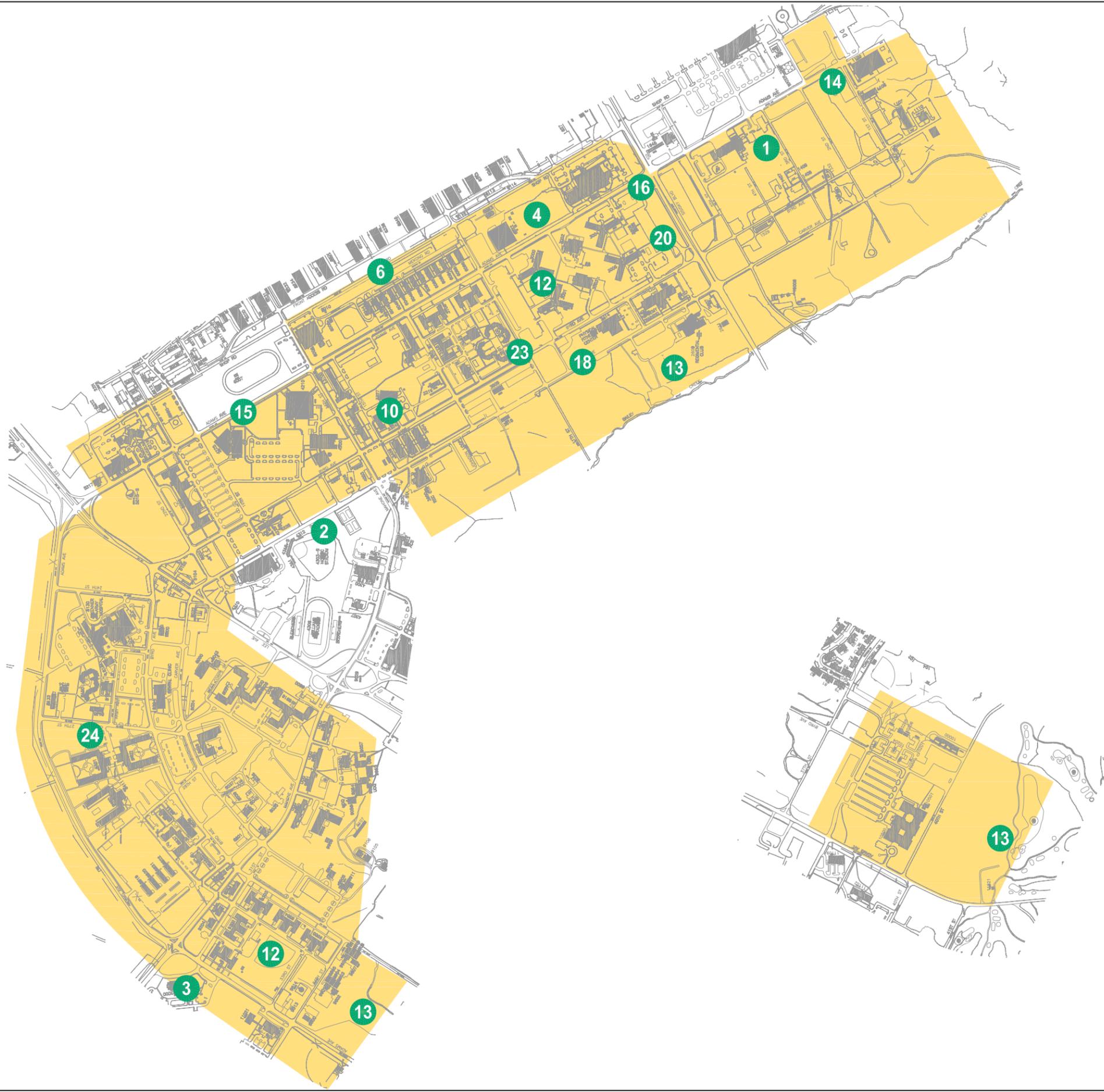
5.5.5.6 Force Protection

- 21 Group new and existing buildings to create courtyard areas which produce outdoor spaces that are not exposed to streets and parking lots.
- 22 Plant additional groupings of trees around the building in order to screen the views of building glass from distant points.
- 23 Add berms, planters and trees as vehicle barriers between building and roadways.
- 24 Reconfigure parking lot entrances and travel lanes to curve, jog and to align at oblique angles to buildings.

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Map 5.9:
**Living-Training
Visual Zone
Recommendations**

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5.6 INDUSTRIAL AREA VISUAL ZONE

5.6.1 Visual Character

The training buildings and warehouses along Shop Road and Railroad Avenue present an orderly, regimented image appropriate for the industrial area of the installation. The storage yards, by their nature, are somewhat unsightly and presently lack visual screening. This is especially important where they can be seen from Route 36 or the Sisisky Boulevard gateway. A number of the parking areas, along the shoulder of Shop Road, are undefined expanses of gravel and parked vehicles, creating a cluttered appearance.

Goals for this area include improving visual screening at storage yards, as well as improvements to the parking areas. The siting of relocated and new facilities along the Sisisky Boulevard edge should be carefully coordinated with the design for the new intersection and widened Sisisky Boulevard gateway. Ample space should be provided for a forested buffer to visually screen the service and support area from the new entrance and elevated intersection roadway.

5.6.2 Industrial Area Visual Zone Analysis

5.6.2.1 Main Entrance

1 There are two main entrances to the Industrial Area visual zone. First-time visitors enter from 19th Street after coming through the Lee Avenue gateway. Trucks and visitors with vehicle passes enter the zone by turning onto Front Access Road after entering the Sisisky Boulevard or other gateways.

5.6.2.2 Circulation

2 Primary circulation is southwest to northeast along Shop Road, Front Access Road, Rear Access Road, Quartermaster Road, Railroad Avenue and the lanes between the rows of warehouses.

3 Cross traffic reaches the numerous primary routes by using 11th, 16th and 19th Streets.

5.6.2.3 Focal Points

4 All of the buildings in the Industrial Areas visual zone are low-rise and none of them stand out as landmarks.

5.6.2.4 Open Space

5 Open space occurs at both ends of this visual zone with the largest being a wooded area adjacent to the Sisisky Boulevard gateway.

6 The open space at the southwest end of the zone is smaller in area but supports mature trees adjacent to the Lee Avenue gateway.

5.6.2.5 Buffer

7 The Industrial Area visual zone has a vegetative buffer that runs the length of Front Access Road and separates it from Shop Road.

8 Views into the visual zone from VA Route 36 are screened by vegetation in the

Gateways visual zone along the installation boundary.

5.6.2.6 Primary Road

9 The primary road in the Industrial Area Visual Zone is Shop Road which abuts the Living-Training Zone.

5.6.2.7 Secondary Road

10 Numerous secondary roads cross the zone and run lengthwise through it to provide access to both long sides of the warehouse buildings located in the zone.

5.6.2.8 Significant Vegetation

11 The open space at the northeast end of the zone has the greatest area of tree cover. It is interrupted by paved areas used for vehicle parking. This vegetation is largely native species which receive little active maintenance.

12 The wooded open space at the southwest end of the zone is significant for the number of mature trees that thrive there.

5.6.2.9 Good Views

13 The long views along Railroad Avenue are dramatic as stark reminders of the intensity of activity that would have occurred there during earlier times. The tracks and loading docks are now rarely if ever used but one can't help but imagine the buzz of wartime activity.

5.6.2.10 Historical and Architecturally Significant Features

14 The most interesting buildings within the zone are the old warehouses, particularly along Railroad Avenue. These large, rustic buildings portray a haunting image of a bygone era.

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5.6.3 Assets

5.6.3.1 Site Planning

- Strong spatial organization with the long rows of buildings functionally organized around the circulation system.
- Close proximity to barracks area make this location convenient for certain training activities (Fig. 5.33).



Fig. 5.33 - Training sites in the Industrial area are frequently used.

5.6.3.2 Buildings

- Many newer buildings have been upgraded and are heavily used for shops and offices for maintenance of the Fort Lee by DPWL and contractors (Fig. 5.34).



Fig. 5.34 - Buildings between Front and Rear Access Roads are used for shops and offices.

5.6.3.3 Circulation

- The road and railroad network are efficiently arranged to maximize access to the warehouses (Fig. 5.35).

5.6.3.4 Plant Material

- Mature loblolly pine and a developing understory provide a buffer along the Route 36 frontage of the zone.
- Mature stands of trees also occupy the southwestern end of the zone, adjacent to the Lee Avenue gateway.
- Mixed hardwoods and pine occupy large areas at the northeast end of the zone, adjacent to the Sisisky Boulevard gateway.



Fig. 5.35 - View of vegetative buffer between Railroad Avenue and Route 36.

5.6.3.5 Site Elements

- Of the site elements in the Industrial Area visual zone; signs, gazebos and outdoor concrete storage shelters, only the signs would be considered assets.

5.6.3.6 Force Protection

- Force protection measures are not extensively used in the zone because none of the buildings are classified as high occupancy and therefore measures are not required (Fig. 5.36).

5.6.4 Liabilities

5.6.4.1 Site Planning

- The efficiency that the warehouse layout once provided is no longer relevant to the way the buildings are accessed or used (Fig. 5.37).

5.6.4.2 Buildings

- Buildings no longer used are too impractical to maintain and become eyesores.

5.6.4.3 Circulation

- This circulation system provides more pavement than is currently needed and is impractical to maintain.
- Access to some of the buildings is hampered by old style and deteriorating loading docks.
- Parking lots are often poorly defined and maintained.

5.6.4.4 Plant Material

- Planting in parking areas and around building is largely non-existent (Fig. 5.38).

5.6.4.5 Site Elements

- Site elements in the Industrial Area visual zone are inconsequential and casually arranged (Fig. 5.39).



Fig. 5.36 - Some of the large warehouses are maintained and used



Fig. 5.37 - An old warehouse that has lacked maintenance for some time.



Fig. 5.38 - Most buildings have no landscaping or shade trees nearby.



Fig. 5.39 - Concrete storage sheds are durable but do not enhance outdoor areas.

5.6.4.6 Force Protection

- Force protection measures are generally not used in the Industrial Area visual zone because the buildings are not classified as high-occupancy.

5.6.5 Recommendations for the Industrial Areas Visual Zone

For recommendations, refer to Map Figure 5.11.

5.6.5.1 Site Planning

- 1 Improve the image of Shop Road area by upgrading access roads, parking and storage areas along the north side of that road. Parking areas should be defined and restricted to specific areas to allow for landscaping, troop mustering areas, and organized access drive.

5.6.5.2 Buildings

- 2 Design new warehouse structures in a consistent style and scale with a consistent palate of materials. Use brick on sides that would be visible from Route 36. Align all the new structures square with street grid (Railroad Avenue) along a consistent setback line of 200-foot (min.) from centerline of Route 36.
- 3 Remove buildings that are no longer in use or likely to be renovated. Remove loading docks and other unused parts on and around buildings which have changed to a different use.

5.6.5.3 Circulation

- 4 Improve the clarity of the preferred entrances to the shop areas that visitors are intended to identify.
- 5 Remove areas of pavement that are no longer needed.

5.6.5.4 Plant Material

6 Continue to preserve the wooded areas adjacent to the gateways at Lee Avenue and Sisisky Boulevard. Maintain existing trees to a distance of 100 feet from the edge of the roadway. Where breaks interrupt the continuity, plant loblolly pines mixed with other indigenous large scale species as infill to complete the frame.

7 Provide more attractive landscaping adjacent to parking lots and building entrances that visitors use.

8 Establish vegetation in areas where pavement and buildings have been removed.

5.6.5.5 Site Elements

9 Remove open ditches and oversized headwalls by installing underground drainage or by widening them into swales.

10 Install walks and other features between visitor parking and entrances to be used by visitors.

11 Locate gazebos and other features to be used by staff at the sides and rear of buildings rather than near the visitor entrances.

12 Visually screen fenced parking and storage lots from views.

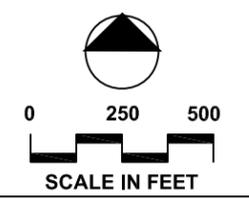
13 Repair or remove broken fencing, curbs and other elements no longer needed or maintained.

5.6.5.6 Force Protection

14 Maintain setback for security fencing at motor pool area 200 feet from the centerline of Sisisky Boulevard (median) is recommended.

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Map 5.11:
Industrial Area Recommendations

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5.7 Community Services Areas Visual Zone

5.7.1 Visual Character

Most community services and many recreation facilities are clustered in two convenient locations. The Central Community Services Area has a strong identity as the hub of off-duty activity for soldiers from the barracks areas and for residents of nearby family housing. The stadium area is an important visual asset as a green open space and forms a part of the park-like environment along Lee Avenue. The Lee Club with its formal lawn presents an appropriate stately image at the terminus of the Lee Avenue axis roadway. The North Community Services Area, with a new PXtra and Commissary, accommodates high volumes of customers including most who live outside the installation.

The Central Community Services Area is older and does not form a cohesive complex. Also, most of the buildings and sites have not been fully upgraded to entice people to linger or socialize as they would in a downtown-style commercial area. The visual clutter of the parking and circulation areas is one of this area's greatest liabilities. Mechanical equipment and loading areas are visible from Battle Drive and detract significantly from the image of the facility.

Goals for this area include improvement of access and parking areas at the PXtra and the screening or relocation of unsightly service and mechanical elements. Planting should be added along Mahone Avenue, at the Fort Lee Playhouse and PXtra and throughout the parking areas. Pedestrian pathways should be improved and carefully located to conveniently link the community facilities with other areas.

The North Community Services Area is an excellent example of high quality site planning, landscape and architectural treatment. It includes a covered walk between the stores, generously landscaped islands in the parking lots, numerous shade trees, pedestrian paving, seating, lighting and attractive architectural styling.

5.7.2 Community Services Areas Visual Zone Analysis

5.7.2.1 Main Entrance

1 The main entrance to the Central Community Services Area is from two approaches; Battle Drive for residents of family housing and Mahone Avenue from the north and south ends of the crescent.

2 The main entrance to the North Community Services Area is from Sisisky Boulevard for customers driving from off the installation through the Sisisky Boulevard gateway and from Adams Avenue for visitors arriving from elsewhere on Fort Lee.

5.7.2.2 Circulation

3 Circulation between the various buildings and fields in the Central Community Services Area is either by vehicle across large parking lots and Mahone Avenue or on foot across the vehicular spaces. A few pedestrian routes are defined with walkways but they only link the PXtra, the Post Office and the Bowling Center.

4 Circulation between the PXtra and Commissary in the North Community Services Area is primarily via a covered walk that connects the two buildings. They are arranged on adjacent sides of a large central parking lot so most shoppers don't drive their cars between stores. The gas station is not linked to the PXtra and Commissary, but lies at the point where most drivers pass it upon arrival to or departure from the stores.

5.7.2.3 Focal Points

5 The dominant focal points (marked with an * on Fig. 5.70) in the Central Community Services Area are the Lee Club, PXtra and MacLaughlin Fitness Center. These are the

largest buildings and their appearance conveys their purpose making them easily identifiable.

6 The two main buildings at the North Community Services Area are large but have been designed and sited to minimize their presence. The result is that neither building functions as a focal point.

5.7.2.4 Open Space

7 The Central Community Services Area has considerable expanses of open space. The most accessible and visible is the large complex of recreational fields and courts on the west side of the area. Less visible is the forested area east of the PXtra and Library. The woods obscure from view the Auto Hobby Shop and the Recreational Vehicle Parking Lot.

8 The North Community Services Area has an area of landscaped open space that separates it from Adams Avenue and Sisisky Boulevard. Along Sisisky Boulevard is a Bayscapes Park and along Adams Avenue is an extensively landscaped berm.

5.7.2.5 Buffer

9 In the Central Community Services Area the wooded area on the east of the PXtra and ACS serves as a buffer between the family housing neighborhoods farther east.

10 In the North Community Services Area the berm along Adams Avenue and the Bayscapes Park along Sisisky Boulevard buffer views of the stores from those adjacent streets.

5.7.2.6 Primary Road

11 In the Central Community Services Area the primary road is Mahone Avenue which passes north-south through the middle and provides access to the front sides of most of the destinations in the area.

12 In the North Community Services Area the primary road is the route that leads visitors from Sisisky Boulevard to the parking lot. This road is distinguished from all the other routes through the parking largely by the presence of street trees along both sides.

5.7.2.7 Secondary Road

13 In the Central Community Services Area the secondary roads are Lee Avenue approaching from the west and Battle Drive from the east.

14 In the North Community Services Area the secondary road is the entry drive from Adams Avenue to the parking lot.

5.7.2.8 Significant Vegetation

15 In the Central Community Services Area two areas of significant vegetation occur. The area with the most trees is the wood east of the PXtra. Numerous mature trees are scattered throughout the recreation facilities west of Mahone Avenue.

16 In the North Community Services Area there are numerous well-established trees on the berm along Adams Avenue and in some parts of the parking lot.

5.7.2.9 Good Views

17 In the Central Community Services Area there are several interesting views particularly those looking across the athletic fields to the stadium.

18 There are no particularly good views within the North Community Services Area.

5.7.2.10 Historical and Architecturally Significant Features

19 The Lee Playhouse is the only historical building in the Central Community Services

Area and the Adult Community Service building (ACS) across Mahone Avenue is significant in that it is a well-designed traditional style building. The stadium in the open space west of Mahone Avenue is a striking structure unlike others on Fort Lee.

20 The North Community Services Area does not have historical or architecturally significant structures.

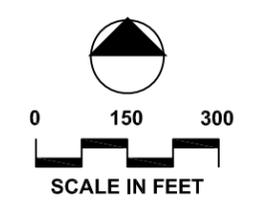
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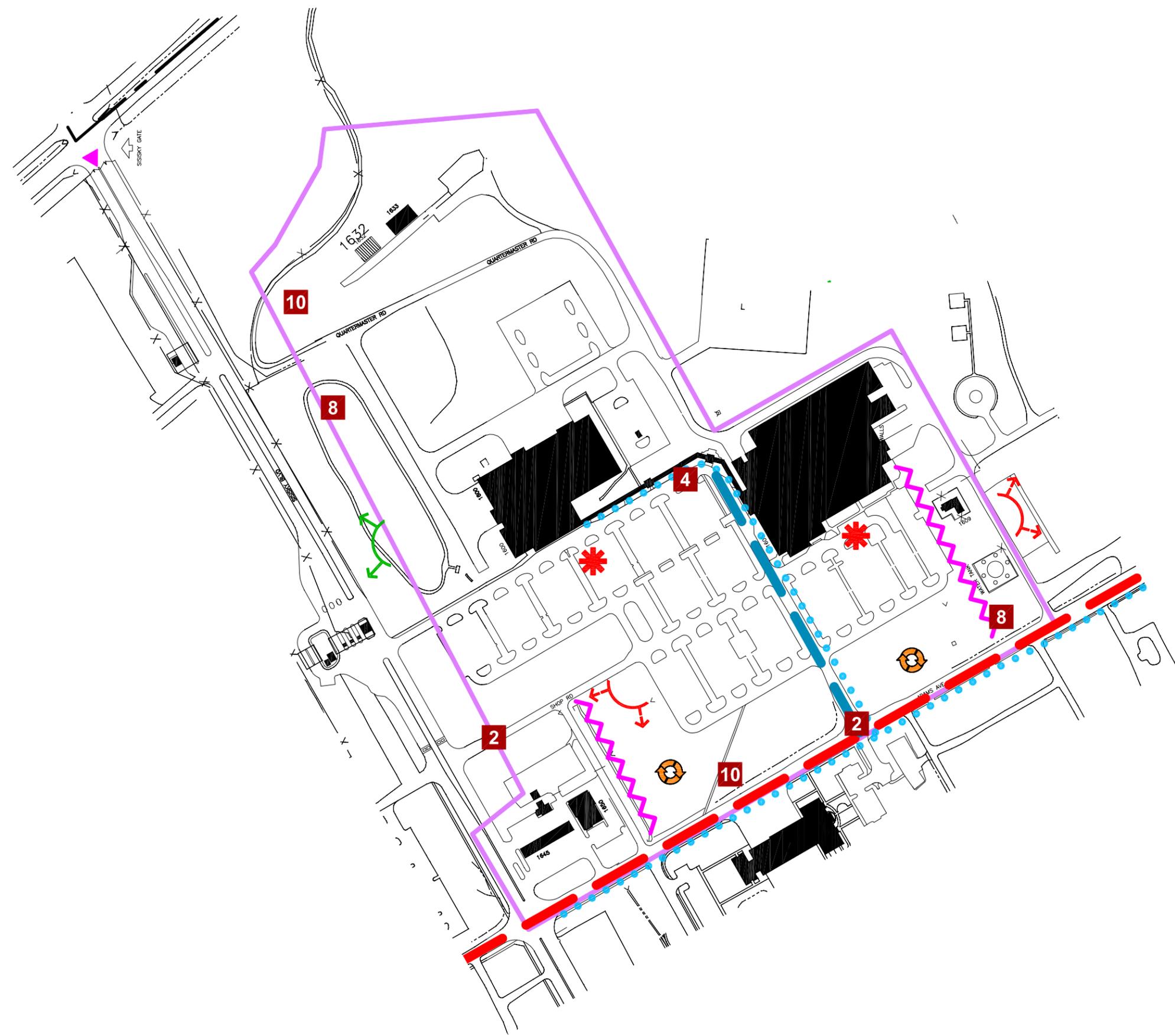

LEGEND

-  Garrison Boundary
-  Primary Entrance
-  Secondary Entrance
-  Pedestrian Circulation
-  Focal Point
-  Visual Conflict
-  Primary Road
-  Secondary Road
-  Good Views
-  Bad Views
-  Edge to be Buffered



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Map 5.12
**Community Services
Visual Zone
Analysis Map-1**



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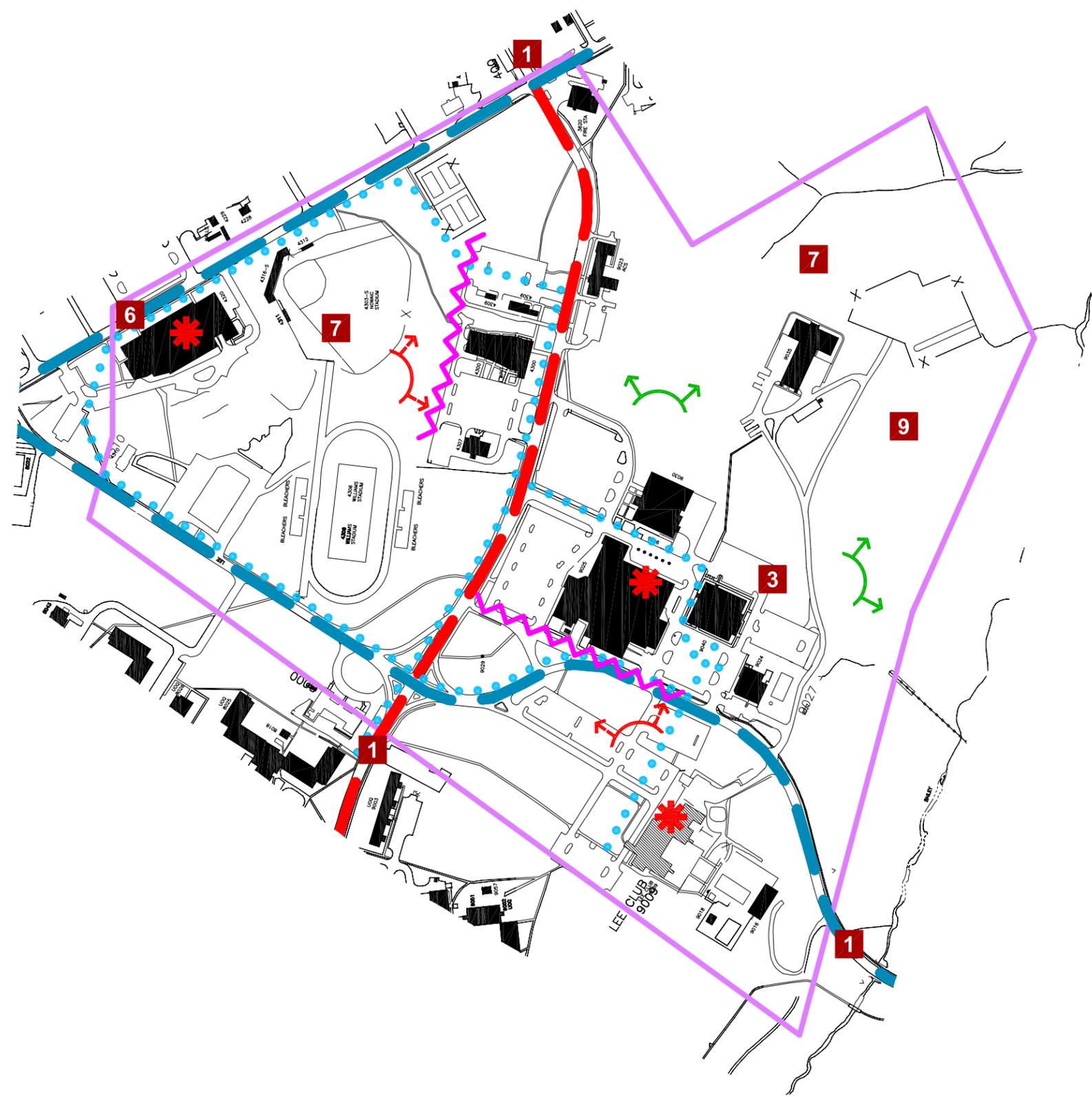
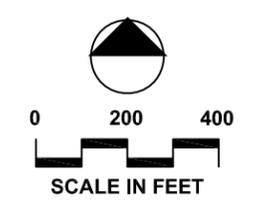
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- Garrison Boundary
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Map 5.13
Community Services Visual Zone Analysis Map-2

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5.7.3 Assets

Central Area

5.7.3.1 Site Planning

- There is a concentration of related facilities organized around open space.

5.7.3.2 Buildings

- The ACS, Lee Playhouse and athletic facilities are notable and visually attractive features (Fig. 5.40).

5.7.3.3 Circulation

- Access between all the activities, except for the Lee Club, is direct for vehicles and pedestrians.

5.7.3.4 Plant Material

- The PXtra entry area is generously landscaped (Fig. 5.41).
- Mature trees are interspersed with athletic fields in the open space west of Mahone Avenue.
- Dense woods occupy the eastern portion of the area and screen views of the Auto Hobby Shop.

5.7.3.5 Site Elements

- The PXtra entry area has pedestrian amenities and places to sit (Fig. 5.42).

5.7.3.6 Force Protection

- The main entrance of the PXtra building is partially blocked by permanent concrete planters and site elements (Fig. 5.43).



Fig. 5.40 - The Lee Theater is a prominent and interesting building.



Fig. 5.41 - The entry area of the PXtra has a generous area of landscaping.



Fig. 5.42 - The entry area at the PXtra has elements to accommodate pedestrians.



Fig. 5.43 - Concrete walls and trees partially block the entry to the PXtra.

North Area

5.7.3.7 Site Planning

- The new Commissary and PX are well-located for traffic and efficiently share a large parking lot (Fig. 5.44).

5.7.3.8 Buildings

- High quality architectural and landscape treatment at the new PX/Commissary complex.

5.7.3.9 Circulation

- Pedestrian access between the new PX and Commissary is well-accommodated by a covered walk between the two buildings (Fig. 5.45).

5.7.3.10 Plant Material

- Landscaping is generous and has become well-established (Figs. 5.46 and 5.47).

5.7.3.11 Site Elements

- Lighting, furniture, signs and other elements installed complement the architecture and accommodate customer needs.

5.7.3.12 Force Protection

- Follow standard recommended force protection in this area.



Fig. 5.44 - A large, central parking lot serves the Commissary and PXtra.



Fig. 5.45 - The covered walk that connects the two buildings.



Fig. 5.46 - The edge of the parking lot along the front of the buildings is heavily landscaped.



Fig. 5.47 - A variety of trees and shrubs screen cars in the parking lot.

5.7.4 Liabilities

Central Area

5.7.4.1 Site Planning

- Linkages for pedestrians between the PXtra, ACS, Lee Playhouse, commercial sites and recreational facilities are not well-developed (Fig. 5.48).



Fig. 5.48 - Pedestrians must walk through parking lots to reach many destinations in the zone.

5.7.4.2 Buildings

- Poor visual image of service/delivery areas and mechanical equipment at the Post Office/PXtra complex.

5.7.4.3 Circulation

- Lack of clear organization, confusing circulation patterns at Post Office area.

5.7.4.4 Plant Material

- Plantings at the central PXtra complex are vigorous and healthy but pruning and a lack of variety creates a static appearance (Fig. 5.49).



Fig. 5.49 - Landscaping lacks variety and interest.

5.7.4.5 Site Elements

- Seating, pedestrian lighting and trash containers in the central PXtra area are aged and deteriorating (Fig. 5.50).
- Although collected and integrated with the architecture, vending machines are prominent on the main wall of the PXtra facing the parking lot.



Fig. 5.50 - Wood seating and trash container in the PXTRA entry area.

5.7.4.6 Force Protection

- No significant physical force protection measures have been installed at the Central Community Services Area other than at the main entrance to the PXtra.

North Area

5.7.4.7 Site Planning

- The buildings are away from the street and completely screened by berms and vegetation (Fig. 5.51).



Fig. 5.51 - The Commissary and PX are not visible over the berm along Adams Avenue.

5.7.4.8 Buildings

- The Commissary loading dock is visible from the Bayscapes Park (Fig. 5.52).



Fig. 5.52 - Vegetation only partially screens the Commissary loading dock.

5.7.4.9 Circulation

- The parking lot lacks dedicated routes for pedestrians to reach the stores.

5.7.4.10 Plant Material

- The middle of the parking lot has little landscaping or shade (Fig. 5.53).



Fig. 5.53 - Large areas of the parking lot lacks shade trees.

5.7.4.11 Site Elements

- There are no amenities for pedestrians within the parking lot as all are concentrated along the covered walkway.
- Some of the light poles have been overtaken by closely planted trees.

5.7.4.12 Force Protection

- No standoff is provided between the fire lane and the fronts of the buildings and parking lot lanes are aligned perpendicular to the facades (Fig. 5.54).



Fig. 5.54 - The front of the Commissary is entirely accessible to vehicles.

5.7.5 Recommendations for the Community Services Areas

Note: Item numbers correspond to the locations of the recommendations on Map Fig. 5.14.

5.7.5.1 Site Planning

- 1 Develop a detailed master development plan for the Central Community Services Area to coordinate building siting, parking access and pedestrian spaces.
- 2 Upgrade the AAFES gas station building, canopy and landscaping.

5.7.5.2 Buildings

- 3 Update the facades on the PXtra and other buildings in the central area to make them more inviting.
- 4 Upgrade appearance of the Lee Club by providing a new entry at the east end that is more compatible with the style of the building.

5.7.5.3 Circulation

- 5 Upgrade the central PXtra complex parking lot to improve circulation and access roads. Reduce aisle width to 60-ft. to improve efficiency.
- 6 Improve pedestrian space in front of the central PXtra complex.
- 7 Realign Battle Drive away from PXtra building to increase the setback distance.
- 8 Develop a clear scheme for overall circulation throughout the PXtra complex. Remove vehicular traffic from the space between Buildings 9025 and 9028. As future buildings are sited, develop a ring road, extending along the north and east edges of the parking fields from the Public Affairs Office (PAO) Building to the ACS.

- 9 Define and develop pedestrian linkages between the various destinations in the central Community Services area (the PXtra, ACS, Lee Playhouse, bank, etc.) to encourage people to spend more time in the area.

5.7.5.4 Plant Material

- 10 Upgrade the central PXtra complex parking lot to provide landscaped islands to define parking bays. Increase width of planting strip along Mahone Avenue edge to 15 feet (min.).
- 11 Provide landscape screening of mechanical equipment and truck loading area along Battle Drive side of the PXtra.
- 12 Refresh the plantings in the pedestrian area in front of the PXtra and include seasonal flowering plants.
- 13 Add landscaping to the new Commissary and PX parking lots.
- 14 Screen with dense plant material the loading docks at the new Commissary and PX.

5.7.5.5 Site Elements

- 15 Rehabilitate or replace the lighting, benches, signs, paving and trash containers in the area.
- 16 Add interesting features such as a fountain or art to the pedestrian area in front of the PXtra.

5.7.5.6 Force Protection

- 17 Enlarge the pedestrian area in front of the PXtra to increase the standoff between vehicular areas and the building.

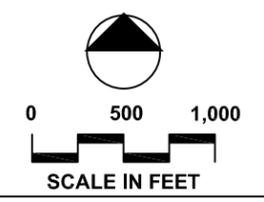
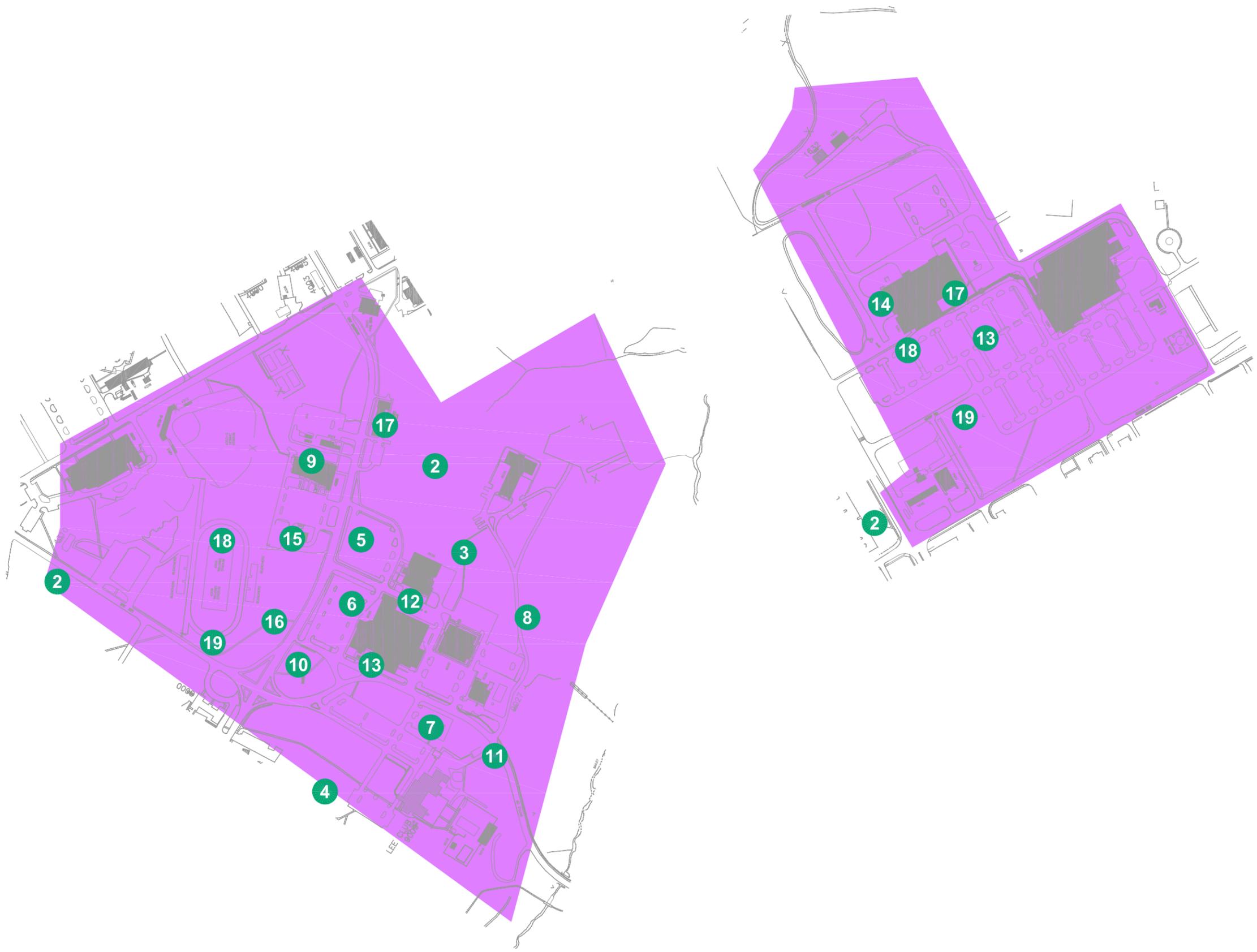
18 Add berms and subtle barriers to the pedestrian areas that can prevent vehicles from approaching the building across the open spaces.

19 Realign travel lanes in the parking lots to eliminate alignments directed straight at the building.

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Map 5.14
**Community Services
Areas Analysis Map
Recommendations**

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5.8 Tenant Facilities Visual Zone

5.8.1 Visual Character

A spacious area separated from the rest of the main cantonment area provides an ideal setting for various tenant activities. The grid of streets from 38th to 41st Streets is an area which was originally developed during World War II and today enjoys a mature growth of tall pine trees. However, the particular location of many roadways does not relate well to current and planned uses, and should be adapted to better suit these new facilities.

The ALMC shares some of these same assets and liabilities. New buildings are generally well built and suitably sited, while remnant street patterns and temporary frame structures detract from the image.

Goals for these areas include the realignment or elimination of unnecessary roadways and coordinated planning to develop a coherent overall scheme. The 38th/41st Street area is a key area for future development. An overall Site Development Concept Plan should be developed to insure a unified image. Each tenant activity should be oriented with an identifiable focus around which buildings, parking areas and training facilities are clustered. Access to these facilities should be clearly organized, rather than diffused throughout a redundant grid of roadways. Mature trees should be preserved wherever possible.

The ALMC expansion should include a new access route from Mahone Avenue that takes visitors to straight to the core of the complex. New parking should be developed on the north side of the road and new building should be sited on the south side. Existing parking in this area should be improved to eliminate the visual clutter caused by overflow parking along streets and in unpaved areas. As temporary buildings are replaced with new facilities, siting of new buildings should be directed by an overall Site Development Concept Plan to insure a strong focus and unified image for the area.

5.8.2 Tenant Facilities Visual Zone Analysis

5.8.2.1 Main Entrance

1 The two main entrances to the Tennant Facilities Visual Zone are from Adams Avenue.

5.8.2.2 Circulation

2 Circulation within the two parts of the zone is separated but within each part there are numerous cross-connection streets and roads.

5.8.2.3 Focal Points

3 The ALMC, Commissary Administration and Petroleum and Water Department buildings are the only focal points in the zone.

5.8.2.4 Open Space

4 The western part of the zone around the ALMC is almost entirely wooded open space.

5 The eastern part of the zone is a series of blocks that have regenerating forest of different ages.

5.8.2.5 Buffer

6 The woods around the ALMC effectively buffer it from surrounding land uses.

7 The east area is surrounded on three sides by the Open Space and Field Training visual zone so there are no conflicting land uses adjacent to its borders.

5.8.2.6 Primary Road

8 Adams Avenue and Mahone Avenue serve the west area while Adams Avenue alone serves the east.

5.8.2.7 Secondary Road

9 Roads internal to the Tenant Facilities zone all terminate in the zone and carry no through traffic.

5.8.2.8 Significant Vegetation

10 The woods around the ALMC and a number of the blocks in the east area support significant numbers of trees and many are becoming mature.

5.8.2.9 Good Views

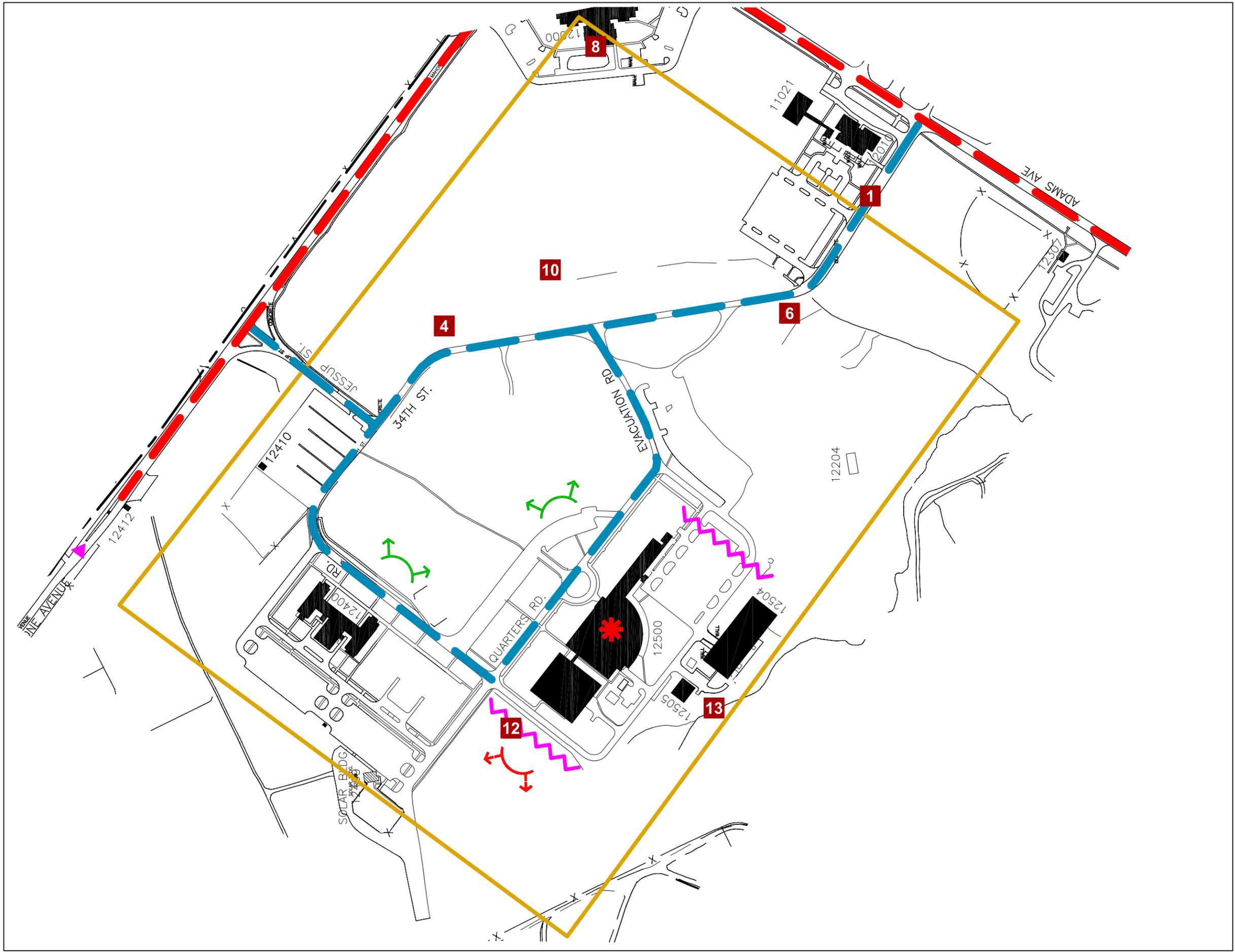
11 Views of the three main buildings in the zone produce compelling views upon approaching them in their isolated wooded settings.

12 Views out from the buildings are generally of dense woods.

5.8.2.10 Historical and Architecturally Significant Features

13 There are no historical buildings in this area, but the ALMC is an architecturally striking with its large curved façade.

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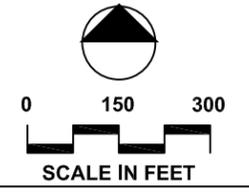


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LEGEND

- Garrison Boundary
- Primary Entrance
- Secondary Entrance
- Pedestrian Circulation
- Focal Point
- Visual Conflict
- Primary Road
- Secondary Road
- Good Views
- Bad Views
- Edge to be Buffered



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Map 5.15
Tenant Facilities
Visual Zone
Analysis Map-1

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New Credit Union Building

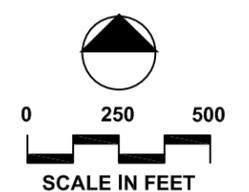


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Map 5.16

**Tenant Facilities
Visual Zone
Analysis Map-2**

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5.8.3 Assets

5.8.3.1 Site Planning

- The ALMC is isolated in a quiet private campus setting.
- The Commissary Administration and Petroleum and Water Department each occupy their own block and have room to expand (Fig. 5.55).

5.8.3.2 Buildings

- The three buildings are each attractive and well sited to express their architectural merits.



Fig. 5.55 - The Petroleum and Water Department Building.

5.8.3.3 Circulation

- Circulation in the east area is from all directions and on all sides of developed and potential sites. There are four secondary streets that connect to Adams Avenue.

5.8.3.4 Plant Material

- Mature canopy trees create unique setting in most of the Tenant Facilities Zone (Fig. 5.56).



Fig. 5.56 - A maturing stand of trees occupies the undeveloped land north of the Petroleum and Water Department.

5.8.3.5 Site Elements

- The three major buildings in the zone are relatively new and include pedestrian features related to entries (Fig. 5.57).

5.8.3.6 Force Protection

- Some parking lots have appropriate standoff distances and some have various barriers to keep vehicles away from buildings.



Fig. 5.57 -The rear entrance to the Petroleum and Water Department has pedestrian lighting and paving.

5.8.4 Liabilities

5.8.4.1 Site Planning

- Remnant street pattern of 38th Street area causes arbitrary divisions for future development sites.

5.8.4.2 Buildings

- Some older buildings remaining in the area detract from the overall appearance (Fig. 5.58).

5.8.4.3 Circulation

- The access to the ALMC from Adams Avenue is circuitous and confusing.
- There are insufficient parking areas to accommodate demand at ALMC.

5.8.4.4 Plant Material

- Some of the blocks in the eastern portion of the zone are sparsely wooded or unevenly covered with vegetation giving them a rough appearance (Fig. 5.59).

5.8.4.5 Site Elements

- The buildings have been developed with minimal pedestrian amenities and none exists connecting the buildings.
- The parking lot at the Petroleum and Water Department is unscreened and lacks shade trees (Fig. 5.60).

5.8.4.6 Force Protection

- Little force protection has been included in the development of the tenant facilities.



Fig. 5.58 - One of the older buildings in the Tenant Facilities Zone.



Fig. 5.59 - An unevenly vegetated block of woods in the Tenant Zone.



Fig. 5.60 - The Petroleum and Water Department building lacks force protection measures.

5.8.5 Recommendations for Tenant Facilities Visual Zone

Note: Item numbers correspond to the locations of the recommendations on Map Fig. 5.17.

5.8.5.1 Planning

- 1 Produce a detailed site development master plan for all areas of major future development. These areas should include the ALMC, the Petroleum School and the Commissary Administration vicinity. The detailed site master plan is to coordinate the exact location of all buildings, parking, access drives, entrance orientations, loading docks, pedestrian areas, troop pathways landscaping, etc.

5.8.5.2 Buildings

- 2 Ensure that new buildings are significant in scale and that the architectural styling is well-developed.
- 3 Because individual buildings in the Tenant Facilities Zone may eventually be visible to each other and could be seen in groups, ensure that the architecture of each is compatible with existing.

5.8.5.3 Circulation

- 4 Organize the 38th-41st Street tenant area, focusing on 40th Street as a central spine and primary access roadway. A major troop movement pathway should be located alongside the street leading through the Tenant Facilities area to the Petroleum and Water Department School. Each tenant complex should be "addressed" along 40th Street with clear directional signage for orientation. Unnecessary cross streets are to be abandoned or removed and not impose arbitrary constraints on future development sites.

5 Organize the ALMC area, coordinating locations of access drives, parking, new development, landscaped areas and pedestrian spaces. Unnecessary remnant roadways are to be removed as obsolete buildings are demolished. A new entry drive from Mahone Avenue should be aligned with the entrance to the ALMC building. Consolidated parking areas should flank both sides of that entry drive, providing a central parking field for the surrounding facilities.

6 Improve pedestrian access to Buildings 12400 and 12401 from rear parking areas. Screen mechanical equipment and separate pedestrian access from loading areas.

5.8.5.4 Plant Material

7 Continue to encourage forest regeneration on unused sites to achieve maximum cover and screening.

8 Limit the extent of landscaped areas and lawns around new buildings to preserve wooded areas and to reduce maintenance.

5.8.5.5 Site Elements

9 Provide appropriate signs for new buildings and locate them in coordination with landscaping and other elements so that the collected small-scale site features are concentrated for maximum visual effect.

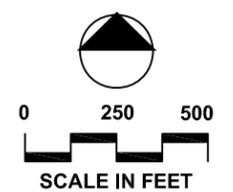
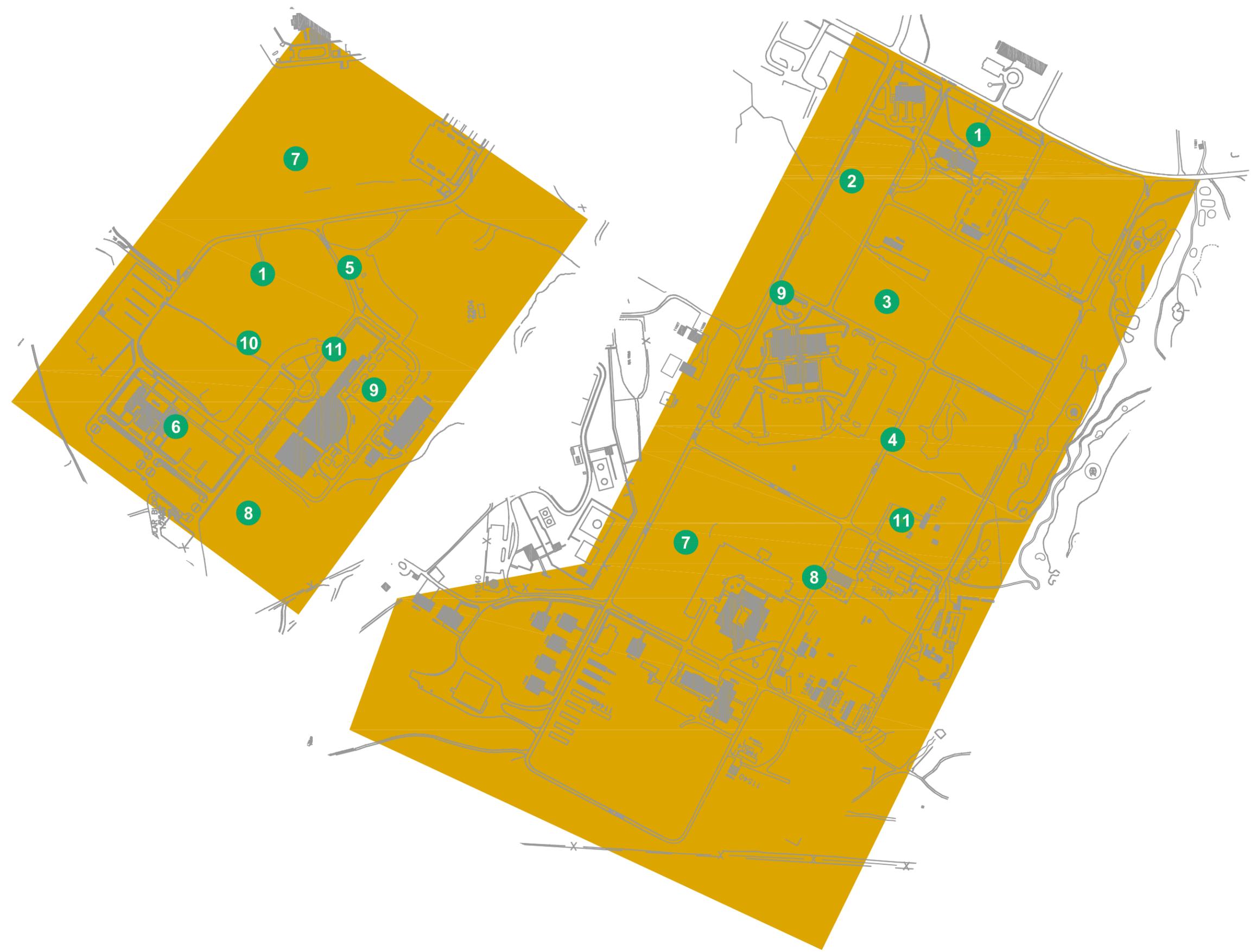
Force Protection

10 Provide force protection stand-off distances as appropriate for each facility.

11 Use landscape features such as berms, trees, walls as force protection barriers to eliminate intrusive and visually incongruous portable concrete and steel.

