MALCOLM PIRNIE

MALCOLM PIRNIE, INC.
ENVIRONMENTAL ENGINEERS, SCIENTISTS & PLANNERS

12 June 1998

USACE - Baltimore District
Attn: CENAB-EN-HM, Michelle Brock
10 South Howard Street
Baltimore, Maryland 21201

Re: 100% Design Contract Plans, Specifications and Cost Estimate
Michie Stadium Parking Lots Landfills C, E & F.
U.S. Military Academy, West Point, NY
US Army Corps Contract No. DACA31-94-D-0017

Dear Ms. Brock:

Malcolm Pirnie Inc. (MPI), in association with Louis Berger & Associates, Inc. (LBA) is pleased to submit the Phase I 100% Design for Michie Stadium Parking Lot Landfills (C, E & F). The Design has been prepared in accordance with the Army Corps Revised Scope of Work, dated 1 June 1998, for the above referenced Contract.

This submittal includes six (6) sets of the Contract Drawings, Contract Specifications, and MCACES Cost Estimates. Also included in this submittal are six draft copies of MPI/LBA responses to the 90% design comments. At your request, the 100% Design submittal has been sent to the individuals on the attached distribution list. Please advise your reviewers that, due to the severe time constraint, the 100% design analysis report (DAR) has not been finished and will be sent to you next week, and that on 10 June 1998 an additional scope change was requested by USMA to provide exterior lighting for the existing stairway between Stoney Lonesome Road and the access road to Lot E. This additional lighting design will be included in the backcheck design submittal.

MPI/LBA looks forward to continuing our work with the Army Corps on this assignment and maintaining the project schedule. Please feel free to call me at (914) 641-2721 or Gregg Stanzione at (914) 641-2627 if you have any questions or need any additional information.

Very truly yours,

MALCOLM PIRNIE, INC.

Michael P. Taylor, P.E.
Associate

cc: LBA: T. Lewis
Distribution list

MALCOLM PIRNIE

100%

COMPLETION PHASE

CONTRACT SPECIFICATIONS

For

Michie Stadium Parking Lot
Landfills (C, E & F)
USMA - West Point, New York

USACE Contract No. DACA31-94-D-0017

June 1998

Prepared by:
Louis Berger & Associates, Inc.
100 Halsted Street
East Orange, New Jersey 07019

In association with:
Malcolm Pirnie, Inc.
104 Corporate Park Drive
White Plains, New York 10602

US Army Corps of Engineers
Baltimore District
DRIVEN BY A VISION...to be the BEST

CONTRACTOR'S BIDDING SCHEDULE FOR:
MICHIE STADIUM PARKING LOTS (LANDFILLS C, E AND F)
USMA, WEST POINT, NY

ITEM	DESCRIPTION	EST. QTY.	UNIT	UNIT PRICE	TOTAL PRICE
ITEM 0001	***SITE PREPARATION/SUPPORT FACILITIES***				
0001.1	Mobilization /Demobilization	N/A	LS	N/A	
0001.2	Demolition	N/A	LS	N/A	
0001.3	Clearing, Grubbing and Tree Removal	N/A	LS	N/A	
0001.4	Miscellaneous	N/A	LS	N/A	
ITEM 0002	***LOT/ACCESS ROAD IMPROVEMENTS***				
0002.1	Landfill Excavation	5	CY		
0002.2	Rip Rap Drainage Swales	N/A	LS	N/A	
0002.3	Lot Aggregate/Bituminous Surface Treatment	N/A	LS	N/A	
0002.4	Gas Vent Stacks	N/A	LS	N/A	
0002.5	Access Road Improvements	N/A	LS	N/A	
ITEM 0003	***LIGHTING IMPROVEMENTS***				
0003.1	Landfill Excavation	175	CY		
0003.2	Lighting System	N/A	LS	N/A	

TOTAL BID PRICE (SUM OF ITEMS 0001 THROUGH 0003) _____

NOTES: N/A=Not Applicable; LS=Lump Sum; EA=Each; CY=Cubic Yard; SY=Square Yard; LF=Linear Foot

PROJECT TABLE OF CONTENTS

DIVISION 01 - GENERAL REQUIREMENTS

01010 SUMMARY OF WORK
01025 MEASUREMENT AND PAYMENT
01090 SOURCES FOR REFERENCE PUBLICATIONS
01110 SAFETY, HEALTH, AND EMERGENCY RESPONSE
01130 ENVIRONMENTAL PROTECTION
01300 SUBMITTAL PROCEDURES
01310 PROJECT SCHEDULE
01451 CONTRACTOR QUALITY CONTROL
01500 TEMPORARY CONSTRUCTION FACILITIES
01720 AS-BUILT DRAWINGS
01760 PROJECT CLOSEOUT

DIVISION 02 - SITE WORK

02050 DEMOLITION
02110 CLEARING, GRUBBING AND TREE REMOVAL
02222 EXCAVATION, TRENCHING, BACKFILLING, AND RIP RAP
02272 SEPARATION/FILTRATION GEOTEXTILE
02361 ROUND TIMBER PILES
02546 AGGREGATE SURFACE COURSE
02551 BITUMINOUS PAVING FOR STREETS
02555 BITUMINOUS SURFACE TREATMENT
02720 STORM-DRAINAGE AND GAS VENT SYSTEM
02841 W-BEAM GUIDE RAIL

DIVISION 03 - CONCRETE

03307 CONCRETE FOR MINOR STRUCTURES

DIVISION 16 - ELECTRICAL

16528 EXTERIOR LIGHTING

-- End of Project Table of Contents --

SECTION 01010

SUMMARY OF WORK

PART 1 GENERAL

1.1 SITE LOCATION

The Michie Stadium Parking Lots C, E and F are located on the grounds of the United States Military Academy (USMA), West Point, New York. Landfill parking Lot C is located west of Michie Stadium. Parking Lots E and F are located west of Howze Field and the Holleder Center. All three (3) landfill parking lots have multiple access routes, either from Stoney Lonesome Road, parking Lot A, or Fenton Place (see existing conditions on contract drawings).

1.2 SITE HISTORY

According to aerial photographs, Landfills C, E, and F were not active during the 1940's. By the early 1950's, landfill activities had begun. By 1970, these activities had ceased and the surface of the landfills were asphalt paved. Landfill C reportedly received wastes from around 1955 to 1956, with an average depth of fill of approximately 20 feet. Landfill E was reportedly in use from around 1952 to 1954 with fill depths ranging from 11 to 43 feet. Landfill F was reportedly in use around 1965 with the thickness of fill ranging from 11 to 18 feet. Reportedly, the wastes disposed included sanitary/domestic wastes, construction debris, limited waste oils and liquids and small amounts of PCB's.

1.3 EXISTING CONDITIONS

The USMA has reportedly, in the past, placed crushed stone and asphalt on the parking lots in an attempt to level the parking surfaces where landfill consolidation and differential settlement have resulted in the formation of surface depressions. According to the USMA, the crushed (recycled) asphalt is from construction activities elsewhere at West Point. The effects of differential settlement throughout the former landfills, combined with poor perimeter drainage, have resulted in a dilapidated parking surface and soil erosion problems down gradient from the landfill parking lots C, E and F.

1.4 PREVIOUS INVESTIGATIONS

Previous investigations were conducted to evaluate the groundwater, leachate seep and soil gas conditions, and to determine the horizontal and vertical extent of waste beneath each of the parking lots. Investigation reports include:

- Final Subsurface Investigation Report, USMA, West Point, NY (LAW Engineering and Environmental Services, 1994)
- Final RCRA Facility Assessment (RFA) of Ten Landfills Report, USMA, West Point, NY (Woodward-Clyde Federal Services (WCFS, 1995))
- Final Phase II Investigation Report of Six Landfills, USMA, West Point, NY (EA Engineering, Science and Technology, 1996)
- Final Quality Control summary Report Phase II Investigation of Six Landfills, USMA, West Point, NY (EA Engineering, Science and Technology, 1996)
- Final Phase II Leachate Management Report, USMA, West Point, NY (EA Engineering, Science and Technology, 1996)

- Final RCRA Facility Investigation of Ten Landfills, USMA, West Point, NY (Malcolm Pirnie Inc, 1997)

1.4.1 Test Borings and Subsurface Investigations

The 1995 investigation of Landfill C included the drilling of three (3) soil borings and the subsequent installation of monitoring wells around the perimeter of the landfill. Bedrock was encountered in one boring at a depth of 25 feet, and not encountered in the other two (2) shallow borings. Materials reported present in the landfill were domestic waste, construction debris, waste oils, and small quantities of PCB's.

The 1995 investigation of Landfill E included the drilling of five (5) borings and the subsequent installation of monitoring wells around the perimeter of the landfill. Five (5) borings were advanced and bedrock was not encountered, including one boring that was advanced to 43 feet. The thickness of the fill was uncertain, but appears to exceed 20 feet in all parts of the landfill except the upslope margins of the landfill. Similar to Landfill C, materials reported present in the landfill were domestic waste, construction debris, waste oils, and small quantities of PCB's.

The Landfill F investigation was to determine whether material present in the landfills had leached into surface water and/or ground water adjacent to and underlying the landfill. A total of four (4) monitoring wells were installed, including one up-gradient well, at least one down-gradient well, and one down-gradient nested pair. Materials reported present in the landfill were domestic waste, construction debris, waste oils, and small quantities of PCB's.

The work performed included the drilling of eleven (11) soil borings within the approximate limits of the landfill. The primary objective of the soil boring program was the characterization of site-specific stratigraphy and physical characteristics of the overburden material, the identification of the horizontal and vertical extent of waste (if present), and the determination of whether water bearing zone was present and being affected by the waste material. Soil samples were taken continuously for the first ten (10) feet, and at five (5) foot intervals thereafter.

1.4.2 Soil Gas and Geophysical Surveys

Explosive soil gas survey investigations were performed by MPI under a separate contract for each of the lots. Results of the explosive soil gas surveys indicate that the majority of the samples within the footprint of the parking lots and underlying landfills contained 100 percent of the lower explosive limit (LEL), that is five (5) percent methane by volume. Soil gas samples were primarily restricted within the footprint of the parking lots due to the steep surrounding topography (MPI, RCRA, 1997).

WCFS performed a geophysical survey of Landfills Lots C and E. Reported electrical conductivities for Landfill C were less than ten (10) mmhos along the perimeter of the landfill (where bedrock is shallow), to values of about 40 mmhos where the landfill materials are thicker and groundwater appeared to be present (WCFS, 1995). High anomalies, probably due to buried metal, were observed in the southern and northeastern portions of Landfill C.

For Landfill E, WCFS reported values of conductivities ranging from 15 mmhos or less along the western side of the parking lot (where depth to bedrock is anticipated to be shallow), to values up to approximately 80 mmhos, where the thickness of the landfill materials is greater and landfill materials are likely saturated (WCFS, 1995).

LAW conducted geophysical surveys at Landfill F to delineate the lateral extent of prior landfill activity. About 5,900 linear feet of EM-31 data

and 5,200 linear feet of magnetometer data were collected which help define the approximate horizontal limits of the landfill. However, the survey did not define the vertical extents for Landfill F.

1.4.3 Groundwater Sampling

Groundwater samples were analyzed for Volatile Organic Contaminants by EPA Method 8240, semi-volatile organic contaminant by EPA Method 8270, Pesticides/PCB by EPA Method 8080A, Inorganics (metals and cyanide), water quality parameters (color, chloride, fluoride, ammonia, nitrate, sulfate, alkalinity, hardness, total suspended solids, total dissolved solids, pH, and dissolved organic carbon), and total phenolics (EA, 1996). The results for each landfill are summarized below.

1.4.3.1 Subsurface and Phase II Investigation

Groundwater sampling at the landfills was conducted over two (2) periods. The first event was conducted by LAW in 1993 and the second by EA in 1995. As reported by EA, NYSDEC Class GA groundwater standards were exceeded for benzene and chlorobenzene for one monitoring well, and acetone for another. In the same report, (2- ethylhexyl) phthalate was reported in one sample but was also reported in the method blank. Up to 20 different inorganic analytes were reported in at least one of the samples. Metals exceeding NYSDEC Class GA groundwater standards include iron, manganese, sodium, ammonia and chloride.

LAW (1994) reported no detectable organics in their groundwater sample. They reported six (6) metals (iron, lead, manganese, mercury, nickel, and zinc) in the sample, with iron and manganese exceeding regulatory limits. All of the results, except for manganese and zinc, were reported at lower concentrations than in the study reported by EA, 1996.

Although the NYSDEC Class GA groundwater standards were exceeded for metals in some of these cases, the exceedences included iron, magnesium, manganese, and sodium; which are parameters associated with taste and odor considerations for drinking water quality. They are not considered "toxic" metals (EA, 1996).

1.4.4 Leachate Sampling

Leachate samples were analyzed for Volatile Organic Contaminants by EPA Method 8240, semi-volatile organic contaminant by EPA Method 8270, Pesticides/PCB by EPA Method 8080A, Inorganics (metals and cyanide), water quality parameters (color, chloride, fluoride, ammonia, nitrate, sulfate, alkalinity, hardness, total suspended solids, total dissolved solids, pH, and dissolved organic carbon), and total phenolics (EA, 1996).

1.4.4.1 Groundwater Quality Survey

EA obtained and analyzed water quality samples for comparability to leachate seeps, and were taken from a spring- fed stream located approximately 100 feet west of Route 218 near the Washington Gate entrance to USMA (EA, 1996). The spring-fed stream was not influenced by roadway runoff from Route 218, since it was approximately two (2) to three (3) feet above the roadbed. Background water quality for overburden ground-water wells was also evaluated using available up-gradient wells (EA, 1996).

Groundwater samples were analyzed for Volatile Organic Contaminants by EPA Method 8240, semi-volatile organic contaminant by EPA Method 8270, Pesticides/PCB by EPA Method 8080A, Inorganics (metals and cyanide), water quality parameters (color, chloride, fluoride, ammonia, nitrate, sulfate, alkalinity, hardness, total suspended solids, total dissolved solids, pH, and dissolved organic carbon), and total phenolics (EA, 1996).

The results from the background spring sample indicated no detectable VOC, or pesticides/PCBs in the sample. The only detectable SVOC, was

bis(2-ethylhexyl)phthalate (4 g/L). However, this analyte was also reported in the corresponding method blank (EA, 1996).

The inorganic and water quality parameter results for the background spring sample indicate that ten (10) of the 23 inorganic analytes were detected in the sample. All concentrations were below the NYSDEC Class GA groundwater standards or Class A surface water standards (NYSDEC 1993), except for iron. Of the eleven (11) water quality parameters tested, none of the concentrations were above the NYSDEC Class GA groundwater standards or Class A surface water standards (EA, 1996).

LAW (1994) reported the presence of iron, lead, and manganese at concentrations of 130, 4, and 5 g/L, respectively, from the background sample (BGLE-1) collected for the Phase I investigation. Higher iron and manganese concentrations were reported in the background sample collected from the current investigation. LAW (1994) reported higher alkalinity (73.7 mg/L), chloride (84.3mg/L), hardness (108 mg/L), and nitrate (0.18 mg/L), and lower ammonia (0.08 mg/L), chemical oxygen demand (10.3 mg/L), and color (12.3 color units), relative to those reported by EA (1996). This variability is likely due to the different locations used by the investigators for the background samples.

1.4.4.2 Subsurface and Phase II Investigation

Results of leachate seep samples collected by EA indicate some elevated metal concentrations, specifically iron, magnesium, manganese, and sodium. During previous investigations performed by WCFS in 1995, three (3) aqueous samples were collected adjacent to Parking Lot C (one up-slope and two down-slope). The samples were labeled as leachate seep samples LCSP-01, LCSP-02, and LCSP-03. Iron, sodium and chloride exceeded the NYSDEC GA groundwater standards. Results from other analyses were either below criteria or not regulated by the NYSDEC.

However, based on a site visit by MPI and USMA representatives, it was concluded that the two down-slope samples were apparently collected from surface water runoff. It is, therefore, believed that the up-slope sample may have been collected from ponded runoff with the intent of establishing background analytical information (MPDCD, 1997).

During previous investigations performed by WCFS, samples LESP-01, LESP-02, and LESP-03 were collected from peripheral areas. Iron, manganese, sodium and chloride exceeded the NYSDEC Groundwater Guidance Values. Results from other analysis were either below criteria or not regulated by the NYSDEC.

EA conducted leachate sampling in 1995. Based on the analytical results, there were no VOC's, SVOC's or pesticides/PCB's detectable in the samples.. However, iron, manganese and chloride exceed or equal NYSDEC Class GA groundwater standards or Class A surface water standards.

Sampling performed by LAW in 1994 reported no detectable organics in their samples. They reported six (6) metals (iron, lead, manganese, mercury, nickel , and zinc) present in the sampling. All of the results, except for manganese and zinc, were reported at lower concentrations in the more recent study (EA, 1996).

1.4.5 Surface Water

The drinking water supply for the USMA is obtained from surface water contained in the 29 square-mile Popolopen-Queensboro watershed. Surface water samples were obtained to measure the effect of leachate on nearby water.

WCFS collected surface water samples in 1995 around the vicinity of the subject parking lots. Analytical results indicate that, with the exception for tentatively identified semi-volatile compounds, none of the detected concentrations of organic chemicals exceeded 10 ug/l. Concentrations of

heavy metals (barium, cadmium, chromium, lead, mercury, and zinc) were generally low. Elevated concentrations of sodium and chloride present in the samples probably reflect the use of deicing compounds. Other results were below the NYSDEC Groundwater Guidance Values. The pH values from both surface water and seep samples were all between 5.78 and 7.03, indicating that surface waters and leachate seeps are near neutral. Conductivity values are relatively low, ranging from 60 to 1008 mmhos, suggesting that the dissolved chemical ions are also low (WCFS, 1996).

1.5 WORK ACTIVITIES

The summary of the Work as described in this section is an overall summary of the responsibilities of the CONTRACTOR and his relation to the CONTRACTING OFFICER. It does not supersede the specific requirements of the other Contract Documents.

In general, the Work under this contract consists of various improvements to Lots C, E and F, including lot regrading, lot bituminous surface treatment, drainage swale improvements, lighting upgrades, gas vent stacks, and access road improvements. More specifically, the Work includes, but is not limited to, the following Section 01025 MEASUREMENT AND PAYMENT: Item 0001 through Item 0003 as detailed in the Contract Documents.

All work shall be performed within the scheduling constraints of the USMA's agenda. Work may be restricted to one Lot at a time, with additional scheduling and mobilization arrangements to accommodate necessary USMA summer activities. More specific details of these restrictions can be found in Section 01310 PROJECT SCHEDULE and are subject to change at the Pre-Construction Conference.

The drainage swale improvements include work within existing swales at Lots C, E and F as well as along the Access Road to Lot E. All swales shall be excavated and have geotextile placed below the specified rip rap. Additionally, swales bordering landfill/parking lot areas shall h 1.5H:1V side slope with a grout layer on the landfill/parking lot Other swale improvements include the replacement of three lengths inch corrugated metal pipe along the Access Road to Lot E and var headwalls as specified on the Contract Drawings.

Lots C and E shall be regraded with additional aggregate fill mat The entire surfaces of Lots C, E and F shall be proof rolled, re single bituminous treatment and covered and rolled with a 3/8 in aggregate layer.

The asphalt Access Road to Lots C and E will be repaired and res according to Section 02551 BITUMINOUS TREATMENT FOR STREETS. A length of embankment off the access road shall receive a rip rap slope stabilization and guard rail installation.

Lighting improvements shall occur along all access roads and in all lots (C, E and F). Thirty-one new steel light poles shall be installed within Lots C, E and F, where specified, on pile supported reinforced concrete foundations. The power supply for this lighting system will be connected by underground conduit and include outlets, as specified, for USMA use in the lots. Existing wood poles removed from Lots C, E and F will be reused for additional lighting along the access roads. All lighting fixtures will be mounted and directed as specified. Gas vent stacks, where specified, shall be placed adjacent to the installation of new light poles and the existing monitoring wells in Lots C and E shall be provided with risers to meet the final grade..

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

SECTION 01025

MEASUREMENT AND PAYMENT

PART 1 GENERAL

1.1 LUMP SUM PAYMENT ITEMS

Payment items for the work of this contract for which contract lump sum payments will be made are listed in the BIDDING SCHEDULE and described below. All costs for items of work, which are not specifically mentioned to be included in a particular lump sum or unit price payment item, shall be included in the listed lump sum item most closely associated with the work involved. The lump sum price and payment made for each item listed shall constitute full compensation for furnishing all plant, labor, materials, tools, eqiopment, and incidentals, and performing any associated Contractor quality control, environmental protection, meeting safety requirements, testing, surveying, reports, and for performing all work required for which separate payment is not otherwise provided.

1.2 UNIT PRICE PAYMENT ITEMS

Payment items for the work of this contract on which the contract unit price payments will be made are listed in the BIDDING SCHEDULE and described below. The unit price and payment made for each item listed shall constitute full compensation for furnishing all plant, labor, materials, tools, eqiopment, and incidentals, and performing any associated Contractor quality control, environmental protection, meeting safety requirements, testing, surveying, reports, and for performing all work required for each of the unit price items.

1.3 ITEM 0001 - SITE PREPARATION/SUPPORT FACILITIES

1.3.1 Item 0001.1 Mobilization /Demobilization

Payment shall be made for all costs associated with transporting to and from the site all personnel and equipment, establishing support, staging and work areas and boundaries, initial setup and final removal of equipment, temporary facilities, temporary power connections for contractor and governmental trailers and final cleanup of construction site in accordance with the Contract Documents.

Unit of measure: lump sum.

1.3.2 Item 0001.2 Demolition

Payment shall be made for all costs associated with demolition activities specified other than listed in items 0002 through 0003. Work shall include, but not be limited to, the power lockout/tagout and demolition of all wood light poles, light fixtures and aerial wiring as indicated on the Contract Drawings. All light poles and fixtures shall be stored where directed by the Contracting Officer and shall become USMA property.

Unit of measure: lump sum.

1.3.3 Item 0001.3 Clearing, Grubbing and Tree Removal

Payment shall be made for all costs associated with operations necessary for clearing and grubbing, including trees of all sizes, and off-site disposal of all existing vegetation as required to complete the Work.

Unit of measure: lump sum.

1.3.4 Item 0001.4 Miscellaneous

Payment shall be made for all costs associated with activities required in conjunction with operations to provide the specified work. Work shall include, but not be limited to: submittal preparation; as-built drawings; Contractor Quality Control Plan; Close-out Plan; subcontractor coordination; Maintenance and Protection of Traffic (MPT) Plan, the Contractor shall submit an MPT Plan to the Contracting Officer for approval and install all construction signs as required and incorporate all required MPT measures; Soil Erosion and Sediment Control (SE&SC), the Contractor shall submit a SE&SC Plan for approval to the NY State approving agency and install the required erosion control measures; an Environmental Protection Plan; a Site Health and Safety Plan; a Construction Schedule; and other activities as specified by the Contracting Officer exclusive of items 0002 through 0003.

Unit of measure: lump sum.

1.4 ITEM 0002 - LOT/ACCESS ROAD IMPROVEMENTS

1.4.1 Item 0002.1 Landfill Excavation

Payment shall be made for all costs associated with the excavation of any landfill materials necessary for the placement of gas vent stacks as detailed in the Contract Drawings. There will be no offsite disposal of landfill material. Work shall include, but not be limited to: excavation; shoring; and, monitoring and Health and Safety compliance activities. The total quantity of material for which payment shall be made shall be approved by the Contracting Officer, but no greater than the pay limits established in the contract drawings.

Unit of measure: cubic yard.

1.4.2 Item 0002.2 Rip Rap Drainage Swales

Payment shall be made for all costs associated with providing the demolition of existing drainage features to be removed, soil excavation, rip rap stone, geotextile, piping and concrete headwalls for the drainage swales as specified. Work shall include, but not be limited to: geotextile placement along the bottom of rip rap swales; seaming, testing, protecting and anchoring the geotextile; bedding placement, construction with reinforced steel, formwork, and CIP concrete as well as backfill for the headwall construction; stone stockpiling; stone placement in swales and for outlet protection at culvert replacements; and grout placement on landfill adjacent side of drainage swales. Other work as necessary for the completion of Item 0002.2 includes, but is not limited to: surveying services; and soil testing services.

Unit of measure: lump sum.

1.4.3 Item 0002.3 Lot Aggregate/Bituminous Surface Treatment

Payment shall be made for all costs associated with the operations necessary to: provide the aggregate surface course for lots C, E and F as specified; provide a bituminous surface treatment for lots C, E, and F; and install the monitoring well risers. Work shall include, but not be limited to: break up areas of existing asphalt pavement; crushed stone placement; grading to obtain specified grades; compaction with pneumatic-tired or steel wheeled rollers; proof rolling by heavy rubber-tired roller; additional aggregate placement in areas depressed by compaction and proof rolling; apply asphalt emulsion by spray truck on specified crushed stone surfaces; spread 3/8 inch layer of crushed stone by mechanical spreader; and roll finished surface with pneumatic-tired or steel-wheel roller; and

all activities necessary for the installation of the monitoring well risers. Other work as necessary for the completion of Item 0002.3 includes, but is not limited to: surveying services; and testing for aggregate density, aggregate moisture and aggregate wear.

Unit of measure: lump sum.

1.4.4 Item 0002.4 Gas Vent Stacks

Payment shall be made for all costs associated with the operations necessary to provide gas vent stacks as specified. Work shall include, but not be limited to: surveying services; drilling and excavation and minor trenching according to landfill specifications, custom geotextile installation; perforated PVC installation below grade; PVC riser installation against new light pole; select fill for backfill; resurfacing according to Item 0002.3.

Unit of measure: lump sum.

1.4.5 Item 0002.5 Access Road Improvements

Payment shall be made for all costs associated with the operations necessary to provide the improvements to the access road between lot C and E, as specified. Work shall include, but not be limited to: surveying services; asphalt true and levelling of existing road depressions/repairs; asphalt resurfacing course; rip rap slope protection; and guard rail installation.

Unit of measure: lump sum.

1.5 ITEM 0003 - LIGHTING IMPROVEMENTS

1.5.1 Item 0003.1 Landfill Excavation

Payment shall be made for all costs associated with the excavation of any landfill materials necessary for the placement of steel pole foundations and the replacement of all excavated landfill material, including gas vent stack excavation materials, around each steel pole foundation under the aggregate surface course, as detailed in the Contract Drawings. There will be no offsite disposal of landfill materials. Work shall include, but not be limited to: excavation; shoring; and, monitoring and Health and Safety compliance activities. The total quantity of material for which payment shall be made shall be approved by the Contracting Officer, but no greater than the pay limits established in the contract drawings.

Unit of measure: cubic yard.