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Map 5.17:
Tenant Facilities Visual Zone Recommendations

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5.9 Family Housing Visual Zone

5.9.1 Visual Character

Fort Lee's woodlands, rolling hills, and stream valleys create a rich natural setting for family housing areas and provide buffers that insulate these areas from surrounding land uses. The edge of the forest is a valuable amenity when housing is placed along it. The general quality of the housing units themselves is good, and the recent addition of wooden fences represents a good approach to screening outdoor storage, patios and mechanical equipment. However, often the air conditioning compressors are unscreened by landscaping or fencing and, therefore, detract from the image of the house entries.

In a few locations on-street parking creates visual clutter and an appearance of expansive paving without relief from landscaping. These areas, particularly at Yorktown Drive, should be reorganized to separate the parking from the roadway and provide landscaping to screen the parking and create visual divisions within the larger area. Coordinated fencing of appropriate scale should be used to screen air conditioning equipment, mechanical access doorways, and provide screening for patio areas.

Family Housing Visual Zone Analysis

5.9.2.1 Main Entrance

1 The main entrances to the central housing areas are via north and southbound Sisisky Boulevard and westbound Battle Drive.

2 The main entrance to the Jackson Circle housing is from Route 36.

5.9.2.2 Circulation

3 Circulation within the central housing area is via a network of interconnecting streets and numerous cul-de-sacs.

4 Circulation in Jackson Circle is via a single loop road which has two short cul-de-sacs.

5.9.2.3 Focal Points

5 The central housing area has a single focal point which is the chapel at the corner of Sisisky Boulevard and Battle Drive.

5.9.2.4 Open Space

6 The central housing area is surrounded by the Open Space and Field Training visual zone which provides a deep woods backdrop to the neighborhoods.

7 The central area also has a recreational open space at the center of the group of neighborhoods. This area includes outdoor recreational activities as well as a daycare center and youth center.

8 Jackson Circle housing had a central open space that the houses on the inside of the loop road back up to. Houses on the outside of the road backup to the surrounding Open Space and Field Training visual zone.

5.9.2.5 Buffer

9 The central housing area neighborhoods are well-buffered from Sisisky Boulevard by a wide planted area along the sides and a wooded fence behind the houses.

10 The Jackson Circle neighborhood is minimally buffered from Route 36 by trees and an iron fence.

5.9.2.6 Primary Road

11 The primary roads within the central housing area are Sisisky Boulevard. and Battle Drive.

12 The primary road in the Jackson Circle area is Jackson Circle.

5.9.2.7 Secondary Road

13 Yorktown Drive is the secondary road in the central housing area that connects between and across Sisisky Boulevard and Battle Drive.

5.9.2.8 Significant Vegetation

14 The older neighborhoods in the central housing area have many individual mature trees, street trees and groups of trees that give a generally wooded impression.

15 The newer neighborhoods in the central housing area have many young, recently planted trees along streets and in open spaces between and behind the houses.

16 The Jackson Circle housing area has some mature trees and some younger trees that are beginning to produce some shade and visual effect.

5.9.2.9 Good Views

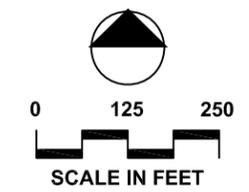
17 The central housing area has a number of views within the neighborhoods which give a very good impression of living there.

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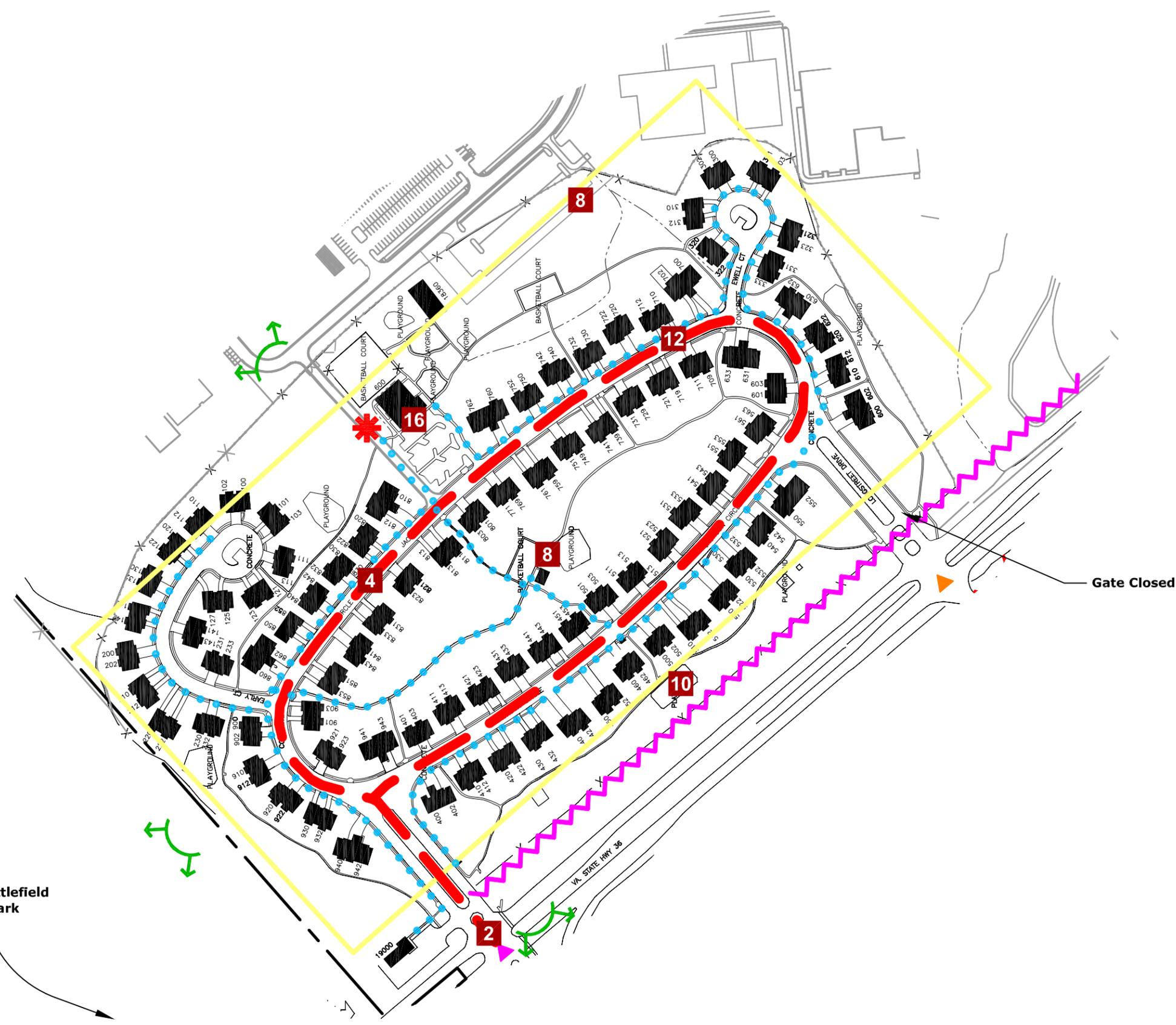

LEGEND

-  Garrison Boundary
-  Primary Entrance
-  Secondary Entrance
-  Pedestrian Circulation
-  Focal Point
-  Visual Conflict
-  Primary Road
-  Secondary Road
-  Good Views
-  Bad Views
-  Edge to be Buffered



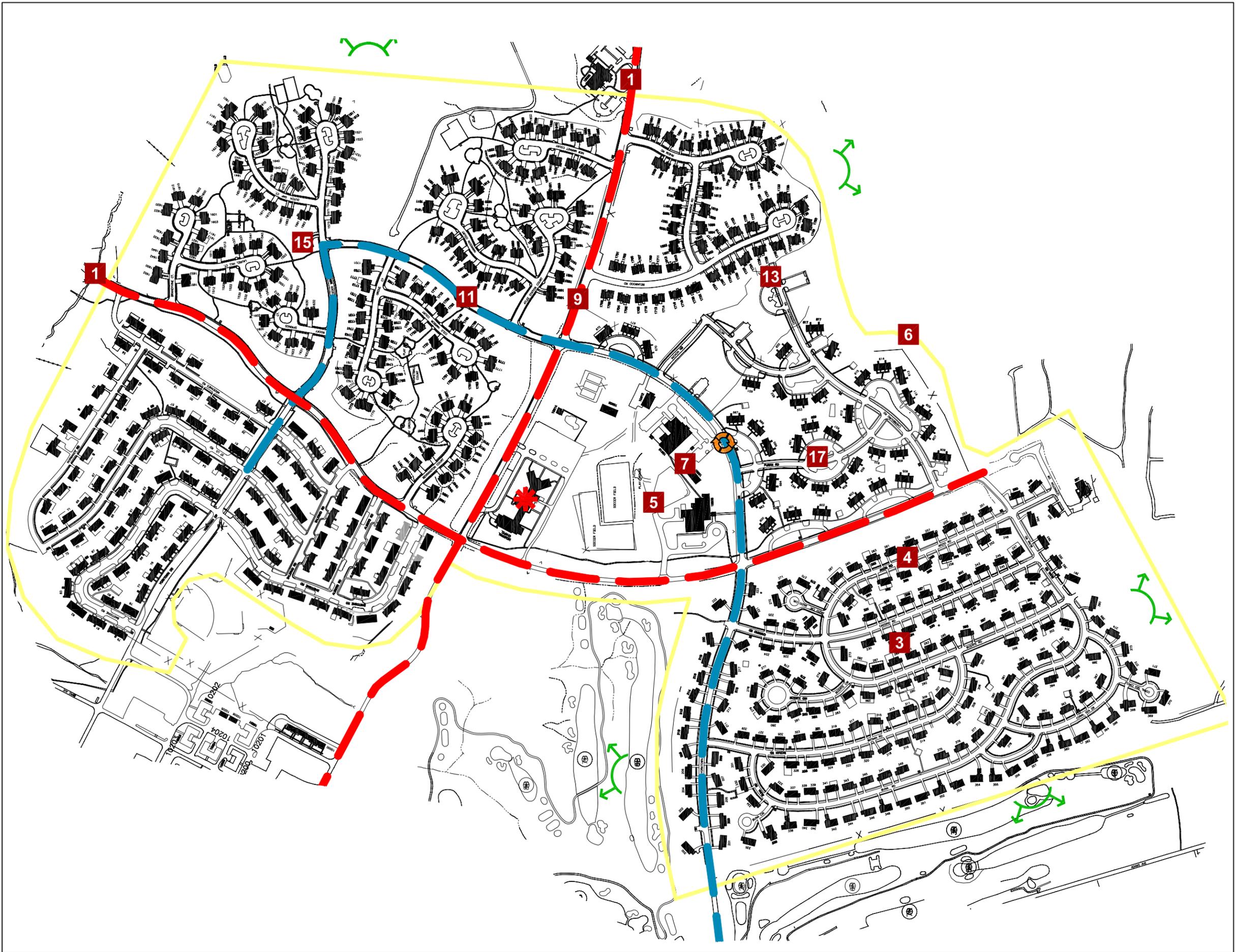
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Map 5.18:
Family Housing Visual Zone Analysis Map-1

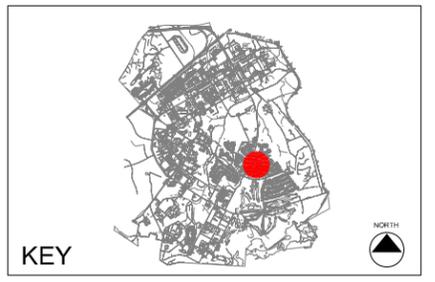


Petersburg Battlefield National Park

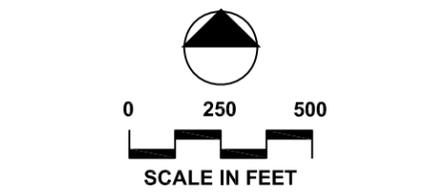
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Map 5.19:
**Family Housing
Visual Zone
Analysis Map-2**

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5.9.3 Assets

5.9.3.1 Site Planning

- Rolling hills and forested areas provide rich natural setting for housing areas (Fig. 5.61).



Fig. 5.61 - Road and homes fit the natural topography.

5.9.3.2 Buildings

- The new Harrison Villa residences have a high quality appearance (Fig. 5.62).



Fig. 5.62 - Harrison Villa residences.

5.9.3.3 Circulation

- Circulation in the central housing areas is efficient and convenient to arrive and depart.

5.9.3.4 Plant Material

- Many mature trees grow in and around the central housing area (Fig. 5.63).



Fig. 5.63 - There is abundant shade in the Monroe Manor area.

5.9.3.5 Site Elements

- There are many useful and attractive site elements in the central housing area open space and recreation complex (Fig. 5.64).



Fig. 5.64 - Bus shelters are conveniently located in the family housing neighborhoods.

5.9.3.6 Force Protection

- Follow AT/FP standard recommended force protection in this area.

5.9.4 Liabilities

5.9.4.1 Site Planning

- The Jackson Circle housing area is isolated from the rest of the cantonment area (Fig. 5.65).

5.9.4.2 Buildings

- The older housing in the central housing area is predominantly lacking in architectural appeal.

5.9.4.3 The Shoppette at Lee Avenue and Route 36 needs façade improvements (Fig. 5.66).

5.9.4.4 Circulation

- The relationship between the street and parking at some residences causes congested streets and an apparent overabundance of cars (Fig. 5.67).
- Circulation in the Jackson Circle is complicated by the need to wait for a traffic light at the entrance to Route 36.

5.9.4.5 Plant Material

- Much of the landscaping in the older neighborhoods is past its prime.

5.9.4.6 Site Elements

- The lack of screening of mechanical equipment and personal storage gives some areas a cluttered appearance (Fig. 5.68).

5.9.4.7 Force Protection

- Follow AT/FP standard recommended force protection in this area.



Fig. 5.65 - Typical duplex housing in the Madison Park neighborhood.



Fig. 5.66 - The Shoppette lacks the appeal of a contemporary retail establishment.



Fig. 5.67 - On-street parking dominates the landscape in Monroe



Fig. 5.68 - The duplexes at Madison Park all have heat pumps right at the front entrances.

5.9.5 Family Housing Visual Zone Recommendations

Note: Item numbers correspond to the locations of the recommendations on Map Fig. 5.20.

5.9.5.1 Site Planning

- 1 Redevelop the older neighborhoods as planned to include more open space and pedestrian access.

5.9.5.2 Buildings

- 2 Replace the existing housing with newer styles such as that used in Harrison Villa.

5.9.5.3 Circulation

- 3 Plan the streets and parking areas so there is less on-street parking.

5.9.5.4 Plant Material

- 4 Improve individual identity to rear patio areas with hedges and other landscaping.

5.9.5.5 Site Elements

- 5 Replace highway type low pressure sodium street lights with residential scale standards throughout housing neighborhoods.
- 6 Provide plantings or low wooden fence to screen view of air compressor units located at front of individual units.

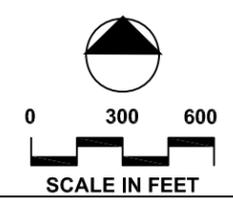
5.9.5.6 Force Protection

- Follow AT/FP standard recommended force protection in this area

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Map 5.20:
Family Housing Visual Zone Recommendations

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5.10 Open Space and Field Training Visual Zone

5.10.1 Visual Character

Woodland areas surround and run throughout Fort Lee creating a natural setting for field training and separating various areas of the post installation. The woodlands are one of Fort Lee's most valuable visual assets and are managed to protect and enhance their natural forest image. Occasionally areas of woodland must be harvested. These cleared areas should be restricted to locations out of view from the main roadways and other active areas of the post. The edge of the forest should appear to be natural with a diversity of species and understory growth.

Pathways used for troop movements should be paved and well drained. A system of storm water management should be developed to minimize soil erosion caused by run-off from other developed areas of the post. Finally, areas for outdoor group instruction should be carefully located and designed to best support that activity, with consideration given to wind protection, sun orientation and other microclimatic conditions.

5.10.2 Open Space and Field Training Visual Zone Analysis

5.10.2.1 Main Entrance

1 There are many points of access to this zone but the golf course and the troop crossing on VA Route 36 are where the greatest number of users enters the zone.

5.10.2.2 Circulation

2 Visitors to the open spaces at Fort Lee generally have tertiary roads and trails on which to move.

3 The largest capacity parking lots are at the golf course and the recreation complex.

5.10.2.3 Focal Points

4 The most visible unit in the open space system is the golf course.

5 Bailey Creek and its tributaries and Blackwater Swamp are the main natural features in the zone.

5.10.2.4 Open Space

6 Most of the open space at Fort Lee is wooded but there are openings of all sizes where wildlife is most apparent.

5.10.2.5 Buffer

7 The open space is large enough in most places to effectively buffer against intrusion from adjacent land uses.

5.10.2.6 Primary Road

8 Sisisky Boulevard and Adams Avenue are the primary roads that pass through the open space zone.

5.10.2.7 Secondary Road

- 9** Byrd Avenue and Lee Avenue are the secondary roads of this zone.
- 10** Lee Avenue runs north-south intersect Byrd Avenue and Sisisky Boulevard.

5.10.2.8 Significant Vegetation

- 11** A variety of forest types occupy most of the open space zone except where clearings exist for various land uses such as the Petroleum School.
- 12** The golf course and recreation complex are the largest areas of grassland in the open space zone.

5.10.2.9 Good Views

- 13** Views across the golf course in most directions are picturesque.
- 14** Views along Bailey Creek are intimate and serene, and provide good opportunities for viewing wildlife.

5.10.2.10 Historical and/or Architecturally Significant Features

Not applicable.

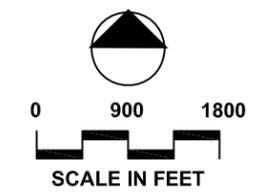
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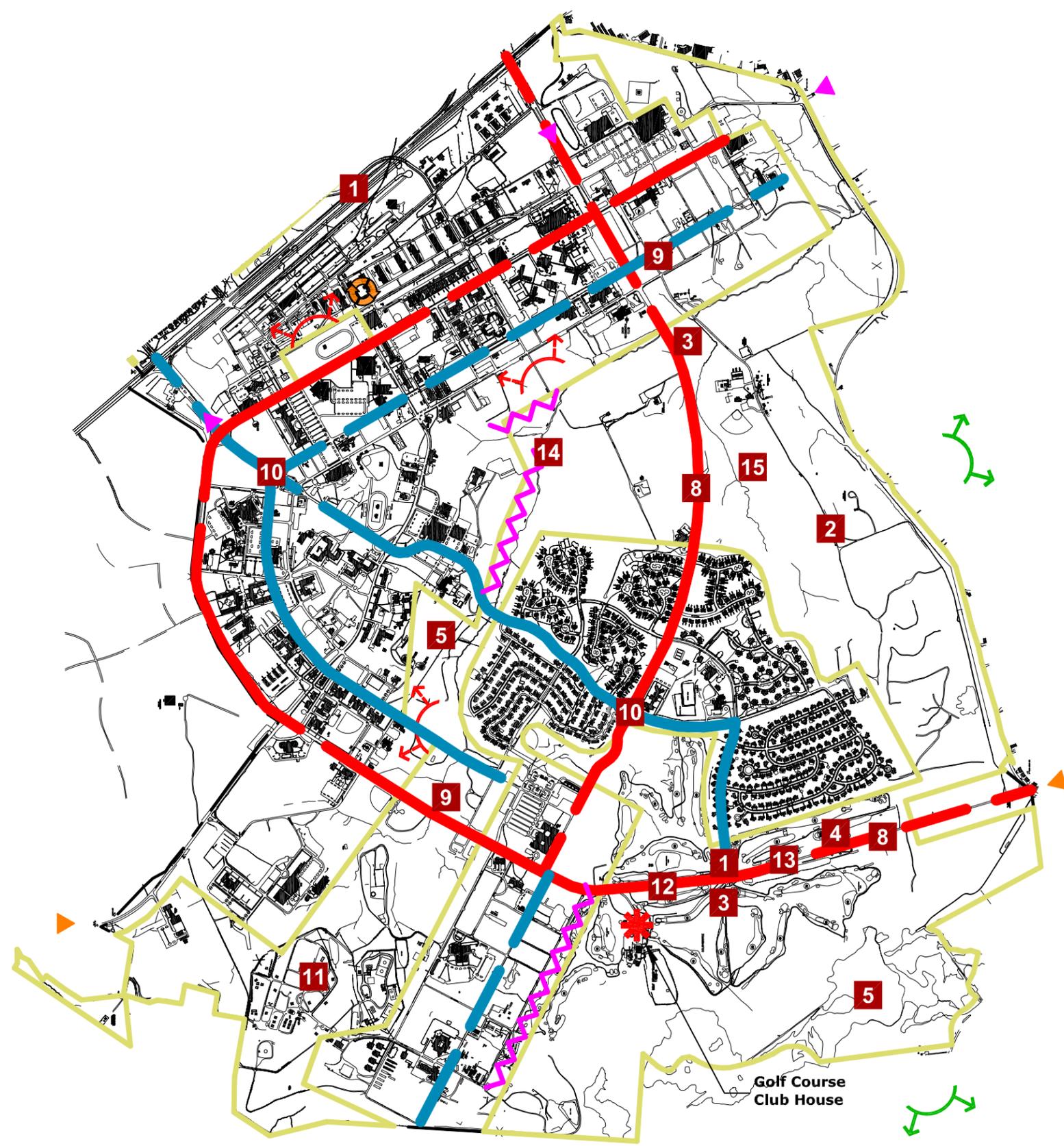

LEGEND

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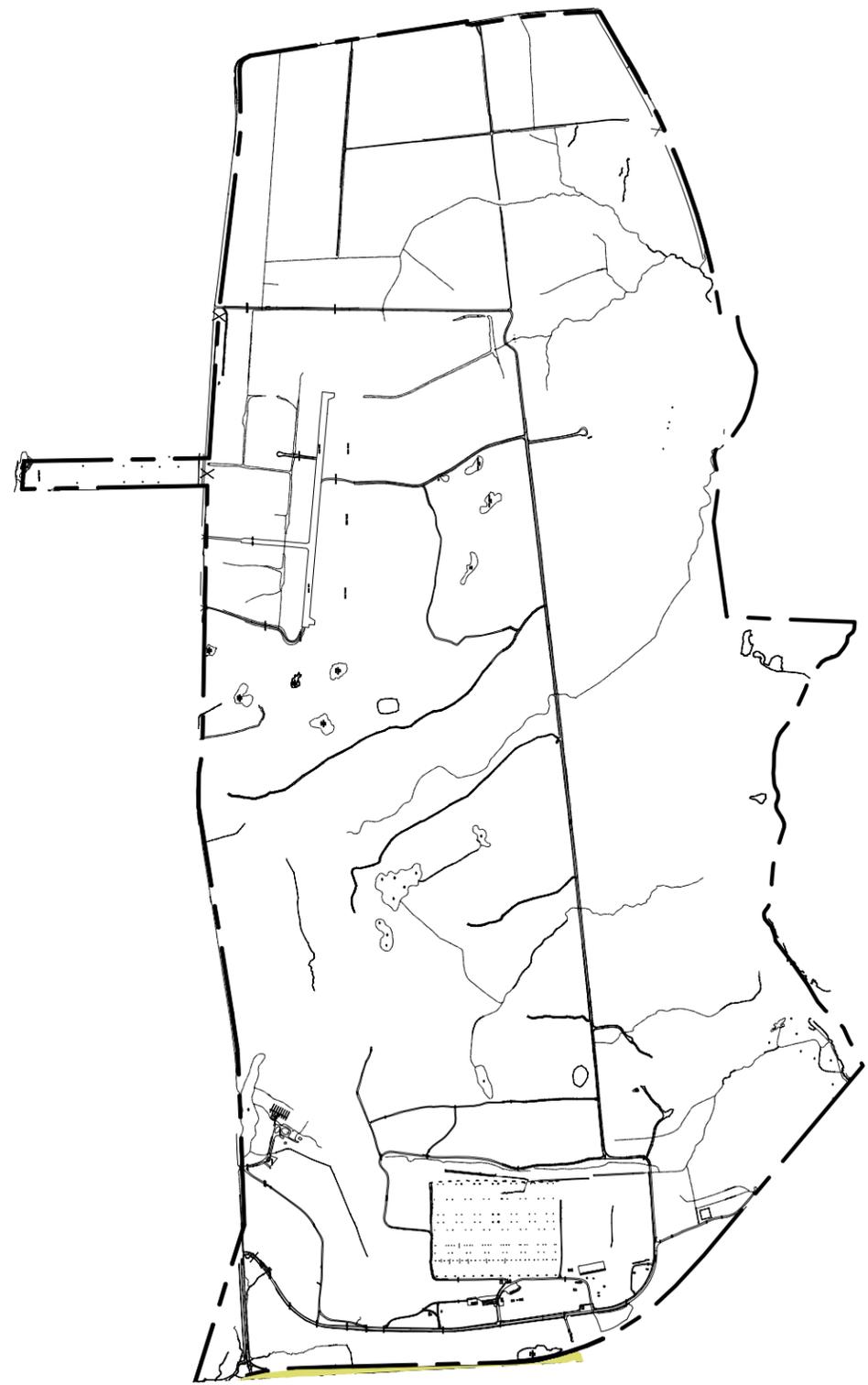
Map 5.21:
Open Space and Field Training Visual Zone Analysis Map



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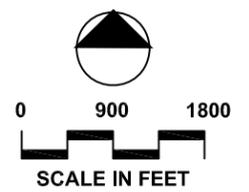
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Map 5.21A:
North Range Complex Visual Zone Analysis Map

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5.10.3 Assets

5.10.3.1 Site Planning

- The Open Space and Field Training Zone in the cantonment area is almost completely interconnected.

5.10.3.2 Buildings

- There are few buildings and those that do exist are small in scale and blend with their natural settings (Fig. 5.69).

5.10.3.3 Circulation

- Access to the main components of the open space system is good with major parking lots at key locations and numerous points where pedestrians can enter.

5.10.3.4 Plant Material

- The Bailey Creek Valley provides rich natural setting for training exercises (Fig. 5.70).

5.10.3.5 Site Elements

- The training equipment in the zone blends into the natural setting (Figs. 5.71 and 5.72).

5.10.3.6 Force Protection

- Major gathering points in the zone are not directly accessible to vehicles.



Fig. 5.69 - Structures located at the Outdoor Recreation Center.



Fig. 5.70 - The golf course clubhouse.



Fig. 5.71 - Equipment sited to protect trees.



Fig. 5.72 - Field training equipment has been designed to blend with wooded setting.

5.10.4 Liabilities

5.10.4.1 Site Planning

- The lack of an adequate storm water management program causes erosion of swales and stream valleys (Fig. 5.73).

5.10.4.2 Buildings

N/A

5.10.4.3 Circulation

- Some sections of the trail system in the zone are not adequately linked so users must use roads to make complete circuits.

5.10.4.4 Plant Material

- Some stands of trees lack the variety of species needed to provide good wildlife habitat.
- The area between Adams Avenue and the Petroleum School includes large areas of previously developed sites and lacks vigorous re-vegetation (Fig. 5.74).

5.10.4.5 Site Elements

- Some of the play equipment, fencing and other elements at the main complex are aged and deteriorating.

5.10.4.6 Force Protection

- Follow AT/FP standard recommended force protection in this area.



Fig. 5.73 - Photo of eroded stream bank.



Fig. 5.74 - Areas of previous development lack re-vegetation.

5.10.5 Recommendations for Open Space and Field Training Visual Zone

Note: Item numbers correspond to the locations of the recommendations on Map Fig. 5.22.

5.10.5.1 Site Planning

- 1 Prevent unsightly effects of erosion. Repair washed out areas at culverts. Replace deep open trenches with wider, shallower, more gently sloping swales.

5.10.5.2 Buildings

- 2 Retrofit the structures at the Petroleum School to produce a more unified appearance.
- 3 Retrofit or rehabilitate older recreational structures at the recreation complex to achieve a more unified architectural style.

5.10.5.3 Circulation

- 4 Maintain roadways through the forest as troop movement pathways leading to major training areas.

5.10.5.4 Plant Material

- 5 Maintain the natural forest edge allowing for understory growth and a transition area between the mowed areas and full height canopy trees of the forest.
- 6 Develop a troop movement pathway flanking Sisisky Boulevard.

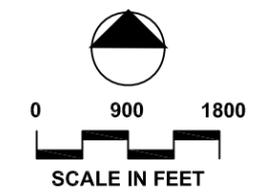
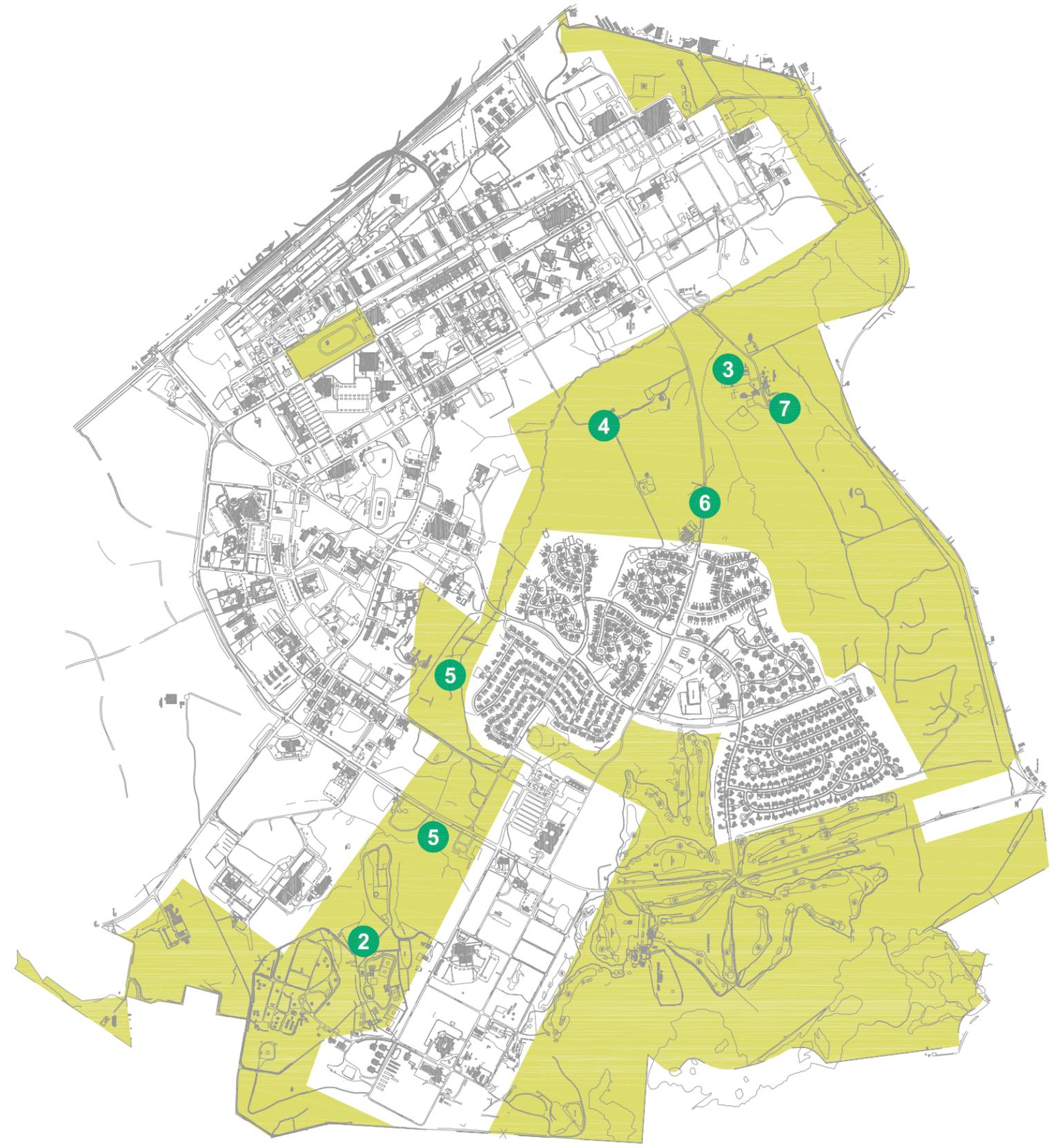
5.10.5.5 Site Elements

- 7 Replace deteriorating and aged play equipment and other elements at the recreation complex.

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Map 5.22:
Open Space and Field Training Visual Zone Recommendation Map

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5.11 ORDNANCE SCHOOL TRAINING COMPLEX VISUAL ZONE (OTSC)

5.11.1 Visual Character

North of the main cantonment Fort Lee, as a result of BRAC, is developing and constructing an entire school campus. The site formerly designated TA-5 is under construction at this time (Fig. 5.74). This facility is unique in that it is under construction and will create a distinctive visual character once construction is completed. The OTSC visual zone includes the former TA-5 training area bounded on the south by Route 36, on the west by Petersburg National Park, and on the north by Temple Avenue. On the north side of Temple Avenue the northern Fort Lee training area is located. It is predominately wooded training and range facilities. On the northern end of this training/ range area is the "North Range". The North Range will be included in the OSTC Visual zone for the purposes of this document. An ADG has been created for the new facilities on the Ordnance School Training Complex and will be accessed for the visual zone analysis of this zone. The OSTC site and the North Range area are located in forested areas with forested edges along both sides of the primary arterial roadways. These forested areas and roadways are major assets, creating a buffer between Colonial Heights and Fort Lee.



Fig. 5.74 - The Ordnance School Training Complex site located on the former TA-5.

5.11.2 Ordnance School Training Complex Visual Zone Analysis (OTSC)

5.11.2.1 Main Entrance

- 1 There will be one primary entry via new bridge from the existing cantonment over Route 36 and into the new Ordnance School Complex.

5.11.2.2 Circulation

- 2 Visitors to the OTSC at Fort Lee will generally have secondary roads and sidewalks on which to move.

- 3** Parking lots are located relative to each building.

5.11.2.3 Focal Points

- 4** The most visible elements are the five story school and training buildings and the barracks.

- 5** A wetlands area bisects the OTSC to create training on the east side and housing and support on the west side. They will remain undisturbed during construction.

5.11.2.4 Open Space

- 6** There will be no undisturbed open space after construction is completed.

5.11.2.5 Buffer

- 7** The forested areas along the primary roadways effectively buffer against intrusion from adjacent land uses.

5.11.2.6 Primary Road

- 8** Route 36 and Temple Avenue are the primary roads that pass around the OTSC zone. River Road connecting Route 36 and Temple has been permanently closed.

5.11.2.7 Secondary Road

- 9** The 11th Avenue street extension and bridge connect to the OTSC loop road.

- 10** The loop road will connect to the Temple Avenue north training range gate.

5.11.2.8 Significant Vegetation

- 11** A variety of forest types occupy the area of the large wetlands which will remain in the center of the site.

5.11.2.9 Good Views

- 12** Views across OTSC zone in most directions will be of the forested edge along main highways as well as the wetlands area.

5.11.2.10 Historical and/or Architecturally Significant Features

- 13** Petersburg National Battlefield Park in located on the western edge of the OTSC visual zone

5.11.3 Assets

5.11.3.1 Site Planning

- The OTSC visual zone area is completely interconnected (Fig. 5.75).

5.11.3.2 Buildings

- There are many buildings in the OTSC of large scale (Fig. 5.76).

5.11.3.3 Circulation

- Access to main buildings and functions is excellent with major parking lots at key locations and numerous points where pedestrians can enter.

5.11.3.4 Plant Material

- Forested areas provide a rich natural setting for the OTSC.

5.11.3.5 Site Elements

- Mechanical equipment is well screened.

5.10.3.6 Force Protection

- Major gathering points in the zone are not directly accessible to vehicles.



Fig. 5.75 - The OSTC visual zone is completely interconnected for vehicular and pedestrian traffic.



Fig. 5.76 - Large scale buildings in the OTSC visual zone.

5.11.4 Liabilities-

- New facilities are under construction.

5.11.5 Recommendations for Ordnance School Training Complex Visual Zone-

- New facilities are under construction.

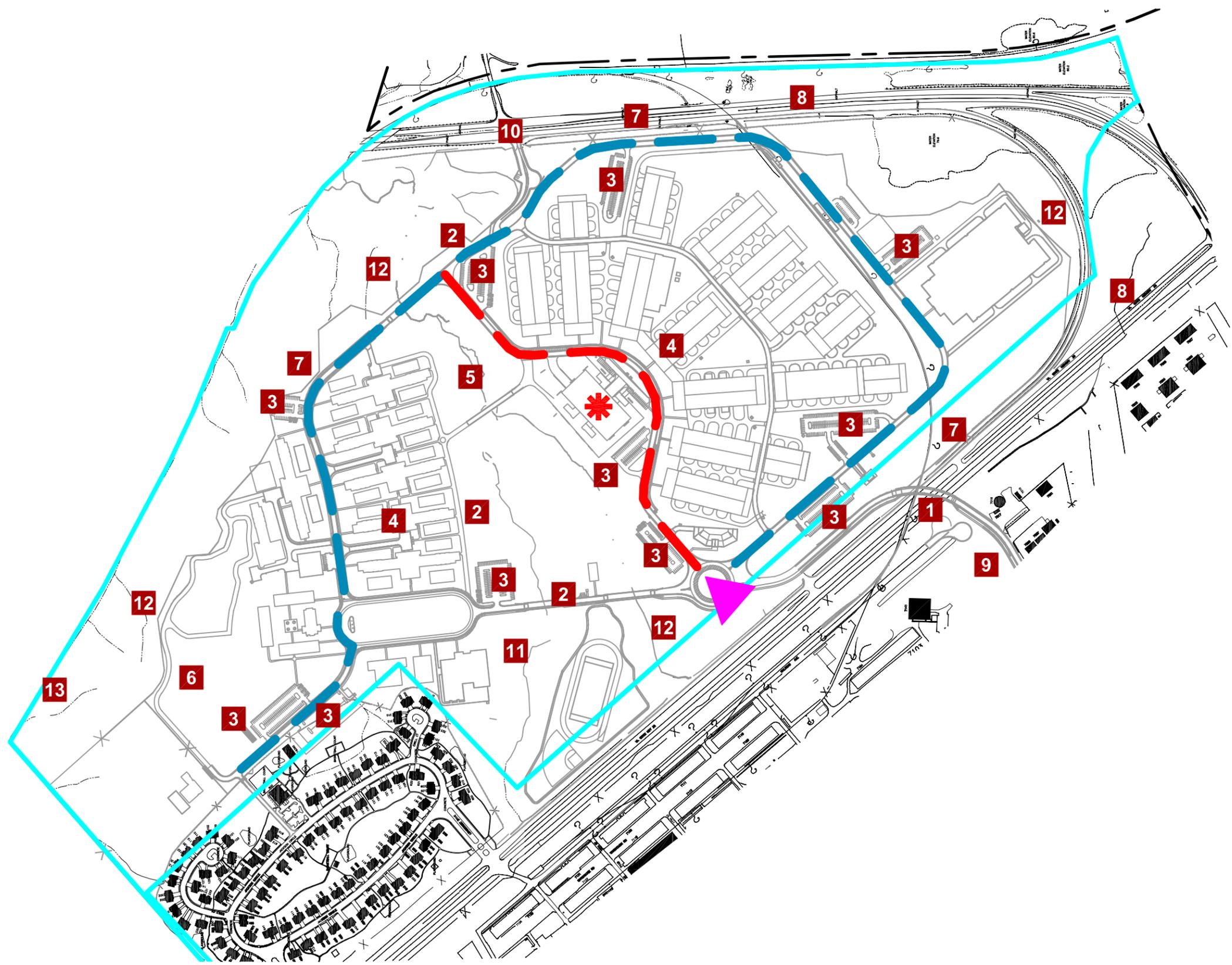
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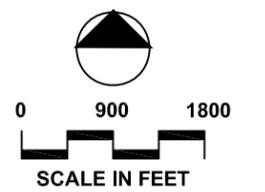
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Map 5.23:
Ordnance School Training Complex Visual Zone Analysis Map

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SECTION 8

BUILDING DESIGN STANDARDS

8.1 INTRODUCTION

8.1.1 The design character of an installation's buildings affect the installations overall image. The visual analysis of buildings and related structures helps define visual zones and themes and is an important part of an installation's assets and liabilities assessment.

8.1.2 The building design component encompasses the character of the buildings as well as the arrangement of buildings to one another and to their environment. Architectural style, materials, and colors indigenous to the region provide regional flavor to an installation while historical and culturally significant buildings give a sense of heritage (Fig. 8.1).

8.1.3 The visual analysis of a structure also includes concern for accessibility, use of materials, placement of entrances, incorporation of additions and renovations, the incorporation of plazas and courtyards, interior design and the appropriateness and quality of building maintenance.

8.1.4 This section provides: 1) the objectives and visual determinants that should be utilized to identify and assess the building design quality of the installation; 2) guidelines to preserve and sustain the existing architectural environment as new campus groupings are developed (Fig. 8.2) and existing buildings are renovated or expanded; and 3) standards and guidance pertaining to the development and maintenance of the various interiors and exteriors of buildings on the installation.

8.2 BUILDING OBJECTIVES

8.2.1 Sustainability. The architectural style of existing and future buildings should reflect and



Fig. 8.1 - The Aerial Delivery Building is a landmark building at Fort Lee.



Fig. 8.2 - New buildings in TA-5, Ordnance School Training Campus at Fort Lee.

reinforce the sustainability of the installation. Sustainable design reduces construction and maintenance cost and conserves energy through proper construction and materials selection. See [Appendix D](#) for a more complete discussion on Sustainable Design.

8.2.2 Building Design Objectives

8.2.2.1 Adapt building designs to natural site conditions (Fig. 8.3).

8.2.2.2 Design buildings in clusters to preserve land and reduce construction and maintenance costs.

8.2.2.3 Develop a coherent architectural style that results in the blending of new and old structures. Create distinguishing architectural elements such as wall curves and bows with vertical and horizontal elements functionally represented such as the Aerial Delivery building. However, when considering historical buildings one should be able to differentiate between the historic fabric and the new material.

8.2.2.4 Design buildings to include more floors in a vertical structure that results in a smaller footprint and more efficiently utilizes limited installation land areas.

8.2.2.5 Combine multiple activities in one building to reduce the number of buildings required and more efficiently utilize limited installation land areas.

8.2.2.6 Design multiple use facilities with the capability to quickly change interior layouts to accommodate changing requirements.

8.2.2.7 Use indigenous construction materials and practices that require less energy to produce and transport and may be recycled at the end of their usefulness.

8.2.2.8 Locate windows to maximize natural light, ventilation and outward views (Fig. 8.4).

8.2.2.9 Consider adaptive reuse of buildings once their initial use is no longer required.

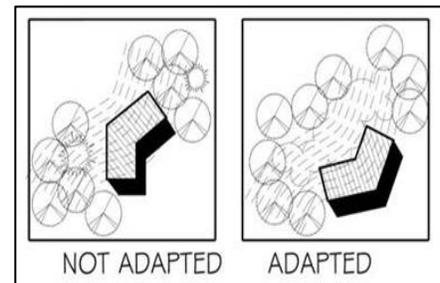


Fig. 8.3 - Adapt Building Design to Site Conditions.



Fig. 8.4 - Locate windows to maximize natural light.

8.2.3 Visual Zones

Visual zones are cohesive areas of clearly organized complexes of buildings with well-defined open spaces in-between. The entire Fort Lee site has been divided into the following visual zones (Fig. 8.5):

- GW / Gateway Zone
- LT / Living-Training Zone
- CC / Community Center Zone
- IA / Industrial Area Zone
- TF / Tenant Facilities Zone
- FH / Family Housing Zone
- OS / Open Space and Field Training Zone
- OSTC / Ordnance School Training Complex/ TA-5/ North Range

Each of these areas must be coordinated through the application of the design criteria to insure a strong, unified image.

8.2.4 Architectural Themes

8.2.4.1 A strong architectural theme for each visual zone should be identified and enforced for new buildings as well as for additions and renovations of existing buildings within each zone. An architectural theme has been developed for the TA-5 facilities soon to be constructed for the Ordnance Training School Complex (Fig. 8.6).

8.2.4.2 The new buildings of the past decade at Fort Lee show a slight departure from the architectural themes established by the designs of more permanent buildings of the previous two decades at Fort Lee. During the building campaign of the previous two decades, the use of red brick with limestone/cast stone trim for the Headquarters building and several other structures nearby created a



Fig. 8.5 - Fort Lee has been divided into several visual zones.



Fig. 8.6 - The TA-5 architectural theme will be applied to all of the buildings to be located on TA-5.

strong architectural theme for future development in that area.

8.2.4.3 But the new buildings of the past decade deviated from extensive use of stucco and instead started using brick, a more permanent building material in combination with brown trim and brown standing seam metal roofing. Limestone and cast stone were employed to accentuate building entrances and in fenestration. Now this trend should continue in the evolution of a major architectural theme across the post for future new buildings, gradually replacing stucco of existing buildings with brick as part of renovation and alteration projects' scope (Fig. 8.7).

8.2.4.4 Traditional brick theme is evident in older buildings at Fort Lee and the new buildings are being built with contemporary brick theme. Recommendations to continue and strengthen this emerging architectural character are presented later in this section.

8.2.5 Sustainability

8.2.5.1 The architectural style of existing and future buildings should reflect and reinforce the sustainability of the installation. Sustainable design reduces construction and maintenance cost and conserves energy through proper construction and materials selection. See [Appendix D](#) for a more complete discussion on Sustainable Design.

8.2.5.2 Fort Lee set goals to achieve "Silver" level by the year 2006 and "Gold" level by the year 2007. The eligibility criteria and requirements for these levels are listed in the LEED Program for "Green" buildings.

8.2.6 Technical & Engineering Aspects

Consideration of performance aspects of building components such as life cycle costs and value engineering may require refinements to the recommendations in this section. These Design Criteria area intended to control the appearance of building materials. Responsibility for adequate and appropriate technical performance of building



Fig. 8.7 – New construction in the training area represents the latest architectural trend at Fort Lee.

components lies with the project manager, DEL, architect, engineer, builder and/or construction manager.

8.3 STRUCTURAL CHARACTER

8.3.1 Historical Context

8.3.1.1 The structural character of buildings within an installation varies according to the buildings' use and the era in which they were built. Building campaigns of each era leave a mark of the period's architectural style that over the years might result in a mix of different characters with incompatibilities (Fig. 8.8).

8.3.1.2 The difference in character may also result when the historical context of an installation, and existing adjacent buildings' character and scale is not considered while developing designs for new buildings or renovation and addition projects.

8.3.1.3 The pattern of development of Fort Lee is a result of a series of building campaigns beginning in 1917. The national emergencies of World War I and World War II each required massive buildups, which took the form of extensive grids of one- and two-story wooden structures.

8.3.1.4 Nearly all of these structures are now demolished as areas have been redeveloped with more permanent larger structures. However, the basic infrastructure, the pattern of roads and general layout of the post, remains somewhat a permanent legacy of the first building campaign. The distinctive crescent-shaped layout of the main cantonment is largely a result of the railroad and roadway alignments dating to pre-Civil War.

8.3.1.5 In recent years, a great deal of effort has been directed towards demolishing the World War II era wooden buildings, leaving very few historic structures at Fort Lee. Building 4300 (Lee Playhouse) and Building 3206 (barracks) are significant historic buildings. They are eligible for listing and inclusion to the NRHP (Fig. 8.9). These historic buildings, while not listed on the register, may require replacement of deteriorated building elements or rehabilitation in



Fig. 8.8 - Building campaigns from each era leave a mark of that period's architectural style at Fort Lee.



Fig. 8.9 - Building 4300, Lee Playhouse.

order to maintain them. Any such changes must be done in a manner that is sensitive to the historic character of the building and the surrounding buildings in its visual zone. The SHPO will also need to be consulted during any changes or development projects to these buildings. Recommendations of *The Secretary of the Interior's Standards for Rehabilitation of Historic Buildings* should also be followed. They address issues as diverse as building materials, building elements, building interiors, building site, and special considerations, such as additions, energy conservation, handicapped accessibility, and fire/life safety. For further guidance use [Army Regulation 200-4](#) and [Department of the Army Pamphlet 200-4](#). Specific requirements and recommendations for the treatment of historic properties are available in the National Park Service's [Secretary of the Interior's Standards for the Treatment of Historic Properties](#). A working awareness of historic preservation policies and procedures followed by the Army Corp of Engineers can be found in the [Technical Instruction \(TI\) 800-01, Design criteria, Chap. 16, Preservation of Historic Structures](#). Also see [Appendix M, Historic Preservation Guidelines](#).

8.3.1.6 Fort Lee is representative of the over-all trend in redevelopment for military installations, which has moved towards fewer and larger more permanent buildings, and away from repetitious grids of temporary structures. This is due in part to efficiencies required by the pragmatic demands of the building functions, as well as the economies of mechanical building systems and energy conservation (Fig. 8.10).

8.3.1.7 The demolition effort has created larger development sites and has set the stage for continuation of the current trend into the post's future development.

8.3.2 Visual Determinants

8.3.2.1 Scale, massing and articulation, form, fenestration, materials, color, and texture are visual determinants that shape a building's character. During the visual analysis of Fort Lee's buildings, each of these determinants should be reviewed to create a set of recommendations for future



Fig. 8.10 - Temporary structure located at Fort Lee.

development that provides a consistent and coherent “sense of order” and “sense of place” as the designs for new buildings or renovation projects are developed and executed. The techniques for reviewing the impact of each of these visual determinants on the structural character are explained below.

8.3.2.2 Scale

Scale refers to the size of a building facade in relation to humans. Buildings that include predominant vertical facades, which dwarf the individual, are defined as monumental in scale. Monumental architectural design is typically utilized for more ceremonial buildings. These buildings make use of large, glazed areas at entrances and oversized fenestration elements to create a scale appropriate to the building’s use (Fig. 8.11). Buildings with more horizontal facades designed to relate more to the size of the human figure are defined as human scale (Fig. 8.12).

8.3.2.3 Recommendations

The scale of most buildings on Fort Lee campus should be more human than monumental. Where the scale of different buildings is consistent in a single area, it results in a strong unified image. All new construction should maintain compatibility of scale with adjacent buildings. Scale and relief should be provided through proper use of roof form, fenestration, building articulation and landscape plantings.

8.3.2.4 Massing and Articulation

8.3.2.4.1 Massing of a building refers to its overall bulk or volume. Massing does not occur in isolation. Site design, building layout planning and building elevation design all influence the massing decisions. The footprint, overall size and proportions, and height of a building’s envelope contribute to its mass (Fig. 8.13).

8.3.2.4.2 Although the Footprint of a new building must vary to accommodate its functional program



Fig. 8.11 - Monumental scale and massing building 1109.



Fig. 8.12 - Human scale and massing at the Fort Lee Federal Credit Union building.



Fig.8.13 - Elements of a building elevation on the new SCoE HQ facility.

requirements, it should be carefully developed to meet the building's desired size and proportion requirements.

8.3.2.4.3 The size and proportions of a new building if located in a cluster of existing buildings should be designed to make it compatible with the architectural theme of adjacent structures in the same visual zone. Compatibility should be achieved by use of form, fenestration, color and material choices.

8.3.2.4.4 The height of a new building should be determined partially by the height of its neighbors. A new high-rise building should not be located on a site directly adjacent to lower-rise buildings. If alternate suitable site is not feasible, a transitional element should be provided. Transition may be achieved by locating the new building at increased spatial interval, changing the form of the new building by a gradual increase in its height, or relating the new building to a human scale by incorporation of horizontal features (Fig. 8.14).

	GW	LT	CS	IA	TF	FH	OS
1 Story	●						○
2 Stories			○	●		●	●
3 Stories		○	●		○		
4 Stories		●			●		

● = Maximum Allowed ○ = Preferred Bldg. Ht.

Fig. 8.14 – Recommended maximum building heights.

8.3.2.5. Recommendations

8.3.2.5.1 The new building's functional program may dictate floor areas, its overall bulk and height. In any single area, the heights of buildings should be matched, so that a consistent scale is maintained. Differences in floor-to-floor heights and sloping sites may require some variation. However, in general, alignment of all major building features is preferred. These include general fenestration, cornice lines, belt courses and roof lines, all of which should be aligned with adjacent buildings whenever possible.

8.3.2.5.2 Although specific program requirements may require higher or lower structures, wherever feasible, the following Recommended Maximum Building Heights should be applied. The Preferred Building Height represents an ideal height for all buildings in the visual zone.

8.3.2.5.3 Although floor areas and overall bulk of buildings must vary to accommodate required functions of the building program, the architectural design solution should resolve the awkward

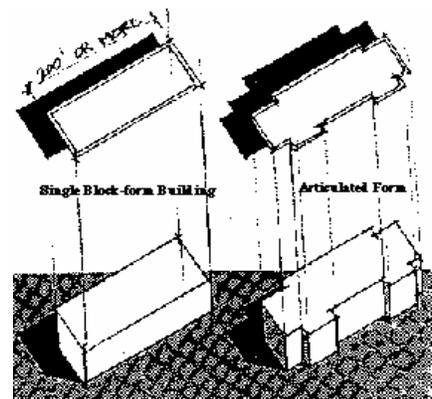


Fig. 8.15 – Articulate large buildings to minimize their mass.

differences by carefully shaping the building's mass and by articulating the facade design. The following illustrations recommend such design solutions for different sizes of buildings (Fig. 8.15).

8.3.2.5.4 Simple block-forms for larger buildings appear awkward and out-of-scale when located among smaller-scaled structures. When the program requires a large building mass, the form should be "articulated" by modulating the facade plane (Fig. 8.16). This breaks up the otherwise massive form and reduces the apparent scale to better fit with the surrounding buildings. The example below shows a large building, which has been "articulated" to appear as three smaller rectangular forms. A central gallery flanked by two pavilions.

8.3.2.5.5 When program requires a large building area on a single floor, the form should be "articulated" by modulating the facade plane.

8.3.2.5.6 When program requires a large building mass in a two or three story structure, the form should be "articulated" by modulating the facade plane.

8.3.2.5.7 Tall, massive buildings, when placed among much smaller buildings, may appear awkward and out-of-place. When the program requires a taller building in an area of smaller structures, the design of the taller building must be "articulated" to reflect the predominant scale of the surrounding area. The following design techniques should be used where appropriate (Figs. 8.17 and 8.18):

- Match cornice line height where adjacent buildings have prominent cornice features.
- Match belt courses or other important lines of vertical articulations.
- Step-back upper stories above prevailing cornice line.

8.3.2.6 Form

The form of a building is determined by its size, mass, shape and proportions. The use of similar building

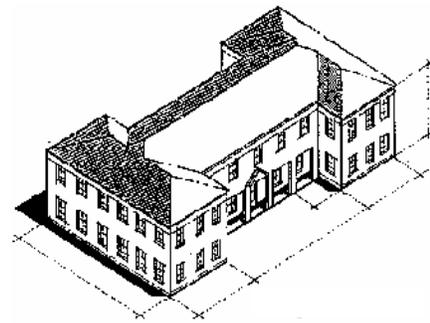


Fig. 8.16 – An example of articulated building form.

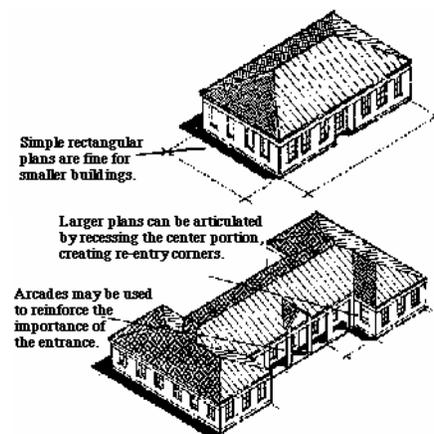


Fig. 8.17 – One-story buildings with large footprints should be

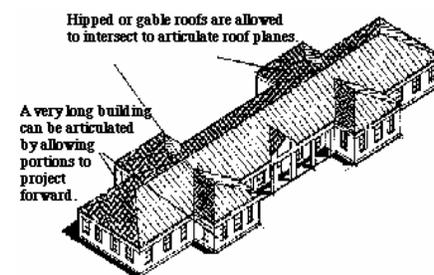


Fig. 8.18 – Long building should be articulated at multiple points along their length.

forms provides continuity to the installation architectural impact. The result is a more aesthetically pleasing environment.

8.3.2.7 Fenestration

Building fenestration includes features such as doors, windows, and building decoration details. These features should be similar in arrangement, design, size, and proportion for architectural compatibility and visual consistency and continuity. The rhythm, pattern and proportions of window openings are major factors in a building's design character. Proper use of building fenestration breaks up mass (Fig. 8.19).

8.3.2.8 Recommendations

8.3.2.8.1 Where a building is located at a prominent location with a lot of visibility in GW, LT, CC or TF visual zones, the formality of its facades needs to be strengthened with careful placement of windows.

8.3.2.8.2 The examples in the figures show how newer buildings at Fort Lee have employed fenestration in the contemporary brick theme:

8.3.2.8.3 Horizontal strip windows at higher sill level set in brick masonry recesses that extend from column to column. This sun-shading device has been employed cleverly to add dramatic fenestration to the façade (Fig. 8.20).

8.3.2.8.4 Facades of the sides where sun-shading is not required continue the window pattern without the recessed masonry to extend the architectural expression on all four sides of the building.

8.3.2.8.5 Brick detailing around window openings as in traditional brick theme is not required

8.3.2.8.6 Cast stone / lime stone is not used at sills and heads of windows but has been utilized in continuous horizontal bands across heads of windows to accentuate the horizontal expression and bring the façade down to human scale.

8.3.2.8.7 Ground floor mechanical louvers are vertically aligned with the masonry recesses.



Undesirable: Continuous Unbroken Mass



Projections and Residential Scale Openings Break Up Mass

Fig. 8.19 - Fenestration breaks up mass.



Fig. 8.20 - The ASTF uses fenestration to modulate building mass.

8.3.2.8.8 The form of this large building has been "articulated" by modulating the facade plane by breaking up the otherwise massive form and reducing the apparent scale to better fit with the surrounding buildings (Fig. 8.21).

8.3.2.8.9 The building looks like a number of small buildings in a complex.

8.3.2.8.10 Each broken mass has been treated with a different arrangement of windows and balancing the contrast with use of horizontal and vertical limestone / cast stone bands of various widths (Fig. 8.22).

8.3.2.8.11 Entrances have been accentuated by steel frame and semi-circular glass canopies.

8.3.2.8.12 The brick towers without windows at lower level add to their massive character.

8.3.2.8.13 The towers at the top with different shade of brick color and roof with its arc add special interest to the building mass.

8.3.2.8.14 The traditional brick theme around the post is accentuated by careful detailing around window and door openings. Most of the new buildings in GW, LT, CS, OSTC, and TF visual zones at Fort Lee are carrying forward the current contemporary brick theme. New construction in these zones, adjacent to buildings with traditional brick theme should follow the tradition by using the recommended examples of sill, head and jamb brick detailing. If no precedent exists, but the visual zone has surrounding buildings with traditional brick theme, choose one of these examples (Fig. 8.23).

8.3.2.9 Materials

The use of the same materials in the exterior finish and trim of buildings helps provide visual continuity (Fig. 8.24).

8.3.2.10 Color

The use of a color scheme that is consistent throughout the installation, where possible, results in



Fig. 8.21 – The Aerial Delivery Training Facility is articulated to reduce its mass.



Fig. 8.22 - An example of how fenestration should be employed for buildings with the traditional brick theme.



Fig. 8.23 - Traditional brick patterns to be used around windows.

a continuity of buildings and contributes to a sense of place (Fig. 8.24).

However, color schemes throughout the installation might vary according to the visual zone and visual theme in which the structure is located.

8.3.2.11 Texture

8.3.2.11.1 The use of materials of similar texture in buildings helps to provide visual continuity for the installation.

8.3.2.11.2 Materials and color selection guidelines and recommendations are provided in Section 8.14.

8.3.3 Architectural Themes

Fort Lee installation already has two strong architectural themes that employ brick extensively; traditional brick theme and contemporary brick theme. The third theme uses painted stucco but since the future trend is towards the use of more permanent materials, and materials with integral colors, themes using painted stucco should be gradually replaced in the design programs for new buildings as well as renovations and additions projects. The following photos illustrate examples of two brick themes that should be continued and reinforced across the installation (Fig. 8.25).

8.3.3.1 Traditional Brick Theme

In all visual zones except SS and FH, where adjacent buildings predominantly show traditional brick theme, the design of new buildings should relate in scale and materials to some of the existing traditional significant buildings.

8.3.3.1.1 Mifflin Hall with brick as predominant building material, pitched metal roofs, and wide overhangs above properly scaled window openings, has created a vocabulary for a formal building form of the traditional brick theme (Fig. 8.26).

8.3.3.1.2 Just as the Mifflin Hall building, a few one-story brick buildings have set vocabulary for design of



Fig. 8.24 - Color scheme for new storage building in the Industrial area.

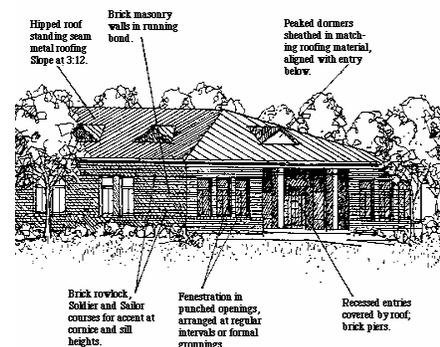


Fig. 8.25 - Criteria for contemporary brick exterior patterns.



Fig. 8.26 - Mifflin Hall, soon to be replaced, is the predominate building at the Lee Gate.

new single-story brick buildings in all visual zones except SS and FH. The following figures show how brick coursing has been used for accent.

8.3.3.1.3 The Gatehouse is the first structure one sees when approaching the Post at the Gateway Zone. The structure should be simple but well designed. Brick and sloped metal roof should be used. Appropriate lighting and site furnishings should be incorporated to improve the visual image.

8.3.3.1.4 The new warehouse structures should be brick exterior, standing seam metal roofing and brick wainscoting to articulate the building form that matches other buildings in the SS zone. Although a number of existing warehouse buildings have used painted stucco for exterior walls, future warehouse structures should use more permanent materials with integral colors (Fig. 8.27).

8.3.3.1.5 Any new family housing which may be developed in the future is to follow these design guidelines. Emphasis is given to stepping the plan to give greater individual identity to each dwelling unit. Brick masonry is recommended, though vinyl siding surfaces may also be used in coordination with brick. Conceptual plan of “stepped” family housing units is shown below (Fig. 8.28):

8.3.3.2 Contemporary Brick Theme

This theme should be used for all building function types in all visual zones except warehousing in SS zone and residential structures in FH zone. The predominant material in these buildings is brick and cast stone / limestone to be used for accent.

8.4 BUILDING ENTRANCES

8.4.1 A building entrance is a primary feature of any building design. The entrance should be defined and recognizable as the point of entry regardless of the size or importance of the building.

8.4.2 The entrance to a building should be in a prominent location and should be oriented toward the



Fig. 8.27- Brick water tables should be used on the facades of new warehouse buildings.

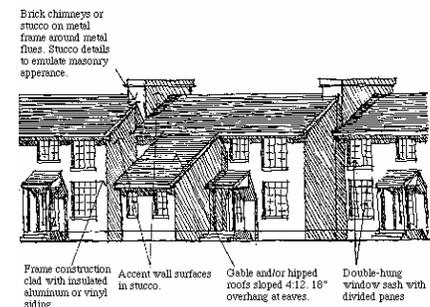
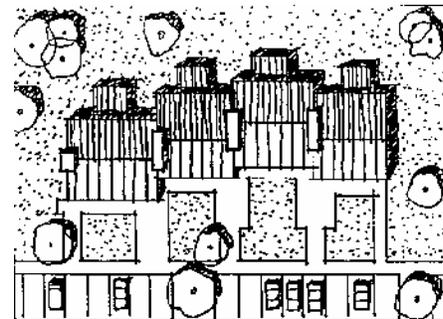


Fig. 8.28 - Plan and elevation views illustrating design criteria for multi-family units.

primary adjacent public spaces such as a courtyard, lawn, parking lot, or street (Fig. 8.29).

8.4.3 The details of an entrance should be designed to provide continuity with other entrances to the building and the entrances of adjacent buildings.

8.4.4 The following criteria apply to building entrances:

8.4.4.1 Cast stone / Lime stone to accentuate entrance (Fig. 8.30);

8.4.4.2 Recessed entrance opening at human scale with a special pointed arched opening above to express major entry point (Fig. 8.31);

8.4.4.3 Major entry at the center of the elevation with vertically aligned window openings;

8.4.4.4 Paired openings to create an interesting rhythm;

8.4.4.5 Consistent head and sill heights for all windows;

8.4.4.6 Cast stone / Lime stone wainscoting at the street level.

8.4.4.7 Imposing glazed block faced wall that follows building form and roof profile to express major entrance at the center of building.

8.4.4.8 The entrance is further articulated by recessed entry points at human scale, window openings punctuating the glazed block wall above, and a special opening at the apex.

8.4.4.9 Interplay of roof forms to add interesting massing (Fig. 8.32).

8.4.4.10 Rhythm of windows on both floors of the brick masses flanking the entrance repeated in central glazed block mass to extend the architectural expression.



Fig. 8.29 - The primary entrances to the Soldier One Stop building is well defined and in a prominent location.



Fig. 8.30 - Accent materials are used at the Kenner Army Medical Clinic to reduce the mass of large windowless walls.



Fig. 8.31- Accent material is used at the ASTF to reduce the vertical mass of the building.



Fig. 8.32 – Accent material used at the 49th Quartermaster Group to emphasize the roofline.

8.4.4.11 Small square louver openings and glazed block accent squares finesse the articulation (Fig. 8.33).

8.5 SERVICE AREAS

8.5.1 Service areas, such as loading docks and trash dumpsters, should be screened from the views of primary use areas such as entrances, courtyards, gathering areas, streets and parking lots (Fig. 8.34).

8.5.2 Fort Lee building design standards recommend mechanical systems equipment to be located in “yards” and not mounted on building roofs. Roof mounted equipment is discouraged however, if roof top equipment is specified it must be well integrated into the design. The equipment should also be screened from primary views.

8.5.3 Screening enclosures should be designed by using walls and landscaping. The enclosure walls should be between six and eight feet high and should be constructed with the same materials as the adjacent building (Fig. 8.35).

8.5.4 Trash and garbage collection areas must be located a minimum of 25 meters from troop billeting, family housing areas (containing more than 12 units), and stand-alone retail facilities. They will be placed a minimum of 10 meters (33 feet) from all other inhabited structures ([UFC 4-010-01](#), Table B-1).

8.6 BUILDING ACCESSIBILITY

8.6.1 All structures or facilities, other than the exceptions mentioned below, must meet the [Americans with Disabilities Act Accessibility Guidelines \(ADAAG\)](#) and the [Uniform Federal Accessibility Standards \(UFAS\)](#) accessibility standards. The more stringent standards apply in the event of conflicting guidelines (Fig. 8.36).

8.6.1.1 Any building or facility that is specifically restricted by occupancy classification to use only by able-bodied personnel during the expected useful life of the building or facility need not be accessible (military exclusion is provided by [UFAS 4.1.4 \[2\]](#)), but



Fig. 8.33 - Accent material is used at the Clark Fitness Center to diminish the height of the wall in appearance.



Fig. 8.34 - The PX loading and receiving dock requires screening from primary view.

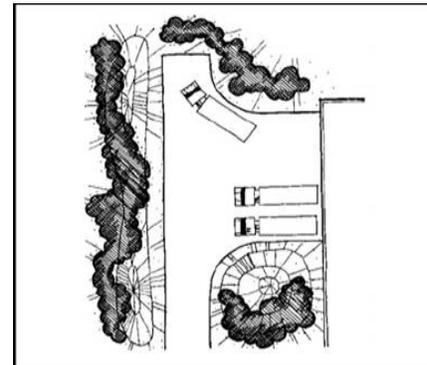


Fig. 8.35 - Plants and berms in service area presents a positive visual image.

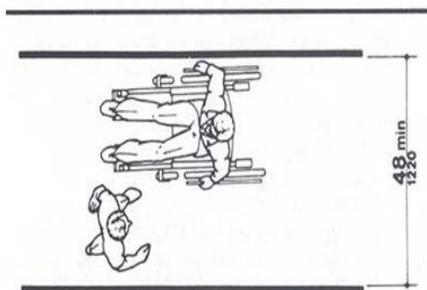


Fig. 8.36 - Facilities must meet UFAS standards.

accessibility is recommended since the intended use of the facility may change with time.

8.6.1.2 In particular, the following facilities need not be designed to be accessible: unaccompanied personnel housing, closed messes, vehicle, and aircraft maintenance facilities.

8.7 SEISMIC POLICY

8.7.1 The minimum performance objective for Army facilities is Substantial Life-Safety. To ensure compliance, seismic evaluations and mitigation of unacceptable seismic risks shall be performed. Higher levels of seismic protection for mission essential facilities will be considered in the evaluation.

8.7.2 Seismic evaluation. Guidance for the seismic evaluation of existing facilities is given in [TI 809-05, *Seismic Design Evaluation and Rehabilitation for Buildings*](#). Buildings will have a seismic evaluation performed when:

- A change in the building's use causes a change in the occupancy category, as defined in [TI 809-04, *Seismic Design for Buildings*](#), to a category of greater importance (lower category number).
- A project is planned which causes the capacity of the structural system or components to be reduced to 90 percent or less of original stability and strength.
- A project will significantly extend the facility's useful life or will significantly increase the facility's value and the cost exceeds 50 percent of the current replacement value.
- A facility is damaged or is deemed to be an exceptionally high risk to occupants or to the public.

8.7.3 Exceptions to Seismic Evaluations. Existing facilities are exempt from seismic evaluation if:

- The original design was done according to the provisions of the 1982 or later edition of [TM 5-809-10](#), or the 1988 or later edition of TM 5-809-1.
- Replacement is scheduled within 5 years.
- The facility is intended only for minimal human occupancy, and occupied by persons for a total of less than 2 hours a day.
- The facility is a one or two family dwelling, two stories or less, located in Zone 1 or 2, as shown in [TM 5-809-10](#).
- The gross area is less than 3000 square feet (275 square meters). Mitigation of unacceptable seismic risks. If the seismic evaluation determines that the facility does not meet Substantial Life-Safety or higher performance standards, as appropriate, unacceptable seismic risks will be mitigated. Rehabilitation will be performed in accordance with [TI 809-05](#).

8.7.4 New Facilities or Additions or Extension of Existing Facilities. New facilities and additions or extension of existing facilities will be designed to provide the level of seismic protection required by [TI 809-04](#).

8.8 INDIGENOUS STRUCTURES

Sustainability in the design and construction of buildings includes incorporating time-proven building designs that are indigenous to the region. Indigenous design elements should be utilized in the design of new buildings.

8.9 HISTORIC ARCHITECTURE

8.9.1 The visual integrity of historic buildings or districts on the installation will be preserved and protected (Fig. 8.37). Fort Lee has two buildings – 3206 and 4300 – that are eligible for being listed as historic. The installation is currently developing a



Fig. 8.37 - The Lee Playhouse is eligible for listing on the National Register.

Historic Preservation Plan for Building 4300 that will provide a guideline of upgrades to the facility while maintaining the building's National Register integrity. Army's management of historic properties is pursuant to the duties and responsibilities established by Congress under the National Historic Preservation Act (NHPA). The NHPA also created the NRHP as the official listing of the nation's historic properties considered worthy of preservation. When working with historic properties the Army uses the following three categories:

8.9.1.1 Historic Buildings or Structures: These are significant buildings or structures, which are listed on or eligible for listing to the NRHP.

8.9.1.2 Historic District: A distinct group of buildings, structures, or landscapes that possesses significance and are listed on or eligible for listing to the National Register.

8.9.1.3 National Historic Landmarks: Buildings, structures, or landscapes listed in the National Register, but also recognized as nationally significant. National Historic Landmarks can either be listed individually or as a district.

8.9.2 For further guidance use [Army Regulation 200-4](#) and [Department of the Army Pamphlet 200-4](#). Specific requirements and recommendations for the treatment of historic properties are available in the National Park Service's [Secretary of the Interior's Standards for the Treatment of Historic Properties](#). A working awareness of historic preservation policies and procedures followed by the Army Corp of Engineers can be found in the [Technical Instruction \(TI\) 800-01, Design criteria, Chap. 16, Preservation of Historic Structures](#).

8.9.3 See [Appendix M, Historic Preservation Guidelines](#).

8.10 RENOVATIONS AND ADDITIONS

8.10.1 When existing buildings are renovated or additions are constructed, the architectural character of the renovation or addition should be

compatible with the architectural character of the existing building and the adjacent buildings (Fig. 8.38). This compatibility includes the use of materials, color, shape, size, scale, and massing in the addition or renovation that blends with the architectural character of the existing structure. However, when renovating or adding to historical buildings one should be able to differentiate between the historic fabric and the new material.

8.10.2 At Fort Lee it is preferred that only permanent materials, such as brick and cast stone be used. Therefore, future renovation projects should not propose using stucco and should include replacement of existing stucco exteriors with brick or other masonry veneers.

8.10.3 Renovations and additions projects might also require closing existing exterior openings, and replacement of windows. The following recommended design solutions should be considered at Fort Lee.

8.10.3.1 Securing Existing Openings

8.10.3.1.1 Where an existing brick masonry opening must be closed, allow the original profile of the opening to remain so that the overall effect of the building's fenestration will be preserved.

Do this by infilling with masonry to match the surrounding brick color, pattern, and coursing.

8.10.3.1.2 Infill masonry should be flush with or recessed back from surrounding wall plane.

8.10.3.1.3 Do not damage existing jambs, head or sill of masonry opening.

8.10.3.2 Replacement Horizontal Strip Windows

8.10.3.2.1 The overall appearance of horizontal strip windows should be maintained where this style of fenestration already exists and windows require replacement (Figs. 8.39 and 8.40). This can be accomplished by selecting matching dark colors for all non-transparent surfaces within the original opening, including mullions, sash, insulated panels, and

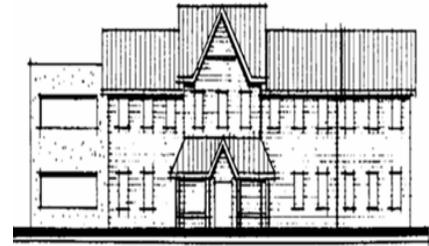


Fig. 8.38 - Renovations and additions should be compatible with the original architecture, not like the extension to the left in the example above.

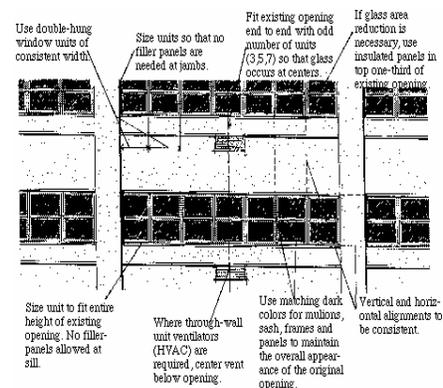


Fig. 8.39 - Criteria for renovation of existing horizontal strip windows.

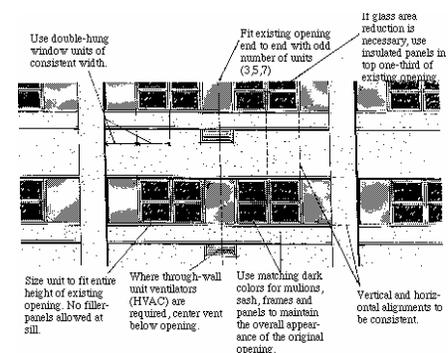


Fig. 8.40 - Criteria for replacement of existing horizontal strip windows.

flashing. From a distance, the overall opening will "read" rather than the individual window unit, and the pattern and proportions of the original building fenestration will be maintained.

8.11 PLAZAS AND COURTYARDS

Plazas and courtyards can be located as part of the primary entrance to a building, or as an extension of non-primary entrance areas to the outside. Wide, paved entrance plazas need vehicular barriers. Plazas and courtyards are discussed in greater detail in Section 7, Site Planning (Fig. 8.41).

8.12 BUILDING MAINTENANCE

8.12.1 General. Buildings designed and constructed to incorporate sustainable design criteria should minimize life cycle, energy and maintenance costs through proper selection of forms, materials, and construction details.

8.12.2 Interior Maintenance. Individual organizations across the installation may need to modify their interior spaces to suit their changing functional requirements. These modifications should be carried out as comprehensive design projects that follow design standards established for the installation, in order to avoid adverse impact to the building's interior environment and sustainability. The modification work, if not coordinated, may block thermostats, HVAC diffusers and returns affecting indoor air quality and wasting energy. The self-help modification work may also degrade lighting, and jeopardize life safety.

8.12.3 Work Order Requests. Follow the Work Order Requests system established by DEL Operations Division. A work order helps the DEL engineers to develop appropriate design decisions that follow and reinforce the building standards of Fort Lee installation.

8.12.4 Standard Equipment List. DEL Operations Division has a list of standard mechanical and electrical equipment to be used across the installation in the interest of efficient maintenance.

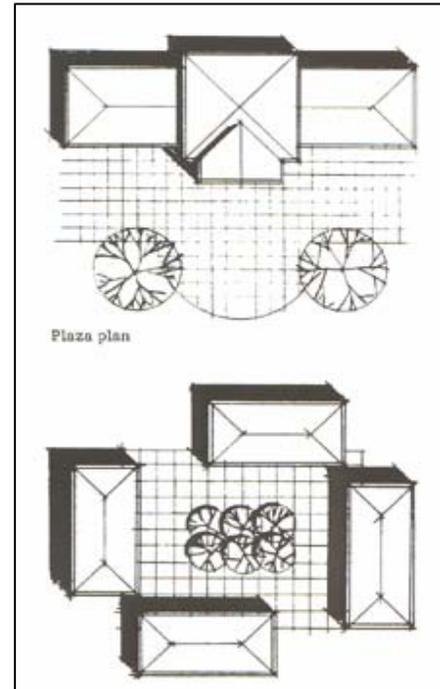


Fig. 8.41 - Plazas and courtyards are good uses of space between buildings.

8.13 INTERIOR DESIGN

8.13.1 Introduction. Inhabited spaces, that require the selection of furnishings or equipment, should be designed by professional interior designers. Interior design impacts the functioning and productivity of people. People spend much of their time inside, working, eating, sleeping, and relaxing. The productivity, comfort, and safety of the personnel in the facilities they inhabit are directly related to the quality of interior design provided within the facility. Also, interiors should be designed and appointed to reflect the purpose of each organization in the Fort Lee hierarchy (Fig. 8.42).

8.13.2 Interior design is required on building construction and renovation projects regardless of the funding source. General interior design guidance and interior design guidance for medical facilities and family housing is provided at the following websites.

- General Guidance. [Design Guide \(DG\) 1110-3-122, Design Guide for Interiors.](#)
- Medical Facilities. Interior design guidance for medical facilities is furnished in [Military Handbook 1191, Medical Military Construction Program Facilities Design and Construction Criteria.](#)
- Family Housing. Interior design for family housing will be in accordance with [Technical Instruction \(TI\) 801-02, Family Housing.](#)

8.13.3 [Engineering Regulation \(ER\) 1110-345-122, Engineering and Design, Interior Design,](#) defines projects that require interior design, design requirements and responsibilities of participants, and methods and funding for execution of interior design. For cost estimating see [Air Force Interior Design Guides, Chap. 3, Cost Estimating Guide.](#)



Fig. 8.42 – Interiors should be designed for the purpose and use of the space.

8.13.4 Space Planning.

8.13.4.1 Space planning is the basic building block of the facilities program for administration and operational facilities. [Army Regulation \(AR\) 405-70, Utilization of Real Property](#) (Appendix D) provides numerical planning allowances and addresses the quantities for programming space for personnel and equipment.

8.13.4.2 Space planning takes into consideration the following; who will be using a space, how this space will be used, what activities will take place there, and the interaction of other people in the building. Professionally trained interior designers are best at gathering the required information to formulate a space utilization plan.

8.13.4.2.1 Bubble Diagrams. Bubble diagrams show the working relationship of one group to another. They do not represent a space plan or floor plan, but the relationship of organizations to one another. The adjacency requirements for individuals, user groups, and support functions which the diagrams represent, depict the relational analysis. Bubble diagrams assist in organizing an existing facility as well as a new facility (Fig. 8.43).

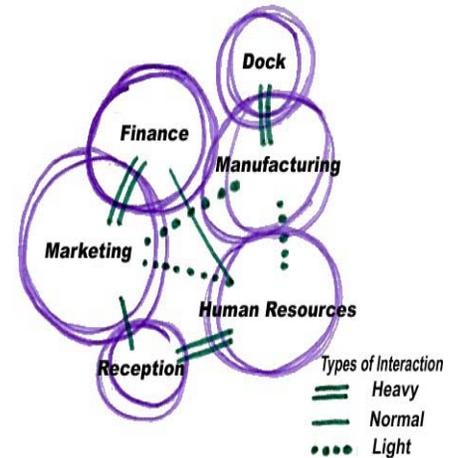


Fig. 8.43 - A typical bubble diagram indicating group relationships.

8.13.4.2.2 Blocking Diagram. An extension of the bubble diagram is the block diagram. The blocking diagram is made more uniform and regular in shape enabling it to fit inside the proposed floor plan (Fig. 8.44).

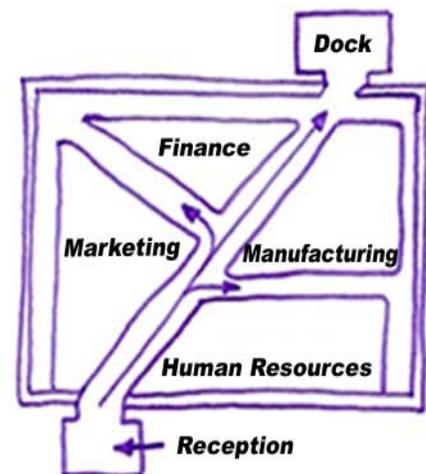


Fig. 8.44 - A typical blocking diagram demonstrating the fit into the floor plan.

8.13.4.3 Excellence of design should not imply added expense but economy of construction while providing functional efficiency and livability of a facility. Carefully worked out functional planning will not only produce a more efficient facility but will also produce a more attractive building, both inside and outside.

8.13.4.4 Floor plan layouts should avoid wasted space due to inefficient corridor layout, unnecessary lobbies, and monumental space. An efficiency analysis comparing gross floor areas with net floor areas should be developed.

8.13.4.5 Computer areas should be separated from adjacent areas by perimeter partitions with one-hour fire rating.

8.13.4.6 Office space should be of modular design to permit maximum flexibility. Mechanical, electrical, utility shafts, elevators, stairs and toilet facilities should be consolidated into core areas. Utility systems should be collocated to allow maximum flexibility for future use modifications and interior partition relocations.

8.13.5 Electrical and Communications.

8.13.5.1 Electrical power supply in the United States is available in a number of configurations, the most common of which are 120/240 Volt single-phase three wire, 120/208 Volt 3-phase 4-wire, and 277/480 Volt 3-phase 4-wire.

8.13.5.1.1 Design standards for interior electrical systems are found in [Unified Facilities Criteria \(UFC\) 3-520-01, Interior Electrical Systems](#). Compliance with this UFC is mandatory for the design of interior electrical systems. This UFC:

- Establishes criteria for the design of interior electrical systems.
- Establishes system-level design criteria.
- Establishes facility-level criteria for interior electrical systems,
- Provides a starting point for determining the applicable design criteria for a facility.

8.13.5.1.2 Facilities outside the United States must comply with the applicable host nation standards; refer to [Technical Manual 5-688, Foreign Voltages and Frequencies Guide](#), for additional information.

8.13.5.2 Communications systems handle the transport of telephone and data networks (e.g. video, multi-media, teleconferencing, data transfer, facsimile transmission, and voice conversation).

8.13.5.2.1 The design criteria for interior wiring of communications and information system is found in the Installation Information Infrastructure Architecture (I3A) Design and Implementation Guide. This guide shall be used as the basis for designing both the premises distribution system (inside plant) and the outside plant cable distribution system for all new construction and renovation projects. The Installation Information Infrastructure Architecture (I3A) Design and Implementation Guide is Appendix A of [U.S. Army Corps of Engineers engineering technical letter \(ETL\) 1110-3-502, Telephone and Network Distribution System Design and Implementation Guide](#).

8.13.5.3 Distribution. Distribution of electrical and electronic systems through a building is generally accomplished through branched distribution. A central chase or trunk will run the length or height of the facility, and then horizontal distribution systems run from a central connection closet to the end user. This distribution may be overhead or underfoot, in many instances it is a combination of the two (Fig. 8.45).

8.13.6 Color.

8.13.6.1 Color plays an important role in the design of interior environments. Color has a large impact on how we feel and behave in a space. Its quality affects emotions directly and immediately. Successful interior designs harmonize form, space, light, and color.

8.13.6.2 Information on color and light, optical effects, basic color theory, color schemes, and applying color in facilities can be found in Corps of Engineers, [Design Guide \(DG\) 1110-3-122, Design Guide for Interiors](#), Chap. 3, Light and Color and in the Air Force Interior Design Guides, Chap. 9, Color Principles, [Part 1](#) and [Part 2](#).

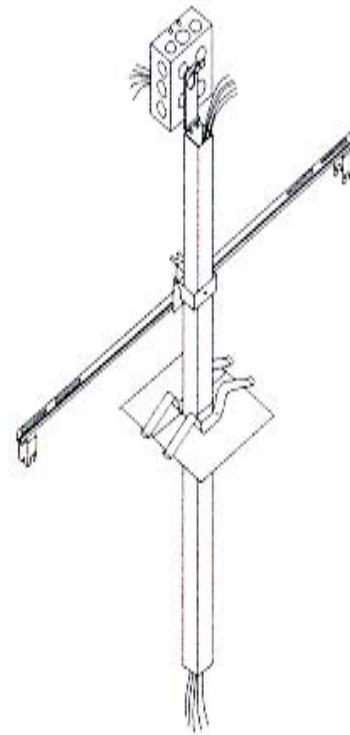


Fig. 8.45 – A system furniture utility column for electrical and communication distribution.

8.13.7 Acoustics.

8.13.7.1 Acoustics as an environmental variable significantly impacts the human impression of an interior environment. Productivity, speech intelligibility, privacy, safety, positive user attitude and response, and environmental comfort all depend on proper acoustic design. The interior designer is concerned with reducing unwanted noise and preserving desirable sound in a space. Sound can be controlled in the following three ways: eliminate the source, isolate the source, i.e. provide a barrier between the user and the source or mask the offending sound (Fig. 8.46).

8.13.7.2 A discussion of the dynamics and control of acoustics can be found in the [Design Guide \(DG\) 1110-3-122, Design Guide for Interiors](#), Chap. 5.

8.13.8 Interior Lighting.

8.13.8.1 Lighting will be designed with the work activities being performed in mind. Always supplement overhead lighting with task lighting and use architectural lighting in entrances, corridors, waiting rooms, and other spaces to light artwork and provide interest.

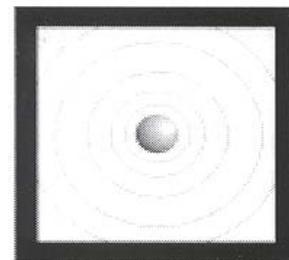
8.13.8.2 For Army installation buildings to achieve a high quality lighting environment, lighting equipment/systems selected must satisfy both performance and aesthetics. Factors for consideration in this selection are based on the following: lumens per watt, color temperature, color rendering index, life and lumen maintenance, availability, switching, dimming capability, and cost.

8.13.8.3 Lighting design approaches and lighting applications can be found in the following publications:

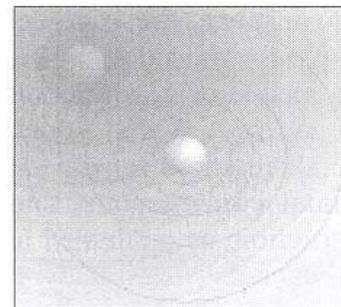
- [Technical Instructions \(TI\) 811-16, Lighting Design; Design Guide for Interiors, DG 1110-3-122](#) Chap. 5
- [Air Force Interior Design Guides, Chap. 10](#)



Elimination



Isolation



Masking

Fig. 8.46 – Three concepts for control noise sources.

- [Unified Facilities Criteria \(UFC\) 3-520-01, Interior Electrical Systems](#), Appendix F.

8.13.8.4 Lighting conservation measures

8.13.8.4.1 Installing energy efficient lighting systems is essential in order to reduce energy consumption at Fort Lee. Consider following fixture types (Fig. 8.47):

8.13.8.4.2 Fluorescent fixtures containing electronic ballast which will operate up to 4 – 32 watt fluorescent lamps. The preferred fixture will be a high efficiency T-8, three tube two by four foot lay-in or surface mount unit. In areas where glare control is not a requirement, use standard clear prismatic acrylic lenses. Computer rooms, labs, conference areas need glare control where the lighting fixtures should utilize parabolic louvers.

8.13.8.4.3 Incandescent fixtures should be limited to minor areas as a standby source or rough duty functions, since they are not a good choice due to their short life and poor efficacy – lumens per watt. In those instances where incandescent type fixtures are desired, compact fluorescent should be considered since they provide higher efficacy and good color rendition.

8.13.8.5 Lighting Maintenance, Types, and Problem Solving. Information on lighting maintenance, types, and lamp trouble-shooting is found in [TM 5-683, Electrical Interior Facilities, Chap. 9](#).

8.13.8.6 Design lighting levels for indoor areas should be as follows: (1 lux = .093 footcandles)

Task Area

Design Illumination

- Non-working areas, corridors, lobbies and service areas
108 lux
- Circulation and minimum reading areas
323 lux

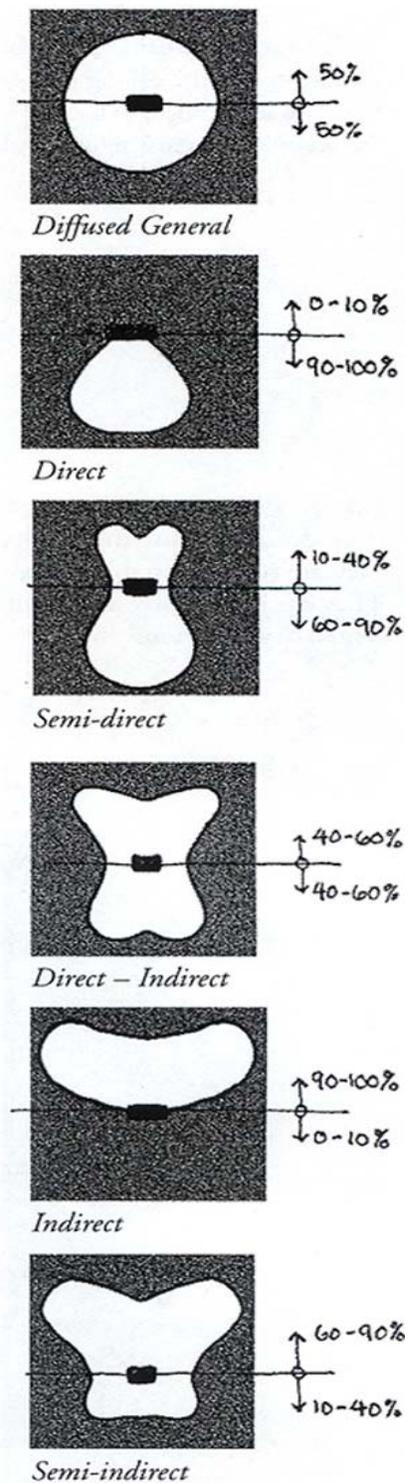


Fig. 8.47 - Typical Distribution of Light by direction.

- Work stations, computer rooms, and general office areas 538 lux

8.13.9 Finishes. Interior finish standardization is important for administrative and financial reasons. Standardization presents a unifying element throughout all buildings that is more cost effective, efficient, and easy to maintain.

8.13.10 Installation Finishes Standards. Installation finishes standards are found in [Appendix I, Interior Finishes Standards](#) of this guide (Fig. 8.48).

8.13.11 Signage.

8.13.11.1 Signage may be informational, directional, or regulatory. Informational signage provides the user with information and includes room or area labels, bulletin boards, menus, artwork descriptions, and emergency information. Directional signage directs circulation and provides orientation. It includes entry directories, directional arrows, and maps. The purpose of regulatory signage is control: providing prohibitions, warnings, emergency instructions, and use restrictions.

8.13.11.2 Interior signage is covered in detail in [Technical Manual \(TM\) 5-807-10, Signage](#). The manual includes graphics for the following: directional, identification signs, information, and pictograms.

8.13.12 Interior Operations Policies.

To preserve the quality of facilities, operations policy is set between the user and the installation management. The user is responsible for preserving the visual appearance of the facility, and installation management is responsible for providing maintenance needed to preserve facility quality. Interior operations policies address the following issues (See [Appendix N, Housekeeping Rules \(Example\)](#)):

- Housekeeping responsibilities.
- Policy to prevent and eliminate visual clutter.



Fig. 8.48 – direct and Indirect lighting design located at a building main entry.

- Carpet cleaning, repair, and replacement policy.
- Height restrictions for partitions and furniture.
- Policy on buildings modifications including: partitions, painting, window treatment, HVAC, lighting, and the installation of communications and electric wiring.
- Maintenance of directories and signage.
- Smoking and eating locations.
- Procurement information on matching or compatible furniture.
- Policy on personalization and plants.

8.13.12.1 Interior Appearance Policy. The following are Army standards to follow.

- Keep work areas cleared of clutter. Cleanup, throw away.
- Avoid hanging things in the work area. Find another way to refer to organization charts, personnel listings, and calendars, other than having them hung on walls or partitions except framed artwork, diplomas, awards, etc.
- Notes and references hung on partition walls should be kept below the height of the partitions. Some things may be mounted on the partitions by hooking into the metal supports between the partitions, but not by hooking into the fabric.
- Anything not contributing to the overall décor of the work area should be put in a drawer or on a shelf behind a closed door.
- Do not overwhelm the work area décor with an excess of plants or personal artifacts (Fig. 8.49).

- Thin out your files.
- Keep walkways into work areas open and free of clutter. Do not store things on the floor, or on top of shelves, or partitions.
- Office chiefs should consider the overall office appearance and visual contrasts between work areas.
- Be sure that anything you do in your work area contributes to color coordination, rather than detracts from it.
- Keep vacant workstations and common areas clean. Do not use them as a dumping area for things you do not know what to do with.



Fig. 8.49 - Waiting area with well balanced décor.

8.14 EXTERIOR BUILDING MATERIALS AND COLOR

8.14.1 Building materials with their color and texture provide a cohesive and consistent architectural character through the installation and within each visual zone. A limited palette of durable, low maintenance materials should be used that, while encouraging a variety of expression, Material should reflect the function of a building, and its hierarchy within the installation. Use the following guidelines when selecting exterior building materials.

- Choose materials for their longevity and maintenance characteristics (Fig. 8.50).
- Use materials with integral colors - avoid painting exterior colors (Fig. 8.51).
- Use installation standard colors for exterior walls. Add accent colors sparingly. Accent colors can be used in recesses and to accent certain portions of a buildings façade.

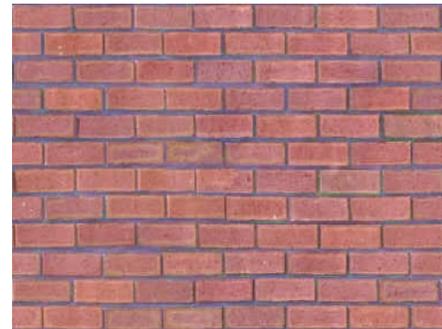


Fig. 8.50 - Brick and brick like materials are low maintenance product and a preferred material at Fort Lee.



Fig. 8.51 - Veneer brick and buff accent brick on the MEPs building creates a preferred color and appearance at Fort Lee.

- Use pre-finished material where possible - gutters, window frames, door frames, etc.
- Use blended colors on pitched roofs.

8.14.2 Material and Color Selection

8.14.2.1 Purpose. The purpose of this section is to set guidelines for color and material selections on new construction, renovations and maintenance work. These selections have been coordinated to establish a strong unified image for the post.

8.14.2.2 Review Procedure. To insure proper coordination, colors and materials are to be presented for review by both the project contracting officer's representative and the installation DEL (or representative). The presentation should be made by the project's designer (A/E) or builder (if project does not involve a design A/E). Samples of all major building materials to be used in the project must be presented together. Sizes of the samples must be large enough to give an accurate impression of their appearance and juxtaposition (what is seen next to what) in the completed project. For renovations, samples of major existing materials (such as brick masonry) should be included in the presentation. For large painting projects, a small portion of the total job (such as a single window) should be completed as a sample to be approved before final selection/approval.

8.14.2.3 Exterior Material Selection. The materials and colors of the major permanent buildings already existing on post have been taken into consideration and in some cases are to be used as the basis for matching new materials. The specific visual zones to be matched are cited in the [Appendix K, Exterior Materials Charts](#).

8.14.2.4 Exterior Building Color. Color is closely linked to the appropriate selection of exterior building materials and is a critical design element in relating adjacent buildings and creating a compatible visual environment within an installation.

8.14.2.5 Exterior Color Selection. Color charts have been developed for specific geographical areas giving consideration to climate, geography, culture, facility function, historical context, architectural character, etc. Color changes will be implemented during normally scheduled paint cycles (see [Appendix L, Exterior Color Charts](#)). Fort Lee's geographical location makes it part of the Central Atlantic geographical area (Fig. 8.52).



Fig. 8.52 - The Army system for exterior color sets is based on geographical region.

8.15 KEY FACILITY TYPES STANDARDIZATION

8.15.1 The Assistant Chief of Staff for Installation Management (ACSIM) establishes Army facility standards and approves deviations from the standards.

8.15.2 Residential Communities Initiative.

8.15.2.1 The intent of the Residential Communities Initiative (RCI) is to improve the housing for military families by providing quality housing that is built in attractive neighborhoods. Fort Lee is engaged in an aggressive housing construction program. All existing housing has been transferred to the RCI program. The new MILCON family home construction, once completed, will be transferred in phases into the RCI program beginning October 2007 and completed in December 2008.

8.15.2.2 The Military Housing Privatization Initiative (MHPI) legislation allows developers to build housing to local standards. In those areas where local standards do not meet the quality of life requirements of soldiers, the Community Development and Management Plan (CDMP) process allows a negotiated determination of those standards. To ensure a uniform level of quality throughout RCI, Headquarters, Department of the Army has developed a ["Quality Standards for New and Replacement Residential Communities Initiative \(RCI\) Family Housing"](#) to be used as reference points during CDMP preparation.

8.15.2.3 All RCI projects planned or under design will meet the "Gold" SPiRiT rating (as of 18 March 2003). See [Assistant Secretary of the Army](#)

[Memorandum Subject: Sustainable Design and Development Requirements, dated 18 March 2003.](#)

8.15.3 Department of the Army (DA), Facilities Standardization Program.

8.15.3.1 Under the DA Facilities Standardization program, standard design packages are developed for facility types that are repetitively designed and constructed at Army installations. These design packages are developed to the definitive design level (10 percent - 15 percent) and once approved are mandatory for Army MILCON (Fig. 8.53).

8.15.3.2 Currently, there are thirty one 31 DA standard design packages. Headquarters, U.S. Army Corps of Engineers has established eight Centers of Standardization to develop and maintain the definitive and design packages. See [Appendix P, DA Facilities Standardization Program Centers of Standardization](#) for a list of the various centers and the facility type assigned to each center. ([Centers of Standardization homepage.](#))

Army Chapel Design Standards are complete and approved. See [The Army Standard for Chapel Construction – January 2004](#) and Memorandum for Record, subject: [The Army Standards for Chapels](#), dated 21 January 2004.

8.15.4 Unaccompanied Personnel Housing (Army Barracks Modernization Program).

8.15.4.1 The Army's Barracks Modernization Program is based upon a whole community approach providing modernized private living and sleeping areas for soldiers as well as a more functional work environment. This is being realized with the construction and renovation of barracks, and associated Company Operations Facilities (COF), Battalion Headquarters (BN HQ) and Brigade Headquarters BDE HQ), and Dining Facilities (DFAC). For a detailed discussion of the Army Barracks Modernization Program see the [Army Barracks Master Plan](#). The Army Barracks Master Plan only includes requirements for activity duty permanent party soldiers' barracks.



Fig. 8.53 - Standard design dining facility for permanent party personnel.

8.15.4.2 Army Barracks Standards. The Army Barracks Modernization Program design criterion gives commanders and contractors the direction to incorporate best business practices around a modular floor plan. The [Army Barracks Master Plan, Appendix I, Army Barracks Standards](#), promotes barracks with an appropriate balance between private and common areas. The Vice Chief of Staff of the Army (VCSA) specified the “New Army Barracks Construction Criteria” in his [Memorandum Subject: New Barracks Construction Criteria, dated 11 July 2002](#) in which he strongly endorsed the new standards. The criterion was further revised in [Memorandum Subject: Revised Barracks Construction Criteria, dated 1 May 2003](#) which makes the following four changes to the Army Barracks Standards:

- Establishes the two-bedroom/one bath module as the standard module (Fig. 8.54);
- Requires installation of a stove or cook top;
- Requires laundries in the barracks; and
- Eliminates the separate soldier community building.

See the above memorandum for detailed guidance.

8.15.4.3 Furnishings.

8.15.4.3.1 Acquisition of new furnishings is planned and accomplished in concert with the facility design and construction schedule so that delivery of the new furnishings coincides with the beneficial occupancy date (BOD).

8.15.4.3.2 The U.S. Army Interior Design Manual (IDM) for Single Soldiers provides guidance to help furniture managers prepare order packages. The manual uses standard Army furniture specifications; i.e. medium oak wood furnishings or acceptable wood/steel alternatives; construction and fabric specification, and specific information for authorized items of furniture. The manual also contains standard living/sleeping room arrangements, and SCB plans with color schemes. The manual includes information

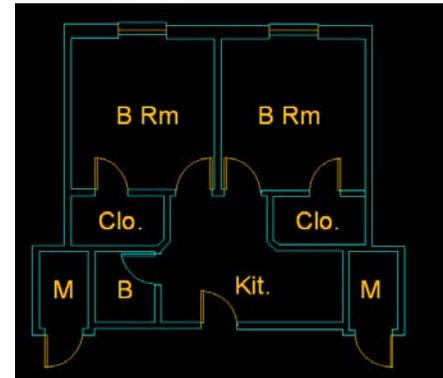


Fig. 8.54 - Standard design 1+1E module for UEPH permanent party personnel.

on waiver requirements, the procurement process, order forms, and final inspection checklist.

8.15.4.4 Construction design criteria for COFs, BBN HQ buildings, BDE buildings, and DFAC facilities can be viewed on the web at [ProjNet](#).

8.15.5 Army Lodging.

8.15.5.1 The Army Lodging Standards promote economies in serving the Army traveler, but not at the expense of quality or service. The standards define the facilities and the level of service the Army traveler should expect.

8.15.5.2 The following standards provide the level of service that a guest should expect when they travel to an Army installation. That expected level of service should be consistent from installation to installation. The following documents provide the service, operations, and facilities standards for Army Lodging.

- [Army Lodging Standards for Service](#)
- [Army Lodging Standards for Operations](#)
- [Army Lodging Standards for Facilities](#)

8.15.6 Morale, Welfare, and Recreation (MWR) Branded Theme Operations.

8.15.6.1 The U.S. Army Community and Family Support Center (CFSC) through its Theme Operations, offers comprehensive theme packages pertaining to restaurants and entertainment centers. The packages are customized to the installation.

8.15.6.2 CFSC will conduct an assessment for market viability, provide architectural designs, and other promotional items. Information on the CFSC Branded Theme Operations to include how to get a theme operation, management support, and food service support is located on the CFSC website at the [Army Brand Theme Operations Home Page](#).

8.15.7 Range Standards.

8.15.7.1 The Army Sustainable Range Program (SRP), proponent is HQDA Office Deputy Chief of Staff Operations, ODCSOPS/G3 (DAMO-TRS), phone number (703) 692-6410. To contact SRP technical support, call (256) 895-1535 or e-mail RTPL@HND01.usace.army.mil.

8.15.7.2 The SRP develops and manages standard designs for Army Ranges in accordance with AR 210-21 and Training Circular 25-8 Army Training Ranges. The Range Standards are available on the following web pages.

- Design Manual for Remote Target Systems (RETS) Ranges, [CEHCN 1110-1-23 Manual](#).
- [Revised Range Design/Construction Interface Standards](#).
- Unexploded Ordinance Considerations in the Planning, Design, and Construction of Ranges, [Supplement to CEHNC 1110-1-23 Manual](#).