1.5.2 Item 0003.2 Lighting System

Payment shall be made for all costs associated with operations necessary to provide steel poles, light fixtures and conduit/wiring as specified for lots C, E and F and to upgrade the access road lighting between lots A to F and lots C to E using existing/relocated wood poles and new light fixtures and conduit/wiring. Work shall include, but not be limited to: excavation and augering; reinforced concrete installation; timber piles installed as specified; conduit trenching; Schedule 80 PVC conduit and wiring; installation of all electrical controls, panels, handholes and outlets as specified; installation of steel poles (6 inch by 30 feet) and light fixtures; connections to existing power; relocation of wood poles for access roads as specified; the provision of all necessary materials; surveying services; testing; and all work necessary for the installation of the lighting system as specified.

Unit of measure: lump sum.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION (Not Applicable)

-- End of Section --

SECTION 01090

SOURCES FOR REFERENCE PUBLICATIONS

PART 1 GENERAL

1.1 REFERENCES

Various publications are referenced in other sections of the specifications to establish requirements for the work. These references are identified in each section by document number, date and title. The document number used in the citation is the number assigned by the sponsoring organization, e.g. UL 1 (1993; Rev thru Jan 1995) Flexible Metal Conduit. However, when the sponsoring organization has not assigned a number to a document, an identifying number has been assigned for convenience, e.g. UL's unnumbered 1995 edition of their Building Materials Directory is identified as UL-01 (1995) Building Materials Directory. The sponsoring organization number (UL 1) can be distinguished from an assigned identifying number (UL-1) by the dash mark (-).

1.2 ORDERING INFORMATION

The addresses of the organizations whose publications are referenced in other sections of these specifications are listed below, and if the source of the publications is different from the address of the sponsoring organization, that information is also provided. Documents listed in the specifications with numbers which were not assigned by the sponsoring organization should be ordered from the source by title rather than by number.

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)

444 N. Capital St., NW, Suite 249
Washington, DC 20001
Ph: 202-624-5800
Fax: 202-624-5806

ACI INTERNATIONAL (ACI)

P.O. Box 9094
Farmington Hills, MI 48331
Ph: 810-848-3700
Fax: 810-848-3766

AMERICAN CONFERENCE OF GOVERNMENTAL INDUSTRIAL HYGIENISTS (ACGIH)

1330 Kemper Meadow Dr.
Cincinnati, OH 45240
Ph: 513-742-2020
Fax: 513-742-3355

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

11 West 42nd St
New York, NY 10036
Ph: 212-642-4900
Fax: 212-302-1286
Internet: http://www.ansi.org/

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

100 Barr Harbor Drive
West Conshohocken, PA 19428-2959

Ph: 610-832-9500
Fax: 610-832-9555
Internet: http://www.astm.org

AMERICAN WOOD-PRESERVERS' ASSOCIATION (AWPA)

P.O. Box 286
Woodstock, MD 21163-0286
Ph: 410-465-3169
Fax: 410-465-3195

ARMY CORPS OF ENGINEERS, WATERWAYS EXPERIMENT STATION (COE)

Attn: Research Library
3909 Halls Ferry Rd.
Vicksburg, MS 39180-6199
Ph: 601-634-2543
Fax: 601-634-2542
http://www.wes.army.mil

CODE OF FEDERAL REGULATIONS (CFR)

Order from:
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Washington, DC 20402
Ph: 202-512-1800
Fax: 202-275-7703
Internet: http://www.pls.com:8001/his/cfr.html

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-- End of Section --

SECTION 01110

SAFETY, HEALTH, AND EMERGENCY RESPONSE

PART 1 GENERAL

1.1 REFERENCES

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

AMERICAN CONFERENCE OF GOVERNMENTAL INDUSTRIAL HYGIENISTS (ACGIH)

ACGIH-02	(1998) Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI Z358.1	(1990) Emergency Eyewash and Shower Equipment

CODE OF FEDERAL REGULATIONS (CFR)

29 CFR 1904	Recording and Reporting Occupational Injuries and Illnesses
29 CFR 1910	Occupational Safety and Health Standards
29 CFR 1926	Safety and Health Regulations for Construction

ENGINEERING MANUALS

EM 385-1-1	(1996) U.S. Army Corps of Engineers Safety and Health Requirements Manual

NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH (NIOSH)

NIOSH Pub No. 85-115	(1985) Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities

1.2 DESCRIPTION OF WORK

This section provides additional requirements for implementing the accident prevention provisions of EM 385-1-1, and specifies a Site Safety and Health Plan (SSHP) which shall satisfy the requirements for submission of a separate Accident Prevention Plan (APP) as required by EM 385-1-1. The requirements shall apply to work performed in both "contaminated" and "clean" areas. The Contractor's Site Safety and Health Officer (SSHO) shall conduct the safety meeting pursuant to EM 385-1-1, Paragraph 01.B.03.

1.3 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 01300 SUBMITTAL PROCEDURES:

SD-09 Reports

Site Safety and Health Plan; GA

Site Superintendant Resume; GA

Provide a resume of the proposed Site Superintendant showing a minimum of (5) years of similar experience.

Monitoring Results; GA

Personnel exposure monitoring/ results.

Site control log; GA

Record of each entry and exit into the site, as specified.

1.4 REGULATORY REQUIREMENTS

Work performed under this contract shall comply with EM 385-1-1, applicable Federal, state, and local safety and occupational health laws and regulations. This includes, but is not limited to, Occupational Safety and Health Administration (OSHA) standards, 29 CFR 1910, especially Section .120, "Hazardous Waste Site Operations and Emergency Response" and 29 CFR 1926, especially Section .65, "Hazardous Waste Site Operations and Emergency Response". Matters of interpretation of standards shall be submitted 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.

1.5 SAFETY AND HEALTH PROGRAM

OSHA Standards 29 CFR 1910, Section .120 (b) and 29 CFR 1926, Section .65 (b) require employers to develop and implement a written Safety and Health Program for employees involved in hazardous waste operations. The site-specific program requirements of the OSHA Standards shall be integrated into one site-specific document, the Site Safety and Health Plan (SSHP). The SSHP shall interface with the employer's overall Safety and Health Program. Any portions of the overall Safety and Health Program that are referenced in the SSHP shall be included as appendices to the SSHP.

1.6 SITE SAFETY AND HEALTH PLAN

1.6.1 Preparation and Implementation

A Site Safety and Health Plan (SSHP) shall be prepared covering onsite work to be performed by the Contractor and all subcontractors. The Safety and Health Manager shall be responsible for the development, implementation and oversight of the SSHP. The SSHP shall establish, in detail, the protocols necessary for the anticipation, recognition, evaluation, and control of hazards associated with each task performed. The SSHP shall address site-specific safety and health requirements and procedures based upon site-specific conditions. The level of detail provided in the SSHP shall be tailored to the type of work, complexity of operations to be performed, and hazards anticipated. Details about some activities may not be available when the initial SSHP is prepared and submitted. Therefore, the SSHP shall address, in as much detail as possible, anticipated tasks, their related hazards and anticipated control measures. Additional details shall be included in the activity hazard analyses as described in paragraph 1.9 ACTIVITY HAZARD ANALYSES.

1.6.2 Acceptance and Modifications

Prior to submittal, the SSHP shall be signed and dated by the Safety and Health Manager and the Site Superintendent. The SSHP shall be submitted for review 20 days prior to the Preconstruction Coordination Meeting as specified in Section 01440, CONTRACTOR QUALITY CONTROL. Deficiencies in the SSHP will be discussed at the Coordination Meeting, and the SSHP shall

be revised to correct the deficiencies and resubmitted for acceptance. Other safety topics to be discussed at the Coordination Meeting shall include, but not be limited to: site hazards, action levels (including limits for upgrade of personal protective equipment), health and safety personnel, levels of protection for site workers, site monitoring program, site control measures, and emergency response and contingency procedures. Onsite work shall not begin until the plan has been accepted. A copy of the written SSHP shall be maintained onsite.

As work proceeds, the SSHP shall be adapted to new situations and new conditions. Changes and modifications to the accepted SSHP shall be made with the knowledge and concurrence of the Safety and Health Manager, the Site Superintendent, and the Contracting Officer. Should any unforeseen hazard become evident during the performance of the work, the Site Safety and Health Officer (SSHO) shall bring such hazard to the attention of the Safety and Health Manager, the Site Superintendent, and the Contracting Officer, both verbally and in writing, for resolution as soon as possible. In the interim, necessary action shall be taken to re-establish and maintain safe working conditions in order to safeguard onsite personnel, visitors, the public, and the environment. Disregard for the provisions of this specification or the accepted SSHP shall be cause for stopping of work until the matter has been rectified.

1.6.3 Availability

The SSHP shall be made available in accordance with 29 CFR 1910, Section .120 (b)(1)(v) and 29 CFR 1926, Section .65 (b)(1)(v).

1.6.4 Elements

Topics required by 29 CFR 1910, Section .120 (b)(4) 29 CFR 1926, Section .65 (b)(4) and the Accident Prevention Plan as described in Table 1-1 of EM 385-1-1 and those described in this section shall be addressed in the SSHP. Where the use of a specific topic is not applicable to the project, the SSHP shall include a statement to justify its omission or reduced level of detail and establish that adequate consideration was given the topic.

1.7 SITE DESCRIPTION AND CONTAMINATION CHARACTERIZATION

1.7.1 Project/Site Conditions

The subsurface boring and monitoring well logs for the Lots are included in the Appendix to these Specifications.

1.7.2 Plan Requirements

The SSHP shall include a site description and contamination characterization section that addresses the following elements:

a. Description of site location, topography, size and past uses of the site.

b. A list of contaminants which may present occupational health and safety hazards. This list shall be created by evaluating the analytical results in the appendices to these Specifications and by researching sources of information from past site investigation activities. Chemical names, concentration ranges, media in which found, locations onsite, and estimated quantities/volumes to be impacted by site work shall be included if known.

1.8 HAZARD/RISK ANALYSIS

The SSHP shall include a safety and health hazard/risk analysis for each site task and operation to be performed. The hazard/risk analysis shall provide information necessary for determining safety and health procedures, equipment, and training to protect onsite personnel, the environment, and

the public. Available site information shall be reviewed when preparing the "Hazard/Risk Analysis" section of the SSHP. The following elements, at a minimum, shall be addressed.

1.8.1 Site Tasks and Operations (Workplan)

The SSHP shall include a comprehensive section that addresses the tasks and objectives of the site operations and the logistics and resources required to reach those tasks and objectives. Based on the type of work required, the following is a list of anticipated major site tasks and operations to be performed: This is not a complete list of site tasks and operations, therefore, it shall be expanded and/or revised, during preparation of the SSHP as necessary.

a. Mobilization/demobilization of equipment and temporary support facilities;

b. Miscellaneous minor concrete construction;

c. Construction of several stormwater culverts;

d. Construction of several stormwater swales;

1.8.2 Hazards

The following potential hazards may be encountered during site work. These are not complete lists, therefore, they shall be expanded and/or revised as necessary during preparation of the SSHP.

1.8.2.1 Safety Hazards

Potential safety hazards include: underground/aboveground utilities; heavy equipment/machinery operation; excavation; vehicle traffic; and lifting operations.

1.8.2.2 Chemical Hazards

Potential chemical hazards that may be encountered during site work are discussed in paragraph SITE DESCRIPTION AND CONTAMINATION CHARACTERIZATION. The Hazard/Risk Analysis section of the SSHP shall describe the chemical, physical, and toxicological properties of contaminants, sources and pathways of employee exposures, anticipated onsite and offsite exposure level potentials, and regulatory (including Federal, state, and local) or recommended protective exposure standards. The SSHP shall also address employee exposure to hazardous substances brought onsite, and shall comply with the requirements of 29 CFR 1910, Section .1200 and 29 CFR 1926, Section .59, Hazard Communication.

1.8.2.3 Physical Agents

Potential physical hazards include: trenches; fire hazards; wet/loose soils and slip/trip/fall obstacles; jagged debris and material; noise; and temperature (i.e. heat stress or cold exposure).

1.8.2.4 Biological Hazards

Potential biological hazards include; poison ivy and poison oak; ticks and snakes.

1.8.3 Action Levels

1.8.3.1 General

Action levels shall be established for the situations listed below, at a minimum. The action levels and required actions (engineering controls,

changes in PPE, etc.) shall be presented in the SSHP in both text and tabular form. The action levels shown below are the minimum required.

a. Implementation of engineering controls and work practices.

b. Upgrade or downgrade in level of personal protective equipment.

1. FID reading 0 ppm to 5 ppm: Use Level D/Modified Level D PPE.

2. FID reading greater the 5 ppm and less than or equal to 50 ppm: Use Level C PPE; use detector tubes to characterize vapors; downgrade to Level D depending on results of detector tube testing.

3. Detector tube reading background to 1/2 PEL: Use Level D/Modified Level D PPE.

4. Detector Tube reading greater than 1/2 PEL and less than or equal to 10 X PEL: Use Level C PPE (Level B for benzene or tetrachloroethane).

5. CGI (for methane) less than 25% LEL: Continue working with monitoring.

c. Work stoppage and/or emergency evacuation of onsite personnel.

1. FID reading greater than 50 ppm: Withdraw from work area and reassess situation.

2. Detector tubes reading above 10 X PEL: Withdraw from work area and reassess situation.

3. CGI reading equal to or greater than 25% LEL: Withdraw from work area and reassess situation.

d. Prevention and/or minimization of public exposures to hazards created by site activities.

1.8.3.2 Confined Space Entry and Trench/Excavation Safety

Entry into and work in a confined space will not be allowed when oxygen readings are less than 19.5% or greater than 23.5% or if the Lower Flammable Limit (LFL) reading is greater than 10%, unless these conditions are adequately addressed in the confined space entry program. In addition, action levels for toxic atmospheres shall be determined.

1.9 ACTIVITY HAZARD ANALYSES

Prior to beginning each major phase of work, an Activity Hazard Analysis shall be prepared by the Contractor performing that work and submitted for review and acceptance. The format shall be in accordance with EM 385-1-1, figure 1-1. A major phase of work is defined as an operation involving a type of work presenting hazards not experienced in previous operations or where a new subcontractor or work crew is to perform. The analysis shall define the activities to be performed and identify the sequence of work, the specific hazards anticipated, and the control measures to be implemented to eliminate or reduce each hazard to an acceptable level. Work shall not proceed on that phase until the activity hazard analysis has been accepted and a preparatory meeting has been conducted by the Contractor to discuss its contents with everyone engaged in the activities, including the government onsite representatives. The activity hazard analyses shall be continuously reviewed and when appropriate modified to address changing site conditions or operations, with the concurrence of the Safety and Health Manager, the Site Superintendent, and the Contracting Officer. Activity hazard analyses shall be attached to and become a part of the SSHP.

1.10 STAFF ORGANIZATION, QUALIFICATIONS, AND RESPONSIBILITIES

An organizational structure shall be developed that sets forth lines of authority (chain of command), responsibilities, and communication procedures concerning site safety, health, and emergency response. This organizational structure shall cover management, supervisors and employees of the Contractor and subcontractors. The structure shall include the means for coordinating and controlling work activities of subcontractors and suppliers. The SSHP shall include a description of this organizational structure as well as qualifications and responsibilities of each of the following individuals. The Contractor shall obtain Contracting Officer's acceptance before replacing any member of the Safety and Health Staff. Requests shall include the names, qualifications, duties, and responsibilities of each proposed replacement.

1.10.1 Site Superintendent

A Site Superintendent, who has responsibility to implement the SSHP, the authority to direct work performed under this contract and verify compliance, shall be designated.

1.10.2 Safety and Health Manager

1.10.2.1 Qualifications

The services of an Industrial Hygienist certified by the American Board of Industrial Hygiene shall be utilized. The name, qualifications (education summary and documentation), and work experience summary shall be included in the SSHP. The Safety and Health Manager shall have the following additional qualifications:

a. A minimum of 2 years experience in developing and implementing safety and health programs at similar sites.

b. Documented experience in supervising professional and technician level personnel.

c. Documented experience in developing worker exposure assessment programs and air monitoring programs and techniques.

d. Documented experience in the development of personal protective equipment programs, including programs for working in and around potentially toxic, flammable and combustible atmospheres and confined spaces.

e. Working knowledge of state and Federal occupational safety and health regulations.

1.10.2.2 Responsibilities

The Safety and Health Manager shall:

a. Be responsible for the development, implementation, oversight, and enforcement of the SSHP.

b. Sign and date the SSHP prior to submittal.

c. Conduct initial site-specific training.

d. Be available for emergencies.

e. Provide written and verbal notices of non-performance to subcontractor supervisory personnel in the event that subcontractor field personnel fail to adhere to the procedures set forth in the subcontractor's SSHP.

f. Provide onsite consultation as needed to ensure the SSHP is fully implemented.

g. Coordinate any modifications to the SSHP with the Site Superintendent, the SSHO, and the Contracting Officer.

h. Provide continued support for upgrading/downgrading of the level of personal protection.

i. Be responsible for evaluating air monitoring data and recommending changes to engineering controls, work practices, and PPE.

j. Review accident reports and results of daily inspections.

k. Serve as a member of the Contractor's quality control staff.

1.10.3 Site Safety and Health Officer (SSHO)

1.10.3.1 Qualifications

An individual and one alternate shall be designated the Site Safety and Health Officer (SSHO). The name, qualifications (education and training summary and documentation), and work experience of the Site Safety and Health Officer and alternate shall be included in the SSHP. The SSHO shall have the following qualifications:

a. A minimum of 1 year experience in implementing safety and health programs at hazardous waste sites where Level C personal protective equipment was required.

b. Documented experience in construction techniques and construction safety procedures.

c. Working knowledge of Federal and state occupational safety and health regulations.

d. Specific training in personal and respiratory protective equipment program implementation, confined space program oversight, and in the proper use of air monitoring instruments, and air sampling methods.

1.10.3.2 Responsibilities

The Site Safety and Health Officer shall:

a. Assist and represent the Safety and Health Manager in onsite training and the day to day onsite implementation and enforcement of the accepted SSHP.

b. Be assigned to the site on a full time basis for the duration of field activities. If operations are performed during more than one work shift per day, a site Safety and Health Officer shall be present for each shift.

c. Have authority to ensure site compliance with specified safety and health requirements, Federal, state and OSHA regulations and all aspects of the SSHP including, but not limited to, activity hazard analyses, air monitoring, use of PPE, decontamination, site control, standard operating procedures used to minimize hazards, safe use of engineering controls, the emergency response plan, confined space entry procedures, spill containment program, and preparation of records by performing a daily safety and health inspection and documenting results on the Daily Safety Inspection Log.

d. Have authority to stop work if unacceptable health or safety

conditions exist, and take necessary action to re-establish and maintain safe working conditions.

e. Consult with and coordinate any modifications to the SSHP with the Safety and Health Manager, the Site Superintendent, and the Contracting Officer.

f. Serve as a member of the Contractor's quality control staff on matters relating to safety and health.

g. Conduct accident investigations and prepare accident reports.

h. Review results of daily quality control inspections and document safety and health findings into the Daily Safety Inspection Log.

i. In coordination with site management and the Safety and Health Manager, recommend corrective actions for identified deficiencies and oversee the corrective actions.

1.10.4 Occupational Physician

1.10.4.1 Qualifications

The services of a licensed physician, who is certified in occupational medicine by the American Board of Preventative Medicine, or who, by necessary training and experience is Board eligible, shall be utilized. The physician shall be familiar with this site's hazards and the scope of this project. The medical consultant's name, qualifications, and knowledge of the site's conditions and proposed activities shall be included in the SSHP.

1.10.4.2 Responsibilities

The physician shall be responsible for the determination of medical surveillance protocols and for review of examination/test results performed in compliance with 29 CFR 1910, Section .120 (f) and 29 CFR 1926, Section .65 (f) and paragraph MEDICAL SURVEILLANCE.

1.10.5 Persons Certified in First Aid and CPR

At least two persons who are currently certified in first aid and CPR by the American Red Cross or other approved agency shall be onsite at all times during site operations. They shall be trained in universal precautions and the use of PPE as described in the Bloodborne Pathogens Standard of 29 CFR 1910, Section .1030. These persons may perform other duties but shall be immediately available to render first aid when needed..

1.11 TRAINING

Personnel shall receive training in accordance with the Contractor's written safety and health training program and 29 CFR 1910 Section .120, 29 CFR 1926 Section .65, and 29 CFR 1926 Section .21. The SSHP shall include a section describing training requirements.

1.11.1 General Hazardous Waste Operations Training

Personnel entering the exclusion or contamination reduction zones shall have successfully completed 40 hours of hazardous waste instruction off the site; 3 days actual field experience under the direct supervision of a trained, experienced supervisor; and 8 hours refresher training annually. Onsite supervisors shall have completed the above training and 8 hours of additional, specialized training covering at least the following topics: the employer's safety and health program, personal protective equipment program, spill containment program, and health hazard monitoring procedures and techniques. Copies of current training certification statements shall be submitted prior to initial entry onto the work site.

1.11.2 Site-specific Training

Site-specific training sessions shall be documented in accordance with Section 01.B.03.b of EM 385-1-1.

1.11.2.1 Initial Session (Preentry Briefing)

Prior to commencement of onsite field activities, all site employees, including those assigned only to the Support Zone, shall attend a site-specific safety and health training session of at least 1/2hours duration. This session shall be conducted by the Safety and Health Manager and the Site Safety and Health Officer to ensure that all personnel are familiar with requirements and responsibilities for maintaining a safe and healthful work environment. Procedures and contents of the accepted SSHP and Sections 01.B.02 and 28.D.03 of EM 385-1-1 shall be thoroughly discussed. The Contracting Officer shall be notified at least 5 days prior to the initial site-specific training session so government personnel involved in the project may attend.

1.11.2.2 Periodic Sessions

Periodic onsite training shall be conducted by the SSHO at least weekly for personnel assigned to work at the site during the following week. The training shall address safety and health procedures, work practices, any changes in the SSHP, activity hazard analyses, work tasks, or schedule; results of previous week's air monitoring, review of safety discrepancies and accidents. Should an operational change affecting onsite field work be made, a meeting prior to implementation of the change shall be convened to explain safety and health procedures. Site-specific training sessions for new personnel, visitors, and suppliers shall be conducted by the SSHO using the training curriculum outlines developed by the Safety and Health Manager.

1.11.2.3 Other Training

The Safety and Health Manager shall provide training as specified by 29 CFR 1910 Section .146, for employees who are required to supervise, standby, or enter permit-required confined spaces.

1.12 PERSONAL PROTECTIVE EQUIPMENT

1.12.1 General

In accordance with 29 CFR 1910 Section .120 (g)(5) and 29 CFR 1926 Section .65 (g)(5), a written Personal Protective Equipment (PPE) program which addresses the elements listed in that regulation, and which complies with. respiratory protection program requirements of 29 CFR 1910 Section .134, is to be included in the employer's Safety and Health Program. The Site Safety and Health Plan shall detail the minimum PPE ensembles (including respirators) and specific materials from which the PPE components are constructed for each site-specific task and operation to be performed, based upon the hazard/risk analysis. Components of levels of protection (B, C, D and modifications) must be relevant to site-specific conditions, including heat and cold stress potential and safety hazards. Only respirators approved by NIOSH shall be used. Onsite personnel shall be provided with appropriate personal protective equipment. Protective equipment and clothing shall be kept clean and well maintained. The PPE section of the SSHP shall include site-specific procedures to determine PPE program effectiveness and for onsite fit-testing of respirators, cleaning, maintenance, inspection, and storage of PPE.

1.12.2 Levels of Protection

The Safety and Health Manager shall establish appropriate levels of protection for each work activity based on review of historical site information, existing data, an evaluation of the potential for exposure

(inhalation, dermal, ingestion, and injection) during each task, past air monitoring results, and a continuing safety and health monitoring program. The Safety and Health Manager shall also establish action levels for upgrade or downgrade in levels of PPE from the following specified minimum levels of protection. Protocols and the communication network for changing the level of protection shall be described in the SSHP. The PPE reassessment protocol shall address air monitoring results, potential for exposure, changes in site conditions, work phases, job tasks, weather, temperature extremes, individual medical considerations, etc.

1.12.2.1 Components of Levels of Protection

The following items constitute minimum protective clothing and equipment ensembles to be utilized during this project:

Level D
- Hard Hat
- Work Gloves
- Safety Glasses or Chemical Splash Goggles
- Hearing Protection
- Safety work boots/shoes

Modified Level D
- Items listed under Level D
- Disposable Latex overboots
- Latex undergloves
- Nitrile overgloves
- Heavy rubber outer boots (if deemed necessary by the SSHO)
- Cotton or Tyvek coveralls (if deemed necessary by the SSHO)

Level C (if upgraded based on air monitoring)
- Full face respirator with organic vapor/acid gas/high efficiency particulate air cartridge as selected by the Contractor's CIH based on site specific hazards
- Items listed under Modified Level D

Level B
- Pressure-demand full-facepiece SCBA or pressure-demand supplied-air respirator with escape SCBA
- Items listed under Modified Level D

1.12.2.2 Initial Minimum Levels of PPE by Task

Based on available information, the initial minimum protective equipment requirements for each major task and operation are listed below. Available site information shall be reviewed and the list of tasks and operations and these levels of protection shall be expanded and/or revised during preparation of the SSHP.

TASK/OPERATION	INITIAL LEVEL OF PROTECTION
All Tasks	Level D

1.12.3 PPE for Government Personnel

Three clean sets of Modified Level D personal protective equipment and clothing (excluding safety shoes, which will be provided by individual visitors) shall be available for use by the Contracting Officer or official visitors. The items shall be cleaned and maintained on site by the Contractor and clearly marked: "FOR USE BY GOVERNMENT ONLY." The Contractor shall provide basic training in the use and limitations of the PPE provided, and institute administrative controls to check prerequisites prior to issuance. Such prerequisites include meeting minimum training requirements for the work tasks to be performed and medical clearance for

site hazards and respirator use.

1.13 MEDICAL SURVEILLANCE

The Safety and Health Manager, in conjunction with the Occupational Physician, shall detail, in the employer's Safety and Health Program and the SSHP, the medical surveillance program that includes scheduling of examinations, certification of fitness for duty, compliance with OSHA requirements, and information provided to the physician. Examinations shall be performed by or under the supervision of a licensed physician, preferably one knowledgeable in occupational medicine, and shall be provided without cost to the employee, without loss of pay and at a reasonable time and place. Medical surveillance protocols and examination and test results shall be reviewed by the Occupational Physician. The medical surveillance program shall contain the requirements specified below. Personnel working in contaminated areas of the site shall have been examined as prescribed in 29 CFR 1910 Section .120, and 29 CFR 1926Section .65, and determined medically fit to perform their duties.

1.13.1 Frequency of Examinations

Employees shall have been provided with medical examinations as specified, within the past 12 months and shall receive exams annually thereafter (if contract duration exceeds 1 year); on termination of employment; reassignment in accordance with 29 CFR 1910 Section .120 (f)(3)(i), and 29 CFR 1926 Section .65 (f)(3)(i)(C); if the employee develops signs or symptoms of illness related to workplace exposures; if the physician determines examinations need to be conducted more often than once a year; and when an employee develops a lost time injury or illness during the period of this contract. The supervisor shall be provided with a written statement signed by the physician prior to allowing the employee to return to the work site after injury or illness resulting in a lost workday, as defined in 29 CFR 1904 Section .12 (f).

1.13.2 Content of Examinations

The following elements shall be included in the medical surveillance program. Additional elements may be included at the discretion of the occupational physician responsible for reviewing the medical surveillance protocols.

a. Complete medical and occupational history (initial exam only).

b. General physical examination of major organ systems.

c. Pulmonary function testing including FVC and FEV1.0.

d. CBC with differential.

e. Blood chemistry screening profile (e.g. SMAC 20/25).

f. Urinalysis with microscopic examination.

g. Audiometric testing (as required by Hearing Conservation Program).

h. Visual acuity.

i. Chest x-ray. (This test should be performed no more frequently than every 4 years, unless directed by Occupational Physician.)

j. Electrocardiogram (as directed by Occupational Physician).

1.13.3 Information Provided to the Occupational Physician

The physician shall be furnished with the following:

a. Site information from paragraph, SITE DESCRIPTION AND CONTAMINATION CHARACTERIZATION.

b. information on the employee's anticipated or measured exposure.

c. a description of any PPE used or to be used.

d. A description of the employee's duties as they relate to the employee's exposures (including physical demands on the employee and heat/cold stress).

e. A copy of 29 CFR 1910 Section .120, or 29 CFR 1926 Section .65.

f. Information from previous examinations not readily available to the examining physician.

g. A copy of Section 5.0 of NIOSH Pub No. 85-115.

h. Information required by 29 CFR 1910 Section .134.

1.13.4 Physician's Written Opinion

Before work begins a copy of the physician's written opinion for each employee shall be obtained and furnished to the Safety and Health Manager; and the employee. The opinion shall address the employee's ability to perform hazardous remediation work and shall contain the following:

a. The physician's recommended limitations upon the employee's assigned work and/or PPE usage.

b. The physician's opinion about increased risk to the employee's health resulting from work; and

c. A statement that the employee has been informed and advised about the results of the examination.

1.13.5 Medical Records

Documentation of medical exams shall be provided as part of the Certificate of Worker or Visitor Acknowledgment. Medical records shall be maintained in accordance with 29 CFR 1910 Section .120, and 29 CFR 1926Section .65.

1.14 EXPOSURE MONITORING/AIR SAMPLING PROGRAM

The Safety and Health Manager shall prepare and implement an exposure monitoring/air sampling program to identify and quantify safety and health hazards and airborne levels of hazardous substances in order to assure proper selection of engineering controls, work practices and personal protective equipment for affected site personnel. Minimum initial requirements for the program are delineated below. Available site information shall be reviewed and the exposure monitoring/air monitoring program shall be expanded and/or revised for submittal as part of the SSHP.

1.14.1 Dust

A portable dust monitor shall be used to monitor ground intrusive activities for dust.

1.14.2 Combustible Gas/Oxygen Indicator (CGI)

Combination combustible gas/oxygen indicators shall be used to continuously monitor for the presence of explosive atmospheres and oxygen concentration during ground intrusive activities and in areas where methane might be encountered.

1.14.3 Flame Ionization Detector (FID)

Flame Ionization Detectors shall be used to continuously monitor for the presence of volatile chemical contaminants during all intrusive activities and in areas where volatile organics may be encountered.

1.15 HEAT AND COLD STRESS MONITORING

The Safety and Health Manager shall develop a heat stress and cold stress monitoring program for onsite activities. Details of the monitoring program, including schedules for work and rest, and physiological monitoring requirements, shall be described in the SSHP. Personnel shall be trained to recognize the symptoms of heat and cold stress. The SSHO and an alternate person shall be designated, in writing, to be responsible for the heat and cold stress monitoring program.

1.15.1 Heat Stress

Physiological monitoring shall commence when the ambient temperature is above 70 degrees F. Monitoring frequency shall increase as the ambient temperature increases or as slow recovery rates are observed. An adequate supply of cool drinking water shall be provided for the workers. NIOSH Pub No. 85-115 may be consulted for guidance in determining protocols for prevention of heat stress.

1.15.2 Cold Stress

To guard against cold injury, appropriate clothing and warm shelter for rest periods shall be provided. Procedures to monitor and avoid cold stress shall be followed in accordance with the current TLVs for Cold Stress as recommended in ACGIH-02.

1.16 SAFETY PROCEDURES, ENGINEERING CONTROLS AND WORK PRACTICES

The SSHP shall describe the standard operating safety procedures, engineering controls and safe work practices to be implemented for the work covered. These shall include, but not be limited to, the following:

1.16.1 General Site Rules/Prohibitions

General site rules/prohibitions (buddy system, eating, drinking, and smoking restrictions, etc.):

a. Satisfy the medical surveillance requirements as listed in 29 CFR 1910.120, Hazardous Waste Operations and Emergency Response, Final Rule, and EM 385-1-1.

b. Receive appropriate safety training (29 CFR 1910.120 (e)). Workers shall have received 40 hours of initial Health and Safety Training and annual Refresher Training. Supervisors shall have completed an additional 8-hours of Supervisory Training.

c. Complete three days of prior field work under a qualified supervisor.

d. Supply documentation for Items 1 and 2.

e. Complete confined space training per 29 CFR 1910.146.

f. Attend the site-specific pre-project safety training session to review this SSHP.

g. Dress in accordance with the task-specific plans.

h. No eating, drinking, smoking, or gum or tobacco chewing shall be allowed in the exclusion zone and contamination reduction zone, if so established by the Contractor.

i. Wash hands and face before leaving the work area. Individuals will shower as soon as possible after leaving the job site at the end of the day.

j. Contact with potentially contaminated surfaces or surfaces suspected of being potentially contaminated should be avoided while the worker is unprotected. In the event that protective clothing is ripped or torn, work is to stop and the protective clothing removed and replaced as soon as possible. In the event of direct skin contact, the affected area is to be washed immediately with soap and water.

k. Any person under a physician's care, taking medication, or those who experience allergic reactions must inform the site HSO.

l. Employ the buddy system at all times.

m. The wearing of contact lenses for onsite personnel is prohibited.

All personnel entering areas requiring Level B or C protection (if an upgrade is necessary) shall:

n. Be respirator fit-tested within previous year. Documentation must be provided to show respirator size, model, and manufacturer.

o. Be cleanly shaven.

p. Have been trained in the level of respiratory protection being used at the site..

1.16.2 Work Permit Requirements

The Contractor shall obtain any permits required for the performance of the Work.

1.16.3 Material Handling Procedures

All materials excavated from the landfill beneath Lots C, E and F fro the placement of gas vent stacks or lighting pole foundations shall be staged on top of and covered with polyethylene liners (6 mil). All such materials will be replaced in the excavation area they were removed from and covered with a minimum of 12 inches of clean bituminous materials, as specified in Section 02222, EXCAVATION, TRENCHING, BACKFILLING AND RIP RAP.

1.16.4 Ignition Sources

The following have been identified as ignition sources: internal combustion engines, and sparking resulting from metal to metal contact of tools/materials. Prevention of fires resulting from such ignition sources shall be conducted as specified in the paragraph Fire Protection and Prevention.

1.16.5 Fire Protection and Prevention

During intrusive activities, combustible gas indicators and flame ionization detectors shall be used to monitor levels of potentially volatile organics. Fire extinguishers shall be kept readily available.

At a minimum, the Contractor shall have the following on-site:

a. Two Class A, B dry chemical fire extinguishers at each active work site.

b. Two Class A, B dry chemical fire extinguishers at the CRZ.

c. One Class A, B dry chemical fire extinguisher at each site trailer.

The Contractor shall alert local fire departments to the nature and location of remedial activities. The Contractor shall adhere to the recommended practices and standards of the National Fire Protection Association (NFPA). Tanks, containers and pumping equipment, portable or stationary, used for the storage and handling of flammable and combustible liquids, shall meet the recommendations of the NFPA.

1.16.6 Electrical Safety

Temporary electrical power used for this project shall conform to NFPA 70, ANSI C2, and EM 385-1-1. Where possible, motorized vehicles shall be grounded. Electrical equipment to be used on this project shall conform to EM 385-1-1. Air monitoring and sampling equipment shall be rated intrinsically safe for Class I, Division 1, Groups A, B, C, and D areas. All portable electrical equipment shall be protected by Ground Fault Circuit Interrupters (GFCI). Clearances to adjacent overhead transmission and distribution electrical lines shall be sufficient for the movement of vehicles and operation of construction equipment. The requirements stated in EM 385-1-1, 29 CFR 1926, and NFPA 70 shall be followed..

1.16.7 Excavation and Trench Safety

All excavation work shall be conducted in strict conformance with, at a minimum, EM 385-1-1 and 29 CFR 1926 sections .650 through .653, including requirements for shoring or continuously sloping excavations in which employees are exposed to danger from moving ground. Prior to opening an excavation, underground installations (e.g., sewer, telephone, water, fuel, electric lines) shall be located and protected from damage or displacement. Utility companies and other responsible authorities shall be contacted to locate and mark the locations and, if they so desire, direct or assist with protecting the underground installations.

1.16.8 Guarding of Machinery and Equipment

Guarding shall be in accordance with EM 385-1.

1.17 SITE CONTROL MEASURES

In order to prevent the spread of contamination and control the flow of personnel, vehicles, and materials into and out of work areas, site control measures shall be established and described in the SSHP. The SSHP shall describe the methodology to be used by the Safety and Health Manager and SSHO in determining work zone designations and their modifications, and procedures to limit the spread of contamination. The SSHP shall include procedures for the implementation and enforcement of safety and health rules for all persons on the site, including employers, employees, outside Contractors, government representatives, and visitors.

1.17.1 Work Zones

Utilizing this guidance, and existing site information,work zone boundaries (exclusion zone, including restricted and regulated areas; contamination reduction zone; and support zone) and access points shall be established and the boundary delineations shall be included on the drawings and in the SSHP. Delineation of work zone boundaries shall be based on the contamination characterization data and the hazard/risk analysis to be performed as described in paragraph: HAZARD/RISK ANALYSIS. As work progresses and field conditions are monitored, work zone boundaries may be modified with approval of the Contracting Officer. Work zones shall be clearly identified and marked in the field (using fences, tape, signs, etc.). A site map, showing work zone boundaries and locations of decontamination facilities, shall be posted in the onsite office. Work zones shall consist of the following:

a. Exclusion Zone (EZ): The exclusion zone is the area where

hazardous contamination is either known or expected to occur and the greatest potential for exposure exists. Entry into this area shall be controlled and exit may only be made through the CRZ.

b. Contamination Reduction Zone (CRZ): The CRZ is the transition area between the Exclusion Zone and the Support Zone. The personnel and equipment decontamination areas shall be separate and unique areas located in the CRZ.

c. Support Zone (SZ): The Support Zone is defined as areas of the site, other than exclusion zones and contamination reduction zones, where workers do not have the potential to be exposed to hazardous substances or dangerous conditions resulting from site operations. The Support Zone shall be secured against active or passive contamination. Site offices, parking areas, and other support facilities shall be located in the Support Zone.

1.17.2 Site Control Log

A log of personnel visiting, entering, or working on the site shall be maintained. The log shall include the following: date, name, agency or company, time entering and exiting site, time entering and exiting the exclusion zone (if applicable), and personal protective equipment utilized. Before visitors are allowed to enter the Contamination Reduction Zone or Exclusion Zone, they shall show proof of current training, medical surveillance and respirator fit testing (if respirators are required for the tasks to be performed) and shall fill out the Certificate of Worker or Visitor Acknowledgment. This visitor information, including date, shall be recorded in the log.

1.17.3 Communication

An employee alarm system that has adequate means of on and off site communication shall be provided and installed in accordance with 29 CFR 1910 Section .165. The means of communication shall be able to be perceived above ambient noise or light levels by employees in the affected portions of the workplace. The signals shall be distinctive and recognizable as messages to evacuate or to perform critical operations. This includes: walkie talkies, air horns, and hand signals..

1.17.4 Site Security

Security Signs shall be printed in bold large letters on contrasting backgrounds in English or where appropriate in the predominant language of workers unable to read English. Signs shall be visible from all points where entry might occur and at such distances from the restricted area that employees may read the signs and take necessary protective steps before entering.

1.18 PERSONAL HYGIENE AND DECONTAMINATION

Personnel entering the Exclusion or Contamination Reduction Zones or otherwise exposed or subject to exposure to hazardous chemical vapors, liquids, or contaminated solids shall adhere to the following personal hygiene and decontamination provisions. Decontamination shall be performed in the CRZ prior to entering the Support Zone from the Exclusion Zone. Chapter 10.0 of NIOSH Pub No. 85-115 shall be consulted when preparing decontamination procedures. A detailed discussion of personal hygiene and decontamination facilities and procedures to be followed by site workers shall be submitted as part of the SSHP. Employees shall be trained in the procedures and the procedures shall be enforced throughout site operations. Persons disregarding these provisions of the SSHP shall be barred from the site.

1.18.1 Decontamination Facilities

Personnel egress to and from the Exclusion Zone will be limited. This shall minimize the potential spread of contaminated material to clean areas.

Upon leaving the Exclusion Zone for lunch break or at the end of each work shift, personnel shall be required to remove all protective clothing/equipment. Upon completion of activities within the Exclusion Zone, at each time of break, or at the end of each work shift, the work crew shall proceed toward the designated decontamination area. All equipment (i.e., shovels, tools, etc.) shall remain in the Exclusion Zone until end of the project. A large plastic sheet shall be placed on the splashed water. Prior to removal, boot covers or boots, aprons or outer gloves shall be washed in large tubs with a soap and water solution (i.e. Alconox), rinsed with fresh water, and removed. A bristle brush shall be used to remove gross soil contamination. A pump sprayer shall be utilized for each rinse station. Wash and rinse waters shall be contained in storage tanks for ultimate disposal by the Contractor.

In the event of minor, non-life threatening injury, personnel should follow the decontamination procedures as outlined above, and then administer first aid. In the event of a major injury or other serious medical concern, immediate first aid is to be administered in lieu of further decontamination efforts unless the environmental conditions would be considered "Immediately Dangerous to Life or Health," in which case all personnel shall evacuate the site.

1.18.2 Procedures

Minimum decontamination procedures are outlined above. Available site information shall be reviewed and these procedures shall be expanded and/or revised for submittal as part of the SSHP.

1.19 EQUIPMENT CLEANING

All field equipment used for intrusive activities (e.g., excavation, handling of site soils) in the exclusion zone shall be decontaminated in the CRZ prior to removal from the site. Equipment shall be washed in large tubs with a soap and water solution, rinsed with fresh water, and removed. A bristle brush shall be used to remove gross soil contamination. A pump sprayer shall be utilized for each rinse station. Wash and rinse waters shall be containerized for ultimate disposal by the Contractor.

Heavy equipment used for intrusive activities in the Exclusion Zone shall be washed with high-pressure washing equipment on the decontamination pad in the CRZ upon leaving the Exclusion Zone. The decon water shall be containerized for ultimate disposal by the Contractor.

Heavy equipment used for non-intrusive activities (e.g., handling clean fill material) within the Exclusion Zone shall be in a broom-clean condition before leaving the Exclusion Zone and prior to moving along access roads and between lots.

1.19.1 Decontamination Facilities

A heavy equipment decontamination station shall be established to capture decontamination water, including overspray, and shall allow for collection and removal of the decontamination water using whatever means as required. A high pressure, low volume, water wash shall be used for decontamination for equipment and vehicles. Disposal of decontamination water shall be the responsibility of the Contractor.

1.19.2 Procedures

Procedures for equipment decontamination shall be developed and utilized to prevent the spread of contamination into the SZ and off-site areas. These procedures shall address disposal of contaminated products and spent materials used on the site, including containers, fluids, oils, etc. Any

item taken into the EZ shall be assumed to be contaminated and shall be inspected and/or decontaminated before the item leaves the area. Vehicles, equipment, and materials used for intrusive activities shall be cleaned and decontaminated prior to leaving the site. Vehicles, equipment and materials used for non-intrusive activities shall be in a broom-clean condition prior to leaving the site. Construction material shall be handled in such a way as to minimize the potential for contaminants being spread and/or carried offsite. Prior to exiting the site, vehicles and equipment shall be monitored to ensure the adequacy of decontamination.

1.20 EMERGENCY EQUIPMENT AND FIRST AID REQUIREMENTS

The SSHP shall describe the emergency and first aid equipment to be available onsite. The following items, as a minimum, shall be maintained onsite and available for immediate use:

a. First aid equipment and supplies which conform with Red Cross and the requirements of 29 CFR 1910.120.

b. Emergency eyewashes and showers which comply with ANSI Z358.1.

c. Emergency-use respirators. For escape purposes, 3 5- to 15-minute emergency escape masks shall be supplied. For rescue purposes, 1 positive pressure self-contained breathing apparatus (SCBA) shall be supplied. These shall be dedicated for emergency use only and maintained onsite in the Contamination Reduction Zone.

d. Fire extinguishers with a minimum rating of AB and/or ABC shall be provided at site facilities and in all vehicles and at any other site locations where flammable or combustible materials present a fire risk.

1.21 EMERGENCY RESPONSE AND CONTINGENCY PROCEDURES

An Emergency Response Plan, that meets the requirements of 29 CFR 1910 Section .120 (l) and 29 CFR 1926 Section .65 (l), shall be developed and implemented as a section of the SSHP. In the event of any emergency associated with remedial action, the Contractor shall, without delay, alert all onsite employees that there is an emergency situation; take action to remove or otherwise minimize the cause of the emergency; alert the Contracting Officer; and institute measures necessary to prevent repetition of the conditions or actions leading to, or resulting in, the emergency. Employees that are required to respond to hazardous emergency situations shall be trained in how to respond to such expected emergencies. The plan shall be rehearsed regularly as part of the overall training program for site operations. The plan shall be reviewed periodically and revised as necessary to reflect new or changing site conditions or information. Copies of the accepted SSHP and revisions shall be provided to the affected local emergency response agencies. The following elements, as a minimum, shall be addressed in the plan:

a. Pre-emergency planning. The local emergency response agencies shall be contacted and met with during preparation of the Emergency Response Plan. Agencies to be contacted include local fire, police, and rescue authorities with jurisdiction and nearby medical facilities that may be utilized for emergency treatment of injured personnel. At these meetings, the agencies shall be notified of upcoming site activities and potential emergency situations. The response agencies' capabilities shall be ascertained and written response commitments obtained. The Contractor shall ensure the Emergency Response Plan for the site is compatible and integrated with the disaster, fire and/or emergency response plans of local, state, and Federal agencies.

b. Personnel roles, lines of authority, communications for emergencies.

c. Emergency recognition and prevention.

d. Site topography, layout, and prevailing weather conditions.

e. Criteria and procedures for site evacuation (emergency alerting procedures, employee alarm system, emergency PPE and equipment, safe distances, places of refuge, evacuation routes, site security and control).

f. Specific procedures for decontamination and medical treatment of injured personnel.

g. Route maps to nearest prenotified medical facility. Site-support vehicles shall be equipped with maps. At the beginning of project operations, drivers of the support vehicles shall become familiar with the emergency route and the travel time required.

h. Emergency alerting and response procedures including posted instructions and a list of names and telephone numbers of emergency contacts (physician, nearby medical facility, fire and police departments, ambulance service, Federal, state, and local environmental agencies; as well as Safety and Health Manager, the Site Superintendent, the Contracting Officer and/or their alternates).

i. Criteria for initiating community alert program, contacts, and responsibilities.

j. Procedures for reporting incidents to appropriate government agencies. In the event that an incident such as an explosion or fire, or a spill or release of toxic materials occurs during the course of the project, the appropriate government agencies shall be immediately notified. In addition, the Contracting Officer shall be verbally notified immediately and receive a written notification within 24 hours. The report shall include the following items:

(1) Name, organization, telephone number, and location of the Contractor.

(2) Name and title of the person(s) reporting.

(3) Date and time of the incident.

(4) Location of the incident, i.e., site location, facility name.

(5) Brief summary of the incident giving pertinent details including type of operation ongoing at the time of the incident.

(6) Cause of the incident, if known.

(7) Casualties (fatalities, disabling injuries).

(8) Details of any existing chemical hazard or contamination.

(9) Estimated property damage, if applicable.

(10) Nature of damage, effect on contract schedule.

(11) Action taken to ensure safety and security.

(12) Other damage or injuries sustained, public or private.

k. Procedures for critique of emergency responses and follow-up.

1.22 CERTIFICATE OF WORKER/VISITOR ACKNOWLEDGEMENT

A copy of a Contractor-generated certificate of worker/visitor acknowledgement shall be completed and submitted for each visitor allowed to enter contamination reduction or exclusion zones, and for each employee, following the example certificate at the end of this section.

1.23 INSPECTIONS

The SSHO shall perform daily inspections of the jobsite and the work in progress to ensure compliance with EM 385-1-1, the Safety and Health Program, the SSHP and other occupational health and safety requirements of the contract, and to determine the effectiveness of the SSHP. Procedures for correcting deficiencies (including actions, timetable and responsibilities) shall be described in the SSHP. Follow-up inspections to ensure correction of deficiencies shall be conducted and documented. Daily safety inspection logs shall be used to document the inspections, noting safety and health deficiencies, deficiencies in the effectiveness of the SSHP, and corrective actions taken. The SSHO's Daily Inspection Logs shall be attached to and submitted with the Daily Quality Control reports. Each entry shall include the following: date, work area checked, employees present in work area, PPE and work equipment being used in each area, special safety and health issues and notes, and signature of preparer. In the event of an accident, the Contracting Officer shall be notified according to EM 385-1-1. Within 2 working days of any reportable accident, an Accident Report shall be completed on ENG Form 3394 and submitted.

1.24 SAFETY AND HEALTH PHASE-OUT REPORT

A Safety and Health Phase-Out Report shall be submitted within 10 working days following completion of the work, prior to final acceptance of the work. The following minimum information shall be included:

a. Summary of the overall performance of safety and health (accidents or incidents including near misses, unusual events, lessons learned, etc.).

b. Final decontamination documentation including procedures and techniques used to decontaminate equipment, vehicles, and onsite facilities.

c. Summary of exposure monitoring and air sampling accomplished during the project.

d. Signatures of Safety and Health Manager and SSHO.

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EXAMPLE CERTIFICATE OF WORKER/VISITOR ACKNOWLEDGMENT

PROJECT NAME CONTRACT NO.
PROJECT ADDRESS
CONTRACTOR'S NAME
[EMPLOYEE'S] [VISITOR'S] NAME

The contract for the above project requires the following: that you be provided with and complete formal and site-specific training; that you be supplied with proper personal protective equipment including respirators; that you be trained in its use; and that you receive a medical examination to evaluate your physical capacity to perform your assigned work tasks, under the environmental conditions expected, while wearing the required personal protective equipment. These things are to be done at no cost to you. By signing this certification, you are acknowledging that your employer has met these obligations to you.

I HAVE READ, UNDERSTAND AND AGREE TO FOLLOW THE SITE SAFETY AND HEALTH PLAN FOR THIS SITE.

Name Date

---------- ----------

FORMAL TRAINING: I have completed the following formal training courses that meet OSHA's requirements:

Date Completed

40 hour: ....._____
8 hour supervisory:....._____
8 hour refresher:....._____

SITE-SPECIFIC TRAINING: I have been provided and have completed the site-specific training required by this Contract. The Site Safety and Health Officer conducted the training. _____

RESPIRATORY PROTECTION: I have been trained in accordance with the criteria in [the Contractor's] [my Employer's] Respiratory Protection program. I have been trained in the proper work procedures and use and limitations of the respirator(s) I will wear. I have been trained in and will abide by the facial hair policy. _____

EXAMPLE CERTIFICATE OF WORKER/VISITOR ACKNOWLEDGMENT

RESPIRATOR FIT-TEST TRAINING: I have been trained in the proper selection, fit, use, care, cleaning, and maintenance, and storage of the respirator(s) that I will wear. I have been fit-tested in accordance with the criteria in my employer's Respiratory Program and have received a satisfactory fit. I have been taught how to properly perform positive and negative pressure fit-check upon donning negative pressure respirators each time._____

MEDICAL EXAMINATION: I have had a medical examination within the last twelve months which was paid for by my employer. The examination included: health history, pulmonary function tests and may have included an evaluation of a chest x-ray. A physician made determination regarding my physical capacity to perform work tasks on the project while wearing protective equipment including a respirator. I was personally provided a copy and informed of the results of that examination. My employer's industrial hygienist evaluated the medical certification provided by the physician and checked the appropriate blank below. The physician determined that there:

were no limitations to performing the required work tasks;

were identified physical limitations to performing the required work tasks.

Date medical exam completed

[Employee's] [Visitor's] Signature _____
Date _____

Printed Name _____

Social Security Number _____

Contractor's Site Safety and Health Officer Signature _____

Date _____

Printed Name _____

Social Security Number _____

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION (Not Applicable)

-- End of Section --

SECTION 01130

ENVIRONMENTAL PROTECTION

PART 1 GENERAL

1.1 REFERENCES

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

CODE OF FEDERAL REGULATIONS (CFR)

40 CFR 261	Identification and listing of Hazardous Waste

ENGINEERING MANUALS (EM)

EM 385-1-1	(1996) U.S. Army Corps of Engineers Safety and Health Requirements Manual

1.2 DEFINITIONS

Environmental pollution and damage is defined as the presence of chemical, physical, or biological elements or agents that adversely affect human health or welfare; unfavorably alter ecological balances of plant or animal communities; or degrade the environment from an aesthetic, cultural or historic perspective. Environmental protection is the prevention/control of pollution and habitat disruption that may occur during construction. The control of environmental pollution and damage requires consideration of air, water, land, biological and cultural resources; and includes management of visual aesthetics; noise; solid, chemical, gaseous, and liquid waste; radiant energy and radioactive materials; and other pollutants.

1.3 SUBMITTALS

Government approval is required for all submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01300 SUBMITTAL PROCEDURES:

SD-09 Reports

Environmental Protection Plan; GA

Soil Erosion and Sediment Control Plan; GA

1.4 ENVIRONMENTAL PROTECTION REQUIREMENTS

The Contractor shall comply with all applicable Federal, State, and local laws and regulations. The Contractor shall provide environmental protective measures and procedures to prevent and control pollution, limit habitat disruption, and correct environmental damage that occurs during construction. Safety and health documents and procedures for hazardous, toxic, and radioactive waste (HTRW) site activities are specified in Section 01110 SAFETY, HEALTH, AND EMERGENCY RESPONSE (HTRW/UST).