8.16 PHYSICAL SECURITY REQUIREMENTS

To assure the required physical measures are met the installation Provost Marshall or Physical Security Officer will be coordinated with during the planning, design, and construction of all construction projects. ([AR 190-13, The Army Physical Security Program](#), Para 1-26) See [Section 12, Force Protection](#) for a more detailed discussion regarding Antiterrorism measures.

8.17 SALE AND OUTLEASE OF ARMY ASSETS

8.17.1 In an effort to offset some of the impacts of constrained resources, the Army has implemented initiatives that improve cost effectiveness and efficiency of installation operations. To the extent permitted by law, funds that become available as a result of these initiatives are retained by, or returned to, garrison commanders.

8.17.2 The Office of the Assistant Secretary of the Army for Financial Management and Comptroller (OASA (FM&C)) has developed the "[Sales and Outlease of Army Assets - Installation Guide](#)" to assist garrison commanders in using the sales and outlease program. The guide provides an overview of major policies, procedures, and responsibilities pertaining to the following three major initiatives of the program including the sale of Real Property, Outlease of Real Property, and Outlease of Personal Property.

The guide provides hyperlinks to Sale and Outlease governing regulations and legal and informational references.

8.18 ARMY STANDARDS

The cited Army Standards shall be met.

- [Army Regulation \(AR\) 420-70, Buildings and Structures](#)
- [Unified Facilities Criteria \(UFC\) 3-520-01, Interior Electrical Systems](#)
- [Unified Facilities Criteria \(UFC\) 4-010-01, DoD Minimum Antiterrorism Standards for Buildings](#)
- [Americans with Disabilities Act Accessibility Guidelines \(ADAAG\)](#)
- [Uniform Federal Accessibility Standards \(UFAS\)](#)
- [Secretary of the Interior's Standards for the Treatment of Historic Properties](#)
- [U.S. Army Corps of Engineers Engineering Technical Letter \(ETL\) 1110-3-502, Telephone and Network Distribution System Design and Implementation Guide](#)
- [Standards of Seismic Safety for Existing Federally Owned and Leased Buildings](#)

- [Army Barracks Master Plan, Appendix I, Army Barracks Standards](#)
- [Memorandum Subject: Revised Barracks Construction Criteria, dated 1 May 2003](#)
- [Quality Standards for New and Replacement Residential Communities Initiative \(RCI\) Family Housing](#)
- [Army Lodging Standards](#)
- Design Manual for Remote Target Systems (RETS) Ranges, [CEHCN 1110-1-23 Manual](#)
- Unexploded Ordinance Considerations in the Planning, Design, and Construction of Ranges, [Supplement to CEHNC 1110-1-23 Manual](#)
- [Revised Range Design/Construction Interface Standards](#)

8.19 REFERENCES

The following references are provided for guidance.

- [Army Regulation \(AR\) 190-13, *The Army Physical Security Program*](#)
- [Army Regulation \(AR\) 200-1, *Environmental Protection and Enhancement*](#)
- [Army Regulation \(AR\) 200-2, *Environmental Effects of Army Actions*](#)
- [Army Regulation \(AR\) 200-4, *Cultural Resources Management*](#)
- [Army Regulation \(AR\) 405-45, *Real Property Inventory Management*](#)
- [Army Regulation \(AR\) 405-70, *Utilization of Real Property*](#)

- [Unified Facilities Criteria \(UFC\) 2-600-01, *Installation Design, Chap 8*](#)
- [Unified Facilities Criteria \(UFC\) 1-200-01, *Design: General Building Requirements, 31 July 2002*](#)
- [Engineering Regulation \(ER\) 1110-345-122, *Engineering and Design, Interior Design*](#)
- [Department of the Army Pamphlet \(DA PAM\) 200-4, *Cultural Resources Management*](#)
- [U.S. Army Corps of Engineers, Design Guide \(DG\) 1110-3-122, *Design Guide for Interiors*](#)
- [Department of Defense \(DoD\) Interior Design Website](#)
- [Military Handbook 1191, *Medical Military Construction Program Facilities Design and Construction Criteria*](#)
- [Technical Instructions \(TI\) 800-01, *Design Criteria*](#)
- [Technical Instructions \(TI\) 809-04, *Seismic Design for Buildings*](#)
- [Technical Instructions \(TI\) 809-05, *Seismic Design Evaluation and Rehabilitation for Buildings*](#)
- [Technical Instructions \(TI\) 811-16, *Lighting Design*](#)
- [Technical Manual \(TM\) 5-683, *Electrical Interior Facilities*](#)
- [Technical Manual \(TM\) 5-688, *Foreign Voltage and Frequencies Guide*](#)
- [Technical Manual \(TM\) 5-809-10/Navy NAVFAC P-355/Air Force AFM 88-3, Chap 13, *Seismic Design for Buildings*](#)

- [Technical Manual \(TM\) 5-809-10-2/Navy NAVFAC P-355.2/Air Force AFM 88-3, Chap 13, Sec B, Seismic Design Guidelines for Upgrading Existing Buildings](#)
- [Army Barracks Master Plan](#)
- [Air Force Sustainable Facilities Guide](#)
- [Air Force Interior Design Guides](#)
- Office of the Assistant Secretary of the Army for Financial Management and Comptroller (OASA (FM&C)) [Sales and Outlease of Army Assets - Installation Guide](#)
- [Assistant Chief of Staff for Installation Management, Sustainable Design and Development Website](#)
- U.S Army Corps of Engineers, Engineering Research and Development Center, Construction Engineering Research Laboratory (CERL), [Sustainable Design and Development Website](#)
- [U.S. Army Corps of Engineers Engineering Technical Letter \(ETL\) 1110-3-502, Telephone and Network Distribution System Design and Implementation Guide](#)
- [Whole Building Design Guide](#)
- Unified Facilities Guide Specifications (UFGS), "Division 12 - Furnishings", [Construction Criteria Base](#)
- [Engineering and Construction Bulletins](#)

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APPENDIX G
GIS Data

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Section: Appendix H. Exterior Signage

Appendix H

Exterior Signage

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SIGNAGE DESIGN STANDARDS

1.0 SIGNS

1.0.1 Signs are used to visually communicate information. They are highly visible features that should be attractive and compatible with their surroundings. Careful consideration must be given to what a sign says, how it is said, its visual appearance and organization, its location, structural support system, and relation to other signs within the installation. Standardized signage systems facilitate movement, provide a sense of orientation, and reinforce standards of excellence. Signage creates a unifying element throughout the installation that visually ties the installation themes together and builds a reference and continuity that translates into confidence and reassurance when traveling throughout the installation. The standards to apply for signage color, type, and sizing is found in Technical Manual (TM) 5-807-10, *Signage*.

1.0.2 Sign System Characteristics. There are several basic design characteristics that, by serving to convey necessary information clearly and attractively, are an integral part of any successful signage system.

1.0.2.1 Simplicity. An effective strategy provides only needed information, avoids redundancy, and eliminates over-signing with resultant clutter and visual confusion. Sign messages must be clear, simple, and easy for motorists to process quickly.

1.0.2.2 Continuity. It is essential that the system be applied uniformly and consistently throughout the entire installation. The importance of consistent implementation extends from the larger issues of sign type and size down to accurate color continuity and matching typestyles.

1.0.2.3 Visibility. Sign location is a very important ingredient within the system. Signs must be located at significant decision points and oriented to provide

clear sight lines for the intended user. Close coordination of locations with respect to landscaping, utilities, adjacent signage, and various other street design elements is important to ensure long-term maximum visibility.

1.0.2.4 Legibility. Sign typestyle, line spacing, color, and size all combine to create the crucial design characteristics of legibility. This aspect of sign design should take into consideration users such as motorist, pedestrians, or bicyclists, and the relative travel speed at which each type of user will be traveling when viewing the signs.

1.0.3 Vocabulary-Communications

1.0.3.1 A common language has been created for establishing a signing system. The different components that create the sign package have been named and referred to within the total signing system.

1.0.3.2 The creation of a "signing language" helps generate a unified bond within sign types that make up a signing family.

- Reference
 - Information/Message
 - Presentation
 - Architectural Influence
 - Graphic Architecture

1.0.4 Visual Hierarchy (Fig. 1.1)

1.0.4.1 The entire signing system must communicate, through a range of sign and typestyle sizes, the relative importance of the individual activity that the sign identifies. The system should follow a logical progression from a point of origin to the desired destination.

1.0.4.2 A stated ranking method supports the visual standard of hierarchy within the signing system. Signs can be organized within assigned classes with

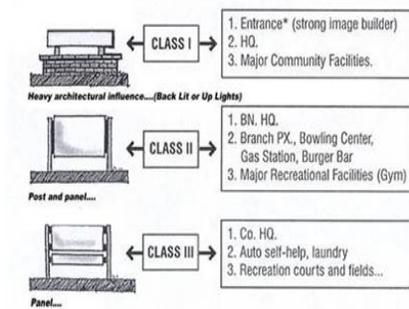


Fig. 1.1 - Signs can be organized into classes within the visual hierarchy.

emphasis on the function and image of the installation.

1.0.4.3 Within each class, the level of architectural influence evokes the importance of the sign to the installation. This is also critical to the idea of progression. The importance of a sign must be presented in its size and level of detail.

1.0.4.4 As individuals move closer to their destination on the installation, the scale of the sign becomes progressively smaller and the level of the message more detailed.

1.0.5 Types of Signs

1.0.5.1 Information / Identification Signs (Fig. 1.2).

These are signs that identify entrances to the installation, areas within the installation, major tenants, buildings, and organizational or functional components. They identify a location, and greet the visitor to that location. They should be compatible in scale and character with the architecture and also blend with the natural surroundings. These signs are designed to include the following:

1.0.5.1.1 Typeface: Lettering is self-adhesive backing material.

- Building Title: Helvetica Medium, Upper and lower case
- Building Numbers: Helvetica regular
- Building Addresses: Helvetica Medium, Upper and lower case

1.0.5.1.2 Color:

- Panel: Dark Brown
- Lettering: Cream
- Post: Dark Brown

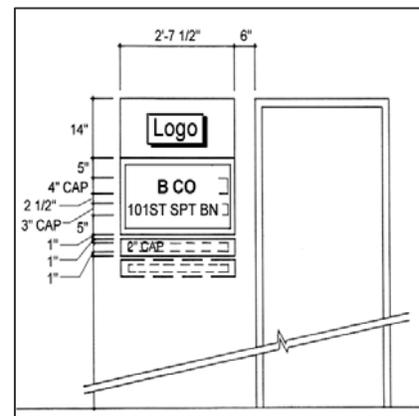


Fig. 1.2 - Building mounted information sign.

- Exposed panel backs and edges: Dark Brown
- All paint: Semi gloss

1.0.5.1.3 Materials:

- Panel: Double-face 1/8-inch thick aluminum
- Post: Steel Pipe
- Foundation: Concrete pier or direct burial

1.0.5.1.4 Building Identification.

1.0.5.1.4.1 Street Addresses. The addressing procedures prescribed in DoD 4525.8-M, DoD Official Mail Manual are mandatory for use by all DoD components. (Fig. 1.3) DoD 4525.8-M, Chapter 3 prescribes the following:

All DoD address shall be assigned so they are compatible with the U.S. Postal Services automated delivery point sequencing (C3.3).

The DoD installation is responsible for assigning city-style, street address on the installation (C3.3.2.2).

Street addresses shall be assigned and used even though a DoD activity may deliver the mail to the addressee (C3.3.2.2.1) (Fig. 1.4).

Only geographically locatable civilian-style street address (such as 4102 Cindy Avenue) shall be used (C3.3.2.2.4).

Installations shall not use one street address for the entire installation and then use secondary unit designators such as "Building 123" to designate the delivery addresses on the installation (C3.3.2.2.5).

Addresses such as "Building 123 Roberts Street" are not a valid address format and shall not be used (C3.3.2.2.6).

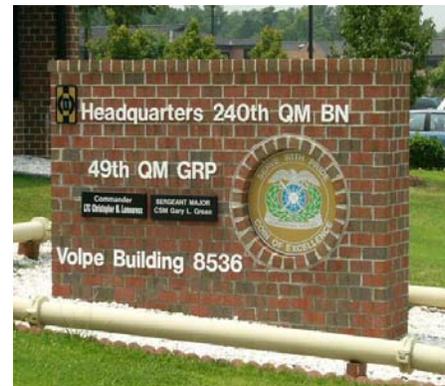


Fig. 1.3 - Use Street addresses on all building identification signs.



Fig. 1.4 - Bronze anodized metal sign at CASCOM.

1.0.5.1.4.2 Address Placement.

Place addresses by the front entrance of the building so they can be seen (C3.3.2.3.1).

Fort Lee buildings have the building number on the corner of the building structure.

Building identification signs will use street addresses.

Buildings without identification signs shall have the address number and street name centered above the main entrance or located to the right side.

1.0.5.1.5 Housing Areas.

1.0.5.1.5.1 The sign should be complimentary to the architectural setting of the housing area and approved by the installation Real Property Planning Board (Fig. 1.5).

1.0.5.1.5.2 Housing numbers should be placed on the house where lighting will effectively light the numbering.

1.0.5.1.6 Installation Identification Signs.

1.0.5.1.6.1 Installation identification signs name the installation and display the official US Army plaque. The designation "United States Army" must appear at the top of the sign in accordance with AR 420-70, para 2-7h. Every installation entrance shall have an installation identification sign displaying only the US Army plaque, with the words "United States Army, Fort (Name of Fort), and gate name as indicated in "Figure 1.7 - Installation Entrance Signs". The placement of Senior Mission Commander logo, unit crest, and other installation identification signs, monuments, or displays shall be located inside the installation beyond the cleared area of the Access Control Point (ACP) of entry. When used service-wide, these signs convey a uniform image of strength and stability to the public. Emblems, branch colors, unit mottos, names, and titles of individuals are not to be displayed (Fig. 1.6).



Fig. 1.5 - Brick sign at Jackson Circle.



Fig. 1.6 - Fort Lee Installation Entrance Sign.

1.0.5.1.6.2 Installation identification signs consist of three types:

- Sign type A1, main entrance sign, identifies the principal visitor entrance (Fig. 1.7).
- Sign type A2, secondary entrance sign, identifies entry points with relatively high volumes of visitor traffic.
- Sign type A3, limited access entry gate signs, identifies entry points with limited public access.



Fig. 1.7 - Building sign at Fort Lee.

1.0.5.1.6.3 See Technical Manual (TM) 5-807-10, Signage, paragraph 3-3, for sign specifications and paragraph 3-11 for sign placement guidelines.

- Identification signs are those that state the name of the building or facility at that location. Permanent signs are installed at permanent buildings.
- Directional signs point the way to a destination with an arrow (Fig. 1.8).
- Directory signs are those that list a series of destinations within a building or in an area of the post, and may serve as secondary information to an identification sign (Fig. 1.9).
- Informational signs convey other general messages such as schedules, policies or regulations.
- Mandatory signs carry imperative regulatory messages such as warnings and restrictions; and, must have prior approval from DOL/DPW Traffic Review Board.
- Regulatory signs are to be accomplished by DOL/DPW only. Overhead Passage signs are to be accomplished by DOL/DPW only



Fig. 1.8 - Typical Directional Signage at Fort Lee.

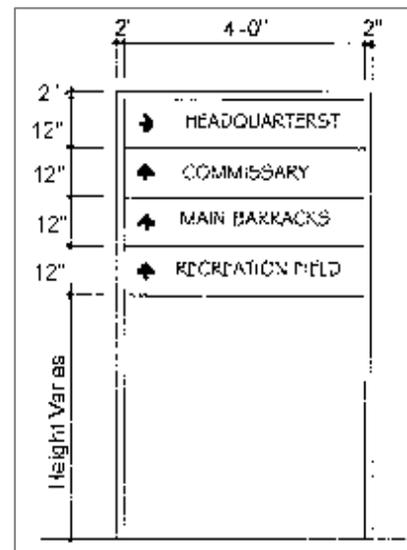


Fig. 1.9 - Direction Sign with Arrows on Left Side Only.

- Motivational signs are those that carry inspirational slogans to support training and morale; and, except for 'Army Values' signs, display is limited to 30 days.

1.0.5.1.7 Street Signs.

Street name identification signs should be designed with the same lettering, color, and materials as other information signs.

1.0.5.1.8 Wheeled/ Hobo Electrical Signs.

Wheeled electrical signs will have an attractive presentation. Temporary landscape elements should not be used whenever possible. The siting of this type of sign will be approved by the RPPB. This type of sign should not be used or used longer than six (6) months. After which time, the sign will be removed or turned into a permanent sign.

Table 1.1 Sign Matrix

Type of Message Required	Identification	Directional Signs	Directory Signs	Informational Signs	Mandatory/Prohibitory Signs	Motivational Signs
<p>● Permitted</p> <p>○ Permitted on Secondary Sign Board Only</p>						
Type of Sign (DC 6.2):						
A1	●					
A2	●					
A3	●					
A4	●					
B1	●	○	○			
B2	●	○	○	●	●	●
B3		●	●			
B4		●	●			
B5	●					
B6	●			●	●	
B7						●
B8					●	●
B9	●				●	
B10		●		●	●	
C1	●					
C2	●					

1.0.5.1.9 Directional Signs.

These signs guide the motorist or pedestrian in, around, and out of the installation. The legibility and placement of these signs, as well as the ordering of information, is critical to their effectiveness. These signs should be placed in central locations and at major decision points along circulation routes. These signs are designed to include the following:

1.0.5.1.9.1 Typeface: Lettering is self-adhesive backing material.

1.0.5.1.9.2 Arrow:

- Place at end indicating direction (Fig. 1.10).
- Stroke width: Helvetica Medium cap
- Fort Lee prefers that the arrow be placed on the left side of the sign.

1.0.5.1.9.3 Color:

- Panel: Dark Brown
- Lettering: White
- Post: Dark Brown
- Exposed panel backs and edges: Dark Brown
- All paint: Semi gloss

1.0.5.1.9.4 Materials:

- Panel: Double-face 1/8" thick aluminum
- Post: Steel Pipe
- Foundation: Concrete pier or direct burial

1.0.5.1.10 Regulatory Signs.

These signs provide the rules for travel and parking on the installation. They include speed signs, turning

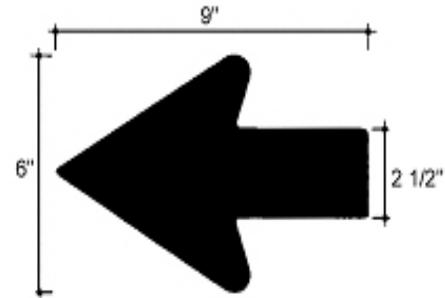


Fig. 1.10 - Typical Arrow For Use On All Destination Signs.

and lane use signs, warning signs, parking control signs, etc. Related to these signs are pavement markings and traffic signals. These signs are designed to include the following (Fig. 1.11):

1.0.5.1.10.1 Typeface: Lettering is self-adhesive backing material.

- Helvetica Medium upper and lower case

1.0.5.1.10.2 Color:

- Panel: Dark Brown
- Lettering: White
- Post: Dark Brown
- Exposed panel backs and edges: Dark Brown
- All paint: Semi gloss

1.0.5.1.10.3 Materials:

- Panel: Double-face 1/8" thick aluminum
- Post: Steel Pipe
- Foundation: Concrete pier or direct burial

1.0.5.1.11 Traffic Control Signs.

1.0.5.1.11.1 CONUS Installations. National highway standards will be used for signs to regulate vehicular traffic on CONUS installation (AR 420-72, Transportation Infrastructure and Dams, Para 2-15f). These standards are described in the Manual of Uniform Traffic Control Devices (MUTCD). Also see MTMC Pamphlet 55-14, Traffic Engineering for Better Signs and Markings. This pamphlet clarifies existing standards and provides definite guidelines for installation officials to conform to the MUTCD. These standards shall be used installation wide to include installation Access Control Points (Fig. 1.12).

1.0.5.1.11.2 OCONUS Installations. OCONUS installation streets and roads are to be considered

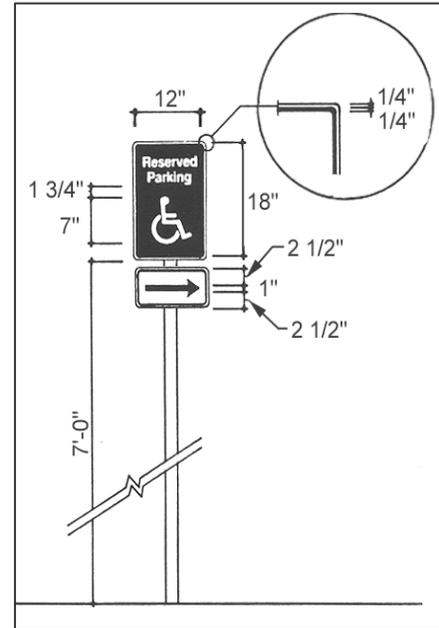


Fig. 1.11 - Regulatory Sign.

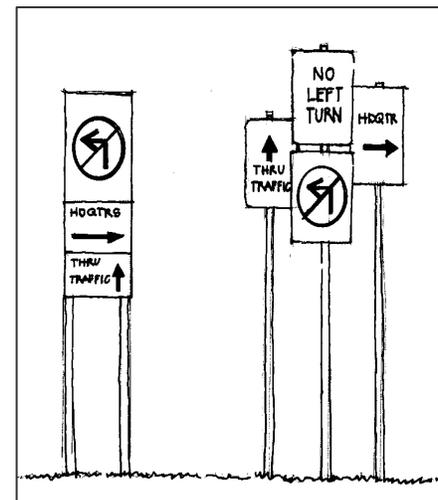


Fig. 1.12 - Sign should be Simple, Legible, and Combined.

extensions of the road system of the host nation and shall use traffic control device standards and criteria of the host nation (AR 420-72, Transportation Infrastructure and Dams, Para 2-15e).

1.0.5.1.11.3 Prohibitory (Warning) Signs. This category of signage is intended to maintain security and safety on the installation perimeter and at other specific secure areas. These signs notify visitors of restrictions, as well as other security procedures. The guidelines for design, fabrication, and placement of warning signs are found in Technical Manual (TM) 5-807-10, Signage, para 3-9.

1.0.5.1.12 Electronic Exterior Signs

All exterior flashing signs, traveling lights, or signs animated by lights of changing degrees of intensity or color are prohibited.

1.0.6 Sign Placement

Placement of signs differs according to the type of sign and the specific site constraints. The following guidelines apply to placement of the majority of signs.

Do not place more than one sign at any location. Traffic rules are the exception to this rule.

Place signs in areas free of visual clutter and landscape materials.

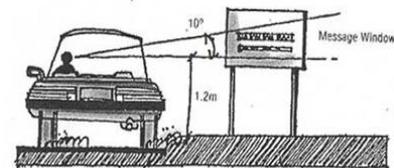
Place signs in locations that allow enough time for the user to read and react to the message (Fig. 1.13).

Signs should not be placed to block sight lines at intersections.

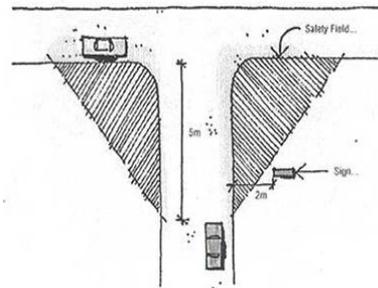
Place signs approximately 1.2 meters (4 feet) above ground level to be within 10 degrees the driver's line of vision. Provide proper placement to avoid a hazard to children.

1.0.7 Sign System Typography

1.0.7.1 Military Emblems. The Army has a rich tradition of military heraldry. Military emblems are an important part of the soldiers' identity and the



Placement with reference to message copy



Placement with reference to signing

Fig. 1.13 - Placement Is Critical To Ensure Easy Readability.

emblems have been carefully crafted over the years to express unit pride and unique history and function of the unit. The care and use of organizational emblems in a signage system can add visual interest as well as build pride and a sense of history. However, the overuse of miscellaneous emblems can lead to clutter and a dilution of their importance. Colors for military emblems must be in accordance with the Institute of Heraldry.

1.0.7.2 Department of the Army Plaque. The plaque should be displayed on installation identification signage to emphasize the heritage and professionalism of the United States Army. The design of the plaque must be in accordance with Army Regulation (AR) 840-1, Department of the Army Seal, and Department of the Army Emblem and Branch of Service Plaques, and must be reproduced in full color.

1.0.7.3 Insignias. The use of branch insignia, shoulder sleeve insignia, coat of arms and/or distinctive insignia on headquarters signs is permitted. All military emblems must appear in full color. Motivational symbols or motifs will not be used.

1.0.8 Reduce Visual Clutter

1.0.8.1 Over-signing detracts from a uniform sign system and if left uncontrolled will eventually destroy the integrity of the system.

1.0.8.2 Clutter creates confusion and ineffectiveness. Often motorists and pedestrians are confused by the bombardment of messages that have no relationship to each other, or the communication is on such a minimal level that the sign serves no purpose (Fig. 1.14).

1.0.9 Location Maps

1.0.9.1 The location map is an integral element of an installation entrance. The location map display provides information and sense of place to the viewer. The design and construction should be of compatible architectural materials found throughout the installation (Fig. 1.15).

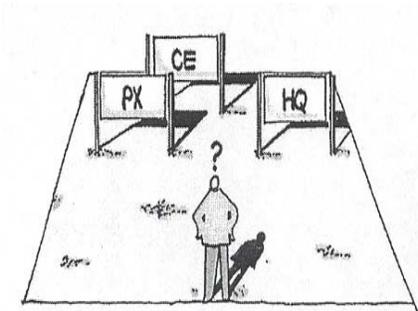


Fig. 1.14 - Visual Clutter Causes Confusion.

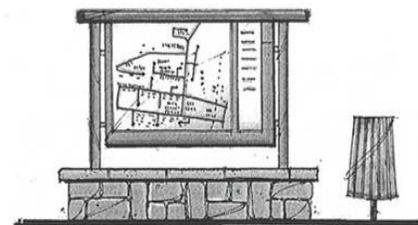


Fig. 1.15 Location Maps Provide a Sense of Place.

1.0.9.2 The location map should contain the following characteristics within the design.

- Plexiglas covered map for protection
- Architectural compatible materials used for the base
- Paved walk-up area
- Litter receptacle
- Provide parking adjacent
- Provide current takeaway maps

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BUILDING IDENTIFICATION SIGN



EXTERIOR SIGNAGE AT 2100 ADAMS AVENUE, FORT LEE, VA.

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Section: Appendix I. Acceptable Plants List

Appendix I

Acceptable Plants List

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REPLY TO
ATTENTION OF

DEPARTMENT OF THE ARMY
HEADQUARTERS, UNITED STATES ARMY GARRISON-FORT LEE
1100 LEE AVENUE SUITE 112
FORT LEE, VIRGINIA 23801-1720

FORT LEE POLICY NO. 18-03

10 Jun 2003

ATZM-EMO

MEMORANDUM FOR FLOFMAIL/FLOTMAIL

SUBJECT: Minimizing the Introduction and Spread of Invasive Plant and Insect Species on Fort Lee, VA

1. **Purpose.** The purpose of this policy is to establish adequate procedures to reduce the potential introduction and spread of invasive species on Fort Lee, VA.
2. **References.**
 - a. National Invasive Species Act of 1996 (P.L. 104 –332).
 - b. Federal Noxious Weed Act of 1974 (with amendments).
 - c. Executive Order 11987, Exotic Organisms, 24 May 77.
 - d. Executive Order 11312, Invasive Species, 3 Feb 99.
 - e. Invasive Alien Plant Species List of Virginia – Virginia Department of Conservation and Recreation.
3. **Background.** Invasive plants and insects are species that have been introduced into an environment where they did not evolve. As a result, these species usually have no natural enemies to limit their reproduction and spread. These species threaten biodiversity, threatened and endangered species, and the training mission - by rendering portions of training areas unusable. Invasive species have been introduced to Fort Lee by natural migration and through the transportation and planting of nursery stock. It is impossible to completely eradicate these species. It would be cost prohibitive to eliminate these species; however, steps can be taken to minimize the introduction and spread of invasive species.
4. **Policy.** Contracting agents will insert specifications into contracts requiring landscaping vendors to provide nursery stock that is nursery - certified to be free from insects, invasive plants, and their seeds. Contracting agents include all personnel responsible for the procurement of landscaping goods and services who are responsible for the development of scopes of work, performance work statements, etc., or the direct purchase of landscaping materials (i.e., credit card purchases). A standard contract statement is inserted for inclusion in all procurement

ATZM-EMO

SUBJECT: Minimizing the Introduction and Spread of Invasive Plant and Insect Species on Fort Lee, VA

documents (including credit card and purchases). Copies of this certification must accompany shipping manifests of nursery stock and the agent will require copies per the contract prior to the commencement of planting. IMPAC cardholders purchasing landscaping services or nursery stock will also require a copy of the certification from the vendor prior to planting.

a. The Imported Red Fire Ant has been introduced into Virginia from nursery stock transported from Red Fire Ant quarantine states. The U. S. Department of Agriculture has signed compliance agreements with nurseries working in these states. Nursery stock or materials originating from the following states are required to have an Imported Red Fire Ant – free certificate attached to the shipping manifest: Georgia, Florida, North Carolina, Texas, Mississippi, Alabama, Louisiana, South Carolina, Tennessee, Arkansas, and Oklahoma. If the certificate is absent do not accept shipment of these materials.

b. Land management equipment operating in known areas of infestation will be thoroughly cleaned at a designated washdown site prior to relocating to uninfested areas. This requirement applies to equipment operated by DoD employees as well as contractors and vendors.

c. Whenever possible, native plant species grown from local stock should be used for conservation and landscaping purposes. There is an abundant variety of indigenous species available and they are usually less expensive.

d. DEL Natural Resources staff will regulate water levels in the Impact Area waterfowl impoundment at appropriate intervals to control the establishment of aquatic invasive species.

e. DEL Natural Resources staff will conduct an ongoing surveillance program to monitor the development of known infestations, control their spread, and be on the alert for new infestations. Funding permitting, the staff will reduce the invasive species population on Fort Lee.

3. **Effective Date.** This policy is effective on the above-mentioned date of this memorandum.

4. **Proponent.** Proponent for this policy is DEL's Environmental Management Office, extension 45061.

5. This policy supersedes Fort Lee Policy 34-01 dated 4 Sep 01.

John R. Angevine /s/
JOHN R. ANGEVINE
Colonel, US Army
Garrison Commander

Fort Lee

Native Plant Directory

Prince George County, VA
05/15/2006

**Prepared by: Resource Management Associates
P. O. Box 119
Locustville, VA 23404
(757) 787-2637
conserve@visi.net**

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Introduction

The Native Plant Guide was designed for Fort Lee, Environmental Management Office (EMO) as a reference for proposed planting projects on the Post. A literature search was conducted to determine those plants that were adapted to the climate and conditions at Fort Lee. Native species were selected according to their UDA Plant Hardiness Zones and physiographic province, and then cross-referenced with the U.S. Fish and Wildlife Service's *Native Plants for Wildlife and Conservation Landscaping* (Slattery et als. 2003). Additional information was acquired from online sources and Michael A. Dirr's *Manual of Woody Landscape Plants* (Dirr, 1998). Final edits were conducted by an NC State horticulturist.

A very important planning consideration is to preserve existing native plants whenever possible prior to construction by clearly designating naturalized areas and protecting them from construction impacts. Protecting these sites along the periphery of construction zones is an effective method to segregate conflicting land uses with vegetative buffers.

Construction sites typically are adversely impacted by soil compaction and mixing of soil profiles that can create hostile environments for the establishment and maintenance of native plants. Compacted soils typically have poor water infiltration capability that can lead to plant nutrient and disease conditions. Therefore, advance planning and protecting zones along the periphery of construction sites can be a cost effective method to maintain and/or encourage the establishment of native plants.

It is very important to understand the intended function of a new land use and characteristics of potential plants to insure that the plants characteristics support and not conflict with the new use. Specie accounts have been developed to describe unique characteristics of each plant to support the plant selection process.

Species Tables

Native Trees

Genus	Species	Common Name	Habit	Height	Sun/Shade	Moisture	Page
Acer	negundo	boxelder	Deciduous	30-60'	Full sun/partial shade	Moist/wet	20
Acer	rubrum	red maple	Deciduous	40-100'	Full sun/partial shade	Moist/wet	21
Acer	saccharinum	silver maple	Deciduous	50-100'	Full sun/partial shade	Moist/wet	22
Acer	saccharum	sugar maple	Deciduous	60-100'	Full sun/partial shade/shade	Moist	23
Amelanchier	arborescens	downy serviceberry	Deciduous	10-25'	Full sun/partial shade	Moist	24
Amelanchier	canadensis	canadian serviceberry	Deciduous	35-50'	Partial shade/shade	Moist/wet	25
Asimina	triloba	paw-paw	Deciduous	20-35'	Full sun	Moist	26
Betula	lenta	sweet birch	Deciduous	50-75'	Full sun/partial shade	Dry/moist	27
Betula	nigra	river birch	Deciduous	50-75'	Full sun/partial shade	Moist/wet	28
Carpinus	caroliniana	American hombbeam	Deciduous	13-40'	Partial shade/shade	Moist	29
Carya	alba	mockernut hickory	Deciduous	60-100'	Partial shade/shade	Dry/moist	30
Carya	cordiformis	bitternut hickory	Deciduous	60-100'	Full sun	Moist/wet	31
Carya	glabra	pignut hickory	Deciduous	60-100'	Full sun/partial shade	Dry/moist/wet	32
Carya	ovata	shagbark hickory	Deciduous	70-100'	Full sun	Moist	33
Castanea	pumila	chinquapin	Deciduous	12-20'	Full sun/partial shade	Dry	34
Celtis	occidentalis	hackberry	Deciduous	40-100'	Full sun/partial shade/shade	Dry/moist/wet	35
Cercis	canadensis	eastern redbud	Deciduous	20-35'	Partial shade/shade	Dry/moist	36
Chamaecyparis	thyoides	Atlantic white cedar	Evergreen	75'	Partial shade/shade	Moist/wet	37
Chionanthus	virginicus	white fringetree	Deciduous	20-35'	Full sun/partial shade/shade	Dry/moist	38
Cornus	alternifolia	alternate-leaf dogwood	Deciduous	15-25'	Full sun/partial shade	Moist	39
Cornus	florida	flowering dogwood	Deciduous	20-50'	Partial shade	Dry/moist	40
Crataegus	crus-galli	cockspur hawthorn	Deciduous	20-35'	Full sun/partial shade	Dry/moist	41
Crataegus	viridis	green hawthorn	Deciduous	20-35'	Partial shade/shade	Moist/wet	42
Diospyros	virginiana	common persimmon	Deciduous	50-75'	Full sun/partial shade	Dry/moist	43
Fagus	grandifolia	American beech	Deciduous	50-100'	Full sun/partial shade	Moist	44
Fraxinus	americana	white ash	Deciduous	50-100'	Full sun/partial shade	Moist	45
Fraxinus	pennsylvanica	green ash	Deciduous	50-75'	Full sun/partial shade	Dry/moist/wet	46
Ilex	opaca	American holly	Evergreen	15-50'	Full sun/partial shade/shade	Moist	47
Juglans	nigra	black walnut	Deciduous	70-90'	Full sun	Moist	48
Juniperus	virginiana	eastern red cedar	Evergreen	50-75'	Full sun	Dry/moist	49
Liquidambar	styraciflua	sweetgum	Deciduous	60-100'	Full sun/partial shade	Moist/wet	50
Liriodendron	tulipifera	yellow poplar	Deciduous	70-100'	Full sun/partial shade	Moist	51
Magnolia	virginiana	sweetbay magnolia	Evergreen	12-30'	Full sun/partial shade/shade	Moist/wet	52
Malus	coronaria	sweet crabapple	Deciduous	10-30'	Full sun	Moist	53
Morus	rubra	red mulberry	Deciduous	35-60'	Full sun/partial shade	Moist	54
Nyssa	aquatica	water tupelo	Deciduous	35-50'	Full sun/partial shade	Moist/wet	55
Nyssa	sylvatica	black gum	Deciduous	30-75'	Full sun/partial shade	Dry/moist/wet	56
Ostrya	virginiana	hophornbeam	Deciduous	25-50'	Partial shade/shade	Moist	57
Persea	borbonia	redbay, sweet bay	Evergreen	15-40'	Full sun/partial shade	Dry/moist	58
Pinus	echinata	shortleaf pine	Evergreen	100'	Full sun	Dry/moist	59
Pinus	rigida	pitch pine	Evergreen	50-75'	Full sun	Dry	60
Pinus	serotina	pond pine	Evergreen	50-60'	Full sun	Moist/wet	61
Pinus	strobus	eastern white pine	Evergreen	75-100'	Full sun	Dry/moist	62
Pinus	taeda	loblolly pine	Evergreen	70-90'	Full sun	Dry/moist/wet	63
Pinus	virginiana	Virginia pine	Evergreen	50-80'	Full sun	Dry/moist	64
Platanus	occidentalis	American sycamore	Deciduous	75-100'	Full sun/partial shade	Moist/wet	65
Populus	deltoides	eastern cottonwood	Deciduous	75-100'	Full sun	Moist/wet	66
Populus	heterophylla	swamp cottonwood	Deciduous	80'	Full sun	Wet	67
Prunus	americana	American wild plum	Deciduous	20-35'	Full sun/partial shade	Dry/Moist	68
Prunus	serotina	black or wild cherry	Deciduous	40-75'	Full sun	Dry/moist	69
Quercus	alba	white oak	Deciduous	75-100'	Full sun/partial shade	Dry/moist	70
Quercus	bicolor	swamp white oak	Deciduous	60-100'	Full sun/partial shade	Wet	71
Quercus	coccinea	scarlet oak	Deciduous	40-75'	Full sun	Dry/moist	72
Quercus	falcata	southern red oak	Deciduous	70-80'	Full sun	Dry/moist	73
Quercus	marilandica	blackjack oak	Deciduous	35-50'	Partial shade	Dry	74
Quercus	michauxii	swamp chestnut oak	Deciduous	50-80'	Full sun	Moist/wet	75

Species Tables

Native Trees (continued)

Genus	Species	Common Name	Habit	Height	Sun/Shade	Moisture	Page
Quercus	muehlenbergii	chinkapin oak	Deciduous	35-50'	Full sun	Dry/moist	76
Quercus	nigra	water oak	Deciduous	50-80'	Partial shade/shade	Moist/wet	77
Quercus	palustris	pin oak	Deciduous	50-80'	Full sun	Moist/wet	78
Quercus	phellos	willow oak	Deciduous	80-100'	Full sun/partial shade	Moist/wet	79
Quercus	prinus	chestnut oak	Deciduous	40-80'	Full sun/partial shade/shade	Dry	80
Quercus	rubra	northern red oak	Deciduous	90'	Full sun/partial shade	Dry/moist	81
Quercus	stellata	post or iron oak	Deciduous	35-50'	Full sun	Dry/moist	82
Quercus	velutina	black oak	Deciduous	75-100'	Full sun	Dry/moist	83
Salix	nigra	black willow	Deciduous	35-50'	Full sun/partial shade	Moist/wet	84
Salix	sericea	silky willow	Deciduous	12'	Full sun/partial shade/shade	Moist/wet	85
Sassafras	albidum	sassafras	Deciduous	35-50'	Full sun/partial shade	Dry/moist	86
Taxodium	distichum	bald cypress	Deciduous	50-100'	Full sun/partial shade	Wet	87
Tilia	americana	American basswood	Deciduous	60-100'	Full sun	Dry	88
Tsuga	canadensis	eastern hemlock	Evergreen	75-100'	Partial shade	Moist	89
Ulmus	americana	American elm	Deciduous	75-100'	Full sun/partial shade	Moist/wet	90
Ulmus	rubra	slipery or red elm	Deciduous	70'	Partial shade/shade	Dry/moist	91

Species Tables

Native Shrubs

Genus	Species	Common Name	Habit	Height	Sun/Shade	Moisture	Page
Alnus	serrulata	smooth or hazel alder	Deciduous	12-20'	Full sun	moist/wet	93
Aralia	spinosa	Devil's walking stick	Deciduous	20-30'	Full sun/partial shade	dry/moist	94
Baccharis	halimifolia	groundsel tree	Deciduous	6-12'	Full sun	Dry/moist/wet	95
Callicarpa	americana	American beautyberry	Deciduous	6'	Full sun/partial shade	dry/moist	96
Ceanothus	americanus	New Jersey tea	Deciduous	3'	Full sun/partial shade	dry	97
Cephalanthus	occidentalis	buttonbush	Deciduous	6-12'	Full sun/partial shade/shade	moist/wet	98
Clethra	alnifolia	sweet pepperbush, summersweet	Deciduous	6-12'	Partial shade/shade	moist/wet	99
Cornus	amomum	silky dogwood, red willow	Deciduous	6-12'	Full sun/partial shade	moist/wet	100
Cornus	racemosa	red-piniced or gray dogwood	Deciduous	6-12'	Full sun/partial shade/shade	dry/moist	101
Corylus	americana	American hazelnut or filbert	Deciduous	10-15'	Partial shade	dry/moist	102
Gaylussacia	baccata	black huckleberry	Deciduous	1.5-3'	Partial shade/shade	Dry/moist/wet	103
Gaylussacia	frondosa	dangleberry	Deciduous	2-4'	Full sun/partial shade/shade	Dry/moist/wet	104
Hamamelis	virginiana	witch hazel	Deciduous	15-30'	Partial shade/shade	Dry/moist	105
Hydrangea	arborescens	wild or smooth hydrangea	Deciduous	3-6'	Partial shade/shade	Moist	106
Hypericum	densiflorum	dense St. John's wort	Deciduous	1.5-6'	Full sun	Dry/moist/wet	107
Ilex	decidua	deciduous holly, possumhaw	Deciduous	20-30'	Full sun/partial shade	dry/moist	108
Ilex	glabra	inkberry	Evergreen	6-10'	Full sun/partial shade/shade	dry/moist	109
Ilex	laevigata	smooth winterberry	Deciduous	10-12'	Full sun/partial shade	moist	110
Ilex	verticillata	winterberry holly, black alder	Deciduous	6-12'	Full sun/partial shade/shade	moist/wet	111
Itea	virginica	Virginia sweetspire	Evergreen	6-10'	Full sun/partial shade/shade	moist/wet	112
Iva	frutescens	marsh elder, high tide bush	Deciduous	2-10'	Full sun	dry/moist	113
Kalmia	angustifolia	sheep laurel or lambkill	Evergreen	2-3'	Full sun/partial shade/shade	moist/wet	114
Kalmia	latifolia	mountain laurel	Evergreen	12-20'	Full sun/partial shade/shade	dry/moist/wet	115
Leucothoe	racemosa	fatterbush, sweetbells	Evergreen	13'	Partial shade/shade	moist/wet	116
Lindera	benzoin	spicebush	Deciduous	6.5-16'	Partial shade/shade	moist/wet	117
Lyonia	ligustrina	male-berry	Deciduous	6-12'	Partial shade/shade	moist	118
Lyonia	mariana	stagger-bush	Deciduous	0.5-6.5'	Partial shade/shade	dry/moist	119
Myrica	caroliniensis	southern or swamp bayberry	Evergreen	8-12'	Full sun/partial shade/shade	Dry/moist/wet	120
Myrica	cerifera	wax myrtle, southern bayberry	Evergreen	6-15'	Full sun/partial shade	Dry/moist/wet	121
Myrica	pensylvanica	northern bayberry, candleberry	Deciduous	5-10'	Full sun/partial shade	Dry/moist/wet	122
Photinia	melanocarpa	black chokeberry	Deciduous	3-6'	Full sun/partial shade	Dry/moist/wet	123
Photinia	pyrifolia	red chokeberry	Deciduous	1.5-13'	Full sun/partial shade	dry/moist/wet	124
Physocarpus	opulifolius	ninebark	Deciduous	5-12'	Full sun/partial shade	moist/wet	125
Rhododendron	atlanticum	dwarf or coast azalea	Deciduous	1-2.5'	Partial shade/shade	Moist	126
Rhododendron	maximum	great laurel or rosebay	Evergreen	15-20'	Partial shade/shade	moist/wet	127
Rhododendron	periclymenoides	pinxterbloom, pink azalea	Deciduous	3-10'	Full sun/partial shade/shade	Dry/moist/wet	128
Rhododendron	viscosum	swamp azalea	Deciduous	6.5-10'	Full sun/partial shade	moist/wet	129
Rhus	aromatica	fragrant sumac	Deciduous	6'	Full sun/partial shade	dry	130
Rhus	copallina	shining or winged sumac	Deciduous	20-35'	Full sun/partial shade	dry	131
Rhus	glabra	sweet or smoothed sumac	Deciduous	2-20'	Full sun	dry/moist	132
Rhus	hirta (typhina)	staghorn sumac	Deciduous	35-50'	Full sun	dry/moist	133
Ribes	rotundifolium	Appalachian gooseberry	Deciduous	3-6'	Partial shade	dry	134
Rosa	carolina	pasture rose	Deciduous	.5-3'	Full sun/partial shade	dry/moist	135
Rosa	palustris	swamp rose	Deciduous	8'	Full sun/partial shade/shade	moist/wet	136
Rubus	allegheniensis	Allegheny blackberry	Deciduous	3-9'	Full sun/partial shade	Dry/moist	137
Salix	humilis	prairie willow	Deciduous	6-12'	Full sun	Dry/moist/wet	138
Sambucus	nigra (canadensis)	common elderberry	Deciduous	6-12'	Full sun/partial shade/shade	dry/moist/wet	139
Spiraea	tomentosa	steeplesh, hardback spirea	Deciduous	3-6'	Full sun	moist/wet	140
Staphylea	trifolia	American bladdernut	Deciduous	3-15'	Shade	moist	141
Vaccinium	corymbosum	highbush blueberry	Deciduous	6-12'	Full sun/partial shade/shade	Dry/moist/wet	142
Vaccinium	pallidum	early lowbush blueberry	Deciduous	1.5-2'	Full sun/partial shade	dry/moist	143
Vaccinium	stamineum	deerberry	Deciduous	6-12'	Full sun/partial shade	dry/moist	144
Viburnum	acerifolium	maple-leaved arrowwood	Deciduous	3-6'	Full sun/partial shade/shade	dry/moist	145
Viburnum	dentatum (recognitum)	southern arrowwood	Deciduous	10-15'	Full sun/partial shade/shade	dry/moist/wet	146
Viburnum	nudum (cassinoides)	naked witherod, possum-haw	Deciduous	6.5-20'	Full sun/partial shade/shade	moist/wet	147
Viburnum	prunifolium	black haw	Deciduous	12-24'	Full sun/partial shade/shade	dry/moist/wet	148

Species Tables

Native Ground Covers

Genus	Species	Common Name	Habit	Height	Sun/Shade	Moisture	Page
Andropogon	gerardii	big bluestem	perennial	2-6.5'	Full sun/partial shade	Dry/moist/wet	150
Andropogon	glomeratus	bushy bluestem	perennial	1.5-5'	Full sun/partial shade	Moist/wet	151
Andropogon	virginicus	broomsedge	perennial	1-3'	Full sun	Dry/moist/wet	152
Asclepias	tuberosa	butterflyweed, milkweed	perennial	1-3'	Full sun/partial shade	Dry/moist	153
Chrysogonum	virginianum	green-and-gold, golden knees	perennial	0.5-1'	Full sun/partial shade/shade	Dry/moist	154
Eupatorium	dubium	Joe-Pye weed	perennial	2-5'	Full sun/partial shade	Moist/wet	155
Lobelia	cardinalis	cardinal flower	perennial	2-4'	Full sun/partial shade	Moist/wet	156
Lobelia	siphilitica	great blue lobelia	perennial	1-5'	Full sun/partial shade/shade	Moist/wet	157
Monarda	didyma	bee-balm, Oswego tea	perennial	2-5'	Full sun/partial shade	Moist/wet	158
Monarda	punctata	horsemint, spotted bee-balm	perennial	0.5-3.5'	Full sun	Dry	159
Rudbeckia	hirta	black-eyed Susan	perennial	1-3.5'	Full sun/partial shade	Dry/moist	160
Schizachyrium (Andropogon)	scoparium (scoparius)	little bluestem	perennial	1.5-4'	Full sun	Dry	161
Sorghastrum	nutans	Indiangrass	perennial	2.5-8'	Full sun	Dry/moist	162

*Species Tables by Habit (Leaf Cycle)**Deciduous Trees*

Genus	Species	Common Name	Height	Sun/Shade	Moisture	Page
Acer	negundo	boxelder	30-60'	Full sun/partial shade	Moist/wet	20
Acer	rubrum	red maple	40-100'	Full sun/partial shade	Moist/wet	21
Acer	saccharinum	silver maple	50-100'	Full sun/partial shade	Moist/wet	22
Acer	saccharum	sugar maple	60-100'	Full sun/partial shade/shade	Moist	23
Amelanchier	arborea	downy serviceberry	10-25'	Full sun/partial shade	Moist	24
Amelanchier	canadensis	canadian serviceberry	35-50'	Partial shade/shade	Moist/wet	25
Asimina	triloba	paw-paw	20-35'	Full sun	Moist	26
Betula	lenta	sweet birch	50-75'	Full sun/partial shade	Dry/moist	27
Betula	nigra	river birch	50-75'	Full sun/partial shade	Moist/wet	28
Carpinus	caroliniana	American hombear	13-40'	Partial shade/shade	Moist	29
Carya	alba	mockernut hickory	60-100'	Partial shade/shade	Dry/moist	30
Carya	cordiformis	bitternut hickory	60-100'	Full sun	Moist/wet	31
Carya	glabra	pignut hickory	60-100'	Full sun/partial shade	Dry/moist/wet	32
Carya	ovata	shagbark hickory	70-100'	Full sun	Moist	33
Castanea	pumila	chinquapin	12-20'	Full sun/partial shade	Dry	34
Celtis	occidentalis	hackberry	40-100'	Full sun/partial shade/shade	Dry/moist/wet	35
Cercis	canadensis	eastern redbud	20-35'	Partial shade/shade	Dry/moist	36
Chionanthus	virginicus	white fringetree	20-35'	Full sun/partial shade/shade	Dry/moist	38
Cornus	alternifolia	alternate-leaf dogwood	15-25'	Full sun/partial shade	Moist	39
Cornus	florida	flowering dogwood	20-50'	Partial shade	Dry/moist	40
Crataegus	crus-galli	cockspur hawthorn	20-35'	Full sun/partial shade	Dry/moist	41
Crataegus	viridis	green hawthorn	20-35'	Partial shade/shade	Moist/wet	42
Diospyros	virginiana	common persimmon	50-75'	Full sun/partial shade	Dry/moist	43
Fagus	grandifolia	American beech	50-100'	Full sun/partial shade	Moist	44
Fraxinus	americana	white ash	50-100'	Full sun/partial shade	Moist	45
Fraxinus	pennsylvanica	green ash	50-75'	Full sun/partial shade	Dry/moist/wet	46
Juglans	nigra	black walnut	70-90'	Full sun	Moist	48
Liquidambar	styraciflua	sweetgum	60-100'	Full sun/partial shade	Moist/wet	50
Liriodendron	lulipifera	yellow poplar	70-100'	Full sun/partial shade	Moist	51
Malus	coronaria	sweet crabapple	10-30'	Full sun	Moist	53
Morus	rubra	red mulberry	35-60'	Full sun/partial shade	Moist	54
Nyssa	aquatica	water tupelo	35-50'	Full sun/partial shade	Moist/wet	55
Nyssa	sylvatica	black gum	30-75'	Full sun/partial shade	Dry/moist/wet	56
Ostrya	virginiana	hophornbeam	25-50'	Partial shade/shade	Moist	57
Platanus	occidentalis	American sycamore	75-100'	Full sun/partial shade	Moist/wet	65
Populus	deltoides	eastern cottonwood	75-100'	Full sun	Moist/wet	66
Populus	heterophylla	swamp cottonwood	80'	Full sun	Wet	67
Prunus	americana	American wild plum	20-35'	Full sun/partial shade	Dry/Moist	68
Prunus	serotina	black or wild cherry	40-75'	Full sun	Dry/moist	69
Quercus	alba	white oak	75-100'	Full sun/partial shade	Dry/moist	70
Quercus	bicolor	swamp white oak	60-100'	Full sun/partial shade	Wet	71
Quercus	coccinea	scarlet oak	40-75'	Full sun	Dry/moist	72
Quercus	falcata	southern red oak	70-80'	Full sun	Dry/moist	73
Quercus	marilandica	blackjack oak	35-50'	Partial shade	Dry	74
Quercus	michauxii	swamp chestnut oak	50-80'	Full sun	Moist/wet	75
Quercus	muehlenbergii	chinkapin oak	35-50'	Full sun	Dry/moist	76
Quercus	nigra	water oak	50-80'	Partial shade/shade	Moist/wet	77
Quercus	palustris	pin oak	50-80'	Full sun	Moist/wet	78
Quercus	phellos	willow oak	80-100'	Full sun/partial shade	Moist/wet	79
Quercus	prinus	chestnut oak	40-80'	Full sun/partial shade/shade	Dry	80
Quercus	rubra	northern red oak	90'	Full sun/partial shade	Dry/moist	81
Quercus	stellata	post or iron oak	35-50'	Full sun	Dry/moist	82
Quercus	velutina	black oak	75-100'	Full sun	Dry/moist	83
Salix	nigra	black willow	35-50'	Full sun/partial shade	Moist/wet	84
Salix	sericea	silky willow	12'	Full sun/partial shade/shade	Moist/wet	85
Sassafras	albidum	sassafras	35-50'	Full sun/partial shade	Dry/moist	86
Taxodium	distichum	bald cypress	50-100'	Full sun/partial shade	Wet	87
Tilia	americana	American basswood	60-100'	Full sun	Dry	88
Ulmus	americana	American elm	75-100'	Full sun/partial shade	Moist/wet	90
Ulmus	rubra	slipery or red elm	70'	Partial shade/shade	Dry/moist	91