1.4.1 Protection of Features

This section supplements the Contract Clause PROTECTION OF EXISTING VEGETATION, STRUCTURES, EQUIPMENT, UTILITIES, AND IMPROVEMENTS. The

Contractor shall prepare a list of features requiring protection under the provisions of the contract clause which are not specially identified on the drawings as environmental features requiring protection. The Contractor shall protect those environmental features, indicated specially on the drawings, in spite of interference which their preservation may cause to the Contractor s work under the contract.

1.4.2 Permits

This section supplements the Contractor s responsibility under the contract clause PERMITS AND RESPONSIBILITIES to the extent that the Government has already obtained environmental permits. The Government has obtained permits for the National Pollutant Discharge Elimination System (NPDES) Permit for Storm Water Discharges from Construction Sites. The contractor shall comply with the terms, and conditions of these permits. The contractor shall also comply with other environmental commitments made by the Government. Copies of permit terms and conditions as well as those other commitments made by the Government are included at the end of this section.

1.4.3 Special Environmental Requirements

The Contractor shall comply with the special environmental requirements included at the end of this section. These special environmental requirements are an outgrowth of environmental commitments made by the Government during the project development.

1.4.4 Environmental Assessment of Contract Deviations

The Contract specifications have been prepared to comply with the special conditions and mitigation measures of an environmental nature which were established during the planning and development of this project. The Contractor is advised that deviations from the drawings or specifications (e.g., proposed alternate borrow areas, disposal areas, staging areas, alternate access routes, etc.) could result in the requirement for the Government to reanalyze the project from an environmental standpoint. Deviations from the construction methods and procedures indicated by the plans and specifications which may have an environmental impact will require a extended review, processing, and approval time by the Government. The Contracting Officer reserves the right to disapprove alternate methods, even if they are more cost effective, if the Contracting Officer determines that the proposed alternate method will have an adverse environmental impact.

1.5 ENVIRONMENTAL PROTECTION PLAN

Within 20 calendar days of Notice of Award, the Contractor shall submit an Environmental Protection Plan for review and acceptance by the Contracting Officer. The Government will consider an interim plan for the first 30 days of operations. However, the Contractor shall furnish an acceptable final plan not later than 30 calendar days after receipt of the Notice to Proceed. Acceptance is conditional and is predicated upon satisfactory performance during construction. The Government reserves the right to require the Contractor to make changes in the Environmental Protection Plan or operations if the Contracting Officer determines that environmental protection requirements are not being met. The plan shall detail the actions which the Contractor shall take to comply with all applicable Federal, State, and local laws and regulations concerning environmental protection and pollution control and abatement, as well as the additional specific requirements of this contract. No physical work at the site shall begin prior to acceptance of the Contractor s plan or an interim plan covering the work to be performed. The environmental protection plan shall include, but not be limited to, the following:

1.5.1 List of State and Local Laws and Regulations

The Contractor shall provide as part of the Environmental Protection Plan a list of all State and local environmental laws and regulations which apply to the construction operations under the Contract.

1.5.2 Spill Control Plan

The Contractor shall include as part of the environmental protection plan, a Spill Control Plan. The plan shall include the procedures, instructions, and reports to be used in the event of an unforeseen spill of a substance regulated by the Emergency Response and Community Right-to-Know Act or regulated under State or local laws or 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 be responsible for implementing and supervising the containment and cleanup.

b. Training requirements for Contractor's personnel and methods of accomplishing the training.

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

d. 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.

e. The methods and procedures to be used for expeditious contaminant cleanup.

f. 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 Contracting Officer 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 spill occurs. The plan shall contain a list of the required reporting channels and telephone numbers.

1.5.3 Recycling and Waste Minimization Plan

The Contractor shall submit a Recycling and Waste Minimization Plan as a part of the Environmental Protection Plan. The plan shall detail the Contractor's actions to comply with the following recycling and waste minimization requirements:

a. The Contractor shall participate in the United States Military Academy recycling programs to reduce the volume of solid waste materials at the source.

1.5.4 Contaminant Prevention Plan

As a part of the Environmental Protection Plan, the Contractor shall prepare a contaminant prevention statement identifying potentially hazardous substances to be used on the job site and intended actions to prevent accidental or intentional introduction of such materials into the air, water, or ground. The Contractor shall detail provisions to be taken to meet Federal, State, and local laws and regulations regarding the storage and handling of these materials.

1.5.5 Environmental Monitoring

The Contractor shall include in the plan the details of environmental monitoring requirements under the laws and regulations and a description of how this monitoring will be accomplished.

1.6 SOIL EROSION AND SEDIMENT CONTROL

Subsequent to the approval of the Contracting Officer, the Contractor shall conduct his operations in conformance with his Soil Erosion and Sediment Control Plan certified by the New York State Department of Environmental Conservation (Region III). Surface drainage from cuts and fills within the limits of the work shall be held in suitable sedimentation ponds or shall be graded to control erosion within acceptable limits. Temporary erosion and sediment control measures (e.g. haybales, surface mulch) shall be provided and maintained until the permanent work is completed and operative. The area of bare soil exposed at any given time by construction shall be restricted to a minimum. Fills and waste areas shall be constructed by selective placement of materials to eliminate silts or clays on the surface which may erode and contaminate the adjacent waterway. The Contractor shall also comply with all applicable United States Military Academy laws concerning soil erosion and sediment control.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.1 SPECIAL ENVIRONMENTAL PROTECTION REQUIREMENTS

3.1.1 Tree Protection

No ropes, cables, or guys shall be fastened to or attached to any tree(s) for anchorage unless specifically authorized by the Contracting Officer. Where such special use is permitted, the Contractor shall provide effective protection to prevent damage to the tree and other land and vegetative resources. Unless specifically authorized by the Contracting Officer, no construction equipment or materials shall be placed or used within the dripline of trees outside the limits of the work. No excavation or fill shall be permitted within the dripline of trees to be saved except as shown on the drawings.

3.1.2 U.S. Department of Agriculture (USDA) Quarantined Considerations

The Contractor shall thoroughly clean all construction equipment at the prior job site in a manner that ensures all residual soil is removed and that egg deposits from plant pests are not present. The Contractor shall consult with the USDA Plant Protection and Quarantine (USDA - PPQ) jurisdictional office for additional cleaning requirements that may be necessary.

3.1.3 Soil Disposal Areas on Government Property

Material disposal on Government property shall be disposed only in those areas designated on the contract drawings. Hazardous, toxic, and radiological wastes (HTRW) shall not be disposed of on Government property. Disposal operations shall be managed and controlled to prevent erosion of soil or sediment from entering nearby waters or wetlands. Disposal operations shall be developed and managed in accordance with Section 02222 EXCAVATION, TRENCHING, BACKFILLING and RIP RAP.

3.1.4 Disposal of Solid Wastes

Solid waste is rubbish, debris, waste materials, garbage, and other discarded solid materials (excluding clearing debris and hazardous waste as defined in following paragraphs). Solid waste shall be placed in containers and disposed on a regular schedule. All handling and disposal shall be conducted in such a way as to prevent spillage and contamination. The Contractor shall transport all solid waste off Government property and dispose in compliance with Federal, State, and local requirements.

3.1.5 Clearing Debris

Clearing debris is trees, tree stumps, tree trimmings, and shrubs, and leaves, vegetative matter, excavated natural materials (e.g., dirt, sand, and rock), and demolition products (e.g., brick, concrete, glass, and metals).

a. The Contractor shall collect trees, tree stumps, tree trimmings, shrubs, leaves, and other vegetative matter; and shall transport from Government property for proper disposal in compliance with Federal, State, and local requirements. The Contractor shall segregate the matter where appropriate for proper disposal. Untreated and unpainted scrap lumber may be disposed of with this debris where appropriate.

b. Excavated natural materials shall be transported from Government property for proper disposal in compliance with Federal, State, and local requirements.

c. Demolition products shall be transported from Government property for proper disposal in compliance with Federal, State, and local requirements.

3.1.6 Disposal of Contractor Generated Hazardous Wastes

Hazardous wastes are hazardous substances as defined in 40 CFR 261, or as defined by applicable State and local regulations. Hazardous waste generated by construction activities shall be removed from the work area and be disposed in compliance with Federal, State, and local requirements. The Contractor shall segregate hazardous waste from other materials and wastes, and shall protect it from the weather by placing it in a safe covered location; precautionary measures against accidental spillage such as berming or other appropriate measures shall be taken. Hazardous waste shall be removed from Government property within 60 days. Hazardous waste shall not be dumped onto the ground, into storm sewers or open water courses, or into the sanitary sewer system.

3.1.7 Fuels and Lubricants

Fueling and lubrication of equipment and motor vehicles shall be conducted in a manner that affords the maximum protection against spills and evaporation. Lubricants and waste oil to be discarded shall be stored in marked corrosion-resistant containers and recycled or disposed in accordance with Federal, State, and local laws and regulations.

3.2 HISTORICAL, ARCHAEOLOGICAL, AND CULTURAL RESOURCES

3.2.2 Discovered Historic, Archaeological, and Cultural Resources

If during construction activities, items are observed that may have historic or archaeological value (e.g., Native American human remains or associated objects are discovered), such observations shall be reported immediately to the Contracting Officer 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. The Contractor shall cease all activities that may result in impact to or the destruction of these resources. The Contractor shall prevent his employees from trespassing on, removing, or otherwise disturbing such resources.

3.3 PROTECTION OF WATER RESOURCES

The Contractor shall keep construction activities under surveillance, management, and control to avoid pollution of surface and ground waters.

3.4 PROTECTION OF AIR RESOURCES

Special management techniques as set out below shall be implemented to

control air pollution by the construction activities. These techniques supplement the requirements of Federal, State, and local laws and regulations; and the safety requirements under this Contract. If any of the following techniques conflict with the requirements of Federal, State, or local laws or regulations, or safety requirements under this contract, then those requirements shall be followed in lieu of the following.

3.4.1 Particulates

Airborne particulates, including dust particles, from construction activities and processing and preparation of materials shall be controlled at all times, including weekends, holidays, and hours when work is not in progress. The Contractor shall maintain all excavations, stockpiles, haul roads, permanent and temporary access roads, plant sites, disposal sites, borrow areas, and all other work areas free from airborne dust which would cause a hazard or nuisance.

3.5 INSPECTION

If the Contracting Officer notifies the Contractor in writing of any observed noncompliance with contract requirements or Federal, State, or local laws, regulations, or permits, the Contractor shall inform the Contracting Officer of proposed corrective action and take such action to correct the noncompliance. If the Contractor fails to comply promptly, the Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action is taken. No time extensions will be granted or costs or damages allowed to the Contractor for any such suspension.

3.6 MAINTENANCE OF POLLUTION CONTROL FACILITIES

The Contractor shall maintain all constructed pollution control facilities and portable pollution control devices for the duration of the Contract or for the length of time construction activities create the particular pollutant.

3.7 TRAINING OF CONTRACTOR PERSONNEL

Contractor personnel shall be trained in environmental protection and pollution control. The Contractor shall conduct environmental protection/pollution control meetings for all Contractor personnel monthly. The training and meeting agenda shall include methods of detecting and avoiding pollution, familiarization with pollution standards, both statutory and contractual, installation and care of facilities (vegetative covers, etc.), 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, shall also be discussed. Other items to be discussed shall include recognition and protection of archaeologic sites and artifacts.

-- End of Section --

SECTION 01300

SUBMITTAL PROCEDURES

PART 1 GENERAL

1.1 SUBMITTAL CLASSIFICATION

Submittals are identified with submittal description (SD) numbers and are classified as follows:

1.1.1 Government Approved

Governmental approval is required for extensions of design, critical materials, deviations, 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."

1.1.2 Information Only

All submittals not requiring Government approval will be for information only. They are not considered to be "shop drawings" within the terms of the Contract Clause referred to above.

1.2 APPROVED SUBMITTALS

The Contracting Officer's approval of submittals shall not be construed as a complete check, but will indicate only that the general method of construction, materials, detailing and other information are satisfactory. Approval will not relieve the Contractor of the responsibility for any error which may exist, as the Contractor under the CQC requirements of this contract is responsible for dimensions, the design of adequate connections and details, and the satisfactory construction of all work. After submittals have been approved by the Contracting Officer, no resubmittal for the purpose of substituting materials or equipment will be considered unless accompanied by an explanation of why a substitution is necessary.

1.3 DISAPPROVED SUBMITTALS

The Contractor shall make all corrections required by the Contracting Officer and promptly furnish a corrected submittal in the form and number of copies specified for the initial submittal. If the Contractor considers any correction indicated on the submittals to constitute a change to the contract, a notice in accordance with the Contract Clause "Changes" shall be given promptly to the Contracting Officer.

1.4 WITHHOLDING OF PAYMENT

Payment for materials incorporated in the work will not be made if required approvals have not been obtained.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.1 GENERAL

The Contractor shall 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, all items shall be checked and approved by the Contractor's Quality Control (CQC) representative and each item shall be stamped, signed, and dated by the CQC representative indicating action taken. Proposed deviations from the contract requirements shall be clearly identified. Submittals shall 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. Submittals requiring Government approval shall be scheduled and made prior to the acquisition of the material or equipment covered thereby. Samples remaining upon completion of the work shall be picked up and disposed of in accordance with manufacturer's Material Safety Data Sheets (MSDS) and in compliance with existing laws and regulations.

3.2 SUBMITTAL REGISTER (ENG FORM 4288)

At the end of this section is one set of ENG Form 4288 listing items of equipment and materials for which submittals are required by the specifications; this list may not be all inclusive and additional submittals may be required. The Contractor will also be given the submittal register as a diskette containing the computerized ENG Form 4288 and instructions on the use of the diskette. Columns "d" through "q" have been completed by the Government; the Contractor shall complete columns "a" and "r" through "t" and submit the forms (hard copy plus associated electronic file) to the Contracting Officer for approval within 30 calendar days after Notice to Proceed. The Contractor shall keep this diskette up-to-date and shall submit it to the Government together with the monthly payment request. The approved submittal register will become the scheduling document and will be used to control submittals throughout the life of the contract. The submittal register and the progress schedules shall be coordinated.

3.3 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 14 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.

3.4 TRANSMITTAL FORM (ENG FORM 4025)

The sample transmittal form (ENG Form 4025) attached to this section shall be used for submitting both Government approved and information only submittals in accordance with the instructions on the reverse side of the form. These forms will be furnished to the Contractor. This form shall be properly completed by filling out all the heading blank spaces and identifying each item submitted. Special care shall be exercised to ensure proper listing of the specification paragraph and/or sheet number of the contract drawings pertinent to the data submitted for each item.

3.5 SUBMITTAL PROCEDURE

Submittals shall be made as follows:

3.5.1 Procedures

The Contractor shall submit to the Contracting Officer a total of six copies of shop drawings and other submittals listed on the Submittal Register (ENG form 4288) as requiring technical review by the Architect/Engineer (AE). Five copies will be forwarded to the AE and one copy will be retained by the Contracting Officer for AE reviews. The

Contractor shall be responsible for all costs incurred in transmitting the required information for review in the submittal process.

3.5.2 Deviations

For submittals which include proposed deviations requested by the Contractor, the column "variation" of ENG Form 4025 shall be checked. The Contractor shall 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.

3.6 CONTROL OF SUBMITTALS

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

3.7 GOVERNMENT APPROVED SUBMITTALS

Upon completion of review of submittals requiring Government approval, the submittals will be identified as having received approval by being so stamped and dated. 4 copies of the submittal will be retained by the Contracting Officer and 2 copies of the submittal will be returned to the Contractor.

3.8 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.

3.9 STAMPS

Stamps used by the Contractor on the submittal data to certify that the submittal meets contract requirements shall be similar to the following:

CONTRACTOR

(Firm Name)

_____ Approved

_____ Approved with corrections as noted on submittal data and/or attached sheets(s).

SIGNATURE: _____

TITLE: _____

DATE: _____

-- End of Section --

SUBMITTAL REGISTER

MICHIE

MPI/BERGER

CONTRACT# DACA31-94-D-0017

Note: Reviewer: AR = USACE representative; A/E = MPI/Berger

SUBMITTAL REGISTER

(ER 415 1-10)

CONTRACT NO.
DACA31-94-D-0017

LE AND LOCATION
USMA MICHIE STADIUM LOT LANDFILLS (C, E & F)

CONTRACTOR
MPI / BERGER

SPECIFICATION SECTION
01110

ACTIVITY NO	TRANSMITTAL NO.	ITEM NO	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	TYPE OF SUBMITTAL											CLASSIFICATION		REVIEWER	CONTRACTOR SCHEDULE DATES			CONTRACTOR ACTION			GOVERNMENT ACTION		
					DATA	DRAWINGS	INSTRUCTIONS	SCHEDULES	STATEMENTS	REPORTS	CERTIFICATES	SAMPLES	RECORDS	O&M MANUALS		INFORMATION ONLY	GOVERNMENT APPROVED		SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	CODE	DATE	SUBMIT TO GOVERNMENT	CODE	DATE	REMARKS
a.	b.	c.	d.	e.	f.	g.	h.	i.	j.	k.	l.	m.	n.	o.		p.	q.	r.	s.	t.	u.	v.	w.	x.	y.	z.	aa.
			1.3	Site Safety and Health Plan						X							X	AR									
			1.3	Site Superintendant Resume						X							X	AR									
			1.3	Monitoring Results						X							X	AR									
			1.3	Site control log						X							X	AR									

SUBMITTAL REGISTER

(ER 415 1-10)

CONTRACT NO.
DACA31-94-D-0017

TLE AND LOCATION
USMA MICHIE STADIUM LOT LANDFILLS (C, E & F)

CONTRACTOR
MPI / BERGER

SPECIFICATION SECTION
01130

ACTIVITY NO	TRANSMITTAL NO.	ITEM NO	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	TYPE OF SUBMITTAL										CLASSIFICATION		REVIEWER	CONTRACTOR SCHEDULE DATES			CONTRACTOR ACTION			GOVERNMENT ACTION		REMARKS
					DATA	DRAWINGS	INSTRUCTIONS	SCHEDULES	STATEMENTS	REPORTS	CERTIFICATES	SAMPLES	RECORDS	O&M MANUALS	INFORMATION ONLY	GOVERNMENT APPROVED		SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	CODE	DATE	SUBMIT TO GOVERNMENT	CODE	DATE	
a.	b.	c.	d.	e.	f.	g.	h.	i.	j.	k.	l.	m.	n.	o.	p.	q.	r.	s.	t.	u.	v.	w.	x.	y.	z.	aa.
			1.3	Environmental Protection Plan						X						X	AR									
			1.3	Soil Erosion and Sediment Control Plan						X						X	AR									

ENG FORM 4288, July 96

SPECSINTACT

SUBMITTAL REGISTER

(ER 415 1-10)

CONTRACT NO.: DACA31-94-D-0017

TLE AND LOCATION: USMA MICHIE STADIUM LOT LANDFILLS (C, E & F)

CONTRACTOR: MPI / BERGER

SPECIFICATION SECTION: 01310

ACTIVITY NO	TRANSMITTAL NO.	ITEM NO	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	TYPE OF SUBMITTAL											CLASSIFICATION		REVIEWER	CONTRACTOR SCHEDULE DATES			CONTRACTOR ACTION			GOVERNMENT ACTION		REMARKS
					DATA	DRAWINGS	INSTRUCTIONS	SCHEDULES	STATEMENTS	REPORTS	CERTIFICATES	SAMPLES	RECORDS	O&M MANUALS	INFORMATION ONLY	GOVERNMENT APPROVED			SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	CODE	DATE	SUBMIT TO GOVERNMENT	CODE	DATE	
a.	b.	c.	d.	e.	f.	g.	h.	i.	j.	k.	l.	m.	n.	o.	p.	q.	r.		s.	t.	u.	v.	w.	x.	y.	z.	aa.
			3.4.2	Initial Project Schedule				X								X	AR										
			3.4.1	Preliminary Project Schedule				X								X	AR										
			3.4.3	Periodic Schedule Updates				X								X	AR										
			3.5.2	Narrative Report						X						X	AR										
			3.5.4	Schedule Reports						X						X	AR										

ENG FORM 4288, July 96

SPECSINTACT

SUBMITTAL REGISTER

(ER 415 1-10)

CONTRACT NO.: DACA31-94-D-0017

TITLE AND LOCATION: USMA MICHIE STADIUM LOT LANDFILLS (C, E & F)

CONTRACTOR: MPI / BERGER

SPECIFICATION SECTION: 01451

ACTIVITY NO	TRANSMITTAL NO.	ITEM NO	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	TYPE OF SUBMITTAL											CLASSIFICATION		REVIEWER	CONTRACTOR SCHEDULE DATES			CONTRACTOR ACTION			GOVERNMENT ACTION		REMARKS
					DATA	DRAWINGS	INSTRUCTIONS	SCHEDULES	STATEMENTS	REPORTS	CERTIFICATES	SAMPLES	RECORDS	O&M MANUALS	INFORMATION ONLY	GOVERNMENT APPROVED			SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	CODE	DATE	SUBMIT TO GOVERNMENT	CODE	DATE	
a.	b.	c.	d.	e.	f.	g.	h.	i.	j.	k.	l.	m.	n.	o.	p.	q.	r.	s.	t.	u.	v.	w.	x.	y.	z.	aa.
			1.2	Contractor Quality Control Plan						X						X	AR									

ENG FORM 4288, July 96

SPECSINTACT

SUBMITTAL REGISTER

(ER 415 1-10)

CONTRACT NO. DACA31-94-D-0017

TITLE AND LOCATION: USMA MICHIE STADIUM LOT LANDFILLS (C, E & F)

CONTRACTOR: MPI / BERGER

SPECIFICATION SECTION: 01500

ACTIVITY NO a.	TRANSMITTAL NO. b.	ITEM NO c.	SPECIFICATION PARAGRAPH NUMBER d.	DESCRIPTION OF ITEM SUBMITTED e.	TYPE OF SUBMITTAL: DATA f.	DRAWINGS g.	INSTRUCTIONS h.	SCHEDULES i.	STATEMENTS j.	REPORTS k.	CERTIFICATES l.	SAMPLES m.	RECORDS n.	O&M MANUALS o.	CLASSIFICATION: INFORMATION ONLY p.	GOVERNMENT APPROVED q.	REVIEWER r.	CONTRACTOR SCHEDULE DATES: SUBMIT s.	APPROVAL NEEDED BY t.	MATERIAL NEEDED BY u.	CONTRACTOR ACTION: CODE v.	DATE w.	SUBMIT TO GOVERNMENT x.	GOVERNMENT ACTION: CODE y.	DATE z.	REMARKS aa.
			1.4	Maintenance and Protection of Traffic Plan						X						X	AR										

SUBMITTAL REGISTER

(ER 415 1-10)

CONTRACT NO.: DACA31-94-D-0017

TITLE AND LOCATION: USMA MICHIE STADIUM LOT LANDFILLS (C, E & F)

CONTRACTOR: MPI / BERGER

SPECIFICATION SECTION: 01720

ACTIVITY NO a.	TRANSMITTAL NO. b.	ITEM NO c.	SPECIFICATION PARAGRAPH NUMBER d.	DESCRIPTION OF ITEM SUBMITTED e.	TYPE OF SUBMITTAL: DATA f.	DRAWINGS g.	INSTRUCTIONS h.	SCHEDULES i.	STATEMENTS j.	REPORTS k.	CERTIFICATES l.	SAMPLES m.	RECORDS n.	O&M MANUALS o.	CLASSIFICATION: INFORMATION ONLY p.	GOVERNMENT APPROVED q.	REVIEWER r.	CONTRACTOR SCHEDULE DATES: SUBMIT s.	APPROVAL NEEDED BY t.	MATERIAL NEEDED BY u.	CONTRACTOR ACTION: CODE v.	DATE w.	SUBMIT TO GOVERNMENT x.	GOVERNMENT ACTION: CODE y.	DATE z.	REMARKS aa.
			1.4	Preliminary submittal		X										X	AR									
			3.2	Final		X										X	AR									

SUBMITTAL REGISTER

(ER 415 1-10)

CONTRACT NO.: DACA31-94-D-0017

TITLE AND LOCATION: USMA MICHIE STADIUM LOT LANDFILLS (C, E & F)

CONTRACTOR: MPI / BERGER

SPECIFICATION SECTION: 01760

ACTIVITY NO	TRANSMITTAL NO.	ITEM NO	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	TYPE OF SUBMITTAL											CLASSIFICATION		REVIEWER	CONTRACTOR SCHEDULE DATES			CONTRACTOR ACTION			GOVERNMENT ACTION		
					DATA	DRAWINGS	INSTRUCTIONS	SCHEDULES	STATEMENTS	REPORTS	CERTIFICATES	SAMPLES	RECORDS	O&M MANUALS		INFORMATION ONLY	GOVERNMENT APPROVED		SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	CODE	DATE	SUBMIT TO GOVERNMENT	CODE	DATE	REMARKS
a.	b.	c.	d.	e.	f.	g.	h.	i.	j.	k.	l.	m.	n.	o.		p.	q.	r.	s.	t.	u.	v.	w.	x.	y.	z.	aa.
			1.2	Closeout Plan					X								X	AR									

SUBMITTAL REGISTER

(ER 415 1-10)

CONTRACT NO. DACA31-94-D-0017

TITLE AND LOCATION: USMA MICHIE STADIUM LOT LANDFILLS (C, E & F)

CONTRACTOR: MPI / BERGER

SPECIFICATION SECTION: 02222

ACTIVITY NO	TRANSMITTAL NO.	ITEM NO	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	TYPE OF SUBMITTAL											CLASSIFICATION		REVIEWER	CONTRACTOR SCHEDULE DATES			CONTRACTOR ACTION			GOVERNMENT ACTION		REMARKS
					DATA	DRAWINGS	INSTRUCTIONS	SCHEDULES	STATEMENTS	REPORTS	CERTIFICATES	SAMPLES	RECORDS	O&M MANUALS		INFORMATION ONLY	GOVERNMENT APPROVED		SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	CODE	DATE	SUBMIT TO GOVERNMENT	CODE	DATE	
a.	b.	c.	d.	e.	f.	g.	h.	i.	j.	k.	l.	m.	n.	o.		p.	q.	r.	s.	t.	u.	v.	w.	x.	y.	z.	aa.
			2.1.1	Select Fill Classification						X							X	A/E									
				Determinations																							
			3.5.3	Field Density Tests						X							X	AR									
			3.5.2	Testing of Backfill Materials						X							X	A/E									

SUBMITTAL REGISTER

(ER 415 1-10)

CONTRACT NO.: DACA31-94-D-0017

TITLE AND LOCATION: USMA MICHIE STADIUM LOT LANDFILLS (C, E & F)

CONTRACTOR: MPI / BERGER

SPECIFICATION SECTION: 02272

ACTIVITY NO a.	TRANSMITTAL NO. b.	ITEM NO c.	SPECIFICATION PARAGRAPH NUMBER d.	DESCRIPTION OF ITEM SUBMITTED e.	TYPE OF SUBMITTAL: DATA f.	DRAWINGS g.	INSTRUCTIONS h.	SCHEDULES i.	STATEMENTS j.	REPORTS k.	CERTIFICATES l.	SAMPLES m.	RECORDS n.	O&M AUALS o.	CLASSIFICATION: INFORMATION ONLY p.	GOVERNMENT APPROVED q.	REVIEWER r.	CONTRACTOR SCHEDULE DATES: SUBMIT s.	APPROVAL NEEDED BY t.	MATERIAL NEEDED BY u.	CONTRACTOR ACTION: CODE v.	DATE w.	SUBMIT TO GOVERNMENT x.	GOVERNMENT ACTION: CODE y.	DATE z.	REMARKS aa.
			1.2	Manufacturing, Sampling, and			X									X	A/E									
				Testing																						
			2.1.1	Geotextile							X					X	A/E									
			2.1.1	Geotextile								X				X	A/E									

SUBMITTAL REGISTER

(ER 415 1-10)

CONTRACT NO.: DACA31-94-D-0017

TITLE AND LOCATION: USMA MICHIE STADIUM LOT LANDFILLS (C, E & F)

CONTRACTOR: MPI / BERGER

SPECIFICATION SECTION: 02361

ACTIVITY NO	TRANSMITTAL NO.	ITEM NO	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	TYPE OF SUBMITTAL											CLASSIFICATION		REVIEWER	CONTRACTOR SCHEDULE DATES			CONTRACTOR ACTION			GOVERNMENT ACTION		
					DATA	DRAWINGS	INSTRUCTIONS	SCHEDULES	STATEMENTS	REPORTS	CERTIFICATES	SAMPLES	RECORDS	O&M MANUALS		INFORMATION ONLY	GOVERNMENT APPROVED		SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	CODE	DATE	SUBMIT TO GOVERNMENT	CODE	DATE	REMARKS
a.	b.	c.	d.	e.	f.	g.	h.	i.	j.	k.	l.	m.	n.	o.		p.	q.	r.	s.	t.	u.	v.	w.	x.	y.	z.	aa.
			3.2	Pile Driving Equipment	X											X											
			3.1.2	Pile Driving									X				X	A/E									

SUBMITTAL REGISTER

(ER 415 1-10)

CONTRACT NO. DACA31-94-D-0017

TITLE AND LOCATION: USMA MICHIE STADIUM LOT LANDFILLS (C, E & F)

CONTRACTOR: MPI / BERGER

SPECIFICATION SECTION: 02546

ACTIVITY NO a.	TRANSMITTAL NO. b.	ITEM NO c.	SPECIFICATION PARAGRAPH NUMBER d.	DESCRIPTION OF ITEM SUBMITTED e.	TYPE OF SUBMITTAL: DATA f.	DRAWINGS g.	INSTRUCTIONS h.	SCHEDULES i.	STATEMENTS j.	REPORTS k.	CERTIFICATES l.	SAMPLES m.	RECORDS n.	O&M MANUALS o.	CLASSIFICATION: INFORMATION ONLY p.	GOVERNMENT APPROVED q.	REVIEWER r.	CONTRACTOR SCHEDULE DATES: SUBMIT s.	APPROVAL NEEDED BY t.	MATERIAL NEEDED BY u.	CONTRACTOR ACTION: CODE v.	DATE w.	SUBMIT TO GOVERNMENT x.	GOVERNMENT ACTION: CODE y.	DATE z.	REMARKS aa.
			1.4	Equipment	X											X	A/E										
			1.5	Sampling and Testing						X						X	A/E										
			1.3	Field Density Test						X						X	AR										
			1.3	Field Wear Test						X						X	AR										
			1.3	Aggregates								X				X	AR										

SUBMITTAL REGISTER

(ER 415 1-10)

CONTRACT NO.: DACA31-94-D-0017

TITLE AND LOCATION: USMA MICHIE STADIUM LOT LANDFILLS (C, E & F)

CONTRACTOR: MPI / BERGER

SPECIFICATION SECTION: 02551

ACTIVITY NO	TRANSMITTAL NO.	ITEM NO	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	TYPE OF SUBMITTAL											CLASSIFICATION		REVIEWER	CONTRACTOR SCHEDULE DATES			CONTRACTOR ACTION			GOVERNMENT ACTION		REMARKS
					DATA	DRAWINGS	INSTRUCTIONS	SCHEDULES	STATEMENTS	REPORTS	CERTIFICATES	SAMPLES	RECORDS	O&M MANUALS	INFORMATION ONLY	GOVERNMENT APPROVED			SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	CODE	DATE	SUBMIT TO GOVERNMENT	CODE	DATE	
a.	b.	c.	d.	e.	f.	g.	h.	i.	j.	k.	l.	m.	n.	o.	p.	q.		r.	s.	t.	u.	v.	w.	x.	y.	z.	aa.
			1.2	Bituminous Pavement						X						X		A/E									
			1.2	Bituminous Base Course						X						X		A/E									
			1.2	Subbase						X						X		A/E									
			1.2	Prime Coat						X						X		A/E									
			1.2	Tack Coat						X						X		A/E									
			1.11	Waybills and Delivery Tickets									X		X												

SUBMITTAL REGISTER

(ER 415 1-10)

CONTRACT NO.: DACA31-94-D-0017

TITLE AND LOCATION: USMA MICHIE STADIUM LOT LANDFILLS (C, E & F)

CONTRACTOR: MPI / BERGER

SPECIFICATION SECTION: 02555

ACTIVITY NO	TRANSMITTAL NO.	ITEM NO	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	TYPE OF SUBMITTAL										CLASSIFICATION		REVIEWER	CONTRACTOR SCHEDULE DATES			CONTRACTOR ACTION			GOVERNMENT ACTION		REMARKS
					DATA	DRAWINGS	INSTRUCTIONS	SCHEDULES	STATEMENTS	REPORTS	CERTIFICATES	SAMPLES	RECORDS	O&M MANUALS	INFORMATION ONLY	GOVERNMENT APPROVED		SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	CODE	DATE	SUBMIT TO GOVERNMENT	CODE	DATE	
a.	b.	c.	d.	e.	f.	g.	h.	i.	j.	k.	l.	m.	n.	o.	p.	q.	r.	s.	t.	u.	v.	w.	x.	y.	z.	aa.
			1.7	Tests						X						X	A/E									
			1.3	Waybills and Delivery Tickets									X		X											

SUBMITTAL REGISTER

(ER 415 1-10)

CONTRACT NO.: DACA31-94-D-0017

TITLE AND LOCATION: USMA MICHIE STADIUM LOT LANDFILLS (C, E & F)

CONTRACTOR: MPI / BERGER

SPECIFICATION SECTION: 02720

ACTIVITY NO a.	TRANSMITTAL NO. b.	ITEM NO c.	SPECIFICATION PARAGRAPH NUMBER d.	DESCRIPTION OF ITEM SUBMITTED e.	TYPE OF SUBMITTAL: DATA f.	DRAWINGS g.	INSTRUCTIONS h.	SCHEDULES i.	STATEMENTS j.	REPORTS k.	CERTIFICATES l.	SAMPLES m.	RECORDS n.	O&M MANUALS o.	CLASSIFICATION: INFORMATION ONLY p.	GOVERNMENT APPROVED q.	REVIEWER r.	CONTRACTOR SCHEDULE DATES: SUBMIT s.	APPROVAL NEEDED BY t.	MATERIAL NEEDED BY u.	CONTRACTOR ACTION: CODE v.	DATE w.	SUBMIT TO GOVERNMENT x.	GOVERNMENT ACTION: CODE y.	DATE z.	REMARKS aa.
			3.4	Placing Pipe			X									X	A/E									
			2.1	Pipe for Culverts and Storm Drains								X				X	A/E									
			2.2	Pipe for Gas Vent Stacks								X				X	A/E									

SUBMITTAL REGISTER

(ER 415 1-10)

CONTRACT NO.: DACA31-94-D-0017

ITLE AND LOCATION: USMA MICHIE STADIUM LOT LANDFILLS (C, E & F)

CONTRACTOR: MPI / BERGER

SPECIFICATION SECTION: 02841

ACTIVITY NO a.	TRANSMITTAL NO. b.	ITEM NO c.	SPECIFICATION PARAGRAPH NUMBER d.	DESCRIPTION OF ITEM SUBMITTED e.	TYPE OF SUBMITTAL: DATA f.	DRAWINGS g.	INSTRUCTIONS h.	SCHEDULES i.	STATEMENTS j.	REPORTS k.	CERTIFICATES l.	SAMPLES m.	RECORDS n.	O&M MANUALS o.	CLASSIFICATION: INFORMATION ONLY p.	GOVERNMENT APPROVED q.	REVIEWER r.	CONTRACTOR SCHEDULE DATES: SUBMIT s.	APPROVAL NEEDED BY t.	MATERIAL NEEDED BY u.	CONTRACTOR ACTION: CODE v.	DATE w.	SUBMIT TO GOVERNMENT x.	GOVERNMENT ACTION: CODE y.	DATE z.	REMARKS aa.
			2.01	Materials Certificates						X						X	A/E									

ENG FORM 4288, July 96

SPECSINTACT

SUBMITTAL REGISTER

(ER 415 1-10)

CONTRACT NO.: DACA31-94-D-0017

TITLE AND LOCATION: USMA MICHIE STADIUM LOT LANDFILLS (C, E & F)

CONTRACTOR: MPI / BERGER

SPECIFICATION SECTION: 03307

ACTIVITY NO a.	TRANSMITTAL NO. b.	ITEM NO c.	SPECIFICATION PARAGRAPH NUMBER d.	DESCRIPTION OF ITEM SUBMITTED e.	TYPE OF SUBMITTAL: DATA f.	DRAWINGS g.	INSTRUCTIONS h.	SCHEDULES i.	STATEMENTS j.	REPORTS k.	CERTIFICATES l.	SAMPLES m.	RECORDS n.	O&M MANUALS o.	CLASSIFICATION: INFORMATION ONLY p.	CLASSIFICATION: GOVERNMENT APPROVED q.	REVIEWER r.	CONTRACTOR SCHEDULE DATES: SUBMIT s.	CONTRACTOR SCHEDULE DATES: APPROVAL NEEDED BY t.	CONTRACTOR SCHEDULE DATES: MATERIAL NEEDED BY u.	CONTRACTOR ACTION: CODE v.	CONTRACTOR ACTION: DATE w.	CONTRACTOR ACTION: SUBMIT TO GOVERNMENT x.	GOVERNMENT ACTION: CODE y.	GOVERNMENT ACTION: DATE z.	REMARKS aa.
			2.1.3.1	Air-Entraining Admixture	X										X											
			2.1.11	Curing Materials	X										X											
			2.1.5	Reinforcing Steel	X											X	A/E									
			3.1.5.3	Batching and Mixing Equipment	X											X	A/E									
			3.2	Conveying and Placing Concrete	X											X	A/E									
			2.1.2	Aggregates						X						X	A/E									
			1.2.3	Concrete Mixture Proportions						X						X	A/E									
			2.1.1	Cementitious Materials							X					X	A/E									
			2.1.2	Aggregates							X					X	A/E									

SUBMITTAL REGISTER

(ER 415 1-10)

CONTRACT NO.: DACA31-94-D-0017

TITLE AND LOCATION: USMA MICHIE STADIUM LOT LANDFILLS (C, E & F)

CONTRACTOR: MPI / BERGER

SPECIFICATION SECTION: 16528

ACTIVITY NO	TRANSMITTAL NO.	ITEM NO	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	TYPE OF SUBMITTAL										CLASSIFICATION		REVIEWER	CONTRACTOR SCHEDULE DATES			CONTRACTOR ACTION			GOVERNMENT ACTION		REMARKS
					DATA	DRAWINGS	INSTRUCTIONS	SCHEDULES	STATEMENTS	REPORTS	CERTIFICATES	SAMPLES	RECORDS	O&M MANUALS	INFORMATION ONLY	GOVERNMENT APPROVED		SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	CODE	DATE	SUBMIT TO GOVERNMENT	CODE	DATE	
a.	b.	c.	d.	e.	f.	g.	h.	i.	j.	k.	l.	m.	n.	o.	p.	q.	r.	s.	t.	u.	v.	w.	x.	y.	z.	aa.
			1.4	Equipment and Materials	X											X	A/E									
			1.4	Lighting System		X										X	A/E									
			1.4	Ground Resistance Measurements						X						X	A/E									

SECTION 01310

PROJECT SCHEDULE

PART 1 GENERAL

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 01300 SUBMITTAL PROCEDURES:

SD-07 Schedules

Initial Project Schedule; GA. Preliminary Project Schedule; GA. Periodic Schedule Updates; GA.

Three copies of the schedules showing codes, values, categories, numbers, items, etc., as required.

SD-09 Reports

Narrative Report; GA. Schedule Reports; GA.

Three copies of the reports showing numbers, descriptions, dates, float, starts, finishes, durations, sequences, etc., as required.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.1 GENERAL

Pursuant to the Contract Clause, SCHEDULE FOR CONSTRUCTION CONTRACTS a Project Schedule as described below shall be prepared. The scheduling of construction shall be the responsibility of the Contractor. Contractor management personnel shall actively participate in its development. Subcontractors and suppliers working on the project should 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.

3.1.1 Schedule Restrictions

Scheduling restrictions exist that shall be incorporated into the Project Schedule. These restrictions need to be sufficiently addressed to provide a safe environment for members of USMA summer program activities near work areas, as well as to provide staging of work operations that result in the smooth and efficient execution of all work specified in the Contract Documents. Restrictions presently known include: all work not performed between May 30 through June 20 will be limited to one lot at a time, including all equipment and materials except that which is specifically mentioned by the Contracting Officer; summer training activities in Lots C and E; and, sport camps in lots A and F. Specific dates and other events will be addressed in the Pre-Construction Conference prior to the mobilization of an equipment or materials.

3.2 BASIS FOR PAYMENT

The schedule shall be the basis for measuring Contractor progress. Lack of an approved schedule or scheduling personnel shall result in an inability of the Contracting Officer to evaluate Contractor 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, then 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.

3.3 PROJECT SCHEDULE

The computer software system utilized by the Contractor to produce the Project Schedule shall be capable of providing all requirements of this specification. Failure of the Contractor to meet the requirements of this specification shall result in the disapproval of the schedule. Manual methods used to produce any required information shall require approval by the Contracting Officer.

3.3.1 Use of the Critical Path Method

The Critical Path Method (CPM) of network calculation shall be used to generate the Project Schedule. The Contractor shall provide the Project Schedule in either the Precedence Diagram Method (PDM) or the Arrow Diagram Method (ADM).

3.3.2 Level of Detail Required

With the exception of the initial and preliminary schedule submission, 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.

3.3.2.1 Activity Durations

Contractor submissions shall be required to 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. A rule of thumb, that the Contractor should use, is that less than 2 percent of all non-procurement activities' Original Durations shall be greater than 20 days.

3.3.2.2 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, delivery, installation, start-up, and testing.

3.3.2.3 Government Activities

Government and other agencies activities that could impact progress shall be shown. These activities include, but are not limited to: approvals, inspections, utility tie-in, Government Furnished Equipment (GFE) and notice to proceed for phasing requirements.

3.3.2.4 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.

3.3.2.5 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.

3.3.3 Scheduled Project Completion

The schedule interval shall extend from notice-to-proceed to the contract completion date.

3.3.3.1 Project Start Date

The schedule shall start no earlier than the date that the Notice to Proceed (NTP) was acknowledged.

3.3.3.2 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.

3.3.4 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.

3.3.5 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 insure 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.

3.3.6 Out-of-Sequence Progress

Activities that have posted progress without predecessors being completed (Out-of-Sequence Progress) shall be allowed only by the case-by-case approval of the Contracting Officer. The Contracting Officer may direct that changes in schedule logic be made to correct any or all out-of-sequence work.

3.3.7 Negative Lags

Lag durations contained in the project schedule shall not have a negative value.

3.4 PROJECT SCHEDULE SUBMISSIONS

The Contractor shall provide the submissions as described below. The data disk, reports, and network diagrams required for each submission are contained in paragraph SUBMISSION REQUIREMENTS.

3.4.1 Preliminary Project Schedule Submission

The Preliminary Project Schedule, defining the Contractor's planned operations for the first 30 calendar days shall be submitted for approval within 10 calendar days after Notice to Proceed is acknowledged. The approved preliminary schedule shall be used for payment purposes not to exceed 30 calendar days after Notice to Proceed.

3.4.2 Initial Project Schedule Submission

The Initial Project Schedule shall be submitted for approval within 20 calendar days after Notice to Proceed. The schedule shall provide a reasonable sequence of activities which represent work through the entire project and shall be at a reasonable level of detail.

3.4.3 Periodic Schedule Updates

Based on the result of progress meetings, specified in "Periodic Progress Meetings," the Contractor shall submit periodic schedule updates. These submissions shall enable the Contracting Officer or to assess Contractor's progress. If the Contractor fails or refuses to furnish the information and project schedule data, which in the judgement 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.

3.5 SUBMISSION REQUIREMENTS

The following items shall be submitted by the Contractor for the initial submission, and every periodic project schedule update throughout the life of the project:

3.5.1 Data Disks

Three data disks containing the project schedule shall be provided. Data on the disks shall be in the format of the computer software program(s) utilized.

3.5.1.1 File Medium

Required data shall be submitted on 3.5 disks, formatted to hold 1.44 MB of data, under the MS-DOS Version 5.0 operating system.

3.5.1.2 Disk Label

A permanent exterior label shall be affixed to each disk submitted. The label shall indicate the type of schedule (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.

3.5.2 Narrative Report

A Narrative Report shall be provided with each update of the project schedule. This report shall be provided as the basis of the Contractor's progress payment request. The Narrative Report shall include: a description of activities along the 4 most critical paths, a description of current and anticipated problem areas or delaying factors and their impact, and an explanation of corrective actions taken.

3.5.3 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.

3.5.4 Schedule Reports

The format for each activity for the schedule reports listed below 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 and Actual Finish Dates shall be printed for those activities in-progress or completed.

3.5.4.1 Activity Report

A list of all activities sorted according to activity number and then sorted according to Early Start Date. For completed activities the Actual Start Date shall be used as the secondary sort.

3.5.4.2 Logic Report

A list of Preceding and Succeeding activities for every activity in ascending order by activity number and then sorted according to Early Start Date. For completed activities the Actual Start Date shall be used as the secondary sort.

3.5.4.3 Total Float Report

A list of all 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.

3.5.4.4 Earnings Report

A compilation of the Contractor's Total Earnings on the project from the Notice to Proceed 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; complete and sum all bid items to provide a total project percent complete. The printed report shall contain, for each activity: Activity Number, Activity Description, Original Budgeted Amount, Total Quantity, Quantity to Date, Percent Complete (based on cost), Earnings to Date.

3.5.5 Network Diagram

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:

3.5.5.1 Continuous Flow

Diagrams shall show a continuous flow from left to right with no arrows from right to left. The activity or event number, description, duration, and estimated earned value shall be shown on the diagram.

3.5.5.2 Project Milestone Dates

Dates shall be shown on the diagram for start of project, any contract required interim completion dates, and contract completion dates.

3.5.5.3 Critical Path

The critical path shall be clearly shown.

3.5.5.4 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.

3.5.5.5 S-Curves

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

3.6 PERIODIC PROGRESS MEETINGS

Progress meetings to discuss payment shall include a monthly on-site meeting or other regular intervals mutually agreed to at the preconstruction conference. During this meeting the Contractor will 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.

3.6.1 Meeting Attendance

The Contractor's Project Manager and Scheduler shall attend the regular progress meeting.

3.6.2 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.

3.6.3 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. The following minimum set of items which the Contractor shall address, on an activity by activity basis, during each progress meeting.

3.6.3.1 Start and Finish Dates

The Actual Start and Actual Finish dates for each activity currently in-progress or completed activities.

3.6.3.2 Time Completion

The estimated Remaining Duration for each activity in-progress. Time-based progress calculations must be based on Remaining Duration for each activity.

3.6.3.3 Cost Completion

The earnings for each activity started. Payment shall be based on earnings for each in-progress or completed activity. Payment for individual activities shall not be made for work that contains quality defects. A portion of the overall project amount may be retained based on delays of activities.

3.6.3.4 Logic Changes

All logic changes pertaining to Notice to Proceed 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.

3.6.3.5 Other Changes

Other changes required due to delays in completion of any activity or group of activities are those delays beyond the Contractors control such as strikes and unusual weather. Also included are delays encountered due to submittals, Government Activities, deliveries or work stoppage which makes re-planning the work necessary, and when the schedule does not represent the actual prosecution and progress of the work.

3.7 REQUESTS FOR TIME EXTENSIONS

In the event the Contractor requests an extension of the contract completion date, he shall furnish such justification, project schedule data and supporting evidence as the Contracting Officer may deem necessary for a determination as to whether or not the Contractor is entitled to an extension of time under the provisions of the contract. Submission of proof of delay, based on revised activity logic, duration, and costs (updated to the specific date that the delay occurred) is obligatory to any approvals.

3.7.1 Justification of Delay

The project schedule must 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, shall not be a cause for a time extension to the contract completion date.

3.7.2 Submission Requirements

The Contractor shall submit a justification for each request for a change in the contract completion date of under two weeks based upon the most recent schedule update at the time of the Notice to Proceed 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:

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

b. A brief explanation of the causes of the change.

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

d. 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.

3.7.3 Additional Submission Requirements

For any request for time extension for 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.

3.8 DIRECTED CHANGES

If Notice to Proceed (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 suggested revisions to the project schedule. The Contractor shall include these revisions in the project schedule until the Contractor submits revisions, and final changes and impacts have been negotiated. If the Contractor has any objections to the revisions furnished by the Contracting Officer, then the Contractor shall advise the Contracting Officer within 2 weeks of receipt of the revisions. Regardless of the objections, the Contractor will continue to update their schedule with the Contracting Officer's revisions until a mutual agreement in the revisions may be made. 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 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.

-- End of Section --

SECTION 01451

CONTRACTOR QUALITY CONTROL

PART 1 GENERAL

1.1 REFERENCES

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

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 3740 (1996) Evaluation of Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction

ASTM E 329 (1995b) Agencies Engaged in the Testing and/or Inspection of Materials Used in Construction

1.2 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 01300 SUBMITTAL PROCEDURES:

SD-09 Reports

Contractor Quality Control (CQC) Plan; GA

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.1 GENERAL

The Contractor is responsible for quality control and shall establish and maintain an effective quality control system in compliance with the Contract Clause entitled "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 construction operations, both onsite and off site, and shall be keyed to the proposed construction sequence. For purposes of this section the term "construction" shall include all activities relating to the erection of buildings, roads, infrastructure, flood control structures, or activities relating to dredging and disposal, demolition, hazardous and toxic waste removal, etc., as indicated in the contract documents. Other sections of the contract documents may also require separate, specially qualified individuals in such areas as chemical data acquisition, sampling and analysis, medical monitoring, industrial hygiene, 0safety officer, etc. The CQC organization will coordinate the activities of these individuals. The project superintendent will be held responsible for the quality of work on the job and is subject to removal by the Contracting Officer for non-compliance with quality requirements specified in the contract. The project superintendent in this context shall mean the individual with the responsibility for the overall management of the project including quality and production.

3.2 QUALITY CONTROL PLAN

3.2.1 General

The Contractor shall furnish for review by the Government, not later than 90 days after receipt of notice to proceed, the Contractor Quality Control (CQC) Plan proposed to implement the requirements of the Contract Clause entitled "Inspection of Construction." The plan shall identify personnel, procedures, control, instructions, test, records, and forms to be used. The Government will consider an interim plan for the first 90 days of operation. Construction will be permitted to begin only after acceptance of the CQC Plan or acceptance of an interim plan applicable to the particular feature of work to be started. Work outside of the features of work included in an accepted interim plan will not be permitted to begin until acceptance of a CQC Plan or another interim plan containing the additional features of work to be started.

3.2.2 Content of the CQC Plan

The CQC Plan shall include, as a minimum, the following to cover all construction operations, both onsite and off site, including work by subcontractors, fabricator, suppliers, and purchasing agents:

a. A description of the quality control organization, including a chart showing lines of authority and acknowledgment that the CQC staff shall implement the three phase control system for all aspects of the work specified. The staff shall include a CQC System Manager who shall report to the project superintendent.

b. The name, qualifications (in resume format), duties, responsibilities, and authorities of each person assigned a CQC function. Clear indication that CQC System Manager will have no duties other than Quality Control.

c. 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. Copies of these letters will also be furnished to the Government.

d. Procedures for scheduling, reviewing, certifying, and managing submittals, including those of subcontractors, off site fabricators, suppliers, and purchasing agents. These procedures shall be in accordance with Section 01330 SUBMITTAL PROCEDURES.

e. 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. (Laboratory facilities will be approved by the Contracting Officer.) The Contractor shall incorporate all tests required by the contract (including systems commissioning and operating tests) to derive the above list of testing information which shall be presented in matrix form as part of the CQC Plan. This matrix shall be suitable for use by the Contractor and the Government as a checklist to control testing to be done on the contract. Coordinate any additional test submission or plan requirements for Mechanical and Electrical Systems with appropriate specialized specification section if applicable.

f. Procedures for tracking preparatory, initial, and follow-up control phases and control, verification, and acceptance tests including documentation. Provide matrix of Preparatory and Initial Inspections including specification reference paragraph, the name of the Definable Feature of Work, and spaces for date performed, results, and names of attendees.

g. Procedures for tracking construction deficiencies from identification through acceptable corrective action. These procedures will establish verification that identified deficiencies have been corrected.

h. Reporting procedures, including proposed reporting formats.

i. A list of the definable features of work. A definable feature of work is a task which is separate and distinct from other tasks and has separate control requirements. It could be identified by different trades or disciplines, or it could 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 is frequently more than one definable feature under a particular section. This list will cover all features of work on the project, and will be agreed upon during the coordination meeting.

j. A brief explanation of the duties of the CQC organization with respect
To safety. Note that separate Accident Prevention Plan and Hazards Analysis is required for submission and acceptance.

k. Contractor's plan for training all CQC personnel in the CQC System.

3.2.3 Acceptance of Plan

Acceptance of the Contractor's plan is required prior to the start of construction. Acceptance is conditional and will be predicated on satisfactory performance during the 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, the Contractor shall notify the Contracting Officer in writing of any proposed change. Proposed changes are subject to acceptance by the Contracting Officer.