Species Tables by Habit (Leaf Cycle)

Deciduous Shrubs

Genus	Species	Common Name	Height	Sun/Shade	Moisture	Page
Alnus	serrulata	smooth or hazel alder	12-20'	Full sun	moist/wet	93
Aralia	spinosa	Devil's walking stick	20-30'	Full sun/partial shade	dry/moist	94
Baccharis	halimifolia	groundsel tree	6-12'	Full sun	Dry/moist/wet	95
Callicarpa	americana	American beautyberry	6'	Full sun/partial shade	dry/moist	96
Ceanothus	americanus	New Jersey tea	3'	Full sun/partial shade	dry	97
Cephalanthus	occidentalis	buttonbush	6-12'	Full sun/partial shade/shade	moist/wet	98
Clethra	alnifolia	sweet pepperbush, summersweet	6-12'	Partial shade/shade	moist/wet	99
Cornus	amomum	silky dogwood, red willow	6-12'	Full sun/partial shade	moist/wet	100
Cornus	racemosa	red-piniced or gray dogwood	6-12'	Full sun/partial shade/shade	dry/moist	101
Corylus	americana	American hazelnut or filbert	10-15'	Partial shade	dry/moist	102
Gaylussacia	baccata	black huckleberry	1.5-3'	Partial shade/shade	Dry/moist/wet	103
Gaylussacia	frondosa	dangleberry	2-4'	Full sun/partial shade/shade	Dry/moist/wet	104
Hamamelis	virginiana	witch hazel	15-30'	Partial shade/shade	Dry/moist	105
Hydrangea	arborescens	wild or smooth hydrangea	3-6'	Partial shade/shade	Moist	106
Hypericum	densiflorum	dense St. John's wort	1.5-6'	Full sun	Dry/moist/wet	107
Ilex	decidua	deciduous holly, possumhaw	20-30'	Full sun/partial shade	dry/moist	108
Ilex	laevigata	smooth winterberry	10-12'	Full sun/partial shade	moist	110
Ilex	verticillata	winterberry holly, black alder	6-12'	Full sun/partial shade/shade	moist/wet	111
Iva	frutescens	marsh elder, high tide bush	2-10'	Full sun	dry/moist	113
Lindera	benzoin	spicebush	6.5-16'	Partial shade/shade	moist/wet	117
Lyonia	ligustrina	male-berry	6-12'	Partial shade/shade	moist	118
Lyonia	mariana	stagger-bush	0.5-6.5'	Partial shade/shade	dry/moist	119
Myrica	pensylvanica	northern bayberry, candleberry	5-10'	Full sun/partial shade	Dry/moist/wet	122
Photinia	melanocarpa	black chokeberry	3-6'	Full sun/partial shade	Dry/moist/wet	123
Photinia	pyrifolia	red chokeberry	1.5-13'	Full sun/partial shade	dry/moist/wet	124
Physocarpus	opulifolius	ninebark	5-12'	Full sun/partial shade	moist/wet	125
Rhododendron	atlanticum	dwarf or coast azalea	1-2.5'	Partial shade/shade	Moist	126
Rhododendron	periclymenoides	pinxterbloom, pink azalea	3-10'	Full sun/partial shade/shade	Dry/moist/wet	128
Rhododendron	viscosum	swamp azalea	6.5-10'	Full sun/partial shade	moist/wet	129
Rhus	aromatica	fragrant sumac	6'	Full sun/partial shade	dry	130
Rhus	copallina	shining or winged sumac	20-35'	Full sun/partial shade	dry	131
Rhus	glabra	sweet or smoothed sumac	2-20'	Full sun	dry/moist	132
Rhus	hirta (typhina)	staghorn sumac	35-50'	Full sun	dry/moist	133
Ribes	rotundifolium	Appalachian gooseberry	3-6'	Partial shade	dry	134
Rosa	carolina	pasture rose	.5-3'	Full sun/partial shade	dry/moist	135
Rosa	palustris	swamp rose	8'	Full sun/partial shade/shade	moist/wet	136
Rubus	allegheensis	Allegheny blackberry	3-9'	Full sun/partial shade	Dry/moist	137
Salix	humilis	prairie willow	6-12'	Full sun	Dry/moist/wet	138
Sambucus	nigra (canadensis)	common elderberry	6-12'	Full sun/partial shade/shade	dry/moist/wet	139
Spiraea	tomentosa	steeplebush, hardback spirea	3-6'	Full sun	moist/wet	140
Staphylea	trifolia	American bladdernut	3-15'	Shade	moist	141
Vaccinium	corymbosum	highbush blueberry	6-12'	Full sun/partial shade/shade	Dry/moist/wet	142
Vaccinium	pallidum	early lowbush blueberry	1.5-2'	Full sun/partial shade	dry/moist	143
Vaccinium	stamineum	deerberry	6-12'	Full sun/partial shade	dry/moist	144
Viburnum	acerifolium	maple-leaved arrowwood	3-6'	Full sun/partial shade/shade	dry/moist	145
Viburnum	(recognitum)	southern arrowwood	10-15'	Full sun/partial shade/shade	dry/moist/wet	146
Viburnum	nudum (cassinoides)	naked witherod, possum-haw	6.5-20'	Full sun/partial shade/shade	moist/wet	147
Viburnum	prunifolium	black haw	12-24'	Full sun/partial shade/shade	dry/moist/wet	148

Species Tables by Habit (Leaf Cycle)

Evergreen Trees

Genus	Species	Common Name	Height	Sun/Shade	Moisture	Page
Chamaecyparis	thyoides	Atlantic white cedar	75'	Partial shade/shade	Moist/wet	37
Ilex	opaca	American holly	15-50'	Full sun/partial shade/shade	Moist	47
Juniperus	virginiana	eastern red cedar	50-75'	Full sun	Dry/moist	49
Magnolia	virginiana	sweetbay magnolia	12-30'	Full sun/partial shade/shade	Moist/wet	52
Persea	borbonia	redbay, sweet bay	15-40'	Full sun/partial shade	Dry/moist	58
Pinus	echinata	shortleaf pine	100'	Full sun	Dry/moist	59
Pinus	rigida	pitch pine	50-75'	Full sun	Dry	60
Pinus	serotina	pond pine	50-60'	Full sun	Moist/wet	61
Pinus	strobus	eastern white pine	75-100'	Full sun	Dry/moist	62
Pinus	taeda	loblolly pine	70-90'	Full sun	Dry/moist/wet	63
Pinus	virginiana	Virginia pine	50-80'	Full sun	Dry/moist	64
Tsuga	canadensis	eastern hemlock	75-100'	Partial shade	Moist	89

Species Tables by Habit (Leaf Cycle)

Evergreen Shrubs

Genus	Species	Common Name	Height	Sun/Shade	Moisture	Page
Ilex	glabra	inkberry	6-10'	Full sun/partial shade/shade	dry/moist	109
Itea	virginica	Virginia sweetspire	6-10'	Full sun/partial shade/shade	moist/wet	112
Kalmia	angustifolia	sheep laurel or lambkill	2-3'	Full sun/partial shade/shade	moist/wet	114
Kalmia	latifolia	mountain laurel	12-20'	Full sun/partial shade/shade	dry/moist/wet	115
Leucothoe	racemosa	fatterbush, sweetbells	13'	Partial shade/shade	moist/wet	116
Myrica	caroliniensis	southern or swamp bayberry	8-12'	Full sun/partial shade/shade	Dry/moist/wet	120
Myrica	cerifera	wax myrtle, southern bayberry	6-15'	Full sun/partial shade	Dry/moist/wet	121
Rhododendron	maximum	great laurel or rosebay	15-20'	Partial shade/shade	moist/wet	127

*Species Tables by Sunlight Dependency**Full Sun - Deciduous Trees*

Genus	Species	Common Name	Height	Moisture	Page
Acer	negundo	boxelder	30-60'	Moist/wet	20
Acer	rubrum	red maple	40-100'	Moist/wet	21
Acer	saccharinum	silver maple	50-100'	Moist/wet	22
Acer	saccharum	sugar maple	60-100'	Moist	23
Amelanchier	arborea	downy serviceberry	10-25'	Moist	24
Asimina	triloba	paw-paw	20-35'	Moist	26
Betula	lenta	sweet birch	50-75'	Dry/moist	27
Betula	nigra	river birch	50-75'	Moist/wet	28
Carya	cordiformis	bitternut hickory	60-100'	Moist/wet	31
Carya	glabra	pignut hickory	60-100'	Dry/moist/wet	32
Carya	ovata	shagbark hickory	70-100'	Moist	33
Castanea	pumila	chinquapin	12-20'	Dry	34
Celtis	occidentalis	hackberry	40-100'	Dry/moist/wet	35
Chionanthus	virginicus	white fringetree	20-35'	Dry/moist	38
Cornus	alternifolia	alternate-leaf dogwood	15-25'	Moist	39
Crataegus	crus-galli	cockspur hawthorn	20-35'	Dry/moist	41
Diospyros	virginiana	common persimmon	50-75'	Dry/moist	43
Fagus	grandifolia	American beech	50-100'	Moist	44
Fraxinus	americana	white ash	50-100'	Moist	45
Fraxinus	pennsylvanica	green ash	50-75'	Dry/moist/wet	46
Juglans	nigra	black walnut	70-90'	Moist	48
Liquidambar	styraciflua	sweetgum	60-100'	Moist/wet	50
Liriodendron	tulipifera	yellow poplar	70-100'	Moist	51
Malus	coronaria	sweet crabapple	10-30'	Moist	53
Morus	rubra	red mulberry	35-60'	Moist	54
Nyssa	aqualica	water tupelo	35-50'	Moist/wet	55
Nyssa	sylvatica	black gum	30-75'	Dry/moist/wet	56
Platanus	occidentalis	American sycamore	75-100'	Moist/wet	65
Populus	deltoides	eastern cottonwood	75-100'	Moist/wet	66
Populus	heterophylla	swamp cottonwood	80'	Wet	67
Prunus	americana	American wild plum	20-35'	Dry/Moist	68
Prunus	serotina	black or wild cherry	40-75'	Dry/moist	69
Quercus	alba	white oak	75-100'	Dry/moist	70
Quercus	bicolor	swamp white oak	60-100'	Wet	71
Quercus	coccinea	scarlet oak	40-75'	Dry/moist	72
Quercus	falcata	southern red oak	70-80'	Dry/moist	73
Quercus	michauxii	swamp chestnut oak	50-80'	Moist/wet	75
Quercus	muehlenbergii	chinkapin oak	35-50'	Dry/moist	76
Quercus	palustris	pin oak	50-80'	Moist/wet	78
Quercus	phellos	willow oak	80-100'	Moist/wet	79
Quercus	prinus	chestnut oak	40-80'	Dry	80
Quercus	rubra	northern red oak	90'	Dry/moist	81
Quercus	stellata	post or iron oak	35-50'	Dry/moist	82
Quercus	velutina	black oak	75-100'	Dry/moist	83
Salix	nigra	black willow	35-50'	Moist/wet	84
Salix	sericea	silky willow	12'	Moist/wet	85
Sassafras	albidum	sassafras	35-50'	Dry/moist	86
Taxodium	distichum	bald cypress	50-100'	Wet	87
Tilia	americana	American basswood	60-100'	Dry	88
Ulmus	americana	American elm	75-100'	Moist/wet	90

Full Sun - Evergreen Trees

Genus	Species	Common Name	Height	Moisture	Page
Ilex	opaca	American holly	15-50'	Moist	47
Juniperus	virginiana	eastern red cedar	50-75'	Dry/moist	49
Magnolia	virginiana	sweetbay magnolia	12-30'	Moist/wet	52
Persea	borbonia	redbay, sweet bay	15-40'	Dry/moist	58
Pinus	echinata	shortleaf pine	100'	Dry/moist	59
Pinus	rigida	pitch pine	50-75'	Dry	60
Pinus	serotina	pond pine	50-60'	Moist/wet	61
Pinus	strobus	eastern white pine	75-100'	Dry/moist	62
Pinus	taeda	loblolly pine	70-90'	Dry/moist/wet	63
Pinus	virginiana	Virginia pine	50-80'	Dry/moist	64

Species Tables by Sunlight Dependency

Full Sun - Deciduous Shrubs

Genus	Species	Common Name	Height	Moisture	Page
Alnus	serrulata	smooth or hazel alder	12-20'	moist/wet	93
Aralia	spinosa	Devil's walking stick	20-30'	dry/moist	94
Baccharis	halimifolia	groundsel tree, sea myrtle	6-12'	Dry/moist/wet	95
Callicarpa	americana	American beautyberry	6'	dry/moist	96
Ceanothus	americanus	New Jersey tea	3'	dry	97
Cephalanthus	occidentalis	buttonbush	6-12'	moist/wet	98
Cornus	amomum	silky dogwood, red willow	6-12'	moist/wet	100
Cornus	racemosa	red-pinckled or gray dogwood	6-12'	dry/moist	101
Gaylussacia	frondosa	dangleberry	2-4'	Dry/moist/wet	104
Hypericum	densiflorum	dense St. John's wort	1.5-6'	Dry/moist/wet	107
Ilex	decidua	deciduous holly or possumhaw	20-30'	dry/moist	108
Ilex	laevigata	smooth winterberry	10-12'	moist	110
Ilex	verticillata	winterberry holly or black alder	6-12'	moist/wet	111
Iva	frutescens	marsh elder, high tide bush	2-10'	dry/moist	113
Morella	pensylvanica	northern bayberry or candleberry	5-10'	Dry/moist/wet	122
Photinia	melanocarpa	black chokeberry	3-6'	Dry/moist/wet	123
Photinia	pyrifolia	red chokeberry	1.5-13'	dry/moist/wet	124
Physocarpus	opulifolius	ninebark	5-12'	moist/wet	125
Rhododendron	periclymenoides	pinxterbloom or pink azalea	3-10'	Dry/moist/wet	128
Rhododendron	viscosum	swamp azalea	6.5-10'	moist/wet	129
Rhus	aromatica	fragrant sumac	6'	dry	130
Rhus	copallina	shining, winged, dwarf sumac	20-35'	dry	131
Rhus	glabra	sweet or smoothed sumac	2-20'	dry/moist	132
Rhus	hirta (typhina)	staghorn sumac	35-50'	dry/moist	133
Rosa	carolina	pasture rose	.5-3'	dry/moist	135
Rosa	palustris	swamp rose	8'	moist/wet	136
Rubus	alleghehiensis	Allegheny blackberry	3-9'	Dry/moist	137
Salix	humilis	prairie willow	6-12'	Dry/moist/wet	138
Sambucus	nigra (canadensis)	common elderberry or American elder	6-12'	dry/moist/wet	139
Spiraea	tomentosa	stepleebush, hardback spirea	3-6'	moist/wet	140
Vaccinium	corymbosum	highbush blueberry	6-12'	Dry/moist/wet	142
Vaccinium	pallidum	early lowbush blueberry	1.5-2'	dry/moist	143
Vaccinium	stamineum	deerberry	6-12'	dry/moist	144
Viburnum	acerifolium	maple-leaved arrowwood	3-6'	dry/moist	145
Viburnum	dentatum (recognitum)	southern arrowwood	10-15'	dry/moist/wet	146
Viburnum	nudum (cassinoides)	naked witherod or possum-haw	6.5-20'	moist/wet	147
Viburnum	prunifolium	black haw	12-24'	dry/moist/wet	148

Full Sun - Evergreen Shrubs

Genus	Species	Common Name	Height	Moisture	Page
Ilex	glabra	inkberry	6-10'	dry/moist	109
Itea	virginica	Virginia sweetspire	6-10'	moist/wet	112
Kalmia	angustifolia	sheep laurel or lambkill	2-3'	moist/wet	114
Kalmia	latifolia	mountain laurel	12-20'	dry/moist/wet	115
Morella	caroliniensis	southern or swamp bayberry	8-12'	Dry/moist/wet	120
Morella	cerifera	wax myrtle or southern bayberry	6-15'	Dry/moist/wet	121

*Species Tables by Sunlight Dependency**Full Sun - Perennial Ground Covers*

Genus	Species	Common Name	Height	Moisture	Page
Monarda	punctata	horsemint, spotted bee-balm	0.5-3.5'	Dry	159
Schizachyrium (Andropogon)	scoparium (scoparius)	little bluestem	1.5-4'	Dry	161
Sorghastrum	nutans	Indiangrass	2.5-8'	Dry/moist	162
Andropogon	virginicus	broomsedge	1-3'	Dry/moist/wet	152
Andropogon	gerardii	big bluestem	2-6.5'	Dry/moist/wet	150
Andropogon	glomeratus	bushy bluestem	1.5-5'	Moist/wet	151
Asclepias	tuberosa	butterflyweed, milkweed	1-3'	Dry/moist	153
Eupatorium	dubium	Joe-Pye weed	2-5'	Moist/wet	155
Monarda	didyma	beebalm, Oswego tea	2-5'	Moist/wet	158
Rudbeckia	hirta	black-eyed Susan	1-3.5'	Dry/moist	160
Chrysogonum	virginianum	green-and-gold, golden knees	0.5-1'	Dry/moist	154
Lobelia	siphilitica	great blue lobelia	1-5'	Moist/wet	157
Lobelia	cardinalis	cardinal flower	2-4'	Moist/wet	156

Species Tables by Sunlight Dependency

Partial Shade - Deciduous Trees

Genus	Species	Common Name	Height	Moisture	Page
Acer	negundo	boxelder	30-60'	Moist/wet	20
Acer	rubrum	red maple	40-100'	Moist/wet	21
Acer	saccharinum	silver maple	50-100'	Moist/wet	22
Acer	saccharum	sugar maple	60-100'	Moist	23
Amelanchier	arborea	downy serviceberry	10-25'	Moist	24
Amelanchier	canadensis	canadian serviceberry	35-50'	Moist/wet	25
Betula	lenta	sweet birch	50-75'	Dry/moist	27
Betula	nigra	river birch	50-75'	Moist/wet	28
Carpinus	caroliniana	American hombeam	13-40'	Moist	29
Carya	alba	mockernut hickory	60-100'	Dry/moist	30
Carya	glabra	pignut hickory	60-100'	Dry/moist/wet	32
Castanea	pumila	chinquapin	12-20'	Dry	34
Celtis	occidentalis	hackberry	40-100'	Dry/moist/wet	35
Cercis	canadensis	eastern redbud	20-35'	Dry/moist	36
Chionanthus	virginicus	white fringetree	20-35'	Dry/moist	38
Cornus	alternifolia	alternate-leaf dogwood	15-25'	Moist	39
Cornus	florida	flowering dogwood	20-50'	Dry/moist	40
Crataegus	crus-galli	cockspur hawthorn	20-35'	Dry/moist	41
Crataegus	viridis	green hawthorn	20-35'	Moist/wet	42
Diospyros	virginiana	common persimmon	50-75'	Dry/moist	43
Fagus	grandifolia	American beech	50-100'	Moist	44
Fraxinus	americana	white ash	50-100'	Moist	45
Fraxinus	pennsylvanica	green ash	50-75'	Dry/moist/wet	46
Liquidambar	styraciflua	sweetgum	60-100'	Moist/wet	50
Liriodendron	tulipifera	yellow poplar	70-100'	Moist	51
Morus	rubra	red mulberry	35-60'	Moist	54
Nyssa	aquatica	water tupelo	35-50'	Moist/wet	55
Nyssa	sylvatica	black gum	30-75'	Dry/moist/wet	56
Ostrya	virginiana	hophornbeam	25-50'	Moist	57
Platanus	occidentalis	American sycamore	75-100'	Moist/wet	65
Prunus	americana	American wild plum	20-35'	Dry/Moist	68
Quercus	alba	white oak	75-100'	Dry/moist	70
Quercus	bicolor	swamp white oak	60-100'	Wet	71
Quercus	marilandica	blackjack oak	35-50'	Dry	74
Quercus	nigra	water oak	50-80'	Moist/wet	77
Quercus	phellos	willow oak	80-100'	Moist/wet	79
Quercus	prinus	chestnut oak	40-80'	Dry	80
Quercus	rubra	northern red oak	90'	Dry/moist	81
Salix	nigra	black willow	35-50'	Moist/wet	84
Salix	sericea	silky willow	12'	Moist/wet	85
Sassafras	albidum	sassafras	35-50'	Dry/moist	86
Taxodium	distichum	bald cypress	50-100'	Wet	87
Ulmus	americana	American elm	75-100'	Moist/wet	90
Ulmus	rubra	slipery or red elm	70'	Dry/moist	91

Partial Shade - Evergreen Trees

Genus	Species	Common Name	Height	Moisture	Page
Chamaecyparis	thyoides	Atlantic white cedar	75'	Moist/wet	37
Ilex	opaca	American holly	15-50'	Moist	47
Magnolia	virginiana	sweetbay magnolia	12-30'	Moist/wet	52
Persea	borbonia	redbay, sweet bay	15-40'	Dry/moist	58
Tsuga	canadensis	eastern hemlock	75-100'	Moist	89

Species Tables by Sunlight Dependency

Partial Shade - Deciduous Shrubs

Genus	Species	Common Name	Height	Moisture	Page
Aralia	spinosa	Devil's walking stick	20-30'	dry/moist	94
Callicarpa	americana	American beautyberry	6'	dry/moist	96
Ceanothus	americanus	New Jersey tea	3'	dry	97
Cephalanthus	occidentalis	buttonbush	6-12'	moist/wet	98
Clethra	alnifolia	sweet pepperbush or summersweet	6-12'	moist/wet	99
Cornus	amomum	silky dogwood, red willow	6-12'	moist/wet	100
Cornus	racemosa	red-piniced or gray dogwood	6-12'	dry/moist	101
Corylus	americana	American hazelnut or filbert	10-15'	dry/moist	102
Gaylussacia	baccata	black huckleberry	1.5-3'	Dry/moist/wet	103
Gaylussacia	frondosa	dangleberry	2-4'	Dry/moist/wet	104
Hamamelis	virginiana	witch hazel	15-30'	Dry/moist	105
Hydrangea	arborescens	wild or smooth hydrangea	3-6'	Moist	106
Ilex	decidua	deciduous holly or possumhaw	20-30'	dry/moist	108
Ilex	laevigata	smooth winterberry	10-12'	moist	110
Ilex	verticillata	winterberry holly or black alder	6-12'	moist/wet	111
Lindera	benzoin	spicebush	6.5-16'	moist/wet	117
Lyonia	ligustrina	male-berry	6-12'	moist	118
Lyonia	mariana	stagger-bush	0.5-6.5'	dry/moist	119
Morella	pensylvanica	northern bayberry or candleberry	5-10'	Dry/moist/wet	122
Photinia	melanocarpa	black chokeberry	3-6'	Dry/moist/wet	123
Photinia	pyrifolia	red chokeberry	1.5-13'	dry/moist/wet	124
Physocarpus	opulifolius	ninebark	5-12'	moist/wet	125
Rhododendron	atlanticum	dwarf or coast azalea	1-2.5'	Moist	126
Rhododendron	periclymenoides	pinxterbloom or pink azalea	3-10'	Dry/moist/wet	128
Rhododendron	viscosum	swamp azalea	6.5-10'	moist/wet	129
Rhus	aromatica	fragrant sumac	6'	dry	130
Rhus	copallina	shining, winged, dwarf sumac	20-35'	dry	131
Ribes	rotundifolium	Appalachian or eastern gooseberry	3-6'	dry	134
Rosa	carolina	pasture rose	.5-3'	dry/moist	135
Rosa	palustris	swamp rose	8'	moist/wet	136
Rubus	allegheensis	Allegheny blackberry	3-9'	Dry/moist	137
Sambucus	nigra (canadensis)	common elderberry or American elder	6-12'	dry/moist/wet	139
Vaccinium	corymbosum	highbush blueberry	6-12'	Dry/moist/wet	142
Vaccinium	pallidum	early lowbush blueberry	1.5-2'	dry/moist	143
Vaccinium	stamineum	deerberry	6-12'	dry/moist	144
Viburnum	acerifolium	maple-leaved arrowwood	3-6'	dry/moist	145
Viburnum	dentatum (recognitum)	southern arrowwood	10-15'	dry/moist/wet	146
Viburnum	nudum (cassinoides)	naked witherod or possum-haw	6.5-20'	moist/wet	147
Viburnum	prunifolium	black haw	12-24'	dry/moist/wet	148

Partial Shade - Evergreen Shrubs

Genus	Species	Common Name	Height	Moisture	Page
Ilex	glabra	inkberry	6-10'	dry/moist	109
Itea	virginica	Virginia sweetspire	6-10'	moist/wet	112
Kalmia	angustifolia	sheep laurel or lambkill	2-3'	moist/wet	114
Kalmia	latifolia	mountain laurel	12-20'	dry/moist/wet	115
Leucothoe	racemosa	fatterbush, sweetbells	13'	moist/wet	116
Morella	caroliniensis	southern or swamp bayberry	8-12'	Dry/moist/wet	120
Morella	cerifera	wax myrtle or southern bayberry	6-15'	Dry/moist/wet	121
Rhododendron	maximum	great laurel or rosebay rhododendron	15-20'	moist/wet	127

Species Tables by Sunlight Dependency

Partial Shade - Perennial Ground Covers

Genus	Species	Common Name	Height	Moisture	Page
Andropogon	gerardii	big bluestem	2-6.5'	Dry/moist/wet	150
Andropogon	glomeratus	bushy bluestem	1.5-5'	Moist/wet	151
Asclepias	tuberosa	butterflyweed, milkweed	1-3'	Dry/moist	153
Eupatorium	dubium	Joe-Pye weed	2-5'	Moist/wet	155
Monarda	didyma	beebalm, Oswego tea	2-5'	Moist/wet	158
Rudbeckia	hirta	black-eyed Susan	1-3.5'	Dry/moist	160
Chrysogonum	virginianum	green-and-gold, golden knees	0.5-1'	Dry/moist	154
Lobelia	siphilitica	great blue lobelia	1-5'	Moist/wet	157
Lobelia	cardinalis	cardinal flower	2-4'	Moist/wet	156

Species Tables by Sunlight Dependency

Shade - Deciduous Trees

Genus	Species	Common Name	Height	Moisture	Page
Acer	saccharum	sugar maple	60-100'	Moist	23
Amelanchier	canadensis	canadian serviceberry	35-50'	Moist/wet	25
Carpinus	caroliniana	American hophornbeam	13-40'	Moist	29
Carya	alba	mockernut hickory	60-100'	Dry/moist	30
Celtis	occidentalis	hackberry	40-100'	Dry/moist/wet	35
Cercis	canadensis	eastern redbud	20-35'	Dry/moist	36
Chionanthus	virginicus	white fringetree	20-35'	Dry/moist	38
Crataegus	viridis	green hawthorn	20-35'	Moist/wet	42
Ostrya	virginiana	hophornbeam	25-50'	Moist	57
Quercus	nigra	water oak	50-80'	Moist/wet	77
Quercus	prinus	chestnut oak	40-80'	Dry	80
Salix	sericea	silky willow	12'	Moist/wet	85
Ulmus	rubra	slipery or red elm	70'	Dry/moist	91

Shade - Evergreen Trees

Genus	Species	Common Name	Height	Moisture	Page
Chamaecyparis	thyoides	Atlantic white cedar	75'	Moist/wet	37
Ilex	opaca	American holly	15-50'	Moist	47
Magnolia	virginiana	sweetbay magnolia	12-30'	Moist/wet	52

Species Tables by Sunlight Dependency

Shade - Deciduous Shrubs

Genus	Species	Common Name	Height	Moisture	Page
Cephalanthus	occidentalis	buttonbush	6-12'	moist/wet	98
Clethra	alnifolia	sweet pepperbush or summersweet	6-12'	moist/wet	99
Cornus	racemosa	red-pinicled or gray dogwood	6-12'	dry/moist	101
Gaylussacia	baccata	black huckleberry	1.5-3'	Dry/moist/wet	103
Gaylussacia	frondosa	dangleberry	2-4'	Dry/moist/wet	104
Hamamelis	virginiana	witch hazel	15-30'	Dry/moist	105
Hydrangea	arborescens	wild or smooth hydrangea	3-6'	Moist	106
Ilex	verticillata	winterberry holly or black alder	6-12'	moist/wet	111
Lindera	benzoin	spicebush	6.5-16'	moist/wet	117
Lyonia	ligustrina	male-berry	6-12'	moist	118
Lyonia	mariana	stagger-bush	0.5-6.5'	dry/moist	119
Rhododendron	atlanticum	dwarf or coast azalea	1-2.5'	Moist	126
Rhododendron	periclymenoides	pinxterbloom or pink azalea	3-10'	Dry/moist/wet	128
Rosa	palustris	swamp rose	8'	moist/wet	136
Sambucus	nigra (canadensis)	common elderberry or American elder	6-12'	dry/moist/wet	139
Staphylea	trifolia	American bladdernut	3-15'	moist	141
Vaccinium	corymbosum	highbush blueberry	6-12'	Dry/moist/wet	142
Viburnum	acerifolium	maple-leaved arrowwood	3-6'	dry/moist	145
Viburnum	dentatum (recognitum)	southern arrowwood	10-15'	dry/moist/wet	146
Viburnum	nudum (cassinoides)	naked witherod or possum-haw	6.5-20'	moist/wet	147
Viburnum	prunifolium	black haw	12-24'	dry/moist/wet	148

Shade - Evergreen Shrubs

Genus	Species	Common Name	Height	Moisture	Page
Ilex	glabra	inkberry	6-10'	dry/moist	109
Itea	virginica	Virginia sweetspire	6-10'	moist/wet	112
Kalmia	angustifolia	sheep laurel or lambkill	2-3'	moist/wet	114
Kalmia	latifolia	mountain laurel	12-20'	dry/moist/wet	115
Leucothoe	racemosa	fatterbush, sweetbells	13'	moist/wet	116
Morella	caroliniensis	southern or swamp bayberry	8-12'	Dry/moist/wet	120
Rhododendron	maximum	great laurel or rosebay rhododendron	15-20'	moist/wet	127

Species Tables by Sunlight Dependency

Partial Shade - Perennial Ground Covers

Genus	Species	Common Name	Height	Moisture	Page
Chrysogonum	virginianum	green-and-gold, golden knees	0.5-1'	Dry/moist	154
Lobelia	siphilitica	great blue lobelia	1-5'	Moist/wet	157

Section: Appendix K. Utility Cost Information

APPENDIX K

Utility Cost Information

The following utility rates for this installation are provided for the purpose of performing life cycle cost calculations in response to this solicitation for design development in accordance with Section 01 33 16 Design After Award:

Electrical:

Virginia Dominion Power Rates are included in the attached Rate Schedules.

Natural Gas:

Columbia Gas Rates are tabulated in the attached tariff tables.

Water:

Prince George County special water district rates are the actual cost of the water as provided by Virginia American Water Company plus 10%. Currently the VAWCO rate is in the \$4.95 per 1,000 gallons.

The connection fee for 5,000 gallons per day of water would be \$21,750.

Source: Prince George County

Sewer:

The rate for sanitary sewer discharge to the Hopewell Regional Treatment Facility sewer system is \$2.75 per 1,000 gallons, based on metered water usage.

Source: Arlene Day, Fort Lee

Virginia Electric and Power Company
 N:\Rates\Retail Rate Schedules\Virginia Jurisdiction\Currently Approved\Rate Schedules\Bundled\SchGS1

Schedule GS-1

SMALL GENERAL SERVICE

I. APPLICABILITY

Except as modified herein, this schedule is applicable only to a non-residential Customer who elects to receive Electricity Supply Service and Electric Delivery Service from the Company and who has no more than two billing months with a peak measured demand of 30 kW or more within the current and previous 11 billing months.

At such time the Customer no longer meets the above applicability requirement, the Customer will remain on this schedule for the period (not exceeding two additional billing months) required to achieve an orderly transfer to the applicable schedule.

This schedule is applicable to the supply of direct current electricity to any nonresidential Customer.

II. MONTHLY RATE

A. Distribution Service Charges

- | | | | |
|----|------------------------------|---|---------------------------|
| 1. | Basic Customer Charge | | |
| | For Single-phase Service | | \$11.47 per billing month |
| | For Three-phase Service | | \$15.47 per billing month |
| 2. | Plus Distribution kWh Charge | | |
| | First 1,400 kWh | @ | 1.805¢ per kWh |
| | Over 1,400 kWh | @ | 1.082¢ per kWh |

B. Electricity Supply Service Charges

- | | | | |
|----|---|---|----------------|
| 1. | Electricity Supply kWh Charge | | |
| | a. For the Billing Months of June – September | | |
| | First 1,400 kWh | @ | 3.934¢ per kWh |
| | Over 1,400 kWh | @ | 5.207¢ per kWh |
| | b. For the Billing Months of October – May | | |
| | First 1,400 kWh | @ | 3.934¢ per kWh |
| | Over 1,400 kWh | @ | 2.612¢ per kWh |
| 2. | Each Electricity Supply kilowatt-hour used is subject to Fuel Charge Rider A. | | |

(Continued)

Filed 06-28-07
 Electric-Virginia

Superseding Filing Effective For Usage On and
 After 01-01-04. This Filing Effective For
 Usage On and After 07-01-07.

Thursday, November 04, 2010

Schedule GS-1

SMALL GENERAL SERVICE

II. MONTHLY RATE (Continued)

- C. When direct current electricity is supplied to the Customer a surcharge of 15 percent will be added to the above charges.
- D. The minimum Distribution Service Charge shall be the highest of:
1. The Basic Customer Charge in Paragraph II.A.1.
 2. The amount as may be contracted for.
 3. The sum of the charges in Paragraphs II.A. through II.C., above, plus \$1.480 multiplied by the number of kW by which any minimum demand established exceeds the demand determined under Paragraph III.
 4. If the demand determined under Paragraph III. is 50 kW or greater, the minimum charge shall not be less than \$3.13 per kW of demand determined.

III. DETERMINATION OF DEMAND

- A. A kW demand meter will be installed when the Customer has used 3,000 kWh or more in any billing month, when the Customer's estimated demand is greater than 25 kW, or when the Customer has contracted for standby, maintenance, or parallel operation service.
- B. The kW of demand will be determined as the highest average kW load measured in any 30-minute interval during the billing month.

IV. MINIMUM DEMAND

The minimum demand shall be such as may be contracted for, however;

- A. When the kW demand determined has reached or exceeded 500 kW during the current or preceding eleven billing months, the minimum demand shall not be less than the highest demand determined during the current and previous eleven billing months.

(Continued)

Virginia Electric and Power Company
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Schedule GS-1

SMALL GENERAL SERVICE

IV. MINIMUM DEMAND (Continued)

- B. When the Customer's power factor is less than 85 percent, a minimum demand of not less than 85 percent of the Customer's maximum kVA demand may be established.

V. METER READING AND BILLING

- A. Meters may be read in units of 10 kWh and bills rendered accordingly.
- B. The Company shall have the option of reading meters monthly or bimonthly. When the meter is read at other than monthly intervals, the Company may render an interim monthly bill based on estimated kWh use during periods for which the meter was not read.
- C. When bills are calculated for a bimonthly period, the Basic Customer Charge shall be multiplied by two; the number of kWh specified in the initial block of the Distribution kWh Charge and the Electricity Supply kWh Charge shall be multiplied by two before the rates per kWh are applied to the usage for the bimonthly period; the minimum Distribution Service Charge shall be multiplied by two; and the charge specified in Paragraph VII.C. shall be multiplied by two.

VI. UNMETERED SERVICE

- A. The Company may, at its sole discretion, provide unmetered service when the Company determines the characteristics of the service location are highly unsuitable for the placement of a meter. Impracticality may be caused by difficult or dangerous meter access, high potential for vandalism, etc.
- B. The monthly kWh usage for unmetered services shall be determined by multiplying the connected load by the hours of operation in a month.
- C. The monthly charge for unmetered service, except for services qualifying under Paragraph VI.D. below will include the charge in Paragraph II.A.1. less \$2.00 per billing month, plus the unmetered kWh usage as determined in VI.B. above multiplied by the charges contained in Paragraphs II.A.2., II.B.1., and II.B.2.

(Continued)

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Electric-Virginia

Superseding Filing Effective For Usage On and
After 01-01-04. This Filing Effective For
Usage On and After 07-01-07.

Thursday, November 04, 2010

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Schedule GS-1

SMALL GENERAL SERVICE

VI. UNMETERED SERVICE (Continued)

- D. The monthly charge for unmetered services connected to a Company street lamp photocell receptacle through the use of an adapter will include the charge in Paragraph II.A.1. less \$4.00 per billing month, plus the unmetered kWh usage as determined in VI.B. above multiplied by the charges contained in Paragraphs II.A.2., II.B.1., and II.B.2. This service will be available only at the convenience of the Company and through agreement between the Company and the Customer for communication devices that are not interconnected with other communication facilities via communications wiring or optical fiber.
- E. Each point of connection shall be considered as a unique Customer and shall receive separately calculated bill amounts.

VII. STANDBY, MAINTENANCE OR PARALLEL OPERATION SERVICE

A Customer requiring standby, maintenance or parallel operation service may elect service under this schedule provided the Customer contracts for the maximum kW which the Company is to supply. Standby, maintenance or parallel operation service is subject to the following provisions:

- A. Suitable relays and protective apparatus shall be furnished, installed, and maintained at the Customer's expense in accordance with specifications furnished by the Company. The relays and protective equipment shall be subject, at all reasonable times, to inspection by the Company's authorized representative.
- B. In case the maximum kW demand determined in Paragraph III. or the minimum demand determined in Paragraph IV. exceeds the contract demand, the contract demand shall be increased by such excess demand.
- C. In addition to the charges in Paragraph II. the Customer will be charged an amount equal to \$4.717 multiplied by the number of kW by which the contract demand exceeds the demand determined in Paragraph III.

(Continued)

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Schedule GS-1

SMALL GENERAL SERVICE

(Continued)

VIII. TERM OF CONTRACT

The contract shall be open order unless (a) standby, maintenance or parallel operation service is provided, or (b) the Customer or the Company requests a written contract. In such cases, the term of contract for the purchase of electricity under this schedule shall be as mutually agreed upon, but for not less than one year. During the minimum term of applicability, the Customer may be billed under the corresponding Unbundled Rate Schedule GS-1U, if applicable.

Virginia Electric and Power Company
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Schedule GS-2
 INTERMEDIATE GENERAL SERVICE

I. APPLICABILITY

Except as modified herein, this schedule is applicable only to a non-residential Customer who elects to receive Electricity Supply Service and Electric Delivery Service from the Company and who has within the current and previous 11 billing months at least three peak measured demands of 30 kW or more and not more than two peak measured demands of 500 kW or more.

For a Customer served under this schedule whose peak measured demand has decreased to less than 30 kW, this schedule shall remain applicable to the Customer and the Customer shall not have the option to purchase electricity under Schedule GS-1 until such time the maximum measured demand has remained at less than 30 kW during all billing months within the current and previous 11 billing months.

At such time the Customer no longer meets the above applicability requirements, the Customer will remain on this schedule for the period (not exceeding two additional billing months) required to achieve an orderly transfer to the applicable schedule.

For new service, this schedule is applicable when the anticipated kW demand meets the above criteria.

II. 30-DAY RATE

A. Non-Demand Billing

1. Distribution Service Charges

a. Basic Customer Charge

Basic Customer Charge \$21.17 per billing month.

b. Plus Distribution kWh Charge

All kWh	@	2.433¢ per kWh
---------	---	----------------

2. Electricity Supply Service Charges

a. Electricity Supply kWh Charge

1) For the billing months of June – September

All kWh	@	4.795¢ per kWh
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2) For the billing months of October – May

All kWh	@	4.075¢ per kWh
---------	---	----------------

(Continued)

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Virginia Electric and Power Company

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Schedule GS-2
INTERMEDIATE GENERAL SERVICE

(Continued)

II. 30-DAY RATE (Continued)

2. Electricity Supply Service Charges (Continued)

- b. Each Electricity Supply kilowatthour used is subject to Fuel Charge Rider A.

B. Demand Billing

1. Distribution Service Charges

a. Basic Customer Charge

Basic Customer Charge \$21.17 per billing month.

b. Distribution Demand Charge

All kW of Demand	@	\$ 3.387 per kW
------------------	---	-----------------

2. Electricity Supply Service Charges

a. Electricity Supply Demand Charge

1) For the billing months of June – September

All kW of Demand	@	\$ 2.844 per kW
------------------	---	-----------------

2) For the billing months of October – May

All kW of Demand	@	\$1.406 per kW
------------------	---	----------------

b. Plus Electricity Supply kWh Charge

First 150 kWh per kW	@	4.617¢ per kWh
----------------------	---	----------------

Next 150 kWh per kW	@	2.588¢ per kWh
---------------------	---	----------------

Next 150 kWh per kW	@	1.119¢ per kWh
---------------------	---	----------------

Additional kWh	@	0.272¢ per kWh
----------------	---	----------------

- c. Each Electricity Supply kilowatthour used is subject to Fuel Charge Riders A and B.

(Continued)

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After 01-01-04. This Filing Effective For
Usage On and After 07-01-07.

Thursday, November 04, 2010

Schedule GS-2
INTERMEDIATE GENERAL SERVICE

(Continued)

II. 30-DAY RATE (Continued)

C. The minimum charge shall be the highest of:

1. The Basic Customer Charge in Paragraph II.A.1.a. or II.B.1.a., whichever is applicable.
2. The amount as may be contracted for.
3. The sum of the charges in Paragraph II.A. or II.B., whichever is applicable, plus \$1.480 multiplied by the number of kW by which any minimum demand established exceeds the demand determined under Paragraph IV.
4. If the demand determined under Paragraph IV is 50 kW or greater, the minimum charge for Non-Demand Billing under Paragraph II. A. shall not be less than \$3.13 per kW of demand determined.

III. NON-DEMAND BILLING VS. DEMAND BILLING

- A. The non-demand billing charges of Paragraph II.A. apply to customers whose kWh usage for the current month does not exceed 200 kWh per kW of the demand as determined under Paragraph IV.
- B. The demand billing charges of Paragraph II.B. apply to customers whose kWh usage for the current month exceeds 200 kWh per kW of the demand as determined under Paragraph IV.

IV. DETERMINATION OF DEMAND

The kW of demand will be determined as the highest average kW load measured in any 30-minute interval during the billing month.

V. MINIMUM DEMAND

The minimum demand shall be such as may be contracted for, however:

- A. When the kW demand determined has reached or exceeded 500 kW during the current or preceding eleven billing months, the minimum demand shall not be less than the highest demand determined during the current and previous eleven billing months.

(Continued)

Virginia Electric and Power Company

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Schedule GS-2
INTERMEDIATE GENERAL SERVICE

(Continued)

V. MINIMUM DEMAND (Continued)

- B. When the Customer's power factor is less than 85 percent, a minimum demand of not less than 85 percent of the Customer's maximum kVA demand may be established.

VI. METER READING AND BILLING

- A. Meters may be read in units of 10 kWh and bills rendered accordingly.
- B. When the actual number of days between meter readings is more or less than 30 days, the Basic Customer Charge, the Distribution Demand Charge, the Electricity Supply Demand, the quantity of kWh in the first three blocks of the Demand Billing Electricity Supply kWh Charge and the minimum charge of the 30-day rate will each be multiplied by the actual number of days in the billing period and divided by 30.

VII. STANDBY, MAINTENANCE OR PARALLEL OPERATION SERVICE

A Customer requiring standby, maintenance or parallel operation service may elect service under this schedule provided the Customer contracts for the maximum kW which the Company is to supply. Standby, maintenance or parallel operation service is subject to the following provisions:

- A. Suitable relays and protective apparatus shall be furnished, installed, and maintained at the Customer's expense in accordance with specifications furnished by the Company. The relays and protective equipment shall be subject, at all reasonable times, to inspection by the Company's authorized representative.
- B. In case the maximum kW demand determined in Paragraph IV. or the minimum demand determined in Paragraph V. exceeds the contract demand, the contract demand shall be increased by such excess demand.
- C. The demand billed under Paragraph II.B.2.a.1) or II.B.2.a.2) shall be the contract demand.

Virginia Electric and Power Company

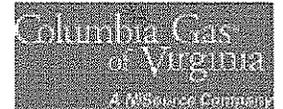
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Schedule GS-2
INTERMEDIATE GENERAL SERVICE

(Continued)

VIII. TERM OF CONTRACT

The contract shall be open order unless (a) standby, maintenance or parallel operation service is provided, or (b) the Customer or the Company requests a written contract. In such cases, the term of contract for the purchase of electricity under this schedule shall be as mutually agreed upon, but for not less than one year. During the minimum term of applicability, the Customer may be billed under the corresponding Unbundled Rate Schedule GS-2U, if applicable.


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[Newsroom](#)
Home :: [My_account](#) :: Columbia Gas of Virginia - Rate information

8:48:09 on Friday, 8th May 2009

My account

[My account home](#)
[Our current rates](#)
[How to read your gas bill](#)
[Bill payment options](#)
[How to read your own meter](#)
[Visit the Energy Store](#)
[Tariff](#)

Contact us

Columbia Gas of Virginia
 DirectLink 1-800-543-8911
24-HOUR EMERGENCY
RESPONSE: 1-800-544-5606
 (gas leak, odor of gas, carbon
 monoxide symptoms)

Rate information effective March 2, 2009.

- [Residential Service \(RS\) Rates](#)
- [Residential Transportation Service \(RTS\) Rates \(Customer Choice Program\)](#)
- [Small General Service \(SGS\) Rates \(Small Commercial\)](#)
- [Small General Transportation Service \(SGTS\) Rates \(Customer Choice Program\) \(Small Commercial\)](#)
- [Large General Service \(LGS\) \(Large Commercial and Industrial\)](#)
- [Columbia Gas of Virginia tariff](#)

1 Ccf = 100 cubic feet of natural gas = 100,000 BTU's**Residential Service (RS) Rates**Residential Sales Service (RS) (for customers that were **not** on Residential Transportation Service (RTS) in the last 12 months):

\$1.2817 per Ccf for the first 50 Ccf of each month
\$1.2729 per Ccf for the next 450 Ccf of each month
\$1.2601 per Ccf for the remaining Ccf used in each month
\$12.25 per month customer charge

Residential Sales Service (RS) (for customers that were on Residential Transportation Service (RTS) in the last 12 months):

\$1.2612 per Ccf for the first 50 Ccf of each month
\$1.2524 per Ccf for the next 450 Ccf of each month
\$1.2396 per Ccf for the remaining Ccf used in each month
\$12.25 per month customer charge

NOTE: Customers currently participating in the Customer Choice Program, please see the Customer Choice - Residential Transportation Service section below.

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Residential Transportation Service (RTS) Rates (Customer Choice Program)

CGV customers are eligible to participate in the [Customer Choice Program](#) enabling customers to choose their gas supplier. Customers choosing an alternative supplier pay the following service and delivery charge rates to Columbia Gas of Virginia. These rates do not include the gas costs from the supplier.

Residential Transportation Service (RTS) (for customers that were **not** on Residential Sales Service (RS) in the last 12 months):

\$0.4471 per Ccf for the first 50 Ccf of each month
\$0.4383 per Ccf for the next 450 Ccf of each month
\$0.4255 per Ccf for the remaining Ccf used in each month.
\$12.25 per month customer charge

Price to compare (as of March 2, 2009) = \$0.8141 per Ccf for all rate blocks.

Residential Transportation Service (RTS) (for customers that were on Residential Sales Service (RS) in the last 12 months):

\$0.4676 per Ccf for the first 50 Ccf of each month
\$0.4588 per Ccf for the first 450 Ccf of each month

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\$0.4460 per Ccf for the remaining Ccf used in each month.
\$12.25 per month customer charge

Price to compare (as of March 2, 2009) = **\$0.8141** per Ccf for all rate blocks.

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Small General Service (SGS) Rates (Small Commercial)

Small General Service (SGS) (for customers that were **not** on Small General Transportation Service (SGTS) in the last 12 months):

\$1.0975 per Ccf for the first 200 Ccf of each month
\$1.0844 per Ccf for the next 800 Ccf of each month
\$1.0808 per Ccf for the next 9000 Ccf of each month
\$1.0747 per Ccf for the next 15,000 Ccf of each month
\$1.0714 per Ccf for the remaining Ccf used in each month
\$23.25 per month customer charge

Small General Service (SGS) (for customers that were on Small General Transportation Service (SGTS) in the last 12 months):

\$1.1032 per Ccf for the first 200 Ccf of each month
\$1.0901 per Ccf for the next 800 Ccf of each month
\$1.0865 per Ccf for the next 9000 Ccf of each month
\$1.0804 per Ccf for the next 15,000 Ccf of each month
\$1.0771 per Ccf for the remaining Ccf used in each month
\$23.25 per month customer charge

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Small General Transportation Service (SGTS) Rates (Customer Choice Program) (Small Commercial)

All customers are eligible to participate in the Customer Choice Program enabling customers to choose their gas supplier. Customers choosing an alternative supplier pay the following service and delivery charge rates to Columbia Gas of Virginia. These rates do not include the gas costs from the supplier.

Small General Transportation Service (SGTS) (for customers that were **not** on Small General Service (SGS) in the last 12 months):

\$0.3444 per Ccf for the first 200 Ccf of each month
\$0.3313 per Ccf for the next 800 Ccf of each month
\$0.3277 per Ccf for the next 9000 Ccf of each month
\$0.3216 per Ccf for the next 15,000 Ccf of each month
\$0.3183 per Ccf for the remaining Ccf used in each month
\$23.25 per month customer charge

Price to compare (as of March 2, 2009) = **\$0.7588** per Ccf for all rate blocks.

Small General Transportation Service (SGTS) (for customers that were on Small General Service (SGS) in the last 12 months):

\$0.3387 per Ccf for the first 200 Ccf of each month
\$0.3256 per Ccf for the next 800 Ccf of each month
\$0.3220 per Ccf for the next 9000 Ccf of each month
\$0.3159 per Ccf for the next 15,000 Ccf of each month
\$0.3126 per Ccf for the remaining Ccf used in each month
\$23.25 per month customer charge

Price to compare (as of March 2, 2009) = **\$0.7588** per Ccf for all rate blocks.

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Large General Service (LGS) (Large Commercial and Industrial)
Columbia Gas of Virginia is an open access system and offers a variety of rate structures for our large volume customers. These options enable our customers to choose the most valuable service according to their needs.

Rates can be found in the [Columbia Gas of Virginia tariff](#), starting on sheet number 3.

If you are an existing customer in Columbia Gas of Virginia's territory, visit our [business and industry services pages](#) to learn about services specific to your needs. There you will find answers to your questions regarding rates, transportation service and other energy options.

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APPENDIX L

LEED Project Credit Guidance (MAY 10)

This spreadsheet indicates Army required credits, Army preferred credits, project-specific ranking of individual point preferences, assumptions guidance for individual credits, and references to related language in the RFP for individual credits.