3.3 COORDINATION MEETING

After the Pre-construction Conference, before start of construction, and prior to acceptance by the Government of the CQC Plan, the Contractor shall meet with the Contracting Officer or Authorized Representative and discuss the Contractor's quality control system. The CQC Plan shall be submitted for review a minimum of 14 calendar days prior to the Coordination Meeting. The initial plan submitted must be found acceptable by the Government before the Coordination Meeting can be held. During the meeting, a mutual understanding of the system details shall be developed, including the forms for recording the CQC operations, control activities, testing, administration of the system for both onsite and off site work, and the interrelationship of Contractor's Management and control with the Government's Quality Assurance. Minutes of the meeting shall be prepared by the Government and signed by both the Contractor and the Contracting Officer. The minutes shall become a part of the contract file. There may be occasions when subsequent conferences will be called by either party 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 General

The requirements for the CQC organization are a CQC System Manager and sufficient number of additional qualified personnel to ensure contract compliance. The number of CQC personnel shall be increased as required

during times of high construction workload. The Contractor shall provide a CQC organization which shall be at the site at all times during progress of the work and with complete authority to take any action necessary to ensure compliance with the contract. All CQC staff members shall be subject to acceptance by the Contracting Officer.

3.4.2 CQC System Manager

The Contractor shall identify as CQC System Manager an individual within his organization at the site of the work 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 graduate of construction management, or shall hold a state Professional Engineer's license, with a minimum of 2 years construction experience on construction similar to this contract, one year of which as a Quality Control Representative. The CQC Manager may also be a construction person with a minimum of 4 years in related work, one year of which as a QC Representative. This CQC System Manager shall be on the site at all times during construction and will be employed by the prime Contractor. An alternate for the CQC System Manager will be identified in the plan to serve in the event of the System Manager's absence. The requirements for the alternate will be the same as for the designated CQC System Manager. The CQC System Manager shall be assigned no duties other than Quality Control.

3.4.3 Organizational Expertise

The CQC organization, which includes the CQC System Manager and additional qualified personnel, must as a minimum possess general corporate technical knowledge of all aspects of the project, and must successfully execute the CQC System on all aspects of the project. Individuals possessing experience in specialized areas shall be added to the organization as required during periods when such specialty areas are being executed. Examples of such specialized areas would include HVAC, electrical distribution and substations, roofing, tele-communication systems, fire protection and alarm systems, computer installations, specialized welding, specialized finishes, precast concrete installation, modular housing, specialized geotech work, dredging, sand placement and surveying, chemical data acquisition, hazardous material removal and disposal, medical monitoring, etc., depending on the nature of the particular project. The Contractor must demonstrate that such additional qualified personnel have received sufficient training and indoctrination into the CQC system, and that these personnel properly execute the requirements of the CQC System within their areas of expertise.

3.4.4 Additional Requirement

In addition to the above experience and education requirements the CQC System Manager shall have completed within the last five years the course entitled "Construction Quality Management for Contractors". This course is given at a cost of $25 by Government personnel and is of two- day duration. The Government will provide one instruction manual for the course.

3.4.5 Organizational Changes

The Contractor shall maintain the CQC Organization at full strength at all times. When it is necessary to make changes to the organization, the Contractor shall revise the CQC Plan to reflect the changes and submit the changes to the Contracting Officer for acceptance.

3.5 SUBMITTALS

Submittals shall be made as specified in Section 01300 SUBMITTAL PROCEDURES. The CQC organization shall be responsible for certifying that all submittals are in compliance with the contract requirements and are submitted in accordance with the date on the submittal register. CQC

personnel shall also make physical checks of materials and equipment before installation to insure compliance with approved shop drawings.

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. At least three phases of control shall be conducted by the CQC System Manager for each definable feature of work as follows:

3.6.1 Preparatory Phase

This phase shall be performed 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 worksite, and shall include:

a. A review of each paragraph of applicable specifications.

b. A review of the contract drawings.

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

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

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

f. 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.

g. A review of the appropriate activity hazard analysis to assure safety requirements are met per EM 385-1-1, "Safety and Health Requirements Manual".

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

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

j. Discussion of the initial control phase.

k. The Government shall be notified at least 48 hours in advance of beginning
the preparatory control phase meeting. 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. The results of the preparatory phase actions shall be documented by separate minutes prepared by the CQC System Manager and attached to the daily CQC report. The Contractor shall clearly indicate its intent and plan for communication of the results of the preparatory phase to applicable workers, to include materials, construction methods, workmanship standards, safety considerations and procedures, and preparatory phase meeting minutes.

3.6.2 Initial Phase

This phase shall be accomplished at the beginning of a definable feature of work (DFW) when the accomplishment of a representative sample of the work is impending.

The following shall be accomplished:

a. A check of the portion of work done to ensure that it is in full compliance with contract requirements. Review minutes of the preparatory meeting.

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

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

d. Resolve all differences.

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

f. The Government shall be notified at least 48 hours in advance of beginning the initial phase meeting. This phase shall include a meeting conducted by the CQC System Manager and attended by the superintendent, other CQC personnel (as applicable), the foreman responsible for the definable feature and the work crew(s) for the appropriate DFW. Separate minutes of this phase shall be prepared by the CQC System Manager and attached to the daily CQC report. Exact location (i.e. CQC Report number) of initial phase shall be indicated for future reference and comparison with follow up phases.

g. The initial phase should be repeated for each new crew to work onsite, or any time acceptable specified quality standards are not being met.

3.6.3 Follow-up Phase

Daily checks shall be performed 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. Final follow-up checks shall be conducted and all deficiencies corrected prior to the start of additional features of work which may be affected by the deficient work. The Contractor shall not build upon or conceal non-conforming work.

3.6.4 Additional Preparatory and Initial Phases

Additional preparatory and initial phases shall be conducted on the same definable feature 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.

3.6.5 Definable Feature of Work: Definition and Discussion

A Definable Feature of Work (DFW) is a portion of work consisting of materials, equipment, supplies and procedures which are closely related to each other, have the same control and will be accomplished by the same work crew to completion. A DFW must be sufficiently small so that control of the work (i.e. communication of requirements to workers, inspection of materials and workmanship and correction of deficiencies) will be easily accomplished. Some examples are:

* Rough-in of electrical boxes and wiring methods

* Lighting fixtures, receptacles, and accessories

* Panelboards, circuit breakers and motors.

* Water supply piping, fittings and supports

* DWV piping, fittings and supports for plumbing

* Concrete reinforcement and formwork

* Concrete mixing, placement, curing and finishing

* Testing Procedure for contaminated soil, materials and storage tank contents

* Storage Tank disassembly and removal

* Setting up of decontamination area, exclusion zones and standard safety procedures for asbestos removal

* Asbestos removal and disposal procedures

* Chemical Data Acquisition

* Preparation, removal and disposal of contaminated material

* Dredging and placement.

3.7 TESTS

3.7.1 Testing Procedure

The Contractor shall perform specified or required tests to verify that control measures are adequate to provide a product which conforms to contract requirements. Upon request, the Contractor shall 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 shall perform the following activities and record and provide the following data:

a. Verify that testing procedures comply with contract requirements.

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

c. Check test instrument calibration data against certified standards.

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

e. Results of all tests taken, both passing and failing tests, will be recorded on the CQC report for the date taken. Specification paragraph reference, location where tests were taken, and the sequential control number identifying the test will be given. If approved by the Contracting Officer, actual test reports may be submitted later with a reference to the test number and date taken. An information copy of tests performed by an off site or commercial test facility will be provided 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 Contractor will be assessed a charge of $1500 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 On-Site 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 Testing

Costs incidental to the transportation of samples or materials will be borne by the Contractor. Samples of materials for test verification and acceptance testing by the Government shall be delivered to the Corps of Engineers Division Laboratory, as designated by the Government Representative. Coordination for each specific test, exact delivery location and dates will be made through the Area Office.

3.8 COMPLETION INSPECTION

3.8.1 Punch-Out Inspection

Near the completion of all work or any increment thereof established by a completion time stated in the Special Clause entitled "Commencement, Prosecution, and Completion of Work," or stated elsewhere in the specifications, the CQC System Manager shall conduct an inspection of the work and develop a "punch list" of items which do not conform to the approved drawings and specifications. Such a list of deficiencies shall be included in the CQC documentation, as required by paragraph DOCUMENTATION below, and 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's "Pre-final" inspection.

3.8.2 Pre-Final Inspection

The Government will perform this inspection to verify that the facility is ready to be occupied. A Government "Pre-final Punch List" will 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 and so notify the Government so that a "Final" inspection with the customer can be scheduled. Any items noted on the "Pre-final" inspection shall be corrected in a timely manner. These inspections and any deficiency corrections required by this paragraph will be accomplished within the time slated for completion of the entire work or any particular increment thereof 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 will be in attendance at this inspection. Additional Government personnel including, but not limited to, those from Base/Post Civil Facility Engineer user groups, and major commands may also be in attendance. The final acceptance inspection will be formally scheduled by the Contracting Officer based upon results of the Pre-Final Inspection. Notice will be given to the Contracting Officer at least 14 days prior to the final acceptance inspection and shall include the Contractor's assurance that all specific items previously identified to the Contractor as being acceptable, 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 entitled "Inspection of Construction".

3.9 DOCUMENTATION

The Contractor shall 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 and shall be on an acceptable form that includes, as a minimum, the following information:

a. Contractor/subcontractor and their area of responsibility.

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

c. 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.

d. Test and/or control activities performed with results and references to specifications/drawings requirements. The control phase should be identified (Preparatory, Initial, Follow-up). List deficiencies noted along with corrective action.

e. Quantity of materials received at the site with statement as to acceptability, storage, and reference to specifications/drawings requirements.

f. Submittals reviewed, with contract reference, by whom, and action taken.

g. Off-site surveillance activities, including actions taken.

h. Job safety evaluations stating what was checked, results, and instructions or corrective actions.

i. Instructions given/received and conflicts in plans and/or specifications.

j. 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. "N/A" shall be entered into any field for which no entry is intended. 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. The original and one copy of these records in report form shall

be furnished to the Government daily within 16 hours after the date(s) covered by the report, except that reports need not be submitted for days on which no work is performed. As a minimum, one report shall be prepared and submitted for every seven days of no work and on the last day of a no work period. All calendar days shall be accounted for throughout the life of the contract. The first report following a day of no work shall be for that day only. Reports shall be signed and dated by the CQC System Manager. The report from the CQC System Manager shall include copies of test reports and copies of reports prepared by all subordinate quality control personnel. All documentation is expected to be literate, legible and complete.

3.10 SAMPLE FORMS

a. The 2-page form at the end of the section will be used for the basic CQC Report. CQC personnel shall attach continuation sheets as required for any entries which cannot fit on the basic form. Preparatory and Initial Inspections, when performed, shall be indicated on the basic CQC report and minutes for each inspection shall be attached. Minutes will consist of a list of specific requirements for materials, procedures or equipment to be employed and shall also include any understandings reached or items of special importance discussed.

b. In addition, outstanding deficiencies shall be listed on the form "List of Outstanding Deficiencies" at the end of this section and shall be attached to each CQC report. As deficiencies are corrected, they are to be acknowledged on the basic CQC report and shall be deleted from the list.

c. Form at the end of this section entitled "CQC Test Report List" shall be used by the Contractor to track testing to be done as the project progresses, and also to summarize the Contractor's Quality Control testing to be reported on the CQC Plan.

d. Form "Record of Preparatory and Initial Inspections" at the end of this section shall be used by the Contractor to track Preparatory and Initial inspections as the project progresses and also to summarize these required inspections as part of the CQC Plan.

e. Additional reporting forms pertaining to specialized activities may be included herein or elsewhere in the contract, and shall be used for reporting as indicated.

3.11 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. Deficiencies cited and verbal instructions given to the Contractor by the Government Representative shall be entered into that day's CQC Report.

(FORMS FOLLOW)

-- End of Section --

RECORD OF PREPARATORY AND INITIAL INSPECTIONS

DATE OF INSP	TYPE OF INSP	DEFINABLE FEATURE OF WORK (DESCRIBE)	REPORT NOS		PERSONS ATTENDING INSP	WAS MATL&/OR EQUIPMENT PHYSICALLY INSPECTED ?
			QA	QC		

NAD FORM 826
22 JULY 86

NOTE:THIS FORM SHALL BE USED BY THE CONTRACTOR TO TRACK PREP/INIT INSP'S
ATTACH ADDITIONAL RESULTS OR COMMENTS AS REQUIRED

LIST OF OUTSTANDING DEFICIENCIES

SH_____ OF _____ DATE:_____

PROJECT TITLE:_____ CONTRACTOR:_____

LOCATION:_____ CQC REPORT#_____ CONTRACT #:_____

SPEC REF OR DWG#	LOCATION ON PROJECT	DESCRIPTION OF DEFICIENCY	DATE FOUND	DATE TO BE CORRECTED	DATE CORRECTED	REMARKS

NOTE: THIS FORM SHALL BE USED BY THE CONTRACTOR TO TRACK OUTSTANDING CONSTRUCTION DEFICIENCIES

CQC TEST REPORT LIST

CQC REPORT#_____ SH_____ OF _____ DATE:_____

CONTRACTOR:_____ CONTRACT #:_____

PROJECT TITLE:_____ LOCATION:_____

SPEC REF OR DWG#	TYPE OF TEST	DATE PERFORMED	RESULTS	REMARKS

NOTE: THIS FORM SHALL BE USED BY THE CONTRACTOR TO TRACK CQC TESTING.PROVIDE ATTACHMENTS AS REQUIRED.

CQC REPORT

1. Project Title:_____

Location:_____Contract No.:_____

2. List Contractors and Subs Working This Day and Areas of Responsibility of each:

_____

_____

_____

3. Weather:

_____

4. Description and Location of Work of the Project
(Also Indicate Days of No Work and reasons for Delay)

_____

_____

_____

_____

_____

5. Labor and Equipment Breakdown by Trade (Attach Continuation)

_____

_____

_____

6. Follow-Up Inspections Performed, Results and Corrective Actions Taken:

_____

_____

_____

_____

_____

_____

_____

_____

_____

7. Job Safety. Indicate What Was Checked, Results,Instructions Received and corrective Actions:

_____

_____

_____

_____

_____

8. Additional Activities and Remarks (Check Appropriate Box)

[ ] a. Prep or Initial Insp. Held. Attach Minutes.
[ ] b. Testing Performed. Attach Results.
[ ] c. Outstanding Deficiencies. See Attached List
[ ] d. Verbal Instructions Received.
[ ] e. Delivery of Equipment and Materials.
[ ] f. Submittal Actions.
[ ] g. Misc/Remarks.

Use Space Below To Discribe Checked Items

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

9. Contractor's Verification: "The above report and attachments are complete and all Supplies, Materials, Equipment and Workmanship incorporated into the work are in full compliance with the contract excepa as noted":

Signed_____ Date_____

CQC Representative

SECTION 01500

TEMPORARY CONSTRUCTION FACILITIES

1.1 GENERAL REQUIREMENTS

1.1.3 Employee Parking

Contractor employees shall park privately owned vehicles in an area designated by the Contracting Officer. This area will be within reasonable walking distance of the construction site. Contractor employee parking shall not interfere with existing and established parking requirements of the United States Military Academy.

1.1.4 Submittal

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 01300 SUBMITTAL PROCEDURES:

SD-09 Reports

Maintenance & Protection of Traffic Plan; GA

1.2 AVAILABILITY AND USE OF UTILITY SERVICES

1.2.1 Payment for Utility Services

The Government will make electric and water utilities available to the Contractor from existing outlets and supplies, as specified in the contract without charge.

1.2.2 Meters and Temporary Connections

The Contractor, at its expense and in a manner satisfactory to the Contracting Officer, shall provide and maintain necessary temporary connections, distribution lines, and meter bases as required, see Section 16528 for lighting and electrical details. The Contractor shall notify the Contracting Officer, in writing, 5 working days before final electrical connection is desired so that a utilities contract can be established. The Contractor's Licensed Electrician will make the final hot connection after inspection and approval by the Contracting Officer of the temporary wiring installation.

1.2.5 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.

1.2.6 Telephone

The Contractor shall make arrangements and pay all costs for telephone facilities desired with the Bell-Atlantic company.

1.3 BULLETIN BOARD, PROJECT SIGN, AND PROJECT SAFETY SIGN

1.3.1 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.

1.3.2 Project and Safety Signs

The requirements for the signs, their content, and location shall be as shown at the end of this section. 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 from the site.

1.4 PROTECTION AND MAINTENANCE OF TRAFFIC

The Contractor is required to coordinate any road closures with both the Project Engineer and Post Provost Marshall's Office a minimum of 14 days in advance. Failure to properly coordinate such events by the Contractor will not be allowed as contract delays.

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 from 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.

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. Haul roads shall be constructed with suitable grades and widths; sharp curves, blind corners, and dangerous cross traffic shall be avoided. The Contractor shall 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. Lighting shall be adequate to assure full and clear visibility for full width of haul road and work areas during any night work operations. Upon completion of the work, haul roads designated by the Contracting Officer shall be removed.

1.4.2 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 and maintained in a continuous line with a maximum spacing of two (2) feet, across all work areas including work in lots. Barricades shall be of the sawhorse type, or similar, and made clearly

visible with adequate illumination to provide sufficient visual warning of the hazard during both day and night.

1.4.3 Maintenance & Protection of Traffic Plan

The Contractor shall prepare a Maintenance & Protection of Traffic Plan and submit it to the Contracting Officer fourteen (14) days prior to implementation for approval. The Maintenance & Protection of Traffic Plan shall provide construction signage, detour routes and direction signals as required for the work.

1.5 CONTRACTOR'S TEMPORARY FACILITIES

1.5.1 Administrative Field Offices

The Contractor shall provide and maintain administrative field office facilities within the support area as indicated. This facility shall have proper lighting, telephone services, sanitary facilities and sufficient room for project meetings. In addition, the field office shall have signage clearly stating the project, two reserved visitor parking spaces, and the Contractor shall have six protective helmets and one set of all contract documents for visitor's use. Government office and warehouse facilities will not be available to the Contractor's personnel.

1.5.3 Supplemental Support 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. 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.

1.5.4 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. Trailers which, in the opinion of the Contracting Officer, require exterior painting or maintenance will not be allowed on the military property.

1.5.5 Maintenance of Storage Area

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.

1.5.7 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.

1.6 GOVERNMENT FIELD OFFICE

1.6.1 Resident Engineer's Office

The Contractor shall provide the Government Resident Engineer with a lockable field office fully installed ten days prior to project start date.

Four (4) parking spaces shall be allocated at the site and clearly marked as reserved for the Contracting Officer. 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.

1.6.1.1 Minimum Construction

A. Structurally sound foundation and superstructure.

B. Completely weathertight and insulated.

C. Exterior finish acceptable to Contracting Officer.

D. All new interior finishes acceptable to Contracting Officer.

E. Resilient floor covering in first class condition.

G. Windows: Minimum 10% of floor area with operable sash and screens.

H. One office area with a minimum of 96 square feet.

I. One conference area sized to accommodate the minimum furnishings.

1.6.1.2 Optional Construction

The Contractor may, at its option, furnish and maintain a trailer-type mobile office acceptable to the Contracting Officer and providing as a minimum the facilities specified above and below. The trailer shall be securely anchored to the ground at all four corners to guard against movement during high winds, leveled and made accessible with stable steps or ramp, and handrails.

1.6.1.3 Minimum Services

The following services shall all be provided and maintained to the Government Office and Contracting Officer for the duration of the project at the sole expense of the Contractor:

A. Interior lighting: electric, non-glare type producing a minimum illumination level of 50 foot candles measured at desk top height.

B. Exterior and security lighting at entrance.

C. Automatic heating/cooling capable of maintaining ambient temperatures inside the structure at 70 degrees F (+/- 3 degrees).

D. A minimum of two duplex outlets for the office area, with additional outlets sufficient for the other working areas.

E. Private telephone service, with a minimum of two separate telephones and one dedicated fax line. Contractor will provide and install all connectionsto provide service to include terminal jacks inside the field office. The Governement will establish actual phone service through the Military Academy's facilities.

F. Potable bottled water.

G. Private sanitary facilities.

H. Provide one fire extinguisher, 201B, non-toxic, dry chemical type, UL-approved for Class A, B, and C fires (minimum rating of 2A, 10B, 10C, respectively).

I. Sufficient Temporary power to trailer in accodance with Section 16528, with the follwing minimum power requirements:

- 1 A/C unit	1500 VA
- + Lighting	750 VA
- + Office Equipment	1500 VA
- = Total Load	3750 VA
- + Spare	1250 VA
- = TOTAL TRAILER REQUIREMENT	5000 VA

1.6.1.4 Minimum Furnishings

A. The office area shall be provided with the following minimum furnishings:

1. One desk (30x60 inches) with laminated top and lockable drawers.
2. One swivel chair with arms.
3. One table (30x60 inches) with laminated top.
4. One telephone with speaker phone capabilities and functions to handle multiple calls. Voice mail/digital answering machine should be provided.
5. One 4-drawer, legal-sized, lockable file cabinet.
6. One bookshelf, minimum 3 shelves (12" deep X 14" high X 36" wide).
7. One wastebasket.
8. Provide one 32-gallon trash can with lid.
8. One computer specified as follows, fully installed with software and in working order:

IBM or compatible personal computer
- Pentium 233MHz or faster
- 32 MB RAM or greater
- 4x CD-ROM or faster
- 1 GB hard drive
- 3.5" floppy drive
- 17" color monitor (1024x768 or better)
- Enhanced 101 keyboard
- 3 button mouse/mousepad
- Data Line connection with modem hardware/software and email capabilities
- Six outlet surge protector
- Hewlett-Packard Laser Jet IV or equivalent printer with ability to print at least 8 pages per minute
- 3,000 sheets 8.5X11 laser jet paper
- 30 double sided high density 3.5 floppy disks
- Microsoft Windows 95 or later
- Latest version Microsoft Office Professional (with all manuals included).

B. The conference area shall be provided with the following minimum furnishings:

1. One office table (42X60 inch minimum) with laminated top.
2. Four chairs.
3. Telephone with speaker capabilities.
4. Fax Machine (plain paper printing)
5. Copier with supplies and service.
4. One bulletin board (4X6 feet minimum size).
5. One vertical filing rack capable of holding E-size drawings.

1.6.1.5 Maintenance

The Contractor shall perform all maintenance required to maintain the Contracting Officer's field office and its services in satisfactory condition throughout the life of the project. Satisfactory is defined as one (1) complete sweeping and mopping of the field office per week, and includes M-W-F trash removal.

1.6.1.6 Removal

The Contractor shall remove the Contracting Officer's field office with seven days after final completion of all work under this contract, or earlier if so directed by the Contracting Officer.

1.7 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.

1.8 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.

1.9 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.

At the discretion of the Project Engineer, if additional labor is required to avoid unsightly conditions, the Contractor will correct the condition to the satisfaction of the Project Engineer at no additional cost to the Governement.

1.10 RESTORATION OF SUPPORT AREA

Upon completion of the project and after removal of trailers, materials, and equipment from within the support area, the area 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.

PART 2 PRODUCT (NOT APPLICABLE)

PART 3 EXECUTION (NOT APPLICABLE)

SECTION 01720

AS-BUILT DRAWINGS

PART 1 GENERAL

1.2 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 01300 SUBMITTAL PROCEDURES:

SD-04 Drawings

Preliminary submittal; GA.

Final; GA.

Submit as-built drawings as specified herein.

1.3 GENERAL

This section covers the preparation of as-built marked drawings complete, as a requirement of this contract.

1.4 PROGRESS MARKED UP AS-BUILT PRINTS

The Contractor shall mark up one set of paper prints to show the as-built conditions. These as-built marked prints shall be kept current and available on the jobsite at all times. All changes from the contract plans which are made in the work or additional information which might be uncovered in the course of construction shall be accurately and neatly recorded as they occur by means of details and notes. The as-built marked prints will be jointly inspected for accuracy and completeness by the Contracting Officer's representative and a responsible representative of the Construction Contractor prior to submission of each monthly pay estimate. The drawings shall show the following information, but not be limited thereto:

1.4.1 The location and description of any utility lines or other installations of any kind or description known to exist within the construction area. The location includes dimensions to permanent features

1.4.2 The location and dimensions of any changes within the building or structure.

1.4.3 Correct grade or alinement of roads, structures or utilities if any changes were made from contract plans.

1.4.4 Correct elevations if changes were made in site grading.

1.4.5 Changes in details of design or additional information obtained from working drawings specified to be prepared and/or furnished by the Contractor including but not limited to fabrication, erection, installation plans and placing details, pipe sizes, insulation material, dimensions of equipment foundations, etc.

1.4.6 The topography and grades of all drainage installed or affected as a part of the project construction.

1.4.7 All changes or modifications which result from the final inspection.

1.5 PRELIMINARY SUBMITTAL

The Contractor shall prepare two copies of the progress as-built prints and these shall be delivered to the Contracting Officer at the time of final inspection for his review and approval. These as-built marked prints shall be neat, legible and accurate. The review by Government personnel will be expedited to the maximum extent possible. Upon approval, one copy of the as-built marked prints will be returned to the Contractor for use in preparation of final as-built drawings. If upon review, the drawings are found to contain errors and/or omissions, they shall be returned to the Contractor for corrections. The Contractor shall complete the corrections and return the as-built marked prints to the Contracting Officer within ten (10) calendar days.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

3.1 DRAWING PREPARATION

3.1.1 Upon approval of the as-built prints submitted, the Contractor will be furnished the original set of contract drawings with all amendments incorporated. These drawings shall be modified as may be necessary to correctly show all the features of the project as it has been constructed by bringing the contract set into agreement with the approved as-built prints, adding such additional drawings as may be necessary. These drawings are part of the permanent records of this project and the Contractor shall be responsible for the protection and safety there of until returned to the Contracting Officer. Any drawings damaged or lost by the Contractor shall be satisfactorily replaced by the Contractor at his expense.

3.1.2 Only personnel proficient in the preparation of engineering drawings to standards satisfactory and acceptable to the Government shall be employed to modify the original contract drawing or prepare additional new drawings. All additions and corrections to the contract drawings shall be neat, clean and legible, and shall match the adjacent existing linework and/or lettering being annotated in type, density, size and style. All drafting work shall be done using the same medium (pencil, plastic, lead or ink) that was employed on the original contract drawings and with graphite lead on paper base material. The Contracting Officer will review all as-built drawings for accuracy and conformance to the above specified drafting standards. The Contractor shall make all corrections, changes, additions, and deletions required to meet these standards. The title block to be used for any new as-built drawings shall be similar to that used on the original drawings.

3.1.3 All original contract drawings shall be marked either "As-Built "drawing denoting no revisions on the sheet or "Revised As-Built" denoting one or more revisions. All original contract drawings shall be dated in the revision block.

3.2 FINAL REQUIREMENTS

After receipt by the Contractor of the approved marked as-built prints and the original contract drawings the Contractor will within 30 days for contracts less than $5 million or 60 days for contracts $5 million and above, make the final as-built submittal. This submittal shall consist of the completed as-built drawings, two blue line prints of these drawings and the return of the approved marked as-built prints. They shall be complete in all details. All paper prints and reproducible drawings will become the property of the Government upon final approval. Failure to submit as-built drawings and marked prints as required herein shall be cause for with holding any payment due the Contractor under this contract. Approval and acceptance of final as-built drawings shall be accomplished before final payment is made to the Contractor.

3.3 PAYMENT

No separate payment will be made for the as-built drawings required under this contract, and all costs in connection therewith shall be considered a subsidiary obligation of the Contractor.

-- End of Section --

SECTION 01760

PROJECT CLOSEOUT

PART 1 GENERAL

The work specified in this section consists of the requirements for project closeout and Contractor demobilization from the site.

1.1 REFERENCES (Not Applicable)

1.2 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 01300 SUBMITTAL PROCEDURES:

SD-08 Statements

Closeout Plan; GA.

The CONTRACTOR shall submit a Closeout Plan which describes final cleaning procedures to be utilized and provides a schedule for CONTRACTOR demobilization activities. Plan shall address demobilization from construction activities separately from demobilization from operational maintenance activities.

1.3 FINAL CLEANING

1.3.1

At the completion of the construction portion of the Work (i.e., prior to commencement of the one-year operations and maintenance period), CONTRACTOR shall remove all rubbish from and about the Site of the Work, and all temporary structures, construction signs, tools, scaffolding, materials, supplies and equipment which he or any of his Subcontractors may have used in the performance of the Work. CONTRACTOR shall broom clean paved surfaces and rake clean other surfaces of grounds. CONTRACTOR shall maintain clean condition of grounds during the one-year operations and maintenance period.

1.3.2

CONTRACTOR shall thoroughly clean all materials, equipment and structures; and all marred surfaces shall be touched up to match adjacent surfaces so as to leave Work in a clean and new appearing condition.

1.3.3

Remove spatter, grease, stains, fingerprints, dirt, dust, labels, tags, packing materials and other foreign items or substances from interior and exterior surfaces, equipment, signs and lettering.

1.3.4

Remove paint, clean and restore all equipment and material nameplates, labels and other identification markings.

1.3.5

CONTRACTOR shall maintain cleaning until Project, or portion thereof, is occupied by the CONTRACTING OFFICER.The CONTRACTOR shall clean all

CONTRACTOR owned construction equipment and vehicles prior to using the local roads of the United States Military Academy.

1.4 INSPECTIONS

1.4.1

At the time of substantial completion an inspection shall be held in accordance with the requirements of the General Conditions.

At the time of completion of all the Work a final inspection shall be held in accordance with the requirements of the General Conditions.

Follow-up Inspection:

1. At the time of the completion of the guarantee period as specified in the General Conditions, CONTRACTING OFFICER will make arrangements with the CONTRACTOR for a follow- up inspection and will send a written notice to said parties to inform them of the date and time of the inspection.

2. After the inspection, CONTRACTING OFFICER will inform CONTRACTOR of any corrections required.

3. When the corrections have been satisfactorily completed, CONTRACTING OFFICER will forward a certificate for the release of Bonds.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

NOT USED

-- End of Section --

SECTION 02050

DEMOLITION

PART 1 GENERAL

1.1 REFERENCES

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

ENGINEERING MANUALS (EM)

EM 385-1-1	(1992) U.S. Army Corps of Engineers Safety and Health Requirements Manual

1.2 GENERAL REQUIREMENTS

The work includes demolition, salvage of identified items and materials, and removal of resulting rubbish and debris. Rubbish and debris shall be removed from Government property daily, unless otherwise directed, to avoid accumulation at the demolition site. Materials that cannot be removed daily shall be stored in areas specified by the Contracting Officer. In the interest of occupational safety and health, the work shall be performed in accordance with EM 385-1-1, Section 23, Demolition, and other applicable Sections. In the interest of conservation, salvage shall be pursued to the maximum extent possible; salvaged items and materials shall be disposed of as specified.

1.3 SUBMITTALS (Not Applicable)

1.4 DUST CONTROL

The amount of dust resulting from demolition shall be controlled to prevent the spread of dust to occupied portions of the construction site and to avoid creation of a nuisance in the surrounding area. Use of water will not be permitted when it will result in, or create, hazardous or objectionable conditions such as ice, flooding and pollution.

1.5 PROTECTION

1.5.1 Protection of Personnel

During the demolition work the Contractor shall continuously evaluate the condition of the structure being demolished and take immediate action to protect all personnel working in and around the demolition site.

The Contractor shall ensure that no elements determined to be unstable are left unsupported and shall be responsible for placing and securing bracing, shoring, or lateral supports as may be required as a result of any cutting, removal, or demolition work performed under this contract.

1.5.2 Protection of Existing Property

Before beginning any demolition work, the Contractor shall survey the site and examine the drawings and specifications to determine the extent of the work. The Contractor shall take necessary precautions to avoid damage to existing items to remain in place, to be reused, or to remain the property of the Government; any damaged items shall be repaired or replaced as approved by the Contracting Officer. The Contractor shall coordinate the work of this section with all other work and shall construct and maintain shoring, bracing, and supports as required. The Contractor shall ensure

that structural elements are not overloaded and shall be responsible for increasing structural supports or adding new supports as may be required as a result of any cutting, removal, or demolition work performed under this contract.

1.5.3 Protection of Trees

Trees within the project site which might be damaged during demolition and which are determined to be left in place by Contracting Officer shall be protected by fences. The fence shall be securely erected a minimum of 5 feet from the trunk of individual trees or follow the outer perimeter of branches or clumps of trees. Any tree designated to remain that is damaged during the work under this contract shall be replaced in kind or as approved by the Contracting Officer.

1.5.4 Environmental Protection

The work shall comply with the requirements of Section 01130.

1.6 BURNING

The use of burning at the project site for the disposal of refuse and debris will not be permitted.

1.7 USE OF EXPLOSIVES

Use of explosives will not be permitted.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.1 EXISTING STRUCTURES

Existing structures indicated shall be removed as indicated on the Contract Drawings. Lots C, E and F wood light poles shall be removed. As directed by the Contracting Officer, all reusable wood poles shall be stored on-site for USMA usage or relocated for access road lighting improvements.

The access road existing culverts and Lot C inlet structure shall be removed and disposed of properly.

Lot F existing stone rip rap located along the swale shall be removed and stockpiled.

3.2 UTILITIES

Existing utilities shall be removed as indicated. The existing lighting fixtures and associated aerial wiring and accessories shall be removed as indicated on the Contract Drawings. As directed by the Contracting Officer, all reusable lighting fixtures shall be stored on-site for USMA usage. When utility lines are encountered that are not indicated on the drawings, the Contracting Officer shall be notified prior to further work in that area.

3.3 DISPOSITION OF MATERIAL

Title to material and equipment to be demolished, except Government salvage and historical items, is vested in the Contractor upon receipt of notice to proceed. The Government will not be responsible for the condition, loss or damage to such property after notice to proceed.

3.3.1 Salvageable Items and Material

Contractor shall salvage items and material to the maximum extent possible.

3.3.1.1 Material Salvaged for the Contractor

Material salvaged for the Contractor shall be stored as approved by the Contracting Officer and shall be removed from Government property before completion of the contract. Material salvaged for the Contractor shall not be sold on the site.

3.3.1.2 Historical Items

Historical items shall be removed in a manner to prevent damage. The following historical items shall be delivered to the Government for disposition: Corner stones, contents of corner stones, and document boxes wherever located on the site.

3.3.2 Unsalvageable Material

Concrete, masonry, and other noncombustible material, except concrete permitted to remain in place, shall be disposed of off site.

3.3.3 Disposal of Landfill Material

Landfill material excavated during the demolition of the existing structures shall remain on-site and be redistributed on Lots C, E and F in accordance with SECTION 02222, Excavation, Trenching, Backfilling and Rip Rap.

3.4 CLEAN UP

Debris and rubbish shall be removed from basement and similar excavations. Debris shall be removed and transported in a manner that prevents spillage on streets or adjacent areas. Local regulations regarding hauling and disposal shall apply.

-- End of Section --

SECTION 02110

CLEARING, GRUBBING AND TREE REMOVAL

PART 1 GENERAL

1.1 REFERENCES (Not Applicable)

1.2 DEFINITIONS

1.2.1 Clearing

Clearing shall consist of the felling, trimming, and cutting of trees into sections and the satisfactory disposal of the trees and other vegetation required for removal to accomplish the work, including down timber, snags, brush, and rubbish occurring in the areas to be cleared.

1.2.2 Grubbing

Grubbing shall be performed to the extent necessary to accomplish the work required. Grubbing shall consist of the removal and disposal of stumps, roots larger than 3 inches in diameter, and matted roots from the required grubbing areas.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.1 CLEARING AND TREE REMOVAL

Trees, stumps, roots, brush, and other vegetation in areas to be cleared shall be cut off flush with or below the original ground surface, except such trees and vegetation as may be indicated or directed to be left standing. Trees designated to be left standing within the cleared areas shall be trimmed of dead branches 1-1/2 inches or more in diameter and shall be trimmed of all branches the heights indicated or directed. Limbs and branches to be trimmed shall be neatly cut close to the bole of the tree or main branches. Cuts more than 1-1/2 inches in diameter shall be painted with an approved tree-wound paint. Trees and vegetation to be left standing shall be protected from damage incident to clearing, grubbing, and construction operations by the erection of barriers or by such other means as the circumstances require. Clearing shall also include the removal and disposal of structures that obtrude, encroach upon, or otherwise obstruct the work.

3.2 GRUBBING

Material to be grubbed, together with logs and other organic or metallic debris not suitable for foundation purposes, shall be removed to a depth of not less than 18 inches below the original surface level of the ground in areas indicated to be grubbed and in areas indicated as construction areas under this contract, such as areas for buildings, and areas to be paved. Depressions made by grubbing shall be filled with suitable material and compacted to make the surface conform with the original adjacent surface of the ground.

3.3 DISPOSAL OF MATERIALS

Trees, logs, stumps, roots, brush, rotten wood, and other refuse from the clearing and grubbing operations shall be disposed of outside the limits of Government-controlled land at the Contractor's responsibility, except when otherwise approved, by the Contracting Officer. Such permission will state the conditions covering the disposal of such products and will also state

the areas in which they may be placed.

-- End of Section --

SECTION 02222

EXCAVATION, TRENCHING, BACKFILLING, AND RIP RAP

PART 1 GENERAL

1.1 REFERENCES

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

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 422	(1963; R 1990) Particle-Size Analysis of Soils
ASTM D 1556	(1990) Density and Unit Weight of Soil in Place by the Sand-Cone Method
ASTM D 1557	(1991) Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/cu. ft. (2,700 kN-m/cu. m.))
ASTM D 2167	(1994) Density and Unit Weight of Soil in Place by the Rubber Balloon Method
ASTM D 2487	(1993) Classification of Soils for Engineering Purposes (Unified Soil Classification System)
ASTM D 2922	(1991) Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
ASTM D 3017	(1988; R 1993) Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth)
ASTM D 4253	(1993) Standard Test Methods for Maximum Index Density of Soils Using a Vibratory Table
ASTM D 448	(1986) Standard Classification for Sizes of Aggregate for Road and Bridge Construction
ASTM C 97	(1996) Absorbation and Bulk Specific Gravity of Dimension Stone

CODE OF FEDERAL REGULATIONS (CFR)

29 CFR 1926	Safety and Health Regulations for Construction

US ARMY CORPS OF ENGINEERS - ENGINEERING MANUALS (EM)

EM 385-1-1	(1996) Safety and Health Requirements Manual

1.2 DEFINITIONS

1.2.1 Degree of Compaction

Degree of compaction shall be expressed as a percentage of the maximum density obtained by the test procedure presented in ASTM D 1557 or ASTM D 4253.

1.3 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 01300 SUBMITTAL PROCEDURES:

SD-09 Reports

Select Fill Classification Determinations; GA.

Field Density Tests; GA. Testing of Backfill Materials; GA.

Copies of all laboratory and field test reports within 24 hours of the completion of the test, as described in Paragraph 3.5.

1.4 SUBSURFACE DATA

Subsurface soil boring logs and other pertinent subsurface information is appended to these specifications.

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 Select Fill

Select fill shall be substantially free from shale, arganic or other soft, poor durability particles. Well graded rock may be used as Select Fill. Select fill shall meet the following particle size distribution:

Sieve Size	Percent Passing
3/8 inch	100
No. 200	0-20

2.1.2 Crushed Stone

Crushed stone or granular fill shall conform to the following ASTM D 448 No. 357 gradation:

Sieve Size	Percent Passing by Weight
2.5 inch	100
2.0 inch	95 to 100
1.0 inch	35 to 70
0.5 inch	10 to 30
No. 4	0 to 5

2.1.3 Sand Filter

The sand filter shall conform to the following gradation:

Sieve Size	Percent Passing by Weight
1 inch	100

Sieve Size	Percent Passing by Weight
3/4 inch	70 to 100
No. 4	30 to 65
No. 40	5 to 30
No. 200	0 to 5

2.1.4 Rock

Rock shall consist of boulders measuring 1/2 cubic yard or more and materials that cannot be removed without systematic drilling and blasting such as rock material in ledges, bedded deposits, unstratified masses and conglomerate deposits, and below ground concrete or masonry structures, exceeding 1/2 cubic yard in volume, except pavements.

2.1.5 Unyielding Material

Unyielding material shall consist of rock and gravelly soils with stones greater than 3 inches in any dimension or as defined by the pipe manufacturer, whichever is smaller.

2.1.6 Unstable Material

Unstable material shall consist of materials too wet to properly support the utility pipe, conduit, or appurtenant structure.

2.1.7 Pipe Bedding

Pipe bedding material shall consist of well-graded sand, gravel, crushed gravel, crushed stone or crushed slag composed of hard, tough and durable particles, and shall contain not more than 10 percent by weight of material passing a No. 200 mesh sieve and no less than 95 percent by weight passing the 1 inch sieve. The maximum allowable aggregate size shall be 3 inches, or the maximum size recommended by the pipe manufacturer, whichever is smaller.

2.1.8 Rip-Rap

Stone used for dumped rip rap shall be hard, durable, angular in shape, resistant to weather and water action, and shall meet the following size distribution requirements:

Sieve Size	Percent of Total Weight Smaller than the Given Size
$3d_{50}$	100
$2d_{50}$	80
$1d_{50}$	50
$0.1d_{50}$	<=10

Note: $2d_{50}$ is equivalent to 2 x d_{50} where d_{50} = 4 inches, 6 inches and 12 inches.
(d_{50} refers to 50 percent size)

The length of each stone shall not exceed three times its width or thickness. Rounded stone or boulders will not be accepted. Broken concrete may be substituted for stone where authorized by the Contracting Officer. Shale and stone with shale seams are not acceptable. Each load of rip rap shall be reasonably well graded from the smallest to the maximum size specified. The minimum density of the stone shall be 150 pounds per cubic foot as computed by multiplying the bulk specific gravity saturated surface dry basis, determined by ASTM C 97, by 62.5 pounds per cubic foot or as certified by the approved borrow service. The gradation of materials furnished for use as dry rip rap will be accepted or rejected based on a visual examination of the material by the Contracting Officer.

2.1.8.1 Grouted Rip Rap

The grout for rip rap shall consist of one part portland cement (Section 03307 CONCRETE FOR MINOR STRUCTURES) and three parts sand, thoroughly mixed with water to produce grout having a thick, creamy consistency. The minimum amount of water should be used to prevent excess shrinkage of the grout after placement.

The stones for grouted rip rap shall be as specified in the Contract Documents and in conformance with the applicable paragraphs of this Section.

2.1.9 Common Fill

Common fill for backfill may be obtained from project-related on-site excavation activities; however, all on-site excavated material proposed for use as common fill shall be free of discoloration.

All common fill shall be free of clay, deleterious material, particles larger than 4 inches in size, and organic material such as leaves, grass, roots, brush and rubbish. Common fill shall be material with gradation of not more than 35 percent passing the No. 200 standard sieve.

2.1.10 Plastic Marking Tape

Plastic marking tape shall be acid and alkali-resistant polyethylene film, 6 inches wide with minimum thickness of 0.004 inch. Tape shall have a minimum strength of 1750 psi lengthwise and 1500 psi crosswise. The tape shall be manufactured with integral wires, foil backing or other means to enable detection by a metal detector when the tape is buried up to 3 feet deep. The tape shall be of a type specifically manufactured for marking and locating underground utilities. The metallic core of the tape shall be encased in a protective jacket or provided with other means to protect it from corrosion. Tape color shall be as specified in TABLE 1 and shall bear a continuous printed inscription describing the specific utility.

TABLE 1. Tape Color

Red:	Electric
Yellow:	Gas, Oil, Dangerous Materials
Orange:	Telephone, Telegraph, Television, Police, and Fire Communications
Blue:	Water Systems
Green:	Sewer Systems

PART 3 EXECUTION

3.1 EXCAVATION

Excavation shall be performed to the lines and grades indicated. Rock excavation shall include removal and disposition of material defined as rock in paragraph MATERIALS. Earth excavation shall include removal and disposal of material not classified as rock excavation. During excavation, material satisfactory for backfilling shall be stockpiled in an orderly manner at a distance from the banks of the trench equal to 1/2 the depth of the excavation, but in no instance closer than 2 feet.Excavated material not required or not satisfactory for backfill shall be removed from the site or shall be stockpiled at a location designated by the Contracting Officer. Grading shall be done as may be necessary to prevent surface water from flowing into the excavation, and any water accumulating therein shall be removed to maintain the stability of the bottom and sides of the excavation. Unauthorized overexcavation shall be backfilled in accordance with paragraph BACKFILLING AND COMPACTION at no additional cost to the Government.

3.1.1 Pipe Trench Excavation

The trench shall be excavated as recommended by the manufacturer of the pipe to be installed. Trench walls below the top of the pipe shall be sloped, or made vertical, and of such width as recommended in the manufacturer's installation manual. Where no manufacturer's installation manual is available, trench walls shall be made vertical. All trench walls more than 4 feet high shall be shored, cut back to a stable slope, or provided with equivalent means of protection in accordance with 29 CFR 1926. Special attention shall be given to slopes which may be adversely affected by weather or moisture content. The trench width below the top of pipe shall not exceed 24 inches plus pipe outside diameter (O.D.) for pipes of less than 24 inches inside diameter and shall not exceed 36 inches plus pipe outside diameter for sizes larger than 24 inches inside diameter. Where recommended trench widths are exceeded, redesign, stronger pipe, or special installation procedures shall be utilized by the Contractor. The cost of redesign, stronger pipe, or special installation procedures shall be borne by the Contractor without any additional cost to the Government.

3.1.1.1 Removal of Unstable Material

Where unstable material is encountered in the bottom of the trench, such material shall be removed to the depth directed and replaced to the proper grade with pipe bedding material as provided in paragraph BACKFILLING AND COMPACTION. When removal of unstable material is required due to the fault or neglect of the Contractor in his performance of the work, the resulting material shall be excavated and replaced by the Contractor without additional cost to the Government.

3.1.1.2 Excavation for Appurtenances

Excavation for manholes, catch-basins, inlets, or similar structures shall be sufficient to leave at least 12 inches clear between the outer structure surfaces and the face of the excavation or support members. Rock shall be cleaned of loose debris and cut to a firm surface either level, stepped, or serrated, as shown or as directed. Loose disintegrated rock and thin strata shall be removed. Removal of unstable material shall be as specified above. When concrete or masonry is to be placed in an excavated area, special care shall be taken not to disturb the bottom of the excavation. Excavation to the final grade level shall not be made until just before the concrete or masonry is to be placed.

3.1.1.3 Stockpiles

Stockpiles of excavated materials shall be placed and graded as directed by the Contracting Officer. Stockpiles shall be kept in a neat and well drained condition, giving due consideration to drainage at all times.

3.1.2 Landfill Excavation

Excavation of parking lot landfill material for the placement of gas vent stacks and lighting pole foundations shall be considered "Landfill Excavation" and conform to appropriate Health and Safety standards. All landfill material removed for the placement of a gas vent stack or lighting pole foundation shall be replaced around the perimeter of each light pole foundation as shown on the Contract Drawings. All excavation for these purposes will follow the pay limits and guidelines detailed in the Contract Drawings with at least twelve inches of surface material on top of all replaced landfill material. No testing or off-site disposal of landfill materials is to occur.

3.2 DEWATERING

Groundwater flowing toward or into excavations shall be controlled to prevent sloughing of excavation slopes and walls, boils, uplift and heave in the excavation and to eliminate interference with orderly progress of

construction. French drains, sumps, ditches or trenches will not be permitted within 900 mm (3 feet) of the foundation of any structure, except with specific written approval, and after specific contractual provisions for restoration of the foundation area have been made. Control measures shall be taken by the time the excavation reaches the water level in order to maintain the integrity of the in situ material. While the excavation is open, the water level shall be maintained continuously, at least 2 feet below the working level. Water generated from dewatering operations shall be discharged on-site as directed by the Contracting Officer.

3.3 BACKFILLING AND COMPACTION

Backfill material shall consist of select fill, common fill, crushed stone, sand filter and pipe bedding material and shall be placed in layers not exceeding 6 inches loose thickness for compaction by hand operated machine compactors, and 10 inches loose thickness for other than hand operated machines, unless otherwise specified. Each layer shall be compacted to at least 90 percent maximum density, unless otherwise specified. No material shall contain or be placed on frozen or organic soil components or subgrade.

3.3.1 Pipe Trench Backfill

Trenches shall be backfilled to the grade shown. The trench shall be backfilled to 2 feet above the top of pipe prior to performing the required pressure tests. The joints and couplings shall be left uncovered during the pressure test.

3.3.1.1 Replacement of Unyielding Material

Unyielding material removed from the bottom of the trench shall be replaced with select fill material or pipe bedding material.

3.3.1.2 Replacement of Unstable Material

Unstable material removed from the bottom of the trench or excavation shall be replaced with select fill or pipe bedding material placed in layers not exceeding 6 inches loose thickness.

3.3.1.3 Pipe Bedding Material

Pipe bedding shall be of the type and thickness shown and shall be placed and compacted with approved tampers to a height of at least one foot above the utility pipe or conduit. The backfill shall be brought up evenly on both sides of the pipe for the full length of the pipe. Care shall be taken to ensure thorough compaction of the fill under the haunches of the pipe.

3.3.1.4 Final Backfill

The remainder of the trench, except for special materials for roadways, shall be filled with common fill. Backfill material shall be placed and compacted as follows:

a. Roadways: Backfill, including select fill and pipe bedding for utilities, shall be placed up to the elevation at which the requirements as shown on Contract Drawings control. Water flooding or jetting methods of compaction will not be permitted.

b. Sidewalks, Turfed or Seeded Areas and Miscellaneous Areas: Common fill shall be deposited in layers of a maximum of 12 inch loose thickness, and compacted to 90 percent maximum density for cohesionless soils.Compaction by water flooding or jetting will not be permitted. This requirement shall also apply to all other areas not specifically designated above.

3.3.2 Backfill for Appurtenances

After the manhole, catchbasin, inlet, or similar structure has been constructed, backfill shall be placed in such a manner that the structure will not be damaged by the shock of falling earth. The backfill material shall be deposited and compacted as specified for final backfill, and shall be brought up evenly on all sides of the structure to prevent eccentric loading and excessive stress.

3.4 SPECIAL REQUIREMENTS

Special requirements for both excavation and backfill relating to the specific utilities and work are as follows:

3.4.1 Rip Rap Swales

The ground surface on which the rip rap is to be placed, at the thickness and size indicated on the Contract Drawings, shall be dressed to a smooth, compacted surface. All soft or spongy material in areas to receive ri shall be removed to a depth of 6 inches as directed by the Contractin Officer and replaced with common fill and compacted in accordance wit section.

Rip rap swales shall be placed on geotextile material in conformance SECTION 02272 SEPARATION/ FILTRATION GEOTEXTILE.

Swales shall be cut accurately to the cross sections and grades as indicated. All roots, stumps, rock, and foreign matter in the sides bottom of the excavation shall be trimmed and dressed or removed to to the slope, grade, and shape of the section indicated. Care shall taken not to excavate below the grades as indicated. Excessive exca shall be backfilled to grade with select fill or common fill, as d All excavations under this section shall be maintained until final acceptance of the work. No excavated material shall be deposited closer to the edges of the excavation than indicated and in no case less than 3 feet.

Where rock and/or bedrock is encountered within the zone designated for rip rap, it will not be required to excavate the rock/bedrock material. Rather, the rip rap stone shall be placed on the rock/bedrock to the specified grade.

3.4.1.1 Placement of grouted Rip Rap

Stones shall be placed in accordance with above paragraph and as specified in the Contract Documents. Stones shall be thoroughly moistened and any excess of fines shall be sluiced to the underside of the stone blanket before grouting.

The grout may be delivered to the place of final deposit by any means that will insure uniformity and prevent segregation of the grout. If penetration of grout is obtained by gravity flow into the interstices, the grout will be spaded or rodded into the interstices to completely fill the voids in the stone blanket. Pressure grouting shall not unseat the stones; and after placing by this method, the grout shall be spaded or rodded into the voids. Stones shall be brushed until surface is exposed. Grout shall be placed only when the temperature is above 35 degrees F and shall be protected until cured.

3.4.2 Rip Rap Slope Protection

Slopes specified to receive rip rap slope protection shall be cleared and grubbed in accordance with Section 02110 CLEARING, GRUBBING AND TREE REMOVAL. Topsoil shall be removed and the toe shall be excavated as specified in the Contract Drawings. A six (6) inch thick layer of crushed stone, in conformance with Paragraph 2.1.2 of the section, shall be placed from the lowest to highest elevation on the cleared slope face. Rip rap

shall be placed on the crushed stone bed in a manner which will produce a reasonably well-graded mass of stone with a minimum of voids. The entire mass of stone should be placed in conformance with the grades and thicknesses shown on the Contract Drawings. The rip rap should be placed at its full course thickness in one operation and in such a manner as to avoid displacing the underlying material, beginning at the toe of the slope. Placing rip rap in layers or by dumping into chutes and similar methods likely to cause segregation is not permitted. The rip rap shall be so placed and distributed that there will be no large accumulations of either the larger or smaller stone sizes. Rip rap gradations will be in conformance with Paragraph 2.1.8 of this section and in accordance with the Contract Documents.

3.4.3 Steel Light Pole Foundation

Excavation for installation of steel pole foundations shall be to the depth and width specified on the Contract Drawings. Piles and necessary features for the installation of lighting pole foundations shall be installed from within these excavation limits. All excavation containing landfill material shall be performed according to Section 01110 SAFETY, HEALTH AND EMERGENCY RESPONSE. All excavated landfill material shall be replaced on-site in accordance with Paragraph 3.1.2 "Landfill Excavation" and as detailed on the Contract Drawings.

3.4.4 Relocated Wood Pole Foundation

Relocated wood pole foundation augering shall be completed using a two (2) foot diameter minimum auger with teeth capable of augering through boulders and/or bedrock to achieve the required depth of embedment.