LEED Credit Paragraph	LEED Project Credit Guidance	Army Guidance: Required - Preferred - Avoid		Project Preference Ranking: (1=most preferred, blank=no preference, X=preference not applicable to this credit, Rqd=required)
PAR	FEATURE			REMARKS
SUSTAINABLE SITES				
SSPR1	Construction Activity Pollution Prevention (PREREQUISITE)	Rqd	Rqd	All LEED prerequisites are required to be met.
SS1	Site Selection		X	See paragraph LEED CREDITS COORDINATION.

SS2	Development Density & Community Connectivity - OPTION 1 DENSITY		X	See paragraph LEED CREDITS COORDINATION.
	Development Density & Community Connectivity - OPTION 2 CONNECTIVITY		X	See paragraph LEED CREDITS COORDINATION.
SS3	Brownfield Redevelopment		X	See paragraph LEED CREDITS COORDINATION.
SS4.1	Alternative Transportation: Public Transportation Access		X	See paragraph LEED CREDITS COORDINATION.
SS4.2	Alternative Transportation: Bicycle Storage & Changing Rooms	Pref		Assume that non-transient building occupants are NOT housed on Post unless indicated otherwise.
SS4.3	Alternative Transportation: Low Emitting & Fuel Efficient Vehicles - OPTION 1			Requires provision of vehicles, which cannot be purchased with construction funds. Assume Government will not provide vehicles unless indicated otherwise. Assume that 50% of GOV fleet is NOT alternative fuel vehicles unless indicated otherwise.
SS4.3	Alternative Transportation: Low Emitting & Fuel Efficient Vehicles - OPTION 2	Pref		
SS4.3	Alternative Transportation: Low Emitting & Fuel Efficient Vehicles - OPTION 3			Requires provision of vehicle refueling stations. Installation must support type of fuel and commit to maintaining/supporting refueling stations.
SS4.4	Alternative Transportation: Parking Capacity	Pref		

SS5.1	Site Development: Protect or Restore Habitat			
SS5.2	Site Development: Maximize Open Space	Pref		Assume AGMBC option for aggregated open space at another location on the installation is not available to the project unless indicated otherwise.
SS6.1	Stormwater Design: Quantity Control	Pref		See paragraph STORMWATER MANAGEMENT.
SS6.2	Stormwater Design: Quality Control	Pref		See paragraph STORMWATER MANAGEMENT.
SS7.1	Heat Island Effect: Non-Roof			
SS7.2	Heat Island Effect: Roof	Pref		Coordinate with nearby airfield requirements, which may preclude this credit.
SS8	Light Pollution Reduction	Pref		
<u>WATER EFFICIENCY</u>				
WEPR1	Water Use Reduction (Version 3 only)	Rqd	Rqd	All LEED prerequisites are required to be met.
WE1.1	Water Efficient Landscaping: Reduce by 50%	Pref		See paragraph IRRIGATION. Project must include landscaping to be eligible for this credit.
WE1.2	Water Efficient Landscaping: No Potable Water Use or No Irrigation	Pref		Project must include landscaping to be eligible for this credit.
WE2	Innovative Wastewater Technologies - OPTION 1			
WE2	Innovative Wastewater Technologies - OPTION 2			
WE3	Water Use Reduction	Pref		See paragraph BUILDING WATER USE REDUCTION.

ENERGY AND ATMOSPHERE				
EAPR1	Fundamental Commissioning of the Building Energy Systems (PREREQUISITE)	Rqd	Rqd	All LEED prerequisites are required to be met.
EAPR2	Minimum Energy Performance (PREREQUISITE)	Rqd	Rqd	All LEED prerequisites are required to be met.
EAPR3	Fundamental Refrigerant Management (PREREQUISITE)	Rqd	Rqd	All LEED prerequisites are required to be met.
EA1	Optimize Energy Performance	Rqd	1	Earning of LEED EA1 points as indicated in paragraph ENERGY CONSERVATION , as a minimum, is required.
EA2.1	On-Site Renewable Energy	Pref		See paragraph ENERGY CONSERVATION .
EA3	Enhanced Commissioning	Rqd		See paragraph COMMISSIONING . The Commissioning Authority may be provided through the Design-Build Contractor only if in accordance with USGBC Credit Interpretation Ruling (CIR) dated 9/15/06. Commissioning Authority activities begin during design phase and continue well beyond beneficial occupancy. Assume Government will not provide CxA post-occupancy activities unless indicated otherwise.
EA4	Enhanced Refrigerant Management			
EA5	Measurement & Verification			Assume Government will not provide post-occupancy activities unless indicated otherwise.
EA6	Green Power		X	See paragraph LEED CREDITS COORDINATION .

MATERIALS AND RESOURCES				
MRPR1	Storage & Collection of Recyclables (PREREQUISITE)	Rqd	Rqd	All LEED prerequisites are required to be met. Coordinate with Installation during design development on collection service and receptacles.
MR1	Building Reuse			
MR2.1	Construction Waste Management: Divert 50% From Disposal	Pref		See paragraph CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT.
MR2.2	Construction Waste Management: Divert 75% From Disposal	Pref		
MR3	Materials Reuse			
MR4.1	Recycled Content: 10% (post-consumer + 1/2 pre-consumer)	Pref		See paragraph RECYCLED CONTENT.
MR4.2	Recycled Content: 20% (post-consumer + 1/2 pre-consumer)	Pref		
MR5.1	Regional Materials:10% Extracted, Processed & Manufactured Regionally			
MR5.2	Regional Materials:20% Extracted, Processed & Manufactured Regionally			

MR6	Rapidly Renewable Materials	Pref		See paragraph BIOBASED AND ENVIRONMENTALLY PREFERABLE MATERIALS and paragraph FEDERAL BIOBASED PRODUCTS PREFERRED PROCUREMENT PROGRAM.
MR7	Certified Wood	Pref		See paragraph BIOBASED AND ENVIRONMENTALLY PREFERABLE MATERIALS.
INDOOR ENVIRONMENTAL QUALITY				
EQPR1	Minimum IAQ Performance (PREREQUISITE)	Rqd	Rqd	All LEED prerequisites are required to be met.
EQPR2	Environmental Tobacco Smoke (ETS) Control (PREREQUISITE)	Rqd	Rqd	All LEED prerequisites are required to be met. Assume all buildings are smoke free unless indicated otherwise (family housing, barracks and other lodging are facility types where smoking may be permitted in some cases).
EQ1	Outdoor Air Delivery Monitoring			
EQ2	Increased Ventilation			
EQ3.1	Construction IAQ Management Plan: During Construction	Pref		See paragraph CONSTRUCTION IAQ MANAGEMENT.
EQ3.2	Construction IAQ Management Plan: Before Occupancy	Pref		See paragraph CONSTRUCTION IAQ MANAGEMENT.
EQ4.1	Low Emitting Materials: Adhesives & Sealants	Pref		See paragraph LOW-EMITTING MATERIALS.
EQ4.2	Low Emitting Materials: Paints & Coatings	Pref		See paragraph LOW-EMITTING MATERIALS.
EQ4.3	Low Emitting Materials: Carpet/Flooring Systems	Pref		See paragraph LOW-EMITTING MATERIALS.

EQ4.4	Low Emitting Materials: Composite Wood & Agrifiber Products	Pref		See paragraph LOW-EMITTING MATERIALS.
EQ5	Indoor Chemical & Pollutant Source Control	Pref		System requiring weekly cleaning to earn this credit is not a permitted option unless indicated otherwise.
EQ6.1	Controllability of Systems: Lighting			
EQ6.2	Controllability of Systems: Thermal Comfort			
EQ7.1	Thermal Comfort: Design	Rqd		See paragraph HEATING, VENTILATING AND AIR CONDITIONING.
EQ7.2	Thermal Comfort: Verification			Project must earn credit EQ7.1 to be eligible for this credit. Assume Government will not provide post-occupancy activities unless indicated otherwise.
EQ8.1	Daylight & Views: Daylight 75% of Spaces	Pref		See paragraph DAYLIGHTING.
EQ8.2	Daylight & Views: Views for 90% of Spaces	Pref		
INNOVATION & DESIGN PROCESS				
IDc1.1	Innovation in Design			See paragraph INNOVATION AND DESIGN CREDITS. Assume Government will not provide any activities associated with ID credits.
IDc1.2	Innovation in Design			
IDc1.3	Innovation in Design			
IDc1.4	Innovation in Design			
IDc2	LEED Accredited Professional	Rqd	Rqd	LEED AP during design and construction is required.
REGIONAL PRIORITY CREDITS (Version 3 only)				See paragraph LEED CREDITS COORDINATION.

APPENDIX M
LEED Owner's Project Requirements

Not Used

APPENDIX N
LEED Requirements for Multiple Contractor Combined Projects

Not Used

APPENDIX O
LEED Strategy Tables

Not Used

APPENDIX P

LEED Registration of Army Projects

15 April 2010

Number of Registrations

Each building must be registered separately, except multiple instances of a standard building on a shared site may be registered as a single project. If a single registration for multiple buildings is chosen, all buildings under the single registration must earn exactly the same points. Do not register buildings that are exempt from a specific LEED achievement requirement.

Typical Registration Procedure

1. Login, complete the online registration form (see guidance below) at the GBCI LEED Online website <http://www.gbci.org/DisplayPage.aspx?CMSPageID=174> and submit it online.
2. Pay the registration fee via credit card (USACE staff: credit card PR&C is funded by project design or S&A funds).
3. GBCI will follow up with a final invoice, the LEED-online passwords and template information.
4. The individual who registers the project online is, by default, the Project Administrator.

Completing the Registration Form

BEFORE YOU BEGIN:

Create a personal account with USGBC if you do not have one.

You will need the following information:

Project name as it appears in P2 (obtain from USACE Project Manager)

Building number/physical address of project

Zip code for Installation/project location

Anticipated construction start and end dates

Total gross area all non-exempt buildings in registration

Total construction cost all non-exempt buildings only (see Project Details Section instructions below)

ACCOUNT/LOGIN INFORMATION

1. The person registering the project **must have an account with USGBC** (login and password) to complete the form. Go to <http://www.gbci.org/>, click on "register a project" at the drop-down menu for project certification (at the top of the page) and select "register now for LEED 2009" to start the project registration process. If you have an account, login with your email address and password and select "register new project" to proceed. If you do not have an account, you may select "register a new account" and follow the instructions. It is recommended that you create an account separately on the USGBC website before you start the form. **IMPORTANT: USACE team members are members of USGBC and are eligible for Member prices. USACE team members registering projects should be sure to include the USACE Corporate Access ID in their personal account profile (if you do not have it contact richard.l.schneider@usace.army.mil or judith.f.milton@usace.army.mil for the number).**
2. The Account/Login Information section is filled out by the person registering the project. It may be a Contractor or a USACE staff member.

ELIGIBILITY SECTION

Follow directions (accepting the terms and conditions)

Review your profile information and make corrections if needed

RATING SYSTEM SELECTION SECTION

Select single project registration and I know which rating system.

Select the rating system - currently only LEED-NC and LEED for Homes are approved for Army use without special approval.

LEED Minimum Program Requirements: select YES

RATING SYSTEM RESULTS SECTION

Confirm selected rating system.

PROJECT INFORMATION SECTION

Project Title: Begin the project title with a one-word identifier for the Installation. Do not include the word "Fort". After this match the project name used in P2 (contact the USACE Project Manager for this information) and identify the building being registered. Example: "Stewart 4th IBC - DFAC".

Project Address 1 and 2: This is the physical location of the project. Provide building number, street address, block number or whatever is known to best describe the location of the project on the Installation.

Project City: Installation Name

State, Country, Zip Code: Self-explanatory

Anticipated Construction Start and End Dates: Self-explanatory – give your best guess if unknown. Note that required data entry format is: 1 or 2 digit month/1 or 2 digit date/4 digit year (example 3/23/2010)

Gross Square Footage: Provide total area all buildings in LEED project. Exclude the area of any buildings that are exempt from the LEED achievement requirement (for example, exclude an unconditioned storage shed to be constructed with a barracks complex).

Is Project Confidential: Indicate NO except, if project has security sensitivity (elements that are FOUO or higher security), indicate YES.

Notification of Local Chapter: Indicate NO unless Government/USACE Project Manager requests you to indicate YES.

Anticipated Project Type: Select the most appropriate option from the drop-down menu.

Anticipated Certification Level: Select the applicable option from the drop-down menu (Silver is the usual level).

PROJECT OWNER INFORMATION SECTION

Project Owner First Name, Last Name, email, phone, address: The Project Owner is the USACE Project Manager. Obtain this info from the USACE Project Manager.

Organization: U.S. Army Corps of Engineers. This field MUST be completed this way because it will be used as a search field by higher HQ to find all USACE registered projects. You may supplement it with district name at the end but DO NOT revise or use an acronym.

May we publish Owner information: Indicate NO

Owner Type: Pick Federal Government from drop-down menu.

Project Owner Assertion: Check the box

PAYMENT INFORMATION

Self-explanatory

APPENDIX Q
REV 2.1 – 30 SEP 2010
AREA COMPUTATIONS

Computation of Areas: Compute the “gross area” and “net area” of facilities (excluding family housing) in accordance with the following subparagraphs:

(1) Enclosed Spaces: The “gross area” is the sum of all floor spaces with an average clear height $\geq 6'-11"$ (as measured to the underside of the structural system) and having perimeter walls which are $\geq 4'-11"$. The area is calculated by measuring to the exterior dimensions of surfaces and walls.

(2) Half-Scope Spaces: Areas of the following spaces shall count as one-half scope when calculating “gross area”:

- Balconies
- Porches
- Covered exterior loading platforms or facilities
- **Covered but not enclosed spaces, canopies, training, and assembly areas**
- Covered but not enclosed passageways and walks
- Open stairways (both covered and uncovered)
- Covered ramps
- Interior corridors (Unaccompanied Enlisted Personnel Housing Only)

(3) Excluded Spaces: The following spaces shall be excluded from the “gross area” calculation:

- Crawl spaces
- Uncovered exterior loading platforms or facilities
- Exterior insulation applied to existing buildings
- Open courtyards
- Open paved terraces
- Uncovered ramps
- Uncovered stoops
- Utility tunnels and raceways
- Roof overhangs and soffits measuring less than 3'-0" from the exterior face of the building to the fascia

(4) Net Floor Area: Where required, “net area” is calculated by measuring the inside clear dimensions from the finish surfaces of walls. If required, overall “assignable net area” is determined by subtracting the following spaces from the “gross area”:

- Basements not suited as office, special mechanical, or storage space
- Elevator shafts and machinery space
- Exterior walls
- Interior partitions
- Mechanical equipment and water supply equipment space
- Permanent corridors and hallways
- Stairs and stair towers
- Janitor closets
- Electrical equipment space
- Electronic/communications equipment space

APPENDIX R

Preliminary Submittal Register

NOTE TO SPECIFIER:

1. Appendix R" will be a Adobe Acrobat pdf version of the Specifier completed "Sample Preliminary Submittal Register." The Sample Register is Excel Spreadsheet format of the RMS Input Form 4288A, which serves two purposes.
2. First, The Register allows the both Government and the Proposers to see and estimate the cost of the Division 00 and Division 01 submittals required by the contract in addition to the Contractor generated submittal register items developed during Design After Award.
3. Secondly, after award, the Government will provide the Contractor the actual Excel Spreadsheet for the Contractor to input the data into RMS to create the Submittal Register used during contract performance. See Section 01 33 00 (Submittal Procedures), paragraph 1.8 (Submittal Register) for the contract requirements.
4. For the contract or task order Solicitation, the Specifier must complete APPENDIX R, found at the following link:
<http://rfpwizard.cecer.army.mil/HTML/Docs/Refs/Sample%20Preliminary%20Submittal%20Register.xls> , save it as a PDF file and then upload it into the Wizard as Appendix R.
5. The RMS Input Form initially includes submittals required by the standardized Model RFP Division 00 and Division 01 Sections, except Section 01 10 00, paragraph 3. Examine the Special Contract Requirements, paragraphs 3 and 6 and any other locally developed portions of the RFP for required submittals and add them to the Input Form. Do not duplicate submittals already listed in the standardized RMS Input Form, because the Contractor needs to submit this information only once.
6. After award, the Government provides the Excel spreadsheet to the selected contractor to develop and input the RMS Input form for the submittal register required by paragraph 1.8 of Section 01 33 00, Submittals.

LUMINAIRES

VP Luminaire Name	Manufacturer	Manufacturer's Number	Nominal Wattage	Lamp Type	Nominal Lumens	Mounting	IES Distribution	IES Cutoff Class	Lamp Orient	VP Stock Number	VP CU	EPA Ft2	Weight Lbs
Acorn - Black	Cooper	ANE70SR255UO148	70	HPS	5000	Post Top	TYPE V	Non-Cutoff	VERTICAL	66384400	LAC5SV	1.7	30
Acorn - Green	Cooper	ANE70SR255UO033	70	HPS	5000	Post Top	TYPE V	Non-Cutoff	VERTICAL	42075990	LAC5SVGN	1.7	30
Acorn - Black	Cooper	ANE10SR255UO149	100	HPS	8000	Post Top	TYPE V	Non-Cutoff	VERTICAL	66384500	LAC8SV	1.7	30
Acorn - Green	Cooper	ANE10SR255UO034	100	HPS	8000	Post Top	TYPE V	Non-Cutoff	VERTICAL	42075991	LAC8SVGN	1.7	30
Acorn - Black	Cooper	ANE15SR255UO150	150	HPS	14000	Post Top	TYPE V	Non-Cutoff	VERTICAL	66384600	LAC14SV	1.7	30
Acorn - Green	Cooper	ANE15SR255U00150	150	HPS	14000	Post Top	TYPE V	Non-Cutoff	VERTICAL	42075992	LAC14SVGN	1.7	30
Carlyle Acorn	Cooper	WST70SR233UO013	70	HPS	5000	Post Top	Type III	Non-Cutoff	VERTICAL	66392400	LCRL5SV	1.7	30
Carlyle Acorn	Cooper	WST10SR233UO011	100	HPS	8000	Post Top	Type III	Non-Cutoff	VERTICAL	66392600	LCRL8SV	1.7	30
Carlyle Acorn	Cooper	WST15SR233UO012	150	HPS	14000	Post Top	Type III	Non-Cutoff	VERTICAL	66392800	LCRL14SV	1.7	30
Colonial	Cooper	LXF70SR233U0260	70	HPS	5000	Post Top	TYPE III	Semi-Cutoff	HORIZONTAL	66386600	LCOL5SV	1.7	25
Colonial	Cooper	LXF10SR233U0261	100	HPS	8000	Post Top	TYPE III	Semi-Cutoff	HORIZONTAL	66387000	LCOL8SV	1.7	25
Colonial	Cooper	LXF15SR233U0263	150	HPS	14000	Post Top	TYPE III	Semi-Cutoff	HORIZONTAL	66388000	LCOL14SV	1.7	25
Contemporary	Cooper	MPW70SR233UO01	70	HPS	5000	Post Top	Type III	Semi-Cutoff	VERTICAL	66388800	LCTP5SV	1.7	34
Contemporary	Cooper	MPW10SR233UO02	100	HPS	8000	Post Top	TYPE III	Semi-Cutoff	VERTICAL	66389000	LCTP8SV	1.7	34
Contemporary	Cooper	MPW15SR233UO02	150	HPS	14000	Post Top	TYPE III	Semi-Cutoff	VERTICAL	66390000	LCTP14SV	1.7	34
Dayform Decorative Colonial	Cooper	UTD70SR233UO036	70	HPS	5000	Post Top	Type III	Cutoff	HORIZONTAL	66386900	LDAY5SV	2.6	35
Dayform Decorative Colonial	Cooper	UTD10SR233UO037	100	HPS	8000	Post Top	Type III	Cutoff	HORIZONTAL	66387300	LDAY8SV	2.6	35
Dayform Decorative Colonial	Cooper	UTD10MPW334	100	MH	7000	Post Top	Type III	Cutoff	HORIZONTAL	42062647	LDAY7MH	2.6	35
Dayform Decorative Colonial	Cooper	UTD15SR233UO038	150	HPS	14000	Post Top	Type III	Cutoff	HORIZONTAL	66388300	LDAY14SV	2.6	35
Dayform Decorative Colonial	Cooper	UTD15MPW334	150	MH	10000	Post Top	Type III	Cutoff	HORIZONTAL	42062648	LDAY10MH	2.6	35
Decorative Acorn	Cooper	CLB10MPW331424	100	MH	7000	Post Top	Type III	Cutoff	VERTICAL	42062649	LDAC7MH	2.1	50
Decorative Acorn - Green	Cooper	CLB10MPW331424H	100	MH	7000	Post Top	Type III	Cutoff	VERTICAL	42062651	LDAC7MHGN	2.1	50
Decorative Acorn	Cooper	CLB15MPW331424	150	MH	10000	Post Top	Type III	Cutoff	VERTICAL	42062650	LDAC10MH	2.1	50
Decorative Acorn - Green	Cooper	CLB15MPW331424	150	MH	10000	Post Top	Type III	Cutoff	VERTICAL	42062652	LDAC10MHGN	2.1	50
Directional Floodlight	Cooper	CFB25SWW76U051	250	HPS	23000	Bracket	7X6	Non-Cutoff	HORIZONTAL	66403800	LF23SV	1.3	35
Directional Floodlight	Cooper	CFB40SWW76U051	400	HPS	42000	Bracket	7X6	Non-Cutoff	HORIZONTAL	66404000	LF42SV	1.3	35
Directional Floodlight	Cooper	GPF91SWW77U018	1000	HPS	127000	Bracket	7X7	Non-Cutoff	HORIZONTAL	66405000	LF127SV	2.7	59
Enclosed Drop Lens	Cooper	OVZ70SR23EU1587	70	HPS	5000	Mast Arm	Type III	Semi-Cutoff	HORIZONTAL	66396000	LEN5SV	0.85	31
Enclosed Drop Lens	Cooper	OVZ10SR23EU1588	100	HPS	8000	Mast Arm	Type III	Semi-Cutoff	HORIZONTAL	66397000	LEN8SV	0.85	31
Enclosed Drop Lens	Cooper	OVZ15SR23EU1589	150	HPS	14000	Mast Arm	Type III	Semi-Cutoff	HORIZONTAL	66398000	LEN14SV	0.85	31
Enclosed Drop Lens	Cooper	OVZ25SWW3EU159	250	HPS	23000	Mast Arm	Type III	Semi-Cutoff	HORIZONTAL	66399000	LEN23SV	0.85	31
Enclosed Drop Lens	Cooper	OVX40SWW7EU149	400	HPS	42000	Mast Arm	Type III	Semi-Cutoff	HORIZONTAL	66400000	LEN42SV	0.87	35
Enclosed Drop Lens	Cooper	OVX40SWW3EU149	400	HPS	42000	Mast Arm	TYPE III	Semi-Cutoff	HORIZONTAL	66402000	LEN42SV27	0.87	35
Enclosed Drop Lens	Cooper	OVL91SWW3EU002	1000	HPS	127000	Mast Arm	TYPE III	Semi-Cutoff	HORIZONTAL	66403000	LEN127SV	2.65	76
Enclosed Flat Lens	Cooper	OVH70SR23DU0320	70	HPS	5000	Mast Arm	Type III	Full-Cutoff	HORIZONTAL	66396100	LEN5FSV	0.8	28
Enclosed Flat Lens	Cooper	OVH10SR23DU0321	100	HPS	8000	Mast Arm	Type III	Full-Cutoff	HORIZONTAL	66397100	LEN8FSV	0.8	28
Enclosed Flat Lens	Cooper	OVH15SR23DU0322	150	HPS	14000	Mast Arm	Type III	Full-Cutoff	HORIZONTAL	66398100	LEN14FSV	0.8	28
Enclosed Flat Lens	Cooper	OVH25SWW3DU03	250	HPS	23000	Mast Arm	Type III	Full-Cutoff	HORIZONTAL	66399100	LEN23FSV	0.8	28
Enclosed Flat Lens	Cooper	OVF40SWW3D	400	HPS	42000	Mast Arm	Type III	Full-Cutoff	HORIZONTAL	66400100	LEN42FSV	0.51	30
Expressway	Holophane	G250HPMALNFVGBR	250	HPS	23000	Bracket;Post Top	Type II Roadway	Full-Cutoff	HORIZONTAL	42057990	LEXP23SV	2.05	50
Expressway	Holophane	G400HPMALNFVGBR	400	HPS	42000	Bracket;Post Top	Type II Roadway	Full-Cutoff	HORIZONTAL	42057991	LEXP42SV	2.05	50
Expressway - Tenon Adapter	Holophane									42059940	LEXADAPTER		
Open Vertical	Cooper	RMA70SR2XXUO258	70	HPS	5000	Mast Arm	Type III	Non-Cutoff	VERTICAL	66395000	LOV5SVIII	1.2	31
Open Vertical	Cooper	RMA70SR2XXUO258	70	HPS	5000	Mast Arm	TYPE V	Non-Cutoff	VERTICAL	66395000	LOV5SV	1.2	31
Open Vertical	Cooper	RMA10SR2XXUO259	100	HPS	8000	Mast Arm	Type III	Non-Cutoff	VERTICAL	66395300	LOV8SVIII	1.2	31

LUMINAIRES

VP Luminaire Name	Manufacturer	Manufacturer's Number	Nominal Wattage	Lamp Type	Nominal Lumens	Mounting	IES Distribution	IES Cutoff Class	Lamp Orient	VP Stock Number	VP CU	EPA Ft2	Weight Lbs
Open Vertical	Cooper	RMA10SR2XXUO259	100	HPS	8000	Mast Arm	TYPE V	Non-Cutoff	VERTICAL	66395300	LOV8SV	1.2	31
Open Vertical	Cooper	RMA15SR2XXUO260	150	HPS	14000	Mast Arm	Type III	Non-Cutoff	VERTICAL	66395600	LOV14SVIII	1.2	31
Open Vertical	Cooper	RMA15SR2XXUO260	150	HPS	14000	Mast Arm	TYPE V	Non-Cutoff	VERTICAL	66395600	LOV14SV	1.2	31
Dark Bronze Shoebox	Cooper	RCL15SW?3D4TU	150	HPS	14000	SQUARE POLE ARM	TYPE III	Full-Cutoff	HORIZONTAL	Non-Stock	Non-Stock	2.1	46
Dark Bronze Shoebox	Cooper	RCL25SW?3D4TU	250	HPS	23000	SQUARE POLE ARM	TYPE III	Full-Cutoff	HORIZONTAL	Non-Stock	Non-Stock	2.1	46
Dark Bronze 10" Arm	Cooper	OA1062				SQUARE POLE ARM				Non-Stock	Non-Stock		
Dark Bronze Shoebox w/8" Arm	ABS	1100-3-150HPS-??V-00-SP-PRF?-BZE	150	HPS	14000	SQUARE POLE ARM	TYPE III	Full-Cutoff	HORIZONTAL	Non-Stock	Non-Stock	1.5	28
Dark Bronze Shoebox w/8" Arm	ABS	1100-3-250HPS-??V-00-SP-PRF?-BZE	250	HPS	23000	SQUARE POLE ARM	TYPE III	Full-Cutoff	HORIZONTAL	Non-Stock	Non-Stock	1.5	32
Suburban II	Cooper	LXF70SR255UO259	70	HPS	5000	Post Top	TYPE V	Semi-Cutoff	VERTICAL	66386400	LSUBII5SV	1.7	25
Suburban II	Cooper	LXF10SR255UO262	100	HPS	8000	Post Top	TYPE V	Semi-Cutoff	VERTICAL	66387700	LSUBII8SV	1.7	25
Traditional Colonial	Cooper	UTR70SR233U0069	70	HPS	5000	Post Top	Type III	Semi-Cutoff	HORIZONTAL	66386800	LCOL5SVME	2.3	37
Traditional Colonial	Cooper	UTR10SR233U0070	100	HPS	8000	Post Top	Type III	Semi-Cutoff	HORIZONTAL	66387200	LCOL8SVME	2.3	37
Traditional Colonial	Cooper	UTR15SR233U0071	150	HPS	14000	Post Top	Type III	Semi-Cutoff	HORIZONTAL	66388200	LCOL14SVME	2.3	37
Ultra Drop Lens	Cooper	RCS70SR23DU005	70	HPS	5000	Mast Arm	Type III	Cutoff	HORIZONTAL	66393000	LULT5SV	2.5	46
Ultra Drop Lens	Cooper	RCS10SR23DU004	100	HPS	8000	Mast Arm	Type III	Cutoff	HORIZONTAL	66393200	LULT8SV	2.5	46
Ultra Drop Lens	Cooper	RCS15SR23DU007	150	HPS	14000	Mast Arm	Type III	Cutoff	HORIZONTAL	66393400	LULT14SV	2.5	46
Ultra Drop Lens	Cooper	RCS25S3DU009	250	HPS	23000	Mast Arm	Type III	Cutoff	HORIZONTAL	66393600	LULT23SV	2.5	46
Ultra Drop Lens	Cooper	RCS40S3DU011	400	HPS	50000	Mast Arm	Type III	Cutoff	HORIZONTAL	66393800	LULT42SV	2.5	46
Ultra Flat Lens	Cooper	RCS70SR23DU003	70	HPS	5000	Mast Arm	Type III	Full-Cutoff	HORIZONTAL	66393100	LULTF5SV	2.1	46
Ultra Flat Lens	Cooper	RCS10SR23DU006	100	HPS	8000	Mast Arm	Type III	Full-Cutoff	HORIZONTAL	66393300	LULTF8SV	2.1	46
Ultra Flat Lens	Cooper	RCS15SR23DU008	150	HPS	14000	Mast Arm	Type III	Full-Cutoff	HORIZONTAL	66393500	LULTF14SV	2.1	46
Ultra Flat Lens	Cooper	RCS25S3DU010	250	HPS	23000	Mast Arm	Type III	Full-Cutoff	HORIZONTAL	66393700	LULTF23SV	2.1	46
Ultra Flat Lens	Cooper	RCS40S3DU012	400	HPS	50000	Mast Arm	Type III	Full-Cutoff	HORIZONTAL	66393900	LULTF42SV	2.1	46

Yellow Denotes Non-standard luminaires available to Fort Lee

Dominion Virginia Power
Standard Outdoor Lighting Materials

Pole Description	Manufacturer	Overall Pole Length (Ft)	Typical Above Grade Height (Ft)	Installation Method	VP Stock Number	VP CU	Bolt Circle (In)	Available Mast Arms and Mast Arm Stock Numbers (Fits all poles in Category)
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Poles for Mast Arm Installation

Wood Poles

Wood Pole 30 Foot Class 6	Various	30	25	Direct Embed	50630006	P306	N/A	- 30 Inch Upswept 17 Inch Rise 66085000
Wood Pole 35 Foot Class 5	Various	35	29.5	Direct Embed	50635005	P355	N/A	- 6 Foot Upswept 30.5 Inch Rise 66086000
Wood Pole 40 Foot Class 4	Various	40	34.5	Direct Embed	50640004	P404	N/A	- 8 Foot Single Guy 33.5 Inch Rise 66089300
Wood Pole 45 Foot Class 3	Various	45	39	Direct Embed	50645003	P453	N/A	- 10 Foot Single Guy 39 Inch Rise 66089800
Wood Pole 50 Foot Class 2	Various	50	44	Direct Embed	50650002	P502	N/A	- 12 Foot Single Guy 46 Inch Rise 66090000
								- 14 Foot Double Guy 47 Inch Rise 66091100
								- 14 Foot 'A' Frame 52 Inch Rise 66091800
								- 16 Foot 'A' Frame 56 Inch Rise 66092500
								- 18 Foot 'A' Frame 60 Inch Rise 66093000
								- 20 Foot 'A' Frame 64 Inch Rise 66093500
								- Floodlight Brackets 42021266;42021267
								- Expressway Luminaire Bracket 66084300

Gray Color Textured Fiberglass Poles

POLE FIBERGLASS GRAY 30'	Various	30	23	Direct Embed	50502000	PF30	N/A	- 6 Foot Upswept 20 Inch Rise 66087700
POLE FIBERGLASS GRAY 35'	Various	35	28	Direct Embed	50502300	PF35	N/A	- 8 Foot Upswept 26 Inch Rise 66088700
POLE FIBERGLASS GRAY 40'	Various	40	33	Direct Embed	50502600	PF40	N/A	- 10 Foot Upswept 36 Inch Rise 66089000
POLE FIBERGLASS GRAY 45'	Various	40	38	Direct Embed	50502900	PF45	N/A	- 12 Foot Upswept 42 Inch Rise 66089200
								- Floodlight Brackets 42021266;42021267
								- Expressway Luminaire Bracket 66084000

Aluminum Color Textured Fiberglass Poles

POLE FIBERGLASS, ALUM COLOR, 30'	Various	30	23	Direct Embed	50504500	PFBRAL30	N/A	- 6 Foot Upswept 20 Inch Rise 66087700
POLE FIBERGLASS, ALUM COLOR, 35'	Various	35	28	Direct Embed	50504700	PFBRAL35	N/A	- 8 Foot Upswept 26 Inch Rise 66088700
POLE FIBERGLASS, ALUM COLOR, 40'	Various	40	33	Direct Embed	50504900	PFBRAL40	N/A	- 10 Foot Upswept 36 Inch Rise 66089000
POLE FIBERGLASS, ALUM COLOR, 45'	Various	45	38	Direct Embed	50505100	PFBRAL45	N/A	- 12 Foot Upswept 42 Inch Rise 66089200
								- Floodlight Brackets 42021266;42021267
								- Expressway Luminaire Bracket 66084000

Concrete Poles

Concrete Street Light Pole 30 Foot Class 002T	Various	30	24	Direct Embed	50513100	PC30002	N/A	- 30 Inch Upswept 17 Inch Rise 42021268
Concrete Street Light Pole 30 Foot Class 003T	Various	30	24	Direct Embed	50513600	PC30003	N/A	- 6 Foot Upswept 20 Inch Rise 42021269
Concrete Street Light Pole 35 Foot Class 002T	Various	35	29	Direct Embed	50515500	PC35002	N/A	- 8 Foot Upswept 26 Inch Rise 42021270
Concrete Street Light Pole 35 Foot Class 004T	Various	35	29	Direct Embed	50516000	PC35004	N/A	- 10 Foot Upswept 36 Inch Rise 66089000
Concrete Street Light Pole 40 Foot Class 004T	Various	40	34	Direct Embed	50517500	PC40004	N/A	- 12 Foot Upswept 42 Inch Rise 66089200
Concrete Street Light Pole 45 Foot Class 045T	Various	45	38.5	Direct Embed	50517800	PC45045	N/A	- Floodlight Brackets 42021266;42021267
								- Expressway Luminaire Bracket 66084000

Concrete Poles - Extra Strength

Concrete Street Light Pole 35 Foot Class 051T	Various	35	29	Direct Embed	42017158	PC35051	N/A	- 16 Foot 'A' Frame 56 Inch Rise 42017087
Concrete Street Light Pole 40 Foot Class 081T	Various	40	34	Direct Embed	42017159	PC40081	N/A	- 20 Foot 'A' Frame 64 Inch Rise 42017089
Concrete Street Light Pole 45 Foot Class 093T	Various	45	38.5	Direct Embed	42017161	PC45093	N/A	

Spun Aluminum Poles

Spun Aluminum Street Light Pole 27.2 Foot	Various	27.2	27.2	Anchor Base	50491500	PA27	14"	- 6 Foot Upswept 30 Inch Rise 66087300
Spun Aluminum Street Light Pole 32.3 Foot	Various	32.3	32.3	Anchor Base	50491800	PA32	14"	- 8 Foot Upswept 30 Inch Rise 66088200

** Dominion has custom anchor base dimensions; please contact us for an anchor base template before constructing foundations.

Dominion Virginia Power
Standard Outdoor Lighting Materials

Pole Description	Manufacturer	Overall Pole Length (Ft)	Typical Above Grade Height (Ft)	Installation Method	VP Stock Number	VP CU	Bolt Circle (In)	Available Mast Arms and Mast Arm Stock Numbers (Fits all poles in Category)
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Poles for Mast Arm Installation

Wood Poles

Spun Aluminum Street Light Pole 37.2 Foot	Various	37.2	37.2	Anchor Base	50492100	PA37	14"	- 10 Foot Upswept Truss 42 Inch Rise 66088800 - 12 Foot Upswept Truss 42 Inch Rise 66089100
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Steel Poles

Dark Bronze 4" Square Steel Poles	Valmont	15'	15'	Anchor Base	Non-Stock	Non-Stock	8 - 9"	Manf # DS330-400Q150-D1-FP-HH-FBC-AB
Dark Bronze 4" Square Steel Poles	Valmont	16'	16'	Anchor Base	Non-Stock	Non-Stock	8 - 9"	Manf # DS330-400Q160-D1-FP-HH-FBC-AB
Dark Bronze 6" Square Steel Poles	Valmont	30'	30'	Anchor Base	Non-Stock	Non-Stock	11 - 13"	Manf # DS330-600W300-D1-FP-HH-FBC-AB
Dark Bronze 6" Square Steel Poles	Valmont	35'	35'	Anchor Base	Non-Stock	Non-Stock	11 - 13"	Manf # DS330-600W350-D1-FP-HH-FBC-AB

Pole for Installation on Bridges

Fiberglass Bridge Street Light Pole 28 Foot	Various	28	28	Anchor Base	50497500	PFBR28	11"	- 6 Foot Upswept 20 Inch Rise 42021269 - 8 Foot Upswept 26 Inch Rise 42021270
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Pole for Installation on Bridges

Aluminum Bridge Street Light Pole 27.2 Foot	Various	27.2	27.2	Anchor Base	50489800	PA27BR	11"	- 6 Foot Upswept Truss 30 Inch Rise 66087000 - 8 Foot Upswept Truss 30 Inch Rise 66088000
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Anchor Base Poles - Contact Dominion for base plate dimensions and bolt pattern.

** Dominion has custom anchor base dimensions; please contact us for an anchor base template before constructing foundations.

Dominion Virginia Power
Standard Outdoor Lighting Materials

Pole Description	Manufacturer	Manufacturer's Number	Overall Pole Length (Ft)	Typical Above Grade Height (Ft)	Installation Method	VP Stock Number	VP CU	Bolt Circle (In)	Post Top Tenon Size (In)
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Concrete Poles									
Poles for Post Top Luminaire Installation									
POLE, CONCRETE, W/TENON, 13'	Various		13	10	Direct Embed	50511300	PC130002	N/A	3" O.D. X 3"
POLE, CONCRETE, W/TENON, 18'	Various		18	14	Direct Embed	50511500	PC180005	N/A	3" O.D. X 3"

Textured Black Color Round Fiberglass Poles									
Pole, Black Fiberglass 11'	Shakespeare	BS11-01N1BZ39P1	11	8	Direct Embed	50499800	PF11	N/A	3" O.D. X 3"
Pole, Black Fiberglass 13'	Shakespeare	BS13-01N1BZ39P1	13	10	Direct Embed	50500000	PF13	N/A	3" O.D. X 3"
Pole, Black Fiberglass 18'	Shakespeare	BS18-01N1BZ09P1	18	14	Direct Embed	50501000	PF18	N/A	3" O.D. X 3"

Gray Color Textured Fiberglass Poles									
POLE, FIBERGLASS,GRAY W/TENON, 30'	Various		30	24	Direct Embed	50503500	PFT30	N/A	3" O.D. X 3"
POLE, FIBERGLASS,GRAY W/TENON, 35'	Various		35	29	Direct Embed	50503700	PFT35	N/A	3" O.D. X 3"
POLE, FIBERGLASS,GRAY W/TENON, 40'	Various		40	34	Direct Embed	50503900	PFT40	N/A	3" O.D. X 3"
POLE, FIBERGLASS,GRAY W/TENON, 45'	Various		45	39	Direct Embed	50504100	PFT45	N/A	3" O.D. X 3"

Decorative Black Tapered Fluted Composite Poles									
Pole, Black Fluted Fiberglass 10'	Shakespeare	AS00-10-FS1101VP	10	10	ANCHOR BASE	50497900	PFF10AB	9 to 11	3" O.D. X 3"
Pole, Black Fluted Fiberglass 12'	Shakespeare	AS00-12-FS1101VP	12	12	ANCHOR BASE	50498100	PFF12AB	9 to 11	3" O.D. X 3"
Pole, Black Fluted Fiberglass 14'	Shakespeare	AS00-14-FS1101VP	14	14	ANCHOR BASE	50498300	PFF14AB	9 to 11	3" O.D. X 3"
Pole, Black Fluted Fiberglass 13'	Shakespeare	DS00-13FS1901VP	13	10	DIRECT EMBED	50498500	PFF13	N/A	3" O.D. X 3"
Pole, Black Fluted Fiberglass 15'	Shakespeare	DS00-15FS1901VP	15	12	DIRECT EMBED	50499000	PFF15	N/A	3" O.D. X 3"
Pole, Black Fluted Fiberglass 18'	Shakespeare	DS00-18FS1901VP	18	14	DIRECT EMBED	50499200	PFF18	N/A	3" O.D. X 3"

Decorative Green Tapered Fluted Composite Poles									
POLE, GREEN FLUTED FIBERGLASS 12'	Shakespeare	AS00-12FS9103VP	12	12	ANCHOR BASE	42062746	PFF12ABGN	9 to 11	3" O.D. X 3"
POLE, GREEN FLUTED FIBERGLASS 14'	Shakespeare	AS00-14FS9101VP	14	14	ANCHOR BASE	42062757	PFF14ABGN	9 to 11	3" O.D. X 3"
POLE, GREEN FLUTED FIBERGLASS 15'	Shakespeare	DS00-15FS9902VP	15	12	DIRECT EMBED	42062744	PFF15GN	N/A	3" O.D. X 3"
POLE, GREEN FLUTED FIBERGLASS 18'	Shakespeare	DS00-18FS9901VP	18	14	DIRECT EMBED	42062745	PFF18GN	N/A	3" O.D. X 3"

Decorative Black Tapered Round Composite Poles									
Pole, Black Decorative, Smooth Tapered, 12 ft	WHATLEY	OA314-12-BK-5N1,3,6	12	12	ANCHOR BASE	42062742	PDF12AB	9 to 11	3" O.D. X 3"
Pole, Black Decorative, Smooth Tapered, 14 ft	WHATLEY	OA314-14-BK-5N1,3,6	14	14	ANCHOR BASE	42062743	PDF14AB	9 to 11	3" O.D. X 3"
Pole, Black Decorative, Smooth Tapered, 15 ft	WHATLEY	OE314-12-BK-5N1,3,6	15	12	DIRECT EMBED	42062740	PDF15	N/A	3" O.D. X 3"
Pole, Black Decorative, Smooth Tapered, 18 ft	WHATLEY	OE314-14-BK-5N1,3,6	18	14	DIRECT EMBED	42062741	PDF18	N/A	3" O.D. X 3"

Anchor Base Poles - Contact Dominion for base plate dimensions and bolt pattern.

** Dominion has custom anchor base dimensions, please contact us for a pole base template before constructing foundations.

Appendix A
Current Offerings
Luminaires

VP Luminaire Name	Manufacturer	Manufacturer's Number	Nominal Wattage	Lamp Type	Nominal Lumens	Mounting	IES Distribution	IES Cutoff Class
* Acorn - Black	Cooper	ANE70SR233UO153	70	HPS	5000	Post Top	TYPE III	Non-Cutoff
Acorn - Black	Cooper	ANE70SR255UO148	70	HPS	5000	Post Top	TYPE V	Non-Cutoff
Acorn - Green	Cooper	ANE70SR255U0033	70	HPS	5000	Post Top	TYPE V	Non-Cutoff
* Acorn - Black	Cooper	ANE10SR233UO152	100	HPS	8000	Post Top	TYPE III	Non-Cutoff
Acorn - Black	Cooper	ANE10SR255UO149	100	HPS	8000	Post Top	TYPE V	Non-Cutoff
Acorn - Green	Cooper	ANE10SR255U0034	100	HPS	8000	Post Top	TYPE V	Non-Cutoff
* Acorn - Black	Cooper	ANE15SR233UO151	150	HPS	14000	Post Top	TYPE III	Non-Cutoff
Acorn - Black	Cooper	ANE15SR255UO150	150	HPS	14000	Post Top	TYPE V	Non-Cutoff
Acorn - Green	Cooper	ANE15SR255U00150	150	HPS	14000	Post Top	TYPE V	Non-Cutoff
Carlyle Acorn	Cooper	WST70SR233UO013	70	HPS	5000	Post Top	Type III	Non-Cutoff
Carlyle Acorn	Cooper	WST10SR233UO011	100	HPS	8000	Post Top	Type III	Non-Cutoff
Carlyle Acorn	Cooper	WST15SR233UO012	150	HPS	14000	Post Top	Type III	Non-Cutoff
Colonial	Cooper	LXF70SR233U0260	70	HPS	5000	Post Top	TYPE III	Semi-Cutoff
Colonial	Cooper	LXF10SR233UO261	100	HPS	8000	Post Top	TYPE III	Semi-Cutoff
* Colonial	Cooper	LXF10VN233UO261	100	MV	3300	Post Top	TYPE III	Semi-Cutoff
Colonial	Cooper	LXF15SR233UO263	150	HPS	14000	Post Top	TYPE III	Semi-Cutoff
* Colonial	Cooper	LXF17VN233UO265	175	MV	7000	Post Top	TYPE III	Semi-Cutoff
Contemporary	Cooper	MPW70SR233UO01	70	HPS	5000	Post Top	Type III	Semi-Cutoff
* Contemporary	Cooper	MPW10VN233UO02	100	MV	3300	Post Top	TYPE III	Semi-Cutoff
Contemporary	Cooper	MPW10SR233UO02	100	HPS	8000	Post Top	TYPE III	Semi-Cutoff
Contemporary	Cooper	MPW15SR233UO02	150	HPS	14000	Post Top	TYPE III	Semi-Cutoff
* Contemporary	Cooper	MPW17VN233UO02	175	MV	7000	Post Top	TYPE III	Semi-Cutoff
Decorative Colonial	Cooper	UTD70SR233UO036	70	HPS	5000	Post Top	Type III	Cutoff
Decorative Colonial	Cooper	UTD10SR233UO037	100	HPS	8000	Post Top	Type III	Cutoff
Decorative Colonial	Cooper	UTD10MPW334	100	MH	7000	Post Top	Type III	Cutoff
Decorative Colonial	Cooper	UTD15SR233UO038	150	HPS	14000	Post Top	Type III	Cutoff
Decorative Colonial	Cooper	UTD15MPW334	150	MH	10000	Post Top	Type III	Cutoff
Decorative Acorn	Cooper	CLB10MPW331424	100	MH	7000	Post Top	Type III	Cutoff
Decorative Acorn - Green	Cooper	CLB10MPW331424H	100	MH	7000	Post Top	Type III	Cutoff
Decorative Acorn	Cooper	CLB15MPW331424	150	MH	10000	Post Top	Type III	Cutoff
Decorative Acorn - Green	Cooper	CLB15MPW331424	150	MH	10000	Post Top	Type III	Cutoff
Directional Floodlight	Cooper	CFB25SWW76U051	250	HPS	23000	Bracket	7X6	Non-Cutoff
* Directional Floodlight	Cooper	CFB40VWW76U051	400	MV	20000	Bracket	7X6	Non-Cutoff
Directional Floodlight	Cooper	CFB40SWW76U051	400	HPS	42000	Bracket	7X6	Non-Cutoff
Directional Floodlight	Cooper	GPF91SWW77U018	1000	HPS	127000	Bracket	7X7	Non-Cutoff
* Directional Floodlight	Cooper	GPF91VWW77U018	1000	MV	53000	Bracket	7X7	Non-Cutoff
Enclosed Drop Lens	Cooper	OVZ70SR23EU1587	70	HPS	5000	Mast Arm	Type III	Semi-Cutoff

Luminaire preceded by an * are maintenance or removal only.

Appendix A
Current Offerings
Luminaires

VP Luminaire Name	Manufacturer	Manufacturer's Number	Nominal Wattage	Lamp Type	Nominal Lumens	Mounting	IES Distribution	IES Cutoff Class
* Enclosed Drop Lens	Cooper	OVZ10VN23EU1591	100	MV	3300	Mast Arm	TYPE III	Semi-Cutoff
Enclosed Drop Lens	Cooper	OVZ10SR23EU1588	100	HPS	8000	Mast Arm	Type III	Semi-Cutoff
Enclosed Drop Lens	Cooper	OVZ15SR23EU1589	150	HPS	14000	Mast Arm	Type III	Semi-Cutoff
* Enclosed Drop Lens	Cooper	OVZ17VN23EU1592	175	MV	7000	Mast Arm	TYPE III	Semi-Cutoff
* Enclosed Drop Lens	Cooper	OVZ25VWW3EU159	250	MV	11000	Mast Arm	TYPE III	Semi-Cutoff
Enclosed Drop Lens	Cooper	OVZ25SWW3EU159	250	HPS	23000	Mast Arm	Type III	Semi-Cutoff
* Enclosed Drop Lens	Cooper	OVX40VWW3EU149	400	MV	20000	Mast Arm	TYPE III	Semi-Cutoff
Enclosed Drop Lens	Cooper	OVX40SWWEU149	400	HPS	42000	Mast Arm	Type III	Semi-Cutoff
* Enclosed Drop Lens	Cooper	OVX40VW83EU149	400	MV	20000	Mast Arm	TYPE III	Semi-Cutoff
Enclosed Drop Lens	Cooper	OVX40SWW3EU149	400	HPS	42000	Mast Arm	TYPE III	Semi-Cutoff
Enclosed Drop Lens	Cooper	OVL91SWW3EU002	1000	HPS	127000	Mast Arm	TYPE III	Semi-Cutoff
* Enclosed Drop Lens	Cooper	OVL91VWW3EU002	1000	MV	53000	Mast Arm	TYPE III	Semi-Cutoff
Enclosed Flat Lens	Cooper	OVH70SR23DU0320	70	HPS	5000	Mast Arm	Type III	Full-Cutoff
Enclosed Flat Lens	Cooper	OVH10SR23DU0321	100	HPS	8000	Mast Arm	Type III	Full-Cutoff
Enclosed Flat Lens	Cooper	OVH15SR23DU0322	150	HPS	14000	Mast Arm	Type III	Full-Cutoff
Enclosed Flat Lens	Cooper	OVH25SWW3DU03	250	HPS	23000	Mast Arm	Type III	Full-Cutoff
Enclosed Flat Lens	Cooper	OVF40SWW3D	400	HPS	42000	Mast Arm	Type III	Full-Cutoff
* Expressway	Cooper	ORL25SWWXXU008	250	HPS	23000	Bracket;Post Top	Type II Roadway	Semi-Cutoff
Expressway	Holophane	G250HPMALNFVGBR	250	HPS	23000	Bracket;Post Top	Type II Roadway	Full-Cutoff
* Expressway	Cooper	ORL40SWWXXU008	400	HPS	42000	Bracket;Post Top	Type II Roadway	Semi-Cutoff
Expressway	Holophane	G400HPMALNFVGBR	400	HPS	42000	Bracket;Post Top	Type II Roadway	Full-Cutoff
Open Vertical	Cooper	RMA70SR2XXUO258	70	HPS	5000	Mast Arm	Type III	Non-Cutoff
Open Vertical	Cooper	RMA70SR2XXUO258	70	HPS	5000	Mast Arm	TYPE V	Non-Cutoff
* Open Vertical	Cooper	RMA10VN2XXUO694	100	MV	3300	Mast Arm	Type III	Non-Cutoff
Open Vertical	Cooper	RMA10SR2XXUO259	100	HPS	8000	Mast Arm	Type III	Non-Cutoff
* Open Vertical	Cooper	RMA10VN2XXUO694	100	MV	3300	Mast Arm	TYPE V	Non-Cutoff
Open Vertical	Cooper	RMA10SR2XXUO259	100	HPS	8000	Mast Arm	TYPE V	Non-Cutoff
Open Vertical	Cooper	RMA15SR2XXUO260	150	HPS	14000	Mast Arm	Type III	Non-Cutoff
Open Vertical	Cooper	RMA15SR2XXUO260	150	HPS	14000	Mast Arm	TYPE V	Non-Cutoff
* Open Vertical	Cooper	RMA17VN2XXUO695	175	MV	7000	Mast Arm	Type III	Non-Cutoff
* Open Vertical	Cooper	RMA17VN2XXUO695	175	MV	7000	Mast Arm	TYPE V	Non-Cutoff
* Rectangular	Cooper	UCS70SR23DU0081	70	HPS	5000	Post Top	Type III	Full-Cutoff
* Rectangular	Cooper	UCS10SR23DU0082	100	HPS	8000	Post Top	Type III	Full-Cutoff
* Rectangular	Cooper	UCS15SR23DU0083	150	HPS	14000	Post Top	Type III	Full-Cutoff
* Sphere (Ball Globe)	General Electric	AM9X07S1HS1LD5GRAY002	70	HPS	5000	Post Top	TYPE V	Non-Cutoff
* Sphere (Ball Globe)	General Electric	AM9X10C1C21LD5GRAY002	100	MV	3300	Post Top	TYPE V	Non-Cutoff
* Sphere (Ball Globe)	General Electric	AM9X10S1H21LD5GRAY002	100	HPS	8000	Post Top	TYPE V	Non-Cutoff

Luminaire preceded by an * are maintenance or removal only.

Appendix A
Current Offerings
Luminaires

VP Luminaire Name	Manufacturer	Manufacturer's Number	Nominal Wattage	Lamp Type	Nominal Lumens	Mounting	IES Distribution	IES Cutoff Class
* Sphere (Ball Globe)	General Electric	AM9X15S1H21LD5GRAY002	150	HPS	14000	Post Top	TYPE V	Non-Cutoff
* Sphere (Ball Globe)	General Electric	AM9X17M1A21LD5GRAY002	175	MV	7000	Post Top	TYPE V	Non-Cutoff
Suburban II	Cooper	LXF70SR255UO259	70	HPS	5000	Post Top	TYPE V	Semi-Cutoff
Suburban II	Cooper	LXF10SR255UO262	100	HPS	8000	Post Top	TYPE V	Semi-Cutoff
Traditional Colonial	Cooper	UTR70SR233U0069	70	HPS	5000	Post Top	Type III	Semi-Cutoff
* Traditional Colonial	Cooper	UTR10VN233U0072	100	MV	3300	Post Top	Type III	Semi-Cutoff
Traditional Colonial	Cooper	UTR10SR233UO070	100	HPS	8000	Post Top	Type III	Semi-Cutoff
Traditional Colonial	Cooper	UTR15SR233UO071	150	HPS	14000	Post Top	Type III	Semi-Cutoff
* Traditional Colonial	Cooper	UTR17VN233U0073	175	MV	7000	Post Top	Type III	Semi-Cutoff
Ultra Drop Lens	Cooper	RCS70SR23DU005	70	HPS	5000	Mast Arm	Type III	Cutoff
Ultra Drop Lens	Cooper	RCS10SR23DU004	100	HPS	8000	Mast Arm	Type III	Cutoff
Ultra Drop Lens	Cooper	RCS15SR23DU007	150	HPS	14000	Mast Arm	Type III	Cutoff
Ultra Drop Lens	Cooper	RCS25SWW3DU009	250	HPS	23000	Mast Arm	Type III	Cutoff
Ultra Drop Lens	Cooper	RCS40SWW3DU0011	400	HPS	50000	Mast Arm	Type III	Cutoff
Ultra Flat Lens	Cooper	RCS70SR23DU003	70	HPS	5000	Mast Arm	Type III	Full-Cutoff
Ultra Flat Lens	Cooper	RCS10SR23DU006	100	HPS	8000	Mast Arm	Type III	Full-Cutoff
Ultra Flat Lens	Cooper	RCS15SR23DU008	150	HPS	14000	Mast Arm	Type III	Full-Cutoff
Ultra Flat Lens	Cooper	RCS25SWW3DU0010	250	HPS	23000	Mast Arm	Type III	Full-Cutoff
Ultra Flat Lens	Cooper	RCS40SWW3DU0012	400	HPS	50000	Mast Arm	Type III	Full-Cutoff

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DEPARTMENT OF THE ARMY
ASSISTANT CHIEF OF STAFF FOR INSTALLATION MANAGEMENT
600 ARMY PENTAGON
WASHINGTON DC 20310-0600

DAIM-ZA

FEB 06 2006

MEMORANDUM FOR SEE DISTRIBUTION

SUBJECT: Sustainable Management of Waste in Military Construction, Renovation, and Demolition Activities

1. References:

a. Army Strategy for the Environment, October 2004.

b. Memorandum, Office of the Assistant Secretary of the Army (Installation and Environment), Sustainable Design and Development Policy Update – SPiRiT to LEED Transition, 5 January 2006.

2. All military construction, renovation, and demolition projects shall include contract performance requirements for a 50% minimum diversion of construction and demolition (C&D) waste by weight, from landfill disposal. Compliance with this policy will ensure installations attain the goals of Reference 1.a and the SDD SPiRiT / LEED ratings mandated in Reference 1.b. This requirement applies to all unawarded contracts and solicitations issued 30-days after the date of this memorandum. Contract specifications will include submission of a contractor's C&D Waste Management Plan, preferably prior to the start of site clearance.

3. This policy applies to all construction, renovation, and demolition projects carried out under the Military Construction (MILCON) Army, MILCON Army Reserves, MILCON National Guard Bureau, Army Family Housing Construction, Facilities Reduction, and installation Operation and Maintenance programs. Construction, renovation, and demolition projects funded by other than the above programs are not subject to this policy. However, those exempt may use installation C&D waste facilities and services only when compliant with this policy.

4. Project cost estimates and documentation shall include expenses for the removal and disposal of building materials through demolition, recovery, reuse, and recycling techniques that will not otherwise be offset by revenue, savings, or cost avoidance within the contract. These contracts shall continue to be awarded on either a low cost or best value basis. Detailed implementation guidance is provided in the enclosure.

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SUBJECT: Sustainable Management of Waste in Military Construction, Renovation, and Demolition Activities

5. My point-of-contact is William F. Eng, William.Eng@us.army.mil, 703-602-5827.

Encl



DAVID W. BARNO
Lieutenant General, GS
Assistant Chief of Staff
for Installation Management

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Director, Defense Commissary Agency, ATTN: Directorate of Facilities
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SUBJECT: Sustainable Management of Waste in Military Construction, Renovation, and Demolition Activities

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Taylor Building (NC3), Arlington, VA 22202-3926
Commander, U.S. Army Corps of Engineers (CEMP-II (Mr. McLeod)), 441 G Street,
NW, Washington, DC 20314-1000
Commander US Army Medical Command, (MCFA-E), 2050 Worth Road,
Ft Sam Houston, TX 78234-6000
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(Mr. C. Shepherd), 1300 E. Avenue, Fort Lee, VA 23801-1800
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(Colonel C. Hart), 3911 S. Walton Walker Blvd., Dallas, TX 75236

ENCLOSURE

DEPARTMENT OF THE ARMY OFFICE OF THE ASSISTANT CHIEF OF STAFF FOR INSTALLATION MANAGEMENT

REQUIREMENTS FOR SUSTAINABLE MANAGEMENT OF WASTE IN MILITARY CONSTRUCTION, RENOVATION, AND DEMOLITION ACTIVITIES

13 January 2006

1. References.

a. Army Regulation (AR) 420-49, 28 Apr 1997, Utility Services, Chapter 3: Solid Waste Management (*Provides basic Army policy on solid waste management and recycling.*)

b. Army Strategy for the Environment, October 2004 (*Establishes the Army vision for meeting the mission today and in the future by making sustainability the foundation for the strategy. Lays out 6 long-term goals that form the building blocks of Army sustainability.*)

c. Deputy Assistant Secretary of the Army for Installations and Housing memorandum, Sustainable Design and Development Policy Update – SPiRiT to LEED Transition, 5 January 2006 (*Announces transition from SPiRiT rating to LEED system as of FY2008 MILCON program. Sets LEED Silver as the minimum sustainability rating for vertical New Construction (NC) projects. Prior year projects will continue to use SPiRiT and achieve a Gold level.*)

d. Assistant Chief of Staff for Installation Management memorandum, Military Construction, Army (MCA) Projects and One-for-One Demolition, 24 Apr 2003 (*Requires that an equal amount of facilities be disposed of or demolished for each square foot of new construction.*)

e. Assistant Secretary of the Army for Installations and Environment memorandum, Sustainable Design and Development, 18 March 2003 (*Sets SPiRiT Silver as the minimum sustainability rating for FY2006 MILCON projects under design and SPiRiT Gold for all other FY2006 and future year MILCON projects.*)

f. Assistant Chief of Staff for Installation Management memorandum, Sustainable Project Rating Tool (SPiRiT), 4 May 2001 (*Announces the Army-wide implementation of SPiRiT to self-evaluate the sustainability of facility construction and repair projects. Sets SPiRiT Bronze as the initial minimum sustainability rating for the Army.*)

g. Principal Deputy Assistant Secretary of the Army (Installations and Environment), DASA(I&E) memorandum, Deconstruction and Re-Use of Excess Army Buildings, 18

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13 January 2006

SUBJECT: Requirements for Sustainable Management of Waste in Military
Construction, Renovation, and Demolition Activities

January 2001 (*Requests ACSIM to issue policy and guidance for installations to work with non-profits and other non-traditional contract entities to plan and carry out building deconstruction activities.*)

h. Assistant Chief of Staff for Installation Management memorandum, Sustainable Design and Development (SDD) Policy, 26 May 2000 (*Forwards Army (DASA(I&H)) policy that SDD be incorporated into installation facilities planning decisions and infrastructure projects.*)

i. Unified Facilities Guide Specification (UFGS), UFGS-01572, Construction and Demolition Waste Management, February 2003 (*Provides detailed requirements for developing and implementing a C&D waste management plan to promote waste and debris diversion through source reduction, salvage, reuse, and recycling.*)

j. UFGS-02220, Demolition, September 2003 (*Provides general requirements for demolition or removal work, and salvage and recycling of materials and components.*)

k. UFGS-01355, Environmental Protection, February 2002 (*Provides general requirements for developing a recycling and solid waste minimization plan and non-hazardous solid waste diversion reports as part of the project's Environmental Protection Plan.*)

l. Unified Facilities Criteria (UFC), UFC 1-900-01, Selection of Methods for the Reduction, Reuse, and Recycling of Demolition Wastes, 1 December 2002 (*Provides guidance for recovery and recycling of demolition waste, and assists in determining the most feasible methods to reduce the amount of construction and demolition (C&D) waste materials disposed in landfills.*)

m. RCRA in Focus, Construction, Demolition, and Renovation, US Environmental Protection Agency, Office of Solid Waste and Emergency Response Publication EPA-530-K-04-005, September 2004 (*Provides a basic understanding of the regulatory requirements for hazardous Construction & Demolition waste; includes information on managing typical hazardous C&D wastes and a hazardous waste requirements checklist for C&D projects; also tips on reducing C&D waste and a fairly extensive list of contacts for the C&D industry.*)

2. Purpose and Applicability.

a. The management of construction and demolition (C&D) debris from the removal of millions of square feet of excess Army buildings is a major challenge. Installations are incorporating Sustainable Design and Development (SDD) principles into facility planning decisions to improve energy usage, quality of life, and the environment. Increasing costs of waste disposal, growing acceptability, and greater value of used

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SUBJECT: Requirements for Sustainable Management of Waste in Military Construction, Renovation, and Demolition Activities

building materials makes the recovery, reuse, and recycling of C&D debris an important and cost effective component of SDD. Sustainable approaches to waste management can simultaneously provide benefits to the community and the environment, while cost effectively supporting construction, renovation, and demolition activities.

b. The requirements described within this document are for the development and implementation of programs to effectively manage waste generated during all construction, renovation, and demolition activities on Army installations. They are intended to minimize the amount of waste that is disposed of through landfilling and promote more efficient use of new construction materials. The objective is to ensure that sustainable practices of C&D waste management are fully integrated into the planning, design, development, and execution of processes for implementing Sustainable Design and Development (SDD) at the installation. The handling and disposal of hazardous waste materials, as defined below, is outside the scope of these requirements.

c. These requirements apply to all construction, renovation, and demolition projects funded by Military Construction (MILCON) Army, MILCON Army Reserves, MILCON National Guard Bureau, Army Family Housing Construction, Facilities Reduction, and installation Operation and Maintenance. Construction, renovation, and demolition projects funded and carried out by other than the above authorities are not currently subject to this policy. However, those exempt, such as Residential Communities Initiative, Army & Air Force Exchange Service, and Defense Commissary Agency, if they wish to utilize an installation's C&D waste facilities and services, may do so only if they comply with the requirements of this policy.

3. Definitions. The following terms are used throughout these requirements.

a. *Construction* – Engineering projects that involve construction, renovation, and/or repair activities.

b. *Construction and demolition (C&D) waste (debris)* – materials generated as a result of construction, renovation, demolition and/or removal projects (e.g., metals, wood, asphalt, concrete, brick, masonry, rocks, rubble, soil, paper, cardboard, plastics, glass, carpet, padding, and related equipment and/or fixtures).

c. *Deconstruction* – planned and controlled building disassembly that preserves the integrity of the building materials and components so that they can be reused or recycled. When the type of construction does not lend itself to “disassembly,” the term deconstruction means the breaking apart of building elements into their more basic constituents (steel, crushed concrete, etc.) and processing for potential reuse and or recycling. Also known as “*sustainable infrastructure removal*.”

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- d. *Disposal* – the landfilling or incineration of C&D waste.
- e. *Diversions* – the redirection of waste, ordinarily disposed of in a landfill or burned in an incinerator, to a recycling facility, to a composting yard, or to another destination for reclamation or reuse.
- f. *Demolition (or “wrecking”)* – an engineering project to reduce a building, structure, paved surface or utility infrastructure through manual and/or mechanized means, with or without the assistance of explosive materials to piles of mixed debris or rubble. Demolition is usually accomplished in a relatively short time frame with or without attempts to segregate the debris or rubble into its various components: wood, metal (steel/cooper), concrete/brick, etc. for recycling.
- g. *Hazardous waste* – any waste substance, which is ignitable, corrosive, reactive, or toxic, or if improperly handled, poses a substantial threat to human health and/or the environment. At the federal level, hazardous wastes are principally governed by Subtitle C, Resource Conservation and Recovery Act (RCRA), the Toxic Substances Control Act (TSCA), the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), or the Asbestos National Emissions Standards for Hazardous Air Pollutants (NESHAPs) under the Clean Air Act. RCRA waste examples include lead and other heavy metals, spent solvents, paints, and thinners, while TSCA wastes would include such materials as PCBs and friable asbestos.
- h. *Recycling facility* – an activity that specializes in collecting, handling, processing, distributing, or reclaiming usable materials from a waste stream for reused by others or remanufacturing into new products.

4. Sustainability Principles:

Army infrastructure projects must adhere to Sustainable Design and Development (SDD) principles. Installation waste and recycling program managers should become familiar with SDD principles and Army policies to ensure that C&D waste management requirements are properly considered and addressed during the planning, design, development, and execution of construction, renovation, and demolition projects. SDD integrates best building practices, technologies, energy conservation, and environmental considerations into installation planning and life-cycle management, including the recovery, recycling and reuse of C&D wastes. Information on SDD is available at the following websites:

ACSIM: <http://www.hqda.army.mil/acsimweb/fd/linksSDD.htm>

USACERL: <http://www.cecer.army.mil/sustdesign/>

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5. Installation C&D Waste Management Overview.

a. Over 60% of the Army's non-hazardous solid waste stream for operations in the Continental United States consisted of C&D debris according to 2004 Army records (SWAR data). C&D debris can constitute up to 80% of the Army's non-hazardous solid waste volume at some installations with major construction and facility removal programs. As much as 15% of all materials used in a construction project will become waste and require disposal.

b. Disposing of C&D wastes in Army-owned landfills consumes capacity that is already in limited supply and dwindling fast. Disposing C&D wastes at a non-installation landfill can be costly in terms of transportation and tipping fees. Incinerating C&D wastes degrades local air quality and results in hazardous ash disposal problems.

c. Sustainable management of C&D waste demonstrates Federal leadership in responsible stewardship of natural resources and can help lower an installation's waste disposal costs, preserve limited landfill capacity, and reduce the need for virgin construction materials. This approach also offers opportunities for reducing the cost of removing facilities. Contractors can recover costs associated with salvage and recycling through their own use or sale of materials, which in a competitive environment will enable them to lower their price to the Government. Where the installation can utilize salvaged or recycled materials on-post, the cost of purchasing new products or virgin materials is avoided. Installations operating C&D landfills benefit from the reduced debris burden, extended landfill life, and associated cost savings.

d. Three significant cost factors in a C&D waste management program are labor, transportation and tipping/disposal fees. Installations that have their own on-site landfills often underestimate the true cost of owning and operating these facilities (capital, engineering, permitting, construction, operation, maintenance, future closure and long-term monitoring costs) by either providing disposal services at no cost or by failing to charge reimbursable customers and contractors enough to cover the true operating costs. Reimbursable customers and contractors shall be charged the full life-cycle cost of disposal at an installation landfill. If Installations are unable to easily calculate reasonable landfill life cycle costs, they shall apply the prevailing local commercial tipping fees as an alternative.

As an added incentive to reduce and divert (instead of demolish) C&D wastes from Army landfills through reduction, recovery, reuse, and recycling, installations are encouraged to offer contract options or performance rebates for levels of diversion that are achieved beyond 50% by weight within each contract or project.

e. Significant waste reduction can only occur through a strategic and deliberate approach to the design, planning, and execution construction, renovation, and

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demolition activities. Early planning to incorporate more efficient facility design and construction processes can reduce the total amount of waste generated, handled and ultimately disposed of in landfills. Best Management Practices during construction and demolition will reduce the amount of waste material generated. Table 1 describes typical C&D debris generated during the various phases of a typical construction project. Successful waste management programs must be comprehensive and pro-actively include the full participation of the installation engineering, contracting, and environmental disciplines as well as all contractors, subcontractors, vendors, and suppliers involved in the project. Installation sustainable management of C&D activities will include, but are not limited to, facility design and construction efficiency, salvage (recovery) for reuse and resale, recycling, disposal, and packaging waste minimization.

Table 1. Types of C&D Debris Generated in Various Phases of a Construction Project

Project Phase	C & D Debris
Construction	Mixed rubble, wood, roofing, wall board, insulation, carpet, pipe, plastic, paper, bricks, lumber, concrete block, metals
Demolition	Mixed rubble, concrete, steel beams, bricks, wood, lumber, wallboard, insulation, carpet, pipes, wire, equipment, fixtures
Excavation	Earth, sand, stones, wood
Roadwork	Asphalt, concrete, earth
Site Clearance	Trees, brush, earth, top soil, concrete, mixed rubble, sand, steel, paper, plastic, garbage, rubbish

6. C&D Waste Management Program Requirements

a. Contract Requirements.

1) All future military construction, renovation, and demolition activities shall include C&D waste management performance requirements in solicitation documents. Contract bid specifications shall either reference the following Unified Facilities Guide Specifications (UFGS), or language as appropriate to the program's solicitation document format by editing these UFGS provisions to the specific project. Explicit designation as UFGS is not required:

- UFGS-01355, "Environmental Protection"
- UFGS-01572, "Construction and Demolition Waste Management" and
- UFGS-02220, "Demolition"

NOTE: These UFGS's may be downloaded from the Construction Criteria Base web site: <http://www.ccb.org/docs/ufgshome/UFGSToc.htm>

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(a) UFGS-01355 requires contractors to develop and provide a recycling and solid waste minimization plan and non-hazardous solid waste diversion reports as part of the project's Environmental Protection Plan.

(b) UFGS-01572 requires contractors to submit a C&D Waste Management Plan for government approval within 15 days after contract award and prior to initiating any site clearance activities. The purpose of the plan is to minimize the generation of C&D waste and to ensure that the maximum amount of C&D waste (including materials generated during clearing of the site, demolition of existing structures, and new construction activities) is salvaged for future resale, reuse, or recycling into new products. Installations with on-site C&D disposal facilities may make these facilities available to the demolition/removal contractor at the prevailing tipping fee for the area, or the actual all-inclusive, on-post cost per ton, if known.

(c) General demolition specifications are contained in UFGS-02220 and include the preparation of a demolition plan and the filing of notices to appropriate authorities concerning hazardous materials, explosives, safety and traffic control, etc.

2) These UFGS documents provide general contract performance requirements and depend on the installation's planner or designer to specify further project and site specific requirements. These documents, when completed, should clearly define ownership of property between the government and the contractor. Ensure the solid waste minimization and non-hazardous solid waste provisions of the Environmental Protection Plan, the C&D Waste Management Plan, and the Demolition specifications are coordinated to prevent conflicts.

3) The Corps of Engineers, Engineering and Support Center in Huntsville, AL publishes a number of Public Works Technical Bulletins in the PWTB 200-1 and 420-49 series, focusing on construction and demolition debris topics. Internet address to access PWTB's: <http://www.hnd.usace.army.mil/techinfo/CPW/pwtb.htm>. For example: PWTB 200-1-23, Guidance for the Reduction of Demolition Debris through Reuse and Recycling, and PWTB 420-49-30, Alternatives to Demolition for Facility Reduction.

b. Contract Administration/Oversight

1) The installation staff offices responsible for solid waste and/or recycling shall review the required C&D waste management plan for installation-managed projects and participate in the review and approval of C&D waste solicitation documents and waste management plans for projects being performed on the installation by others, such as the Corps of Engineers.

2) For each construction, renovation, or demolition project, installations shall document and monitor implementation of the approved plan. Actual diversion shall be

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monitored throughout the construction or demolition project and conformance with the approved Waste Management Plan and contract performance requirements shall be verified and recorded.

3) Installations will ensure that C&D activities and quantities are captured and reported annually in the Solid Waste Annual Reporting System, Web-version (SWARWeb) SWARWeb is accessible via the Army Environmental Reporting Online (AERO) portal at <https://aero.agpea.army.mil>. See Table 2 on page 14 for specific C&D diversion data requirements for SWARWeb. Huntsville Corps of Engineers, as program manager for FRP, will issue through HQs IMA detailed guidance for reporting FRP diversion data via SWARWeb. C&D diversion data for other programs shall be reported in a similar manner.

4) Managers of new construction, major renovation, facilities reduction or other demolition projects will report their C&D activities to the designated installation POC. Organizations that disposed of their C&D wastes off the installation will also comply with this reporting requirement.

c. Methods for Managing Demolition Wastes

1) When non-historical elements of the built environment are old, obsolete, and excess to current and forecasted needs, they are removed to either make way for a replacement facility or to restore the open space for some future use. All removal activities are comprised of a combination of traditional demolition and material recovery, reuse, and recycling techniques.

(a) Traditional demolition is most often accomplished by contracting practices using standard specifications. This is a relatively quick, uncomplicated process, but results in major quantities of waste and debris that must be disposed of in either on-site or off-site landfills.

(b) Appreciable waste stream diversion during demolition can be achieved at no additional cost through proper planning and execution. Historical data shows that the majority of debris materials can be diverted from wood-framed, steel framed, concrete framed, concrete masonry, and pre-engineered metal buildings. Most quantities of concrete, masonry, and metals from any building type can be diverted from landfilling, excluding contaminated materials. The majority of structural material from wood framed buildings can also be diverted through salvage for reuse or recycling, again excluding contaminated materials. Further information and guidance to accomplish appropriate waste stream diversion rates are found in a Best Practices Toolbox located on the Engineering Knowledge Online (EKO) website. The website link will be provided at a later date and updated on a regular basis.

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(c) Material recovery, reuse, and recycling techniques are relatively new concepts when compared to demolition. But these techniques are quickly becoming a more desirable way to remove excess buildings, especially when time constraints are not a major consideration. These methods can be performed under a contract with a firm often specializing in this type of work. Material recovery, reuse, and recycling also lends itself to the use of innovative approaches such as the use of an open auction or sealed bidding process that sells the excess buildings. This method of removal is frequently followed by the use of a supplemental demolition contract to remove and dispose of the remaining non--recycled components. These auctions and sales generate interest from private individuals, small business entrepreneurs, and specialty firms looking to harvest quantities of usable building materials for their own use.

(d) Another innovative approach that can be used for diverting high levels of material from the landfill includes active partnering with non-profit organizations that provide low-cost/no-cost deconstruction and salvage services to further their charitable purposes. Besides generating revenue from the value of the materials reclaimed and reused, there are real dollar savings from the equivalent amount of waste that does not have to be hauled away and landfilled.

(e) The use of on-site mobile concrete and masonry crushing operations can not only reduce waste transportation and disposal requirements but also provide a significant cost avoidance of future requirements by not purchasing new aggregate for construction and/or installation training requirements if required in economical quantities and are at appropriate locations.

2) Unified Facilities Criteria (UFC 1-900-01), "*Selection of Methods for the Reduction, Reuse, and Recycling of Demolition Waste*" provides guidance for recovering and recycling building demolition wastes, by assisting in the process to determine the most feasible methods to reduce the amount of C&D waste that finally is disposed of in a landfill. This UFC is available at the following UFC website:
http://65.204.17.188/report/doc_ufc.html

Guided by the UFC, installation planning personnel shall develop a decision matrix, specific to each project situation, which explores as many alternatives as required, using conventional demolition methods as the benchmark for comparison purposes. Many factors and constraints are considered in the matrix, such as type of construction, time constraints from a follow-on MCA project, contracting mechanisms, availability or lack of recycling markets, as well as costs.

3) Precautions must be taken if hazardous materials (e.g., asbestos, lead based paint, or polyaromatic hydrocarbons (PAHs from parquet floor glues), PCBs, mercury-containing material, ozone-depleting substances, Underground and Aboveground Storage Tanks, petroleum contaminated soil) are suspected to be present. Prior to

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undertaking any demolition activities, consult experts in the containment, removal and disposal of these kinds of materials. In addition, consider inclusion of the requirements for testing of materials in the new construction contract specifications, to assure that they will not be hazardous for recycling or reuse purposes.

4) An Army-owned on-site landfill may be used by a construction or demolition contractor for disposal of materials generated under a contract, contingent on the lack of alternative disposal sites within a reasonable (say, 50-100 miles) driving distance, and the payment of a fee, which is equivalent to the tipping fee prevailing in the area or the actual full life-cycle cost of disposal on-site, whichever is less. The full cost for using the installation landfill must be included in the comparison for all alternatives in order to determine which is most cost effective. The installation, at its discretion, may offer to charge the contractor lower disposal fees for attaining higher diversion rates, above the 50 percent minimum.

7. Integrated Solid Waste Management Plan:

a. Installations shall update their Integrated Solid Waste Management Plan (ISWMP) to incorporate C&D waste management principles and requirements. Updates should be completed within 180 days for ISWMP's that have not been updated within the past 5 years and within 1 year for all others. ISWMPs will be checked by higher headquarters when making periodic on-site compliance reviews.

b. Guidance on ISWMP preparation is available from the U.S. Army Center for Health Promotion and Preventative Medicine and the U.S. Army Engineering and Support Center, Huntsville. USACHPPM guide, TG-197, for preparing ISWMPs is at: <http://chppm-www.apgea.army.mil/documents/TG/TECHGUID/TG197.pdf>. The Corps of Engineers TECHINFO website maintained by the U.S. Army Engineering & Support Center, Huntsville, Alabama is also a source of solid waste and recycling technical guidance. In addition to published Public Works Technical Bulletins, the TECHINFO site has an electronic template for tailoring an ISWMP for a specific installation: <http://www.hnd.usace.army.mil/techinfo/CPW/pwtb.htm>.

8. Other Considerations

a. MCA project cost estimates should include the cost and schedule impacts on the DD 1391 for removal of buildings, structures and underground utilities within the "footprint" of the new facility and for non-footprint 1 for 1 structures, whether by traditional demolition methods or through material recovery, reuse, and recycle of building materials. Consideration must be given to any impacts on initial cost or schedule that would not ordinarily occur with traditional demolition scenario, but would result in an overall net savings or benefit to the Government, even if outside the MCA contract. Addressing these issues early in the project development cycle should enable

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the installation and supporting USACE District to accommodate cost and schedule impacts without adverse effect on the project's execution. Any initial cost to be supported by the construction contract price must be included in the DD 1391.

b. As part of the garrison's oversight responsibilities for all facilities projects on the installation, including those funded by private parties, such as RCI, and separately-funded tenant organizations, the installation planning, engineering, solid waste/recycling and environmental staffs must ensure that C&D waste management issues are addressed. For example, installations should work to have the RCI Community Development Master Plan include requirements equivalent to those in this policy, whenever possible.

c. DoD 4160.21-M, Defense Material Disposition Manual. Screening for reutilization of excess or surplus property should be completed prior to reclamation or disposal through C&D activities.

d. Prior to waste disposal on an installation owned and operated landfill, C&D debris should be reduced in volume where economically possible in order to help preserve landfill capacity. Contracting for the service or partnering with another installation may be more economical than purchasing and operating the equipment outright.

e. Schedule Considerations

1) Diversion activities can usually be performed with no adverse schedule impact if they are addressed during project development, i.e. during the planning, design, and contract document development. In this way, the Government is able to incorporate C&D waste diversion activities into the overall project completion objectives with minimal impact on scheduling and unexpected costs. Bidders and offerors can then incorporate salvage and recycling activities when developing their demolition and construction schedules.

2) In isolated cases, the project delivery schedule or construction schedule may constrain or even rule out salvage, recycling, and diversion activities on the demolition or construction site. Externally imposed project completion requirements such as a late addition to the MILCON program, or a previously established Beneficial Occupancy Date for a new Unit of Action may be such examples. Timely completion of the mission-critical project shall take precedence over meeting the minimum diversion criteria of this policy where missing the Beneficial Occupancy Date is directly attributable to debris diversion activities. In these cases, it is incumbent on the contracting agency to attain the highest diversion rate the project schedule will allow.

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3) Wood frame buildings have been removed from the footprint volumetrically and in panels or sections, and have even been “felled” (controlled collapse) to reduce the time necessary to clear the site. On-site materials segregation, off-site materials segregation, scrap utilization and waste reduction programs, packing and packaging reduction, and disposing of debris at C&D recycling facilities are options that can achieve diversion requirements without prolonging demolition activities. Apply the C&D Waste Management Plan to ensure that contractor has evaluated all diversion options when developing the Plan, and is making a good-faith effort to achieve the highest diversion rate practical within the project schedule.

f. Budget Considerations

1) Army experience shows that significant debris diversion can be accomplished within the established budgets. However, low cost cannot be guaranteed in all cases. Cost variables include the types and scope of facilities being removed, hauling costs and tipping fees, labor rates, salvaged materials' condition and markets, and other local factors.

2) There may be cases where the effort and cost to salvage materials for reuse or recycling may exceed the savings associated with diversion. Preserving the ability to award a contract without compromising project scope shall take precedence over meeting this Policy Memorandum's diversion criteria where the cost of achieving the minimum diversion rate is significantly greater than the cost of conventional demolition and landfiling, and the risk of exceeding the available contract amount can be attributed to the difference in cost between conventional demolition, and achieving the minimum diversion rate. Note that the cost of diversion includes the initial cost, offset by salvaged and recycled materials' value, cost savings from reduced hauling and tipping fees, cost avoidance by using recycled materials in lieu of purchasing new materials, and life cycle landfill savings if the installation has an on-post C&D landfill. In these cases, it is incumbent on the contracting agency to ensure the highest diversion rate the project budget will allow. Apply the C&D Waste Management Plan to ensure that the contractor has evaluated all diversion options when developing the Plan, and is making a good-faith effort to achieve the highest diversion rate practical within the project budget.

g. The means and the methods to combine techniques of traditional demolition and disposal versus material reduction, reuse, and recycling rests solely with the garrison. Decision-makers should, however, carefully consider all the pertinent factors that would affect successful project completion and attainment of Army waste policy diversion goals.

h. Networking with the other Services, local communities, and non-profit / charitable groups may help identify resources that may wish to purchase or otherwise obtain installation C&D wastes. Local and/or regional advertising may help determine the

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marketability of excess materials. Any contracts or agreements governing the sale/transfer of these materials must be legally reviewed. Depending on the approach chosen, such parties may be able to purchase buildings through auction or bid, contract for deconstruction services, or subcontract with a conventional demolition contractor to salvage materials. State and county departments of natural resources (or similar agencies) should be consulted to identify any directories, exchanges or referral services for recycling and salvage firms they may maintain. UFC 1-900-1 provides a compendium of resources for building materials salvage, recycling, reuse, and deconstruction.

i. There are many organizations throughout the United States that may provide resources needed for cost effective deconstruction, salvage, recycling, and reuse or resale of building materials. The following are examples of the types of resources available to Army personnel. This list is not intended to be comprehensive. Other organizations and resources are available as well.

1) The US Department of Agriculture Forest Products Laboratory, in partnership with the University of Florida Center for Construction and the Environment, has published a Directory of Wood Framed Building Deconstruction and Reused Building Materials Companies (http://www.fpl.fs.fed.us/documnts/fplqtr/fpl_qtr150.pdf)

2) USEPA maintains a recycling commodities exchange through their Jobs Through Recycling programs. (<http://www.epa.gov/epaoswer/non-hw/recycle/jtr/comm/exchstat.htm> and <http://www.epa.gov/jtr/jtrnet/brokers.htm>)

3) State and local Environmental Protection Agencies, or Departments of Natural Resources, Solid Waste Management or Pollution Prevention divisions or directorates frequently maintain recycled materials directories, materials exchanges, advisory services, and other forms of supports that installations can consult to support C&D materials' diversion. Some selected examples of these services include:

- California Integrated Waste Management Board, California Materials Exchange Network (<http://www.ciwmb.ca.gov/CalMAX/>)
- State of Georgia Pollution Prevention Assistance Division (<http://www.p2ad.org/>)
- King County WA Construction Recycling Directory (<http://www.metrokc.gov/dnrp/swd/construction-recycling/documents/cdlguide.pdf>)
- State of North Carolina Recycle Products Directory (<http://www.p2pays.org/DMRM/start.aspx>)

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- Recycle Texas Online
 (<http://www.tnrcc.state.tx.us/exec/sbea/rtol/index.html>)
- Many Habitat for Humanity Affiliates operate used building materials stores (typically called ReStores) and deconstruction services.
 (<http://www.habitat.org/>). See <http://www.habitat.org/env/restores.aspx> for the ReStore directory.
- Non-profit organizations can be useful in identifying services and outlets for salvaged and recycled materials. These include, but are not limited to:
- Pollution Prevention Resource Exchange
 (<http://www.p2rx.org/aboutUs/aboutP2Rx.cfm>)
- WasteCap, located in several states (example:
<http://www.wastecapwi.org/>)
- Reuse Development Organization REDO
 (<http://www.redo.org/FindReuse.html>)
- GreenGoat (<http://greengoat.org/whatwedo.html>)

Table 2 - C&D Diversion Data Elements

CONSTRUCTION / DEMOLITION SWARWeb PICKLIST		
MAJOR CATEGORY	SUB-CATEGORY	DEFINITION
Wood	Structural	TBD
	Finished	TBD
	Treated	TBD
	Other (C/D Wood)	TBD
Metal	Steel	TBD
	Copper	TBD
	Aluminum	TBD
	Mixed Metal	TBD
	Other (C/D Metal)	TBD
Masonry/Asphalt/Concrete/Stone	Asphalt	TBD
	Brick	TBD
	Concrete	TBD

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	Concrete Block Unit	TBD
	Stone	TBD
	Other (C/D Masonry/Asphalt)	TBD
Land Clearing Debris		
	Top Soil	TBD
	Sub Soil	TBD
	Petroleum-Contaminated Soil	TBD
	Non-Hazardous Lead-Contaminated Soil	TBD
	Vegetation/Timber (tree trunks & limbs)	TBD
	Crushed Stone/Base	TBD
	Other (C/D Land Clearing)	TBD
Other		
	Siding	TBD
	Composition Roof	TBD
	Insulation	TBD
	Doors/Windows/Stairs/Cabinets	TBD
	Ceiling Tile	TBD
	Gypsum/Plaster	TBD
	Plastic	TBD
	Glass	TBD
	Paper	TBD
	Other (C/D Other)	TBD
Additional Information		
Project Number		
Building Number(s)		
Reuse (Installation)		
Reuse (Off-Site)		
Recycle (Installation)		
Recycle (Off-Site)		
Bury (Installation)		
Bury (Off-Site)		
Dispose (Installation)		
Dispose (Off-Site)		
Other		

A. STORMWATER MANAGEMENT

A.1 BACKGROUND

The Fort Lee Department of Public Works is developing comprehensive stormwater management policies that include, among other things, the requirements that:

1. Site designs shall minimize the generation of stormwater and maximize pervious areas for stormwater treatment. Structural and nonstructural infiltration BMPs shall be encouraged to provide stormwater quality and quantity control and groundwater recharge.
2. Natural channel characteristics shall be preserved to the maximum extent practicable.
3. The use of low-impact development (LID) site planning and integrated management practices shall be encouraged to control stormwater runoff at the source and more closely approximate predevelopment runoff conditions.

State and Federal design manuals that address proper stormwater management design techniques, including the following:

- Virginia Stormwater Management Handbook, Volumes I and II, prepared by the Virginia Department of Conservation and Recreation dated 1999, as amended.
- VDOT Drainage Manual, prepared by the Hydraulics Section of the Virginia Department of Transportation dated 2002, as amended.
- Virginia Erosion and Sediment Control Handbook, prepared by the Virginia Department of Conservation and Recreation dated 1992, as amended.
- Low Impact Development Design Strategies: An Integrated Design Approach, United States Environmental Protection Agency, Office of Water, EPA 841-B-00-003 dated June 1999, as amended.
- Low Impact Development Hydrologic Analysis, United States Environmental Protection Agency, Office of Water, EPA 841-B-00-002 dated June 1999, as amended.

The manuals referenced here should be used by designers to ensure that standard, acceptable design practices are used to develop their stormwater management designs.

A.2 STORMWATER MANAGEMENT CONCEPT PLAN

The designer will prepare a stormwater management concept plan to be reviewed and approved by the Ft. Lee Department of Public Works. Detailed design is not required in the stormwater management concept plan; however, sufficient analyses must be performed to show the plan is workable. The amount of analyses required will vary depending on the size and complexity of the development.

All stormwater management concept plans shall indicate the general manner in which site drainage, and stormwater quantity and quality control requirements will be addressed. The following information shall be provided as a minimum for all sites:

1. Soils map and soils data. Soil borings may be required when infiltration facilities are proposed and the development plan offers little or no alternative to infiltration.
2. Identification of hydric soils and potential wetland impacts by proposed facilities.
3. Location of the 100-year floodplain.
4. Location of Chesapeake Bay Preservation Areas (CBPAs).
5. Existing and proposed onsite drainage divides and an offsite drainage area map.
6. Method for providing stormwater management (onsite BMP, regional facility, LID approach) or a request for exception (in writing) including descriptions, drawings, calculations, and other information necessary to evaluate the requested waiver of stormwater management requirements.
7. General description of site drainage system (i.e., natural streams, constructed channels, storm sewer systems, etc.).
8. Location and type of stormwater management facilities and/or LID integrated management practices to provide required stormwater quantity and quality control. Location of proposed access to facilities. Schedule of facility construction for multi-phase projects.
9. Estimation of post-development impervious cover to verify adequacy of technology based water quality BMPs.
10. Channel adequacy computations.
11. Other Federal and State permits being sought if applicable (e.g., VPDES Permit, COE 404 Permit).

Submission of additional information is encouraged as needed to support the stormwater management proposal.

A.3 LOW-IMPACT DEVELOPMENT

The design will incorporate, to the maximum extent practicable, Low-Impact Development approaches. The designer shall provide sufficient information to verify the feasibility of the LID proposal. Such information shall identify the site planning techniques that will result in a stormwater management design plan that maintains the pre-development hydrologic regime (volume, frequency, and peak runoff rate) to the greatest extent possible. Examples of site planning techniques include:

1. Maintaining natural drainage ways and patterns and directing runoff to depression areas.
2. Preserving as many trees as possible, especially those located on hydrologic soil groups (HSG) A and B.
3. Reducing the percentage of impervious area (e.g., pervious pavers, etc.).
4. Locating IMPs in HSG A and B.
5. Disconnecting impervious areas.

6. Limiting clearing and grading in areas containing permeable soils (HSG A and B).
7. Locating impervious areas to less permeable soils (HSG C and D).
8. Maintaining existing natural topography and terrain.
9. Limiting clearing and grading through "site fingerprinting" techniques.
10. Flattening slopes within cleared and graded areas, where feasible, to facilitate on-lot storage and infiltration.
11. Revegetating cleared and graded areas.
12. Dispersing stormwater flow rather than concentrating it in swales, pipes, or channels

Descriptions of these and other site planning techniques can be found in the LID references listed in section A.1.

Low impact development approaches strive to maintain pre-development stormwater infiltration rates. The designer will determine the target infiltration rates for stormwater management designs by one of the following approaches:

1. Water Recharge Volume – as described in Chapter 2 of the 2000 Maryland Stormwater Design Manual
2. Procedures described in section 4.5 of *Low Impact Development Hydrologic Analysis*, United States Environmental Protection Agency, Office of Water, EPA 841-B-00-002 dated June 1999, as amended.
3. For Bailey Creek – the infiltration goal set forth for the relevant catchment in *Versar (2006) Bailey Creek Watershed Delineation*.
4. For other than Bailey Creek Watershed – contact Ft. Lee Environmental Management Office.

A.4 ADEQUATE OUTFALL

Concentrated stormwater runoff leaving a development site shall be discharged directly into an adequate natural or man-made receiving channel, pipe or storm sewer system or the developer must provide a drainage system satisfactory to the Ft. Lee Department of Public Works to preclude an adverse impact (e.g. soil erosion; sedimentation; yard flooding; duration of ponding water, inadequate overland relief) on downstream properties and receiving channels as well as a proportional improvement of the predevelopment conditions. If the developer chooses to install a storm drainage system, the system shall be designed in accordance with established, applicable criteria for such systems.

A.4.a Analysis of Downstream Drainage Systems

The downstream drainage system shall be analyzed to demonstrate the adequacy of the system (see A.4.b), or it shall be shown that there is no adverse impact to the downstream system as well as a proportional improvement of the predevelopment conditions (see A.4.c).

The extent of the review of the downstream drainage system shall be:

1. To a point that is at least 150 ft (46 m) downstream to a point where the receiving pipe or channel is joined by another that has a drainage area that is at least 90% of the size of the first drainage area at the point of confluence; or
2. To a point at which the total drainage area is at least 100 times greater than the contributing drainage area of the development site; or
3. To a point that is at least 150 ft (45 m) downstream of a point where the drainage area is 360 acres (1.46 km²) or greater.

When using procedures 1 and 3, above, for the extent of review, the analysis must be to a point where all the cross-sections are adequate in the farthest downstream reach of 150 feet. A minimum of three cross-sections shall be provided in the 150 foot reach. If the detention method described in 3, above, is used, the three cross-sections in the farthest downstream reach of 150 feet shall be limited to showing a defined channel or a man-made drainage facility and checking for flooding.

Cross-section selection and information shall be determined in accordance with Chapter 5 of the latest edition of the Virginia Erosion and Sediment Control Handbook (Virginia Department of Conservation and Recreation) under the section titled "Determination of Adequate Channel." Cross-sections shall be shown on the plans with equal horizontal and vertical scales.

A.4.b Adequacy of Receiving Streams

Adequacy of all natural watercourses, channels and pipes shall be verified as follows:

1. The developer shall demonstrate that the total drainage area to the point of analysis within the channel is 100 times greater than the contributing drainage area of the development site; or
2. Natural watercourses shall be analyzed by the use of a 2-year frequency storm to verify that stormwater will not overtop channel banks nor cause erosion of channel bed or banks;
3. All previously constructed man-made channels shall be analyzed by the use of a 10-year frequency storm to verify that stormwater will not overtop channel banks and by the use of a 2-year frequency storm to demonstrate that stormwater will not cause erosion of channel bed or banks;
4. Pipes, storm sewer systems and culverts shall be analyzed by the use of a 10-year frequency storm to verify that stormwater will be contained within the pipe, system, or culvert.

Determinations of the adequacy of drainage systems shall be performed in accordance with methods contained in Chapter 5 of the latest edition of the Virginia Erosion and Sediment Control Handbook (Virginia Department of Conservation and Recreation) under the section titled "Determination of Adequate Channel."

A.4.c Proportional Improvements

The required proportional improvement of the downstream system at each inadequate cross-section is the ratio of the post-development C times A for the contributing drainage area of the site to the existing development C times A for the entire drainage area at that cross-section. The required proportional improvement is computed as follows:

$$P_i = [C_d A_d / C_{cs} A_{cs}] \times 100 \text{ where,}$$

P_i = Required Proportional Improvement (%)

C_d = Runoff Coefficient for the Contributing Drainage Area of the Site in a Post-development Condition

A_d = Contributing Drainage Area of the Site

C_{cs} = Runoff Coefficient for the Contributing Drainage Area to the Cross-section in a Existing Development Condition

A_{cs} = Contributing Drainage Area to the Cross-section

A proportional improvement and no adverse impact to the downstream drainage system shall be shown by one of the following methods:

Critical Shear Stress Method

If the outfall is inadequate due to *erosive velocities* along the extent of review the critical shear stress method may be used to show no adverse impact due to erosive velocities. The erosive work on the channel for the post-development conditions shall be reduced to a level below the erosive work on the channel under pre-development conditions by the required proportional improvement.

Each inadequate cross-section along the extent of review shall then be analyzed for the following:

The shear stress for both the predevelopment condition and the post-development condition for the 2-year storm shall be plotted in relation to time at each cross-section. On each graph, the permissible shear stress also shall be plotted. The permissible shear stress is based on the soil type, and may be determined for cohesive soils from Plate 1 and for non-cohesive soils from Plate 2. The soil type may be determined by field test or the soil type designated on the County soils maps may be used. If the soil type is designated using the County soils maps, the most conservative permissible shear stress for the soil type shall be used. The plans shall indicate how the soil type was determined. The area between the permissible shear stress and the actual shear stress on the graph is erosive work on the channel. The erosive work for the post-development condition shall be less than the erosive work for predevelopment condition by a percentage equal to the required proportional improvement.

The shear stress on the channel can be calculated using the following formula:

$t = gRS$ where,

t = shear stress in lb/sq.ft. (N/m^2)

g = unit weight of water is 62.4 lb/ft^3 (9810 N/m^3)

R = hydraulic radius in ft (m)

S = slope of the channel bed

Channel Capacity Method

If the outfall is inadequate due to *inadequate capacity* along the extent of review, the channel capacity method may be used to show no adverse impact due to overtopping. The largest storm that does not exceed the actual channel, pipe, or culvert capacity under pre-development conditions shall be determined for the cross-section that is most frequently over its capacity. The post-development peak flows for the above storm and the 2-year and 10-year storms shall be reduced to a level below the pre-development conditions by a percent equal to the required proportional improvement.

Detention Method

It shall be presumed that no adverse impact and a proportional improvement will occur if on-site detention is provided as follows and the outfall is discharging into a defined channel or man-made drainage facility:

1. Extended detention of the 1-year storm volume for a minimum of 24 hours. If extended detention of the BMP volume (see § 6-0400 et seq.) also is provided, the 24 hours shall be applied to the difference between the 1-year storm volume and the BMP volume; and
2. In order to compensate for the increase in runoff volume, the 2-year and 10-year post-development peak rates of runoff from the development site shall be reduced below the respective peak rates of runoff for the site in good forested condition (e.g., for NRCS method, a cover type of "woods" and a hydrologic condition of "good"). This reduction results in a proportional improvement and is computed as follows:

$$R_i = [1 - (V_f / V_d)] \times 100 \text{ where,}$$

R_i = Reduction of Peak Flow Below a Good Forested Condition (%)

V_f = Runoff Volume from the Site in a Good Forested Condition

V_d = Runoff Volume from the Site in a Post-Developed Condition

The calculation of the cumulative volumes shall be based on the NRCS (formerly SCS) methodology described in § 6-0802 or other methods as approved by the Director.

Computations demonstrating the 1½-year post-development peak rate of runoff from the development site does not exceed the 1½-year peak rate of runoff for the site in good forested condition are optional. The 1½-year storm is used to obtain Leadership in Energy and Environmental Design (LEED) certification.

If this method is used, each outfall from the site shall be analyzed independently and the allowable release rate shall be based on the area of the site that drains to the outfall under predevelopment conditions.

Other scientifically valid methods, which show no adverse impact regarding erosion or capacity for an inadequate outfall and show proportional improvement, may be approved by the Ft. Lee Department of Public Works.

PLATE 1

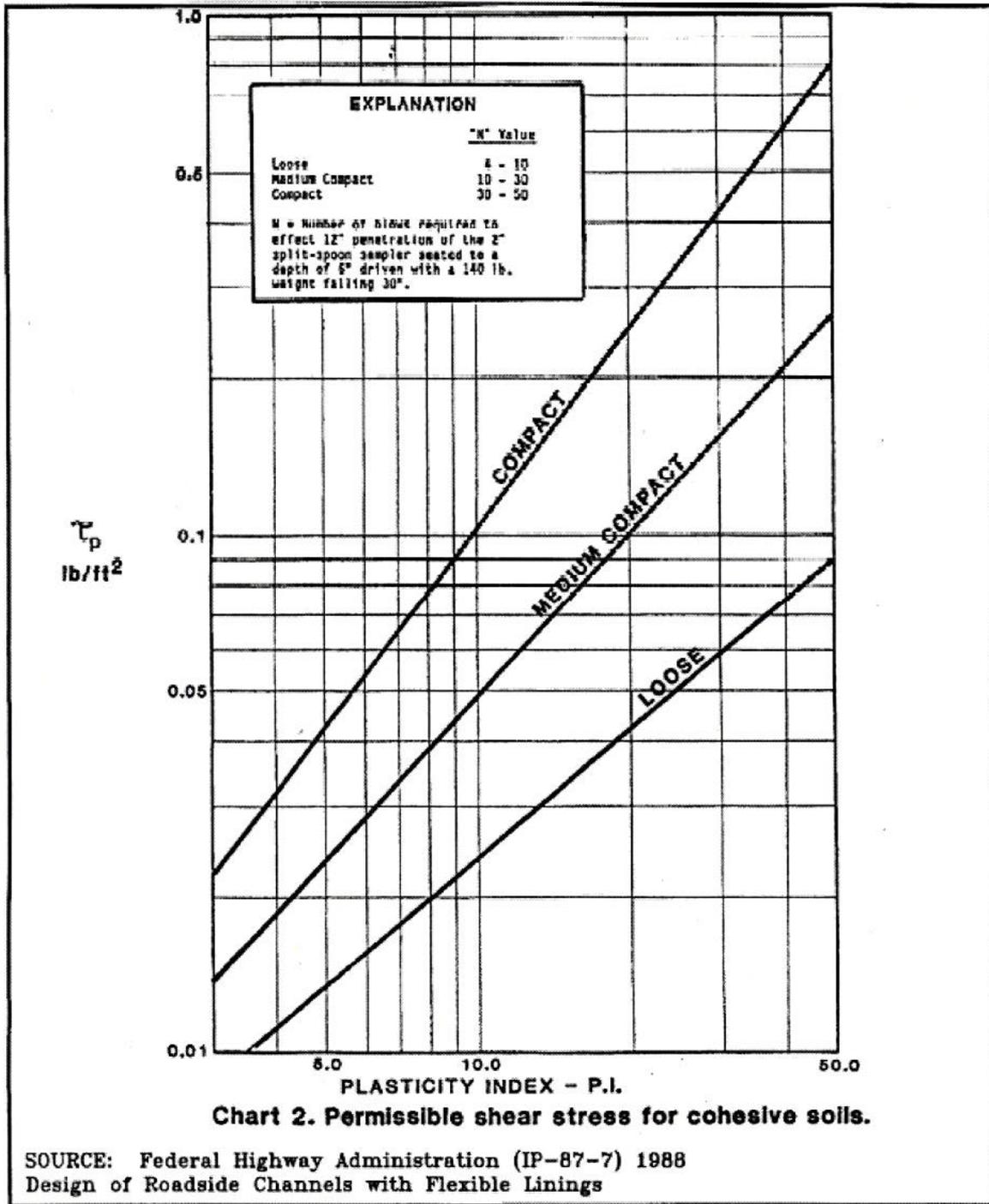
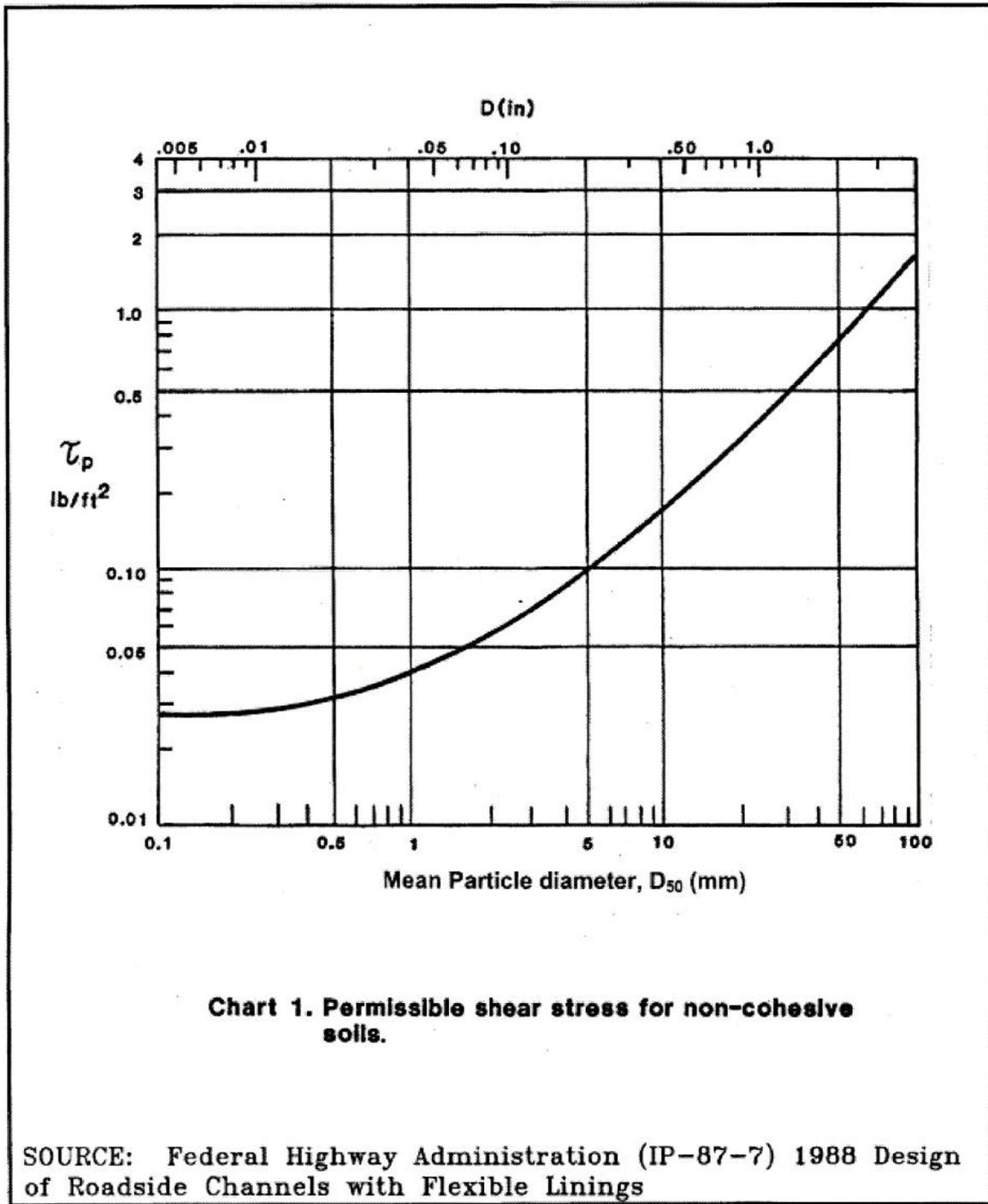


PLATE 2



Site Specific Storm Water Pollution Prevention Plan

SITE-SPECIFIC STORMWATER PACKAGE

This package contains the following:

- Site-Specific Stormwater Pollution Plan Requirements
- Construction Contractor Certification
- Information Checklist for SP3
- Blank Site-Specific SP3 for use as an example or template
- Construction Site Stormwater Inspection Form
- Copy of Permit available hard copy only from EMO

Provide to Fort Lee Environmental Management Office (EMO) prior to Construction

The plan must be approved by EMO:

- Site-specific Stormwater Pollution Prevention Plan
- Signed Construction Contractor Certification

Inspection forms must be maintained by contractor or project manager and copy provided to EMO Personnel.

EMO point of contact is Craig Norris at 734-3772, craig.norris@us.army.mil

Site Specific Storm Water Pollution Prevention Plan

SITE-SPECIFIC STORMWATER POLLUTION PREVENTION PLAN REQUIREMENTS

Each construction activity at Fort Lee is required to have a site-specific Stormwater Pollution Plan (SP3). The SP3 will be generated by the construction contractor and submitted to the site's Construction/Project Manager and the EMO for review and approval. The initial site specific SP3 and all modifications including a signature page with the name of the person responsible for preparing the site-specific SP3 will be kept on file in EMO. The site-specific SP3 shall include the following information:

- Site Description
- Site Map
- Types of Controls
- Non-Stormwater Management
- Post-Construction Stormwater Management
- Waste Management and Disposal
- Maintenance, Inspection, and Repair Procedures
- Identification of Contractors, Subcontractors, and their tasks
- Monitoring and Reporting
- Certification

The key elements of the site-specific SP3 are the site description and the site map (Construction plan). The site map will include details of areas $\frac{1}{4}$ mile beyond the construction site boundaries and will provide the following information:

- Lateral limits of the construction site
- Surface water bodies, including known springs and wetlands
- Areas of soils to be disturbed
- Locations of controls to be used during construction
- Locations of stormwater management controls to be used post-construction
- Outline of off-site drainage areas that discharge into the construction site
- General topography
- Anticipated discharge location(s) where the construction site's stormwater discharges to the installation's stormwater drainage system or other water body.

Descriptions of on-site sources shall be provided with the site-specific maps and shall outline proposed and proper on-site practices. Examples of these descriptions shall include the following:

- List of toxic materials that are known to have been treated, stored, disposed, spilled, or leaked in significant quantities (estimated volumes also to be listed) onto the construction site.
- Stormwater control practices for construction materials, equipment, and vehicles.
- Construction material loading, unloading, and access areas
- Equipment storage, cleaning, and maintenance areas.

Site Specific Storm Water Pollution Prevention Plan

A site-specific SP3 should not be limited to the above information. The requirements outlined above are the minimum requirements to satisfy Fort Lee's VPDES permit for stormwater discharges associated with construction activity; however, additional information not outlined above, but relevant to site-specific stormwater issues should be included with the site-specific SP3 for that construction site. References include EPA's Stormwater Management for Construction Activities – Developing Pollution Prevention Plans and Best Management Practices (EPA 833-R-92-001, October 1992), Virginia's VR 680-14-19 VPDES General Permit Regulation for Stormwater Discharges from Construction Sites, Virginia Stormwater Management Regulations 4 VAC 3-20, and the Virginia Stormwater Management Handbook, First Ed. 1999.

The Engineer responsible for reviewing the site-specific SP3 shall use the checklist provided to ensure that the necessary information is compiled for the plan. If additional information is required, the Engineer can request additional information from the Contractor or use the following supplemental sources:

- United States Geological Survey: For general topographic information and for locations of waterways receiving runoff from each project site.
- Natural Resources Conservation Service: For general soil information, including surface soil erosion potential.
- National Wetlands Inventory Maps: For general locations of documented sensitive wetland areas.
- Federal Emergency Management Agency: For floodplain map data indicating the extent of building restriction lines without flood protection.
- Previous in-house construction project data (if available): For geotechnical boring logs, slope stability studies for site grading, retaining walls, stream channel protection, storm or surface water sampling data, and aerial photography indicating locations of grasslands, woodlands, and unstable slopes.
- Virginia Sediment and Erosion Control Handbook

Site Specific Storm Water Pollution Prevention Plan

FORT LEE, VA CONSTRUCTION CONTRACTOR CERTIFICATION

I certify, under penalty of law, that I have read and understand the terms and conditions of the general Virginia Pollutant Discharge elimination System (VPDES) permit that authorizes the stormwater discharges associated with the construction activity from the Fort Lee construction site and the Stormwater Pollution Prevention Plan (SP3) associated and identified as part of this certification.

Duty or Responsibility: _____

Contractor:

Name: _____

Mailing Address: _____

City: _____ State: _____ Zip Code: _____

Phone: _____

Authorized Signature

Print Name: _____

Signature: _____

Title: _____

Date: _____

Site Specific Storm Water Pollution Prevention Plan

INFORMATION CHECKLIST FOR CONSTRUCTION SP3S

Site Description

- Description of project purpose
- Schedule of major soil disturbing activities
- Soil disturbances necessary to complete the project
 - Soil Excavation Grading Clearing
 - Soil Stockpiling Demolition Preparation for planting
 - Other(s) _____
- Estimate the size of the project site and the area to be disturbed
- Calculate the runoff coefficient for the site (before and after construction)
- Description of existing vegetation at the site
- Description of other potential pollution sources, including vehicle fueling, chemical storage, sanitary facilities, etc.
- Name of surface water body receiving runoff from the project site
- Pollution prevention site map
 - Drainage patterns and slopes/contours after grading
 - Areas of soil disturbance
 - Location of major structural and nonstructural controls identified under "Controls"
 - Location of areas requiring stabilization practices, including types of cover
 - Surface waters, including wetlands
 - Location of surface runoff discharge points and drainage areas
 - Existing and planned paved areas and buildings
 - Locations of permanent stormwater management practices
- Locations of other potential pollution sources

Controls

Description of applicable controls

- Erosion and Sediment Controls
 - Stabilization Practices
 - Structural Practices
- Stormwater Management
- Other Controls

Maintenance

- Description and schedule of maintenance procedures

Site Specific Storm Water Pollution Prevention Plan

Inspections

- At least once every 14 calendar days and within 48 hours of the end of a storm event that is 0.5 inches or greater. Where areas have been finally or temporarily stabilized or runoff is unlikely due to winter conditions (e.g., site is covered with snow, ice, or frozen ground exists) such inspections shall be conducted at least once every month.
- Inspection of disturbed areas, erosion and sediment control structures/practices, and exposed material storage areas
- Updates to SP3 based on inspections, if appropriate (within 7 days)
- Inspection reporting

Non Stormwater Discharges

- Identify all NSDs (except fire fighting flows)

Certifications

- Identify each measure and contractor/subcontractor responsible for implementation
- Certification statement signed by each identified contractor/subcontractor

Site Specific Storm Water Pollution Prevention Plan

SITE SPECIFIC STORMWATER POLLUTION PREVENTION PLAN (use as an example or as a template)

1.0 SITE DESCRIPTION

Project Name & Location:

Owner Name & Address: Commander, Fort Lee
 Directorate of Public Works
 Fort Lee, Virginia 23801-5200

Description of Purpose of Project:

Runoff Coefficient
Before construction: _____ After construction: _____ (Rational Method)

Total Area of Construction Site: Acres
Estimated Area of Soils to be Disturbed: Acres

Name(s) of Receiving Water(s):

2.0 SITE MAP

The following items are included on the site map (Appendix A). The list is presented in checklist form, with the plate number on which each item can be found.

- | | Sheet
No. |
|--|--------------|
| <input type="checkbox"/> Drainage patterns and estimated slopes/contours after grading. | _____ |
| <input type="checkbox"/> Areas of soil disturbance. | _____ |
| <input type="checkbox"/> Locations of major structural and nonstructural controls. | _____ |
| <input type="checkbox"/> Locations of areas requiring stabilization practices, including types of cover. | _____ |
| <input type="checkbox"/> Surface waters, including wetlands. | _____ |
| <input type="checkbox"/> Locations of surface runoff discharge points and associated drainage areas. | _____ |
| <input type="checkbox"/> Existing and planned paved areas and buildings. | _____ |

Site Specific Storm Water Pollution Prevention Plan

- Locations of permanent stormwater management practices. _____
- Locations of other potential pollution sources. _____

3.0 POTENTIAL SOURCES

The following is a list of potential sources of stormwater pollution expected at Fort Lee construction sites. A check is placed next to all sources that apply to this particular construction site and activity. A blank has been provided at the end of the list for any additional potential sources.

Construction Activities

- | | |
|--|--------------------------------------|
| <input type="checkbox"/> Vegetation clearing | <input type="checkbox"/> Excavations |
| <input type="checkbox"/> Soil stockpiling | <input type="checkbox"/> Grading |
| <input type="checkbox"/> Other: | |

Other Sources

- | | |
|--|--|
| <input type="checkbox"/> Vehicle fueling | <input type="checkbox"/> Stockpiled gravel or asphalt |
| <input type="checkbox"/> Hazardous materials storage | <input type="checkbox"/> Building materials (please specify) |
| <input type="checkbox"/> Solid waste storage | <input type="checkbox"/> Sanitary waste facilities |
| <input type="checkbox"/> Other: | |

4.0 CONTROLS

The following is a checklist of control measures that are expected to be implemented during the course of this project. Other measures, not included on the list, are provided in the blanks provided.

Erosion and Sediment Controls

Stabilization Practices

- | | |
|--|--|
| <input type="checkbox"/> Temporary seeding | <input type="checkbox"/> Permanent seeding |
| <input type="checkbox"/> Mulching | <input type="checkbox"/> Geotextiles |
| <input type="checkbox"/> Sod stabilization | <input type="checkbox"/> Vegetative buffer strips |
| <input type="checkbox"/> Protection of trees | <input type="checkbox"/> Preservation of mature vegetation |
| <input type="checkbox"/> Other: | |

Structural Controls

- | | |
|---|---|
| <input type="checkbox"/> Silt fencing | <input type="checkbox"/> Earthen dikes |
| <input type="checkbox"/> Drainage swales | <input type="checkbox"/> Sediment traps |
| <input type="checkbox"/> Sediment basin(s) | <input type="checkbox"/> Check dams |
| <input type="checkbox"/> Subsurface drains | <input type="checkbox"/> Pipe slope drains |
| <input type="checkbox"/> Storm drain inlet protection | <input type="checkbox"/> Rock outlet protection |
| <input type="checkbox"/> Other: | |

Site Specific Storm Water Pollution Prevention Plan

Stormwater Management

The following measures will be installed during the construction process to control pollutants in stormwater discharges that may occur after construction is completed.

- Stormwater detention ponds or other detention structures
- Stormwater retention ponds or other retention structures
- Flow attenuation by use of open vegetated swales and natural depressions
- Infiltration of runoff on site
- Sequential systems (combination of several practices)
- Velocity dissipation device at discharge locations to provide a non-erosive flow velocity
- Other:

Other Controls

Other types of controls not related to sediment and erosion control will be implemented during the course of the construction activity. All that apply are indicated.

Solid Wastes

- Place in closed dumpsters
- Place in trashcans with lids
- Other:

Hazardous Wastes

- Place in closed, EPA/DOT-approved containers
- Stored in a covered area (tarp, portable shed, lean-to)
- Placed within a bermed storage area
- Other:

Sanitary Waste

- Portable facilities that are closed and covered will be used
- Facilities in area where it is unlikely to be damaged or disturbed by heavy equipment.
- Other:

Raw Material Storage Areas

- Kept in closed, EPA/DOT-approved containers
- Stored in a covered material storage area (tarp, portable shed, lean-to)
- Kept within a bermed storage area
- Other:

Site Specific Storm Water Pollution Prevention Plan

5.0 TIMING OF ACTIVITIES AND CONTROLS

The following is a written description of soil-disturbing activities and controls, and in what sequence these activities will occur. Locations, area(s) involved, and types of controls for each activity are described in the order they are expected to occur.

Site Specific Storm Water Pollution Prevention Plan

6.0 INSPECTIONS AND MAINTENANCE

- Contractors will follow, at a minimum, the inspection and maintenance procedures outlined in Section 3.5 of Fort Lee's General SWP3 for Construction Activities. These procedures include inspections at least once every 14 calendar days and within 48 hours of the end of a storm event that is 0.5 inches or greater. Where areas have been finally or temporarily stabilized or runoff is unlikely due to winter conditions (e.g., site is covered with snow, ice, or frozen ground exists) such inspections shall be conducted at least once every month. Any deviations from these procedures, including more stringent inspection and maintenance procedures, are provided below:

7.0 IDENTIFICATION OF NON-STORMWATER DISCHARGES

All non-stormwater discharges (NSDs) associated with construction activities that are planned or expected to occur during this construction activity are listed below:

- Discharges from fire fighting activities
- Fire hydrant flushing
- Waters used to wash vehicles or control dust
- Air-conditioning condensate
- Uncontaminated groundwater, including foundation or footing drains
- Pavement washwaters, where spills or leaks of toxic or hazardous materials have not occurred and where detergents are not used
- Potable water sources, including: water line flushing; irrigation drainage; lawn watering; and routine external building washdown that does not use detergents

Site Specific Storm Water Pollution Prevention Plan

8.0 MATERIAL INVENTORY

The following materials are expected to be on-site during the construction activities:

Construction materials

- | | |
|---|----------------------------------|
| <input type="checkbox"/> Bags of cement and other dry materials | <input type="checkbox"/> Drywall |
| <input type="checkbox"/> Asphalt | <input type="checkbox"/> Metals |
| <input type="checkbox"/> Tar | |
| <input type="checkbox"/> Other: | |

Hazardous materials

- | | |
|--|---|
| <input type="checkbox"/> Solvents | <input type="checkbox"/> Compressed gas cylinders |
| <input type="checkbox"/> Paints | <input type="checkbox"/> Fertilizers |
| <input type="checkbox"/> Pesticides/Herbicides | <input type="checkbox"/> Cleaners/detergents |
| <input type="checkbox"/> Other: | |

Equipment maintenance materials

- | | |
|--|---|
| <input type="checkbox"/> Fuel | <input type="checkbox"/> Antifreeze |
| <input type="checkbox"/> Motor oil, grease | <input type="checkbox"/> Transmission fluid |
| <input type="checkbox"/> Hydraulic fluids | |
| <input type="checkbox"/> Other: | |

Other materials not listed above

- Other:

9.0 GOOD HOUSEKEEPING

Contractors will follow, at a minimum, the good housekeeping procedures outlined in Section 3.2.3 of Fort Lee's General SWP3 for Construction Activities. Any expected deviations from these procedures are provided below:

Site Specific Storm Water Pollution Prevention Plan

10.0 SPILL PREVENTION

Contractors will follow, at a minimum, the spill prevention procedures outlined in Section 3.2.3 of Fort Lee's General SWP3 for Construction Activities. Any expected deviations from these procedures are provided below:

Are materials expected to be on-site that can spill or leak (e.g., fuel, oils, paints)?

Yes No

Will a spill response kit be maintained on site?

Yes No

11.0 CONTRACTOR'S CERTIFICATION

All contractors with responsibilities related to preventing stormwater pollution have signed certification forms provided.

Follow-up visit required
___ YES ___ NO

**STORMWATER INSPECTION FORM FOR CONSTRUCTION PROJECTS
FORT LEE, VA**

Follow-up visit required
___ YES ___ NO

**STORMWATER INSPECTION FORM FOR CONSTRUCTION PROJECTS
FORT LEE, VA**

**Inspect site at least once every 14 calendar days and within 48 hours
of the end of a storm event that is 0.5 inches or greater.**

Contract No./Plot (Area): _____ Date: _____

Site Description: _____

Weather Condition: _____

Days Since Last Rainfall: _____ Amount of Last Rainfall: _____

Project Manager: _____

On-site Construction Inspector: _____

Contractor: _____ Site Telephone #: _____

Contractor's Superintendent: _____ Contractor's Tel. #: _____

24 Hour Emergency Tel. #: _____ Stormwater Inspector: _____

Are the following practices in satisfactory condition
and in compliance with the Stormwater Pollution Prevention Plan?

EROSION & SEDIMENT CONTROL PRACTICES

- | | |
|--|--|
| <input type="checkbox"/> surface roughening | <input type="checkbox"/> temporary stone construction entrance |
| <input type="checkbox"/> silt fence | <input type="checkbox"/> ground cover/perm. or temp. seeding |
| <input type="checkbox"/> dust control | <input type="checkbox"/> geotextile fabric/visqueen |
| <input type="checkbox"/> straw bale barrier | <input type="checkbox"/> outlet protection |
| <input type="checkbox"/> stormwater inlet protection | <input type="checkbox"/> stockpile covers |
| <input type="checkbox"/> safety fencing | <input type="checkbox"/> other _____ |

Issues: _____

Corrective Actions: _____

GROUND MAINTENANCE PRACTICES

- | | |
|--|---|
| <input type="checkbox"/> disposal of wash water to industrial waste system | <input type="checkbox"/> wells in operation |
| <input type="checkbox"/> presence of soil, grit or other sediment in sumps | <input type="checkbox"/> holding tanks |
| <input type="checkbox"/> other _____ | |

Issues: _____

Corrective Actions: _____

Follow-up visit required
 YES NO

**STORMWATER INSPECTION FORM FOR CONSTRUCTION PROJECTS
FORT LEE, VA**

CONSTRUCTION MATERIAL STORAGE PRACTICES

- general housekeeping
- hazardous material – labels, storage practice
- hazardous wastes – storage practices
- spill response equipment
- above ground storage tank (refueling)
- construction material (type) _____
- other _____
- paint
- solvents
- roof tar
- storage shed(s)

Issues: _____

Corrective Actions: _____

CONSTRUCTION EQUIPMENT AND VEHICLE MANAGEMENT PRACTICES

- equipment wash pad
- equipment leaks
- drip pans
- equipment parts and hazardous wastes storage
- equipment maintenance area
- other _____
- spill prevention
- hazardous material storage tank
- refueling area

Issues: _____

Corrective Actions: _____

Inspector:

Print Name: _____

Signature: _____

Representing: _____

INFORMATION PAPER

14 July 2008

SUBJECT: Changes to General Permit for Discharges of Stormwater from Construction Activities VAR100270

PURPOSE: To provide guidance on Stormwater Permit coverage for construction at Fort Lee.

FACTS:

- 1) After consultation with the Virginia Department of Recreation and Conservation (DCR) it was determined that the current General Permit is a project specific permit and independent projects cannot be granted coverage under the same permit number. Therefore, the use of Permit VAR100270 to cover the numerous construction projects on Fort Lee is a misapplication of the permit.
- 2) All projects currently under construction will continue to fall under the requirements of VAR100270 until completion, that is, they must continue to operate under the DOL/DPW-EMO approved Sediment and Erosion Control and Stormwater Pollution Prevention (SWP3) plans. DOL/DPW-EMO will continue regular inspections of these projects, and will serve as stormwater "regulator". See Table 1 for list of included projects.
- 3) Projects not listed must individually apply for coverage to DCR under the Virginia Stormwater Management Program. This applies to projects disturbing one or more acres, either individually or as part of an overall development. Additionally, all projects disturbing more than 10,000 square feet must comply with the requirements of the Virginia Sediment and Erosion Control Regulation to include the requirements for a Responsible Land Disturber and submission of a Sediment and Erosion Control Plan. IAW Fort Lee's permitted Small Municipal Separate Storm Sewer System (MS4), the contractor must submit any required registration statement and accompanying documentation for their project to the DOL/DPW EMO for review and approval at least 30 days prior to submission to DCR. The permit application must be filed and required fees paid by the "operator" of the construction project, as defined in 4VAC50-60. A copy of the registration form and fee structure is included at Table 2.
- 4) IAW Fort Lee's MS4 permit, DOL/DPW EMO will still routinely inspect construction sites for compliance with the law, however, the DCR will be the prime enforcement agency for construction stormwater permits, and will have the authority to inspect, issue citations, and level fines and penalties for violations. These changes have been included in a revised Fort Lee Special Environmental Conditions section to be added to all USACE specification packages for Fort Lee. Project Managers should review their specifications to ensure that these changes are incorporated. If you have any questions please contact Mr. Craig Norris, phone (804) 734-3772, email craig.norris@us.army.mil

Craig Norris/IMNE-LEE-PWE/734-3772

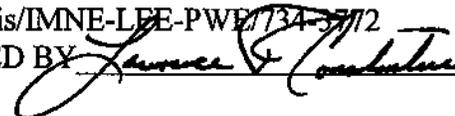
APPROVED BY  15 July 2008

TABLE 1

Projects to remain under the requirements of Permit VAR100270

- 1) Sustainment Center of Excellence (SCoE) HQ
- 2) Logistics University/Simulation Center
- 3) Soldier Support Center
- 4) TSED
- 5) North Range
- 6) TA-5 DFAC
- 7) TA-5 AIT Barracks
- 8) TA-5 Central Campus
- 9) TA-5 Infrastructure
- 10) Family Housing Replacement (Hunt)
- 11) DeCA addition

TABLE 2

VSMP General Permit Registration Statement - Construction Activity Stormwater Discharges (DCR01)

(Please Type or Print All Information)

- 1. **Construction Activity Operator** (NOTE: The permit will be issued to this operator, and the Certification in Item #13 must be signed by the appropriate person associated with this operator [see the instructions])

Name: _____

Mailing Address: _____

City: _____ State: _____ Zip: _____ Phone: _____

- 2. **Location of Construction Activity**

Name: _____

Address: _____

City: _____ State: _____ Zip: _____

If street address unavailable: Latitude _____ Longitude _____

Location of all Offsite Support Activities to be Covered Under the Permit

Name: _____

Address: _____

City: _____ State: _____ Zip: _____

If street address unavailable: Latitude _____ Longitude _____

- 3. **Status:** Federal State Public Private (Check one only)

- 4. **The Nature of the Construction Project** (e.g., commercial, industrial, residential, agricultural, oil and gas, etc.):

- 5. **Name of the Receiving Water(s)** _____

- 6. **If the Discharge Is Through a Municipal Separate Storm Sewer System (MS4), the Name of the Municipal Operator of the Storm Sewer:** _____

- 7. **Estimated Project Start Date:** _____ **Estimated Project Completion Date:** _____

- 8. **Total Land Area of Development** (to the nearest one-tenth acre): _____

Estimated Area to be Disturbed (to the nearest one-tenth acre): _____

- 9. **Is the area to be disturbed by the construction activity part of a larger common plan of development or sale?** Yes No

- 10. **Map:** Attach a topographic map or other map which clearly shows the location of the construction activity, the area to be disturbed (including offsite support activities), and the receiving stream(s) for the stormwater discharge(s).

NOTE: A stormwater pollution prevention plan (SWPPP) must be prepared in accordance with the requirements of the General VSMP Permit for Discharges of Stormwater from Construction Activities prior to submitting this Registration Statement. By signing this Registration Statement you are certifying that the SWPPP has been prepared.

- 11. **Location Where the SWPPP May be Viewed, and the Name and Phone Number of a Contact Person:** (NOTE: The contact person should be a person knowledgeable in the principles and practice of erosion and sediment controls, that is a licensed professional engineer, Responsible Land Disturber (RLD), or other knowledgeable person that (i) holds a certificate of competence from the board in the area of project inspection; or (ii) is enrolled in the board's training program for project inspection or combined administrator and successfully completes such program within one year of enrollment.)

Location of SWPPP: _____

Contact Person Name: _____ Phone Number: _____

- 12. **Permanent BMPs:** Attach a list of permanent BMPs (both structural and non-structural) that will be installed at the construction site. For each BMP, include the following information: (a) Type of BMP to be installed; (b) Geographic location (county - State Hydrologic Unit Code); (c) Waterbody the BMP will discharge into; and, (d) Number of acres that will be treated (to the nearest quarter acre).

- 13. **Certification:** "I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is to the best of my knowledge and belief true, accurate, and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment for knowing violations."

Print Name: _____ Title: _____

Signature: _____ Date: _____

(Please sign in INK. The person signing this form must be associated with the operator identified in item #1 above.)

For Department of Conservation and Recreation Use Only

Accepted/Not Accepted by: _____ Date: _____

Basin _____ Stream Class _____ Section _____ Special Standards _____



INSTRUCTIONS for FORM DCR 199-146

VPDES General Permit Registration Statement - Construction Activity Stormwater Discharges

General

A Registration Statement must be submitted when an operator makes application to the Department of Conservation and Recreation for coverage under the General VSMP Permit for Stormwater Discharges From Construction Activities. Mail the completed form to: The Department of Conservation and Recreation, Stormwater Permitting, 203 Governor Street, Suite 206, Richmond, Virginia 23219.

Section 1 Activity Operator Information

For the purposes of this general permit, "Operator" means any person, company, corporation, partnership, etc., associated with a construction project that meets either of the following two criteria: (1) has direct operational control over construction plans and specifications, including the ability to make modifications to those plans and specifications; or (2) has day-to-day operational control of those activities at a project which are necessary to ensure compliance with a stormwater pollution prevention plan for the site or other permit conditions (e.g., they are authorized to direct workers at a site to carry out activities required by the stormwater pollution prevention plan or comply with other permit conditions). The entities who are considered operators will commonly consist of the owner or developer of a project (the party with control of project specifications) and the general contractor (the party with day to day operational control of the activities at the project site which are necessary to ensure compliance with the permit). Contractors and subcontractors who are under the general supervision of the general contractor are not considered operators and would not need to submit a registration statement. Give the legal name of the operator, do not use a colloquial name. Enter the complete address and phone number of the operator. **The permit will be issued to this operator.**

Section 2 Activity Location Information

Enter the activity's official name and complete street address, including city, state and ZIP code. If the site lacks a street address, enter the latitude and longitude to the nearest 15 seconds of the approximate center of the site.

Offsite Support Activities

The general permit may be used to authorize stormwater discharges from activities that are located away from the construction site (e.g., concrete or asphalt batch plants, equipment staging yards, material storage areas, excavated material disposal areas, borrow areas) provided that they meet the following criteria: (1) The support activity is directly related to a construction site that is required to have VSMP permit coverage for discharges of stormwater associated with construction activity; (2) The support activity is not a commercial operation serving multiple unrelated construction projects by different operators, and does not operate beyond the completion of the construction activity at the last construction project it supports; and (3) Appropriate controls and measures are identified in a stormwater pollution prevention plan covering the discharges from the support activity areas.

Provide the information required for each offsite support activity seeking coverage. Support activities located off site are not required to be covered under this general permit. Discharges of stormwater from offsite support activities may be authorized under another VSMP permit. Where stormwater discharges from offsite support activities are not authorized under this general permit, the land area of the offsite support activity need not be included in determining the total land disturbance acreage of the activity seeking general permit coverage.

Section 3 Legal Status

Indicate the appropriate legal status of the operator of the site.

Section 4 Nature of the Construction Project

Examples: commercial, residential, agricultural, oil and gas, etc.

Section 5 Name of Receiving Water(s)

Enter the name of the receiving water(s) for all stormwater discharge(s), including any stormwater discharges from offsite support activities to be covered under the permit.

Section 6 Name of MS4 Operator

If the stormwater is discharged through a municipal separate storm sewer system (MS4), enter the name of the operator of the MS4.

Section 7 Estimated Project Start Date

Enter the date project is projected to start.

Estimated Project Completion Date

Enter the estimated project completion date.

The Department of Conservation and Recreation reserves the right to request additional information not directly addressed by the Registration Statement if, in its discretion, a facility or operation poses a potential impact on water quality.

Section 8 Total Land Area of the Development

Enter the total area (to the nearest 1/4 acre) of the development (meaning the total acreage of the larger common plan of development or sale). Include the acreage of any offsite support activities to be covered under the permit.

Estimated Acres to be Disturbed

Enter an estimate of the total number of acres of the site (to the nearest 1/4 acre) on which soil will be disturbed.

Section 9 Larger Common Plan of Development or Sale

Indicate if the area to be disturbed by the construction activity is part of a larger common plan of development or sale.

Section 10 Map

Attach a topographic map or other map which clearly shows the location of the construction activity, the area to be disturbed, and the receiving stream(s) for the stormwater discharge(s), including any offsite support activities to be covered under the permit.

Section 11 Location of Pollution Prevention Plan (SWPPP)

A stormwater pollution prevention plan (SWPPP) must be prepared in accordance with the requirements of the General VSMP Permit for Discharges of Stormwater from Construction Activities prior to submitting this Registration Statement. Give the location where the stormwater pollution prevention plan for the site may be viewed, and the name and phone number of a contact person. The contact person should be a person knowledgeable in the principles and practice of erosion and sediment controls, that is a licensed professional engineer, Responsible Land Disturber (RLD), or other knowledgeable person that (i) holds a certificate of competence from the board in the area of project inspection; or (ii) is enrolled in the board's training program for project inspection or combined administrator and successfully completes such program within one year of enrollment.

Section 12 Permanent BMPs That Will Be Installed

Attach a list of the permanent BMPs (both structural and non-structural) that will be installed at the construction site. For each BMP, include the following information:

- (a) Type of BMP to be installed
- (b) Geographic location (county - State Hydrologic Unit Code)
- (c) Waterbody the BMP will discharge into
- (d) Number of acres that will be treated (to the nearest quarter acre)

Section 13 Certification

The operator identified in Section 1 of this Registration Statement is responsible for certifying and submitting this Registration Statement. Please sign the form in INK. State statutes provide for severe penalties for submitting false information on this Registration Statement. State regulations require this Registration Statement to be signed as follows:

For a corporation; by a responsible corporate officer. For the purpose of this section, a responsible corporate officer means: (1) A president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy- or decision-making functions for the corporation, or (2) the manager of one or more manufacturing, production, or operating facilities provided the manager is authorized to make management decisions which govern the operation of the regulated facility including having the explicit or implicit duty of making major capital investment recommendations, and initiating and directing other comprehensive measures to assure long term environmental compliance with environmental laws and regulations; the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for permit application requirements; and where authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures; [*Note: if the title of the individual signing this form is "Plant Manager", submit a written verification that the authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures*].

For a partnership or sole proprietorship: by a general partner or the proprietor, or

For a municipality, state, Federal, or other public facility: by either a principal executive officer or ranking elected official.



**DEPARTMENT OF CONSERVATION AND RECREATION PERMIT APPLICATION FEE
FORM
EFFECTIVE SEPTEMBER 2004**

INSTRUCTIONS

Applicants for an individual Virginia Stormwater Management Program (VSMP) Permit is required to pay permit application fees. Fees are also required for registration for coverage under General Permits. Fees must be paid when applications for permit issuance or modification are submitted. Applications will be considered incomplete if the proper fee is not paid and will not be processed until the fee is received.

The permit fee schedule is included with this form. Fees for permit issuance or reissuance and for permit modification are included. Once you have determined the fee for the type of application you are submitting, complete this form. The original copy of the form and your check or money order payable to "Treasurer of Virginia" should be mailed to:

Virginia Department of Conservation and Recreation
Division of Finance, Accounts Payable
203 Governor Street, 4th Floor
Richmond, Virginia 23219

A copy of the form and a copy of your check or money order should accompany the permit application. You should retain a copy for your records. Please direct any questions regarding this form or fee payment to the Urban Programs Section of the Department of Conservation and Recreation at (804) 786-3998.

APPLICANT NAME: _____ SSN/FIN: _____

ADDRESS: _____

DAYTIME PHONE: (____) _____ - _____

FACILITY/ACTIVITY NAME: _____

LOCATION: _____

TYPE OF PERMIT APPLIED FOR

(from Fee Schedule): _____

TYPE OF ACTION: _____ New Issuance _____ Reissuance _____ Modification

AMOUNT OF FEE SUBMITTED

(from Fee Schedule): _____

EXISTING PERMIT NUMBER (if applicable): _____

FOR DCR USE ONLY	
Date: _____	DC #: _____



FEE SCHEDULES

A. VSMP Permits. Applications for issuance of new individual VSMP permits, and for permittee initiated major modifications that occur (and become effective) before the stated permit expiration date. [NOTE: Individual VSMP permittees pay an Annual Permit Maintenance Fee instead of a reapplication fee. The permittee is billed separately by DCR for the Annual Permit Maintenance Fee.]

TYPE OF PERMIT	ISSUANCE	MODIFICATION
VSMP Municipal Stormwater / MS4 Individual (Large and Medium)	\$21,300	\$10,650
VSMP Municipal Stormwater / MS4 Individual (Small)	\$2,000	\$1,000

B. Registration Statements for VSMP General Permit Coverage. The fee for filing a permit application (registration statement) for coverage under a VSMP stormwater general permit issued by the permit issuing authority is as follows:

TYPE OF PERMIT	ISSUANCE
VSMP Municipal Stormwater / MS4 General Permit (Small)	\$600
VSMP General / Stormwater Management - Phase I Land Clearing ("Large" Construction Activity - Sites or common plans of development equal to or greater than 5 acres)	\$500
VSMP General / Stormwater Management - Phase II Land Clearing ("Small" Construction Activity - Sites or common plans of development equal to or greater than 1 acre and less than 5 Acres)	\$300

C. Permit Maintenance Fees. The annual permit maintenance fees apply to each VSMP permit identified below, including expired permits that have been administratively continued.

TYPE OF PERMIT	MAINTENANCE
VSMP Municipal Stormwater / MS4 Individual (Large and Medium)	\$3,800
VSMP Municipal Stormwater / MS4 Individual (Small)	\$400
VSMP General / Stormwater Management - Phase I Land Clearing ("Large" Construction Activity - Sites or common plans of development equal to or greater than 5 acres)	\$0
VSMP General / Stormwater Management - Phase II Land Clearing ("Small" Construction Activity - Sites or common plans of development equal to or greater than 1 acre and less than 5 Acres)	\$0

LIST OF LOCAL RECYCLING COMPANIES
Updated List as of 02/26/09

Ace Recycling
1301 North Enon Church Road
Chester VA 23836
(804) 318-3701

Antique Building Products
P.O. Box 206
Amherst, VA 24521
(804) 946-0634

Atlantic Iron & Metal
30 Mill Street
Petersburg, VA 23803
(804) 861-1900
and
Richmond, VA 23224
(804) 232-4175
www.caravatis.com

CMC
4509 Pouncey Tract Road
Glen Allen, VA 23059
(804) 369-2120

S.B. Cox, Inc
901 Potomic Street
Richmond, VA 23231
(804) 222-2232

Dominion Salvage
607 Dinwiddie Avenue
Richmond, VA
(804) 231-7964

Dwight Snead Construction
11255 Washington Highway
Glen Allen, VA 23059
(804) 798-1611

Heartwood International
141 Heartwood Circle
Afton, VA 22920
(804) 361-1873

Mark Dunning Industries
1774 Fine Street
Prince George, VA 23875
(804) 732-4444

Mountain Lumber
P.O. Box 289
Ruckersville, VA 22968
(804) 445-2671
www.mountainlumber.com

N&W Salvage, Inc.
541 Trampton Road
Sandston, VA 23150
(804) 328-3440
and
319 West Williamsburg Road
Sandston, VA 23150
(804) 737-0279

Salvage Barn
5240 Hull Street Rd
Richmond, VA 23224
(804) 231-1187

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Fort Lee, Virginia

**Appendix FF
Project Signs**

EP 310-1-6a
01 Jun 06

Construction Project Identification Sign

Below are two samples of the Construction Project Identification sign showing how this panel is adaptable for use to identify either military (top) or civil works projects (bottom). The graphic format for this 4'x 6' sign panel follows the legend guidelines and layout as specified below. The large 4'x 4' section of the panel on the right is to be white with black legend. The 2'x 4' section of the sign on the left

with the full Corps Signature (reverse version) is to be screen-printed Communication Red on the white background. The designation of a sponsor in the area indicated is optional with Military or Civil Works construction signs. Signs may list one sponsoring entity. If agreement on a sponsor designation cannot be achieved, the area should be left blank.

This sign is to be placed with the Safety Performance sign shown on the following page. Mounting and fabrication details are provided on page 16-4.

Special applications or situations not covered in these guidelines should be referred to the district Sign Program Manager.

Legend Group 1: One- to two-line description of Corps relationship to project.
Color: White
Typeface: 1.25" Helvetica Regular
Maximum line length: 19"

Legend Group 2: Division or District Name (optional). Placed below 10.5' reverse Signature (6" Castle).
Color: White
Typeface: 1.25" Helvetica Regular

Legend Group 2a: One- to three-line identification of Military or Civil Works sponsor (optional). Place below Corps Signature to cross-align with Group 5a-b.
Color: White
Typeface: 1.25" Helvetica Regular
Maximum line length: 19"

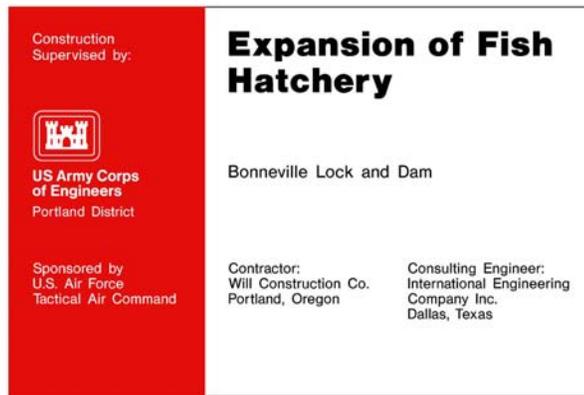
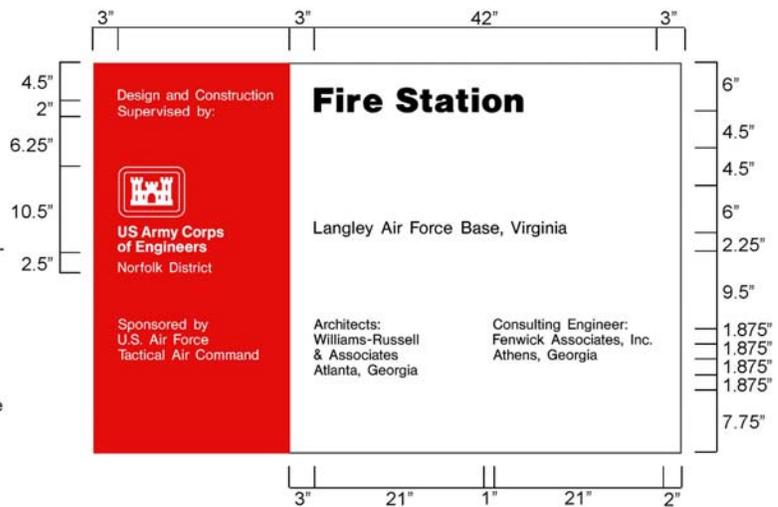
Legend Group 3: One- to three-line project title legend describes the work being done under this contract.
Color: Black
Typeface: 3" Helvetica Bold
Maximum line length: 42"

Legend Group 4: One- to two-line identification of project or facility (civil works) or name of sponsoring department (military).
Color: Black
Typeface: 1.5" Helvetica Regular
Maximum line length: 42"

Cross-align the first line of Legend Group 4 with the first line of the Corps Signature (US Army Corps) as shown.

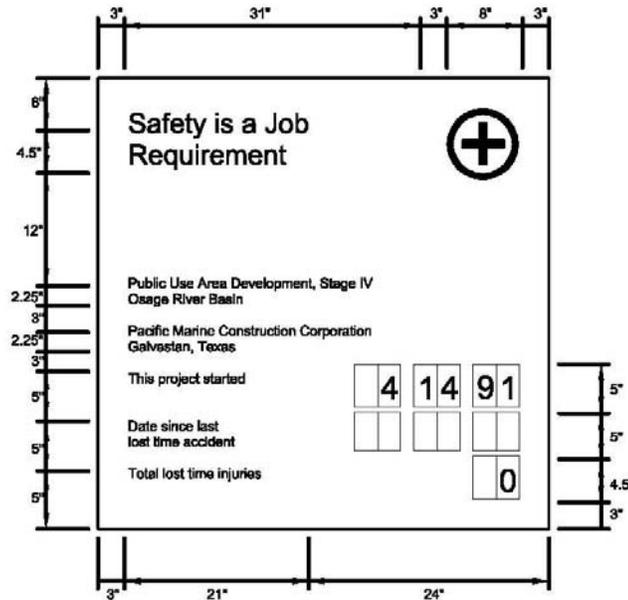
Legend Groups 5a-b: One- to five-line identification of prime contractors including: type (architect, general contractor, etc.), corporate or firm name, city, state. Use of Legend Group 5 is optional.
Color: Black
Typeface: 1.25" Helvetica Regular
Maximum line length: 21"

All typography is flush left and rag right, upper and lower case with initial capitals only as shown. Letter- and word-spacing to follow Corps standards as specified in Appendix D.



Sign Type	Legend Size (A)	Panel Size	Post Size	Specification Code	Mounting Height	Color Bkg/Lgd
CID-01	various	4'x6'	4"x4"	HDO-3	48"	WH-RD/BK

SAFETY SIGN



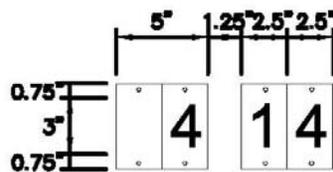
All typography is flush left and rag right, upper and lower case with initial capitals only as shown. Letter and word spacing to follow Corps Standards (EP 310-1-6a and 6b).

Legend Group 1: Standard two-line title "Safety is a Job Requirement" with (8" od.) Safety Green First Aid logo. Typeface: 3" Helvetica Bold; Color: Black.

Legend Group 2: One to two-line project title legend describes the work being done under this contract and name of host project. Typeface: 1.5" Helvetica Regular; Color: Black; Maximum line length: 42".

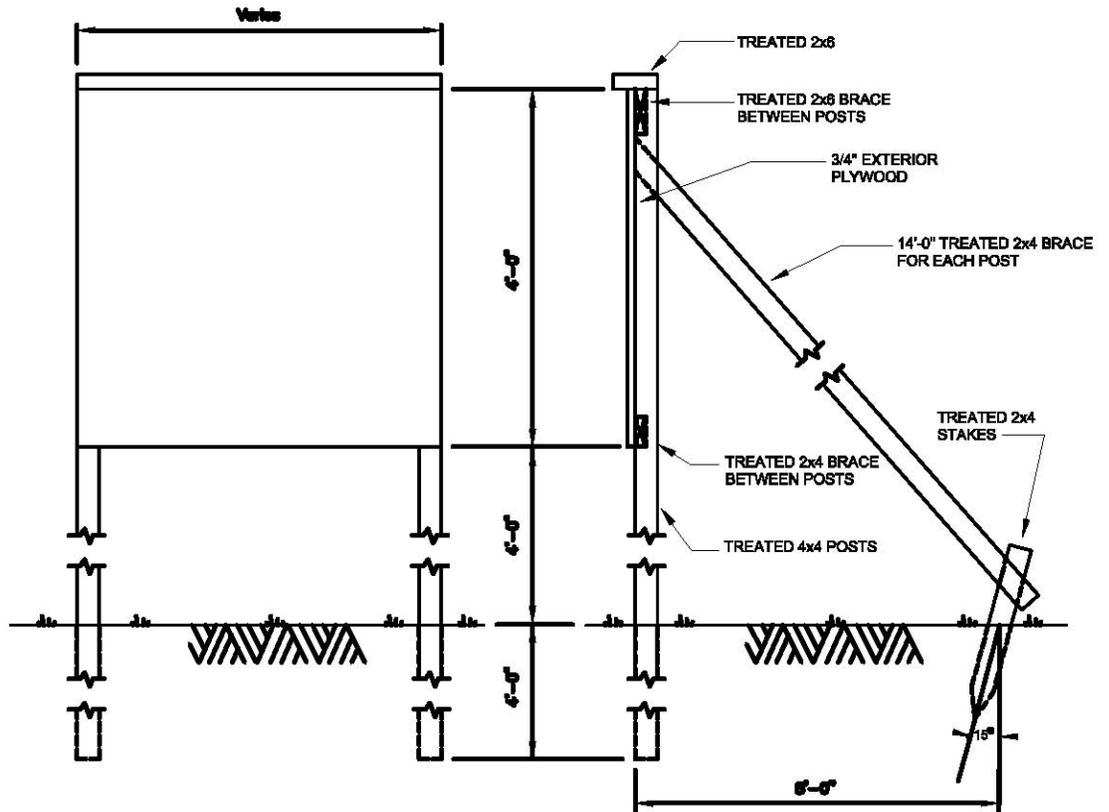
Legend Group 3: One to two-line identification: name of prime contractor and city, state address. Typeface: 1.5" Helvetica Regular; Color: Black; Maximum line length: 42".

Legend Group 4: Standard safety record captions as shown. Typeface 1.25" Helvetica Regular; Color: Black.



Replaceable numbers are to be mounted on white 0.060 aluminum plates and screw-mounted to backdrop. Typeface: 3" Helvetica Regular; Color: Black; Plate size: 2.5"x 4.5".

SIGN ERECTION DETAILS



Appendix GG

Government Furnished, Government Installed Equipment

DVC #	NOMENCLATURE	ASSIGNED
03-08	OBSOLETE - SKIN DECON. REFILL/M58A1	2
03-11	CHEM.DETECTOR TICKET/M256	10
03-16	CAM SIMULATOR, STS 701	4
05-07	BRIDGE, BAILEY, MODEL/M2	1
05-105	AN/PSS-14 SWEEP MONITORING SYSTEM (SMS)	1
05-105/1	AN/PSS-14 TRAINIING TARGET SET	1
05-107/1	TIED2, TRAINING IMPROVISED EXPLOSIVE DEVICE, INCREMENT 2	10
06-111A	CFFT 1.4 CONFIG	1
06-111B	CFFT 1:12 CONFIG	1
06-19C	ART MINE NOISE SIM/BOTH	8
07-132	LMTS CASE 460 LARGE #1	1
07-158	ITAS-FTS	10
07-161	LMTS SNIPER TRAINING SYSTEM L1750	1
07-22D	SMALL ARMS FLASH-NOISE SIM	26
07-59	M19 BFA	25
07-78B	TOW ITAS BASIS SKILLS TNR(BST)	4
08-01A	MANIKIN, NURSING DOLL	10
08-04	WAR-WOUND MOULAGE SET	15
08-14	CASUALTY SIM. KIT- 11E10	11
08-15	RESUSITATION TNG MANIKIN	1
08-16	MANIKIN,HEAD AND TORSO, CPR	3
08-37	CONVULSANT NERVE AGENT TR	15
09-19	5.56RIFLE 2:1 SCALE/M16A1	1
09-20	5.56RIFLE 2:1 SCALE/M16A2	4
11-122	CREW II	96
99-38	FIELD HANDLING TNR. AT4	160
99-41	DRY FIRE CABLE TRIGGER	7
99-79	MANNIKIN, CHILD, PTW 2600	1
AE DVC	COMPASS, LENSOMATIC	1
05-11		
AE DVC	MINE, M18A1, CLAYMORE	51
05-34		
T 05-041	PLACED TRAINING MINE(PTM)	8
T 05-047	UNEXPODED ORDINANCE KIT	3
T 05-054	IRAQI MINE TRAINING BOARD SET	5
T 05-062	IED KIT	16
T 05-42	OBSOLETE - M270 CRATERING KIT TR	1
T 07-083B	M16A2 PLASTIC RIFLE, 1:1	698
T 07-084	OBSOLETE - M16 SIGHTING DEVICE	75
T 07-086	TARGET BOX PADDLE	95
T 07-087	RIDDLE SIGHTING DEVICE	354
T 07-088	CHAMBER SAFETY FLAG	200
T 07-096	CARBINE, M4,-PLASTIC	118
T 07-099	9 MM PLASTIC PISTOL	47
T 07-83	M16A1 PLASTIC RIFLE	201

Appendix GG

Government Furnished, Government Installed Equipment

T 07-90B	MACS,CMBT.SIM.,(NINTENDO)	8
T 09-129	IRAQI MINE KIT	5
T 09-31	OBSOLETE - INERT USSR ROCKET&PROJECT	18
T 17-102	ARMOR VEH.MODELS 1/35TH	8
T 23-030B	M16A2 BRASS DEFLECTOR	170
T 23-033	M21 ANTI-TANK MINE(INERT)	5
T 23-034	M16A1 ANTI-PERSONNEL MINE	41
T 23-038	M14 ANTIPERSONNEL MINE	22
T 23-40	OBSOLETE - COMBINATION MINE	14
T 30-010	RG-42 ANTIPERSONNEL GRENADE	29
T 30-012	RKG-3 ANTITANK GRENADE	49
T 30-018	SVD SNIPER RIFLE	40
T 30-026	MAC 11 W/SILENCER	40
T 30-029	BRIEFCASE BOMB	3
T 30-030	SUICIDE BOMB VEST	10
T 30-034A	ISLAMIC DRESS PANTS MED MEN	50
T 30-034B	ISLAMIC DRESS PANTS MEN LRG	180
T 30-05	RPG-7 GRENADE LAUNCHER W/	65
T 30-06	AK-47 ASSAULT RIFLE MODEL	121
T 30-07	RPK SQUAD MACHINE GUN	43
T 30-09	POMZ-2 APERS MINE	27
T 30-16	OBSOLETE - OPPOSING FORCE UNIFORM	85
		3336
TADSS		3336
MILES		1,764
		1.02