3.4.5 Electrical Distribution System

Direct burial cable and conduit or duct line shall have a minimum cover of 24 inches from the finished grade, unless otherwise indicated.

3.4.6 Plastic Marking Tape

Warning tapes shall be installed directly above the pipe, at a depth of 12 inches below finished grade unless otherwise shown.

3.5 TESTING

Testing shall be the responsibility of the Contractor and shall be performed at no additional cost to the Government.

3.5.1 Testing Facilities

Tests shall be performed by an approved commercial testing laboratory or may be tested by facilities furnished by the Contractor. No work requiring testing will be permitted until the facilities have been inspected and approved by the Contracting Officer. The first inspection shall be at the expense of the Government. Cost incurred for any subsequent inspection required because of failure of the first inspection will be charged to the Contractor.

3.5.2 Testing of Backfill Materials

Characteristics of backfill materials shall be determined in accordance with particle size analysis of soils ASTM D 422 and moisture-density relations of soils ASTM D 1557 Procedure C (Modified Proctor Test) to determine the moisture content for maximum compaction. A minimum of one particle size analysis and one moisture-density relation test shall be performed on each material specified in paragraph "Material' in this section.

3.5.3 Field Density Tests

Tests shall be performed in sufficient numbers to ensure that the specified density is being obtained. A minimum of one field density test per lift of backfill for every 100 feet of pipe and swale installation shall be performed. Field in-place density shall be determined in accordance with ASTM D 2922. When ASTM D 2922 is used, the calibration curves shall be checked and adjusted using the sand cone method as described in paragraph Calibration of the ASTM publication. ASTM D 2922 results in a wet unit weight of soil and when using this method, ASTM D 3017shall be used to determine the moisture content of the soil. The calibration curves furnished with the moisture gauges shall be checked along with density calibration checks as described in ASTM D 3017. The calibration checks of both the density and moisture gauges shall be made at the beginning of a job, on each different type of material encountered, at intervals as directed by the Contracting Officer. Copies of calibration curves, results of calibration tests, and field and laboratory density tests shall be furnished to the Contracting Officer. Trenches improperly compacted shall be reopened to the depth directed, then refilled and compacted to the density specified at no additional cost to the Government.

-- End of Section --

SECTION 02272

SEPARATION/FILTRATION GEOTEXTILE

PART 1 GENERAL

1.1 REFERENCES

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

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 3786	(1987) Hydraulic Bursting Strength of Knitted Goods and Nonwoven Fabrics-Diaphram Bursting Strength Tester Method
ASTM D 4354	(1989; R 1994) Sampling of Geosynthetics for Testing
ASTM D 4355	(1992) Deterioration of Geotextiles from Exposure to Ultraviolet Light and Water (Xenon-Arc Type Apparatus)
ASTM D 4491	(1992) Water Permeability of Geotextiles by Permittivity
ASTM D 4533	(1991) Trapezoid Tearing Strength of Geotextiles
ASTM D 4632	(1991) Grab Breaking Load and Elongation of Geotextiles
ASTM D 4751	(1993) Determining Apparent Opening Size of a Geotextile
ASTM D 4759	(1988; R 1992) Determining the Specification Conformance of Geosynthetics
ASTM D 4833	(1988) Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products
ASTM D 4873	(1995) Identification, Storage, and Handling of Geotextiles

1.2 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 01300 SUBMITTAL PROCEDURES:

SD-06 Instructions

Manufacturing, Sampling, and Testing; GA.

A minimum of 7 days prior to scheduled use, Manufacturer's quality control manual including instructions for storage, handling, installation, seaming, and repair.

SD-13 Certificates

Geotextile; GA.

A minimum of 7 days prior to scheduled use, Manufacturer's certificate of compliance stating that the geotextile meets the requirements of this section. This submittal shall include copies of manufacturer's quality control test results. For needle punched geotextiles, the manufacturer shall also certify that the geotextile has been continuously inspected using permanent on-line full-width metal detectors and does not contain any needles which could damage other geosynthetic layers. The certificate of compliance shall be attested to by a person having legal authority to bind the geotextile manufacturing company.

SD-14 Samples

Geotextile; GA.

A minimum of 7 days prior to scheduled use, one sample shall be provided for testing. The sample shall be the full manufactured width of the geotextile and a minimum of 5 feet in length, folded over and the edges stitched with the same thread type, stitch density, and machine that will be used during construction. A smaller sample will be approved when no testing of the samples will be performed by the Government.

1.3 DELIVERY, STORAGE AND HANDLING

1.3.1 General

Geotextiles shall be labeled, handled, and stored in accordance with ASTM D 4873 and as specified herein. Each roll shall be wrapped in an waterproof layer of plastic during shipment and storage. The pl wrapping shall not be removed until deployment. Each roll shall with the manufacturers name, geotextile type, lot number, roll n roll dimensions (length, width, gross weight). Geotextile or pl wrapping damaged as a result of storage or handling shall be rep replaced, as directed. Geotextile shall not be exposed to tempe excess of 140 degrees F or less if recommended by the manufactu

1.3.2 Handling

No hooks, tongs or other sharp instruments shall be used for hand geotextile. Geotextile shall not be dragged along the ground.

PART 2 PRODUCTS

2.1 RAW MATERIALS

2.1.1 Geotextile

The geotextile shall be a nonwoven pervious sheet of polymeric material and shall consist of long-chain synthetic polymers composed of at least 85 percent by weight polyolefins, polyesters, or polyamides. Stabilizers and/or inhibitors shall be added to the base polymer if necessary to make the filaments resistant to deterioration by ultraviolet light, oxidation, and heat exposure. Regrind material which consists of edge trimming and other scraps that have never reached the consumer may be used to produce the geotextile. Post-consumer recycled material may also be used. Geotextile shall be formed into a network such that the filaments or yarns retain dimensional stability relative to each other, including the selvages. The geotextile physical properties shall equal or exceed the minimum average roll values listed in Table 1. Acceptance of geotextile shall be in accordance with ASTM D 4759. Strength values shown are for the weaker principal direction.

TABLE 1. GEOTEXTILE PHYSICAL PROPERTIES

PROPERTY	TEST METHOD	TEST VALUE 10 OZ.
Apparent Opening Size mm	ASTM D 4751	0.275
Permittivity, sec-1	ASTM D 4491	0.8
Puncture, lbs.	ASTM D 4833	75
Grab Tensile, lbs.	ASTM D 4632	160
Trapezoidal Tear, lbs.	ASTM D 4533	70
Burst Strength, psi	ASTM D 3786	200

2.1.2 Thread

Sewn seams shall be constructed with high-strength polyester, nylon, or other approved thread type. Thread shall have equivalent ultraviolet light stability as the geotextile and the color shall contrast with the geotextile.

PART 3 EXECUTION

3.1 SURFACE PREPARATION

The surface underlying the geotextile shall be smooth and free of ruts or protrusions which could damage the geotextile. Subgrade materials and compaction requirements shall be in accordance with Section 02222 EXCAVATION, TRENCHING, BACKFILLING, AND RIP RAP.

3.2 INSTALLATION

The Contracting Officer shall be present during handling and installation. Geotextile rolls which are damaged or contain imperfections shall be repaired or replaced as directed. The geotextile shall be laid smooth so as to be free of tensile stresses, folds, and wrinkles. On slopes greater than 5 horizontal on 1 vertical, the geotextile shall be laid with the machine direction of the fabric parallel to the slope direction.

3.2.1 Riprap Installation at Shallow Bedrock Locations

Normal installation of geotextile shall be laid upon soil. Where shallow bedrock is encountered within the design riprap zone, the geotextile shall overlap the bedrock a minimum of six (6) inches and covered with riprap stone, as detailed in the Contract Drawings.

3.3 PROTECTION

The geotextile shall be protected during installation from clogging, tears, and other damage. Damaged geotextile shall be repaired or replaced as directed. Adequate ballast (e.g. sand bags) shall be used to prevent uplift by wind. Staples or pins shall not be used to hold the geotextile in place. The geotextile shall not be left uncovered for more than 5 days during installation. Material exposed for more than 5 days shall be removed and replace at no cost to the Government. Equipment with ground pressures less than 5.0 psi shall be used to place materials on the geotextile. Overlying materials shall be deployed such that the geotextile is not shifted, damaged, or placed in tension.

3.4 SEAMING

3.4.1 Overlap Seams

Geotextile panels shall be continuously overlapped a minimum of 12 inches. Where it is required that seams be oriented across the slope, the upper sheet shall be lapped over the lower sheet. The Contractor has the option of field sewing instead of overlapping.

3.4.2 Sewn Seams

Seams shall be sewn as necessary. Seams shall be continuously sewn using a flat seam with one row of a two-thread chain stitch unless otherwise recommended by the manufacturer. The minimum distance from the geotextile edge to the stitch line nearest to that edge shall be 3 inches unless otherwise recommended by the manufacturer. The thread at the end of each seam run shall be tied off to prevent unraveling. Seams shall be on the top side of the geotextile to allow inspection. Skipped stitches or discontinuities shall be sewn with an extra line of stitching with 18 inches of overlap.

3.5 REPAIRS

Geotextile damaged during installation shall be repaired by placing a patch of the same type of geotextile which extends a minimum of 12 inches beyond the edge of the damage or defect. Patches shall be continuously fastened using a sewn seam or other approved method. The machine direction of the patch shall be aligned with the machine direction of the geotextile being repaired. Geotextile which cannot be repaired shall be replaced.

3.6 ENGINEERED PENETRATIONS

Engineered penetrations of the geotextile shall be constructed by approved methods recommended by the geotextile manufacturer.

-- End of Section --

SECTION 02361

ROUND TIMBER PILES

PART 1 GENERAL

1.1 REFERENCES

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

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 569	(1991a; R 1993) Steel, Carbon (0.15 Maximum, Percent), Hot-Rolled Sheet and Strip Commercial Quality
ASTM D 25	(1991) Round Timber Piles
ASTM D 1143	(1981; R 1994) Piles Under Static Axial Compressive Load
ASTM D 1760	(1994) Pressure Treatment of Timber Products

AMERICAN WOOD-PRESERVERS' ASSOCIATION (AWPA)

AWPA C3	(1995) Piles - Preservative Treatment by Pressure Processes
AWPA M4	(1995) Standard for Care of Preservative-Treated Wood Products

1.2 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 01300 SUBMITTAL PROCEDURES:

SD-01 Data

Pile Driving Equipment; FIO.

Descriptions of all pile driving equipment to be employed in the work, prior to commencement of pile installations. This shall include details of the pile hammer, power plant, leads, cushion material, and helmet.

SD-18 Records

Pile Driving; GA.

A complete and accurate record of each driven pile within 3 days of completion of driving. The record shall indicate the pile location (as driven), diameter, driven length, embedded length, final elevations of tip and top, collars, shoes, number of splices and locations, blows required for each foot of penetration throughout the entire length of the pile and for the final 6 inches of penetration, and the total driving time. The record shall also include the type and size of the hammer used, the rate of operation, and the type and dimensions of driving helmet and pile cushion used. Any unusual conditions encountered during pile installation shall be recorded and immediately reported to the Contracting Officer.

1.3 EXPERIENCE

The work shall be performed by a firm specializing in the specified foundation system and having experience installing the specified foundation system under similar subsurface conditions.

1.4 SUBSURFACE DATA

Subsurface soil data logs are shown in the specifications.

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 Wood Piles

Piles shall have a minimum diameter of eight (8) inches. Untreated piles shall be Douglass fir or Southern pine, clean-pealed, conforming to ASTM D 25. Pressure treated piles shall be Douglas fir or Southern pine, clean-peeled, conforming to ASTM D 25. Piles shall be in one piece.

The Contractor has the option of using relocated wood poles from on-site where they meet the requirements of this specification and as approved by the Contracting Officer.

2.1.2 Pile Shoes

Pile shoes where required shall be manufactured from steel conforming to ASTM A 569. Welding procedures shall be in accordance with a nationally recognized welding code. Shoes shall be cleaned and painted with at least one coat of paint. The color and paint shall be the manufactur's standard. Point-type shoes shall conform to the requirements of Table I. The length of the joints formed by the intersection of the sides shall not be less than one half of the height of the shoe and shall be fully welded.

TABLE 1

POINT-TYPE STEEL SHOE FOR TIMBER PILE

		Dimensions (inches)			
Size	Pile Tip Diameter	Height	Width	Joint Length	Thickness
A	5 to 10	9.0	9.5	4.5	3/16
B	8 to 12	11.0	11.0	5.5	3/16
C	11 to 15	13.0	13.5	6.5	3/16

1. Dimensions shall be within 5 percent of values shown.

2. Boot-type shoes shall conform to the requirements of Table II.

TABLE II

		Dimensions (inches)			
Size	Pile Tip Diameter	Top Diameter	Bottom Diameter	Height	Thickness
D	6	6.0	5.625	3.375	3/16

TABLE II

Size	Dimensions (inches) Pile Tip Diameter	Top Diameter	Bottom Diameter	Height	Thickness
E	7	7.0	6.625	3.500	3/16
F	8	8.0	7.625	3.625	3/16
G	9	9.0	8.625	3.750	3/16

1. Dimensions shall be within 5 percent of values shown.

2.2 INSPECTION FOR PRESERVATIVE TREATMENT

The Contractor shall notify the Contracting Officer not less than 2 weeks prior to the start of preservative treatment, stating the place where treatment will be done. Arrangements for access and facilities in this regard shall be made by the Contractor. In lieu of the inspection specified above, marine piling bearing the American Wood Preservers Bureau Quality Mark will be accepted.

PART 3 EXECUTION

3.1 INSTALLATION

3.1.1 Handling

Each pile shall be fitted on the tip with a metal shoe where required . Piles shall be inspected in the leads, and where the protective shell or treated wood is impaired, between cutoff and a point which will be not less than 10 feet below the ground; the piles shall be repaired in accordance with AWPA M4, unless the pile is damaged to such extent that it is rejected. Pile shall be laterally supported during driving, but shall not be unduly restrained from rotation in the leads. Where pile orientation is essential, special care shall be taken to maintain the orientation during driving. Special care shall be taken in supporting battered piles to prevent excess bending stresses in the pile. When necessary, collars shall be placed around the pile head to prevent brooming. Cant hooks shall not be used in handling treated piles. Cutting of piles shall be with pneumatic tools, sawing, or other means approved by the Contracting Officer. Holes for bolts shall be of a size that will ensure a driving fit. Where indicated, holes shall be counterbored for the bolt heads and washers.

3.1.2 Pile Driving

Excavation shall be stopped at 1 foot above foundation grade before piles are driven. When pile driving is completed, excavation shall be completed to lines and grades shown. Permanent piles shall be driven without interruption to provide a minimum of 15,000 pound bearing capacity. The pile hammer used for driving shall be the same type and operated at the same rate and in the same manner as that used for driving the test piles. Diesel powered hammers shall be operated at the rate recommended by the manufacturer throughout the entire driving period. Sufficient pressure shall be maintained at the hammer. The pile cushion or capblock shall be replaced whenever it becomes damaged, split, highly compressed, charred or burned, or has become spongy or deteriorated in any manner. Under no circumstances will the use of small wood blocks, wood chips, rope, or other material permitting excessive loss of hammer energy be permitted. The Contracting Officer shall be notified, and will determine what procedure shall be followed, if a pile reaches the "calculated" pile tip elevation without reaching the required driving resistance; or if the required

driving resistance is reached before the "calculated" pile tip elevation.

3.1.3 Tolerances in Driving

All piles shall be driven with a variation of not more than 0.25 inch per foot of pile length from the vertical for plumb piles or more than 0.50 inch per foot of pile length from the required angle for batter piles. Butts shall be within 4 inches of the location indicated. Manipulation of piles to force them into position will not be permitted. All piles shall be checked by the Contractor for heave. Piles found to have heaved shall be redriven to the required tip elevation. Piles damaged, mislocated, or driven out of alignment shall be replaced or additional piles driven as directed.

3.1.4 Surface Treatment

After piles have been driven and cut off, all cut, bored, and dapped surfaces shall be treated as specified in AWPA M4.

3.2 PILE DRIVING EQUIPMENT

3.2.1 Pile Hammers

The hammer furnished shall have a capacity at least equal to the hammer manufacturer's recommendation for the total weight of pile and character of subsurface material to be encountered. For piles of any length, the maximum driving energy of the hammer shall be 20,000 foot-pounds.

3.2.2 Driving Helmets and Pile Cushions

A driving helmet or cap including a pile cushion or cap block shall be used between the top of the pile and the ram to prevent impact damage to the pile. The driving helmet or cap and pile cushion combination shall be capable of protecting the head of the pile, minimizing energy absorption, and transmitting hammer energy uniformly and consistently during the entire driving period. The driving helmet or cap shall fit snugly on the top of the pile so that the energy transmitted to the pile is uniformly distributed over the entire surface of the pile head. During the test-pile period, the Contractor shall demonstrate to the Contracting Officer that the equipment to be used on the project performs the above functions. The pile cushion may be a solid or laminated softwood block with the grain parallel to the pile axis and enclosed in a close-fitting steel housing. The thickness of block shall be suitable for the length of pile to be driven and the character of subsurface material to be encountered. Generally, thicker blocks are required for longer piles and softer subsurface material.

3.2.3 Capblocks

The capblock used between the driving cap and the hammer ram may be of solid hardwood block with grain parallel to the pile axis and enclosed in a close fitting steel housing or may consist of aluminum and approved industrial type plastic laminate discs stacked alternately in a steel housing. Steel plates shall be used at the top and the bottom of the capblock. Where the block is other than that specified above, the Contractor shall submit to the Contracting Officer at least 2 weeks before the start of test pile driving operations, detailed drawings of the capblock he proposes to use accompanied by records of the successful use. If a wood capblock is used, it shall not be replaced during the final driving of any pile. Under no circumstances will the use of small wood blocks, wood chips, rope, or other material permitting excessive loss of hammer energy be permitted.

-- End of Section --

SECTION 02546

AGGREGATE SURFACE COURSE

PART 1 GENERAL

1.1 REFERENCES

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

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM C 117	(1995) Materials Finer Than 75 micrometer (No. 200) Sieve in Mineral Aggregates by Washing
ASTM C 131	(1989) Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
ASTM C 136	(1995a) Sieve Analysis of Fine and Coarse Aggregates
ASTM D 75	(1987; R 1992) Sampling Aggregates
ASTM D 422	(1963; R 1990) Particle-Size Analysis of Soils
ASTM D 1556	(1990) Density and Unit Weight of Soil in Place by the Sand-Cone Method
ASTM D 1557	(1991) Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/cu. ft. (2,700 kN-m/cu. m.))
ASTM D 2167	(1994) Density and Unit Weight of Soil in Place by the Rubber Balloon Method
ASTM D 2922	(1991) Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
ASTM D 3017	(1988; R 1993) Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth)
ASTM D 3740	(1994a) Minimum Requirements forAgencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction
ASTM D 4318	(1993) Liquid Limit, Plastic Limit, and Plasticity Index of Soils
ASTM E 11	(1995) Wire-Cloth Sieves for Testing Purposes

1.2 DEGREE OF COMPACTION

Degree of compaction is a percentage of the maximum density obtained by the test procedure presented in ASTM D 1557 abbreviated herein as present

laboratory maximum density.

1.3 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 01300 SUBMITTAL PROCEDURES:

SD-01 Data

Equipment; GA.

List of proposed equipment to be used in performance of construction work including descriptive data.

SD-09 Reports

Sampling and Testing; GA. Field Density Test; GA. Field Wear Test; GA.

SD-14 Samples

Aggregates; GA.

Calibration curves and related test results prior to using the device or equipment being calibrated. Copies of field test results within [24] hours after the tests are performed. Test results from samples, not less than 30 days before material is required for the work. Results of laboratory tests for quality control purposes, for approval, prior to using the material.

1.4 EQUIPMENT

All plant, equipment, and tools used in the performance of the work covered by this section will be subject to approval by the Contracting Officer before the work is started and shall be maintained in satisfactory working condition at all times. The equipment shall be adequate and shall have the capability of producing the required compaction, and meeting the grade controls, thickness controls, and smoothness requirements set forth herein.

1.5 SAMPLING AND TESTING

Sampling and testing shall be the responsibility of the Contractor. Sampling and testing shall be performed by an approved commercial testing laboratory or by the Contractor, subject to approval. If the Contractor elects to establish testing facilities of his own, approval of such facilities shall be based on compliance with ASTM D 3740, and no work requiring testing will be permitted until the Contractor's facilities have been inspected and approved.

1.5.1 Sampling

Sampling for material gradation, liquid limit, and plastic limit tests shall be taken in conformance with ASTM D 75. When deemed necessary, the sampling will be observed by the Contracting Officer.

1.5.2 Testing

1.5.2.1 Gradation

Aggregate gradation shall be made in conformance with ASTM C 117, ASTM C 136, and ASTM D 422. Sieves shall conform to ASTM E 11.

1.5.2.2 Liquid Limit and Plasticity Index

Liquid limit and plasticity index shall be determined in accordance with

ASTM D 4318.

1.5.2.3 Moisture-Density Relationship Test

The moisture-density relations of the aggregate shall be determined in accordance with ASTM D 1557 or ASTM D 4253.

1.5.3 Approval of Materials

The source of the material to be used for producing aggregates shall be selected 60 to 90 days prior to the time the material will be required in the work. Approval of sources not already approved by the Corps of Engineers will be based on an inspection by the Contracting Officer. Tentative approval of materials will be based on appropriate test results on the aggregate source. Final approval of the materials will be based on tests for gradation, liquid limit, and plasticity index performed on samples taken from the completed and compacted surface course.

1.6 WEATHER LIMITATIONS

Aggregate surface courses shall not be constructed when the ambient temperatures is below 35 degrees F and on subgrades that are frozen or contain frost. It shall be the responsibility of the Contractor to protect, by approved method or methods, all areas of surfacing that have not been accepted by the Contracting Officer. Surfaces damaged by freeze, rainfall, or other weather conditions shall be brought to a satisfactory condition by the Contractor.

PART 2 PRODUCTS

2.1 AGGREGATES

Aggregates shall consist of clean, sound, durable particles of natural gravel, crushed gravel, crushed stone, sand, slag, soil, recycled asphalt, or other approved materials processed and blended or naturally combined. Aggregates shall be free from lumps and balls of clay, organic matter, objectionable coatings, and other foreign materials. The Contractor shall be responsible for obtaining materials that meet the specification and can be used to meet the grade and smoothness requirements specified herein after all compaction and proof rolling operations have been completed.

2.1.1 Coarse Aggregates

The material retained on the No. 4 sieve shall be known as coarse aggregate. Coarse aggregates shall be reasonably uniform in density and quality. The coarse aggregate shall have a percentage of wear not to exceed 50 percent after 500 revolutions as determined by ASTM C 131. The amount of flat and/or elongated particles shall not exceed 20 percent. A flat particle is one having a ratio of width to thickness greater than three; an elongated particle is one having a ratio of length to width greater than three. When the coarse aggregate is supplied from more than one source, aggregate from each source shall meet the requirements set forth herein.

2.1.2 Fine Aggregates

The material passing the No. 4 sieve shall be known as fine aggregate. Fine aggregate shall consist of screenings, sand, soil, or other finely divided mineral matter that is processed or naturally combined with the coarse aggregate.

2.1.3 Gradation Requirements

Gradation requirements specified in TABLE I shall apply to the completed aggregate surface. It shall be the responsibility of the Contractor to obtain materials that will meet the gradation requirements after mixing,

placing, compacting, and other operations. TABLE I shows permissible gradings for granular material used in aggregate surface roads and airfields. Sieves shall conform to ASTM E 11.

TABLE I. GRADATION FOR AGGREGATE SURFACE COURSES

Sieve Designation	No. 2
1 in.	100
3/8 in.	60-100
No. 4	50-85
No. 10	40-70
No. 40	24-45
No. 200	8-15

2.1.4 Liquid Limit and Plasticity Index

The portion of the completed aggregate surface course passing the No. 40 sieve shall have a maximum liquid limit of 35 and a plasticity index of 4 to 9.

PART 3 EXECUTION

3.1 OPERATION OF AGGREGATE SOURCES

Clearing, stripping, and excavating shall be the responsibility of the Contractor. The aggregate sources shall be operated to produce the quantity and quality of materials meeting these specification requirements in the specified time limit. Upon completion of the work, the aggregate sources on Government reservations shall be conditioned to drain readily and be left in a satisfactory condition. Aggregate sources on private lands shall be conditioned in agreement with local laws or authorities.

3.2 STOCKPILING MATERIALS

Prior to stockpiling the material, the storage sites shall be cleared and leveled by the Contractor. All materials, including approved material available from excavation and grading, shall be stockpiled in the manner and at the locations designated. Aggregates shall be stockpiled in such a manner that will prevent segregation. Aggregates and binders obtained from different sources shall be stockpiled separately.

3.3 PREPARATION OF SUBGRADE

All areas to be resurfaced will be cleared of all debris and foreign objects. The underlying course of Lots C and E, including all existing asphalt pavements and asphalt patch areas, shall be broken up and crushed to a uniform consistency and compaction with the appropriate mechanical equipment. All materials will be redistributed and uniformly regraded and compacted prior to placement of the aggregate. At the time of surface course construction, the underlying course shall contain no frozen material. Ruts or soft yielding spots in the underlying course areas having inadequate compaction and deviations of the surface from the requirements set forth herein shall be corrected by loosening and removing soft or unsatisfactory material and by adding approved material, reshaping to line and grade and recompacted. The completed underlying course shall not be disturbed by traffic or other operations and shall be maintained by the Contractor in a satisfactory condition until the surface course is placed.

3.4 GRADE CONTROL

During construction, the lines and grades including crown and cross slope

indicated for the aggregate surface course shall be maintained by means of line and grade stakes placed by the Contractor. Provision shall be made for the additional aggregate layer placed in accordance with Section 02555 BITUMINOUS SURFACE TREATMENT for Lots C, E and F.

3.5 MIXING AND PLACING MATERIALS

The materials shall be mixed and placed in such a manner as to obtain uniformity of the material and at a uniform optimum water content for compaction. The Contractor shall make such adjustments in mixing or placing procedures or in equipment so as to obtain the true grades, to minimize segregation and degradation, to obtain the desired water content, and to ensure a satisfactory surface course.

3.6 LAYER THICKNESS

The aggregate material shall be placed on the underlying course in layers of uniform thickness. When a compacted layer of 6 inches or less is specified, the material may be placed in a single layer; when a compacted thickness of more than 6 inches is required, no layer shall exceed 6 inches nor less than 3 inches when compacted.

3.7 COMPACTION

Each layer of the aggregate surface course shall be compacted with approval compaction equipment. The water content during the compaction procedure shall be maintained at optimum or at the percentage specified by the Contracting Officer. Localized resurfacing in Lot F will be held to the same Quality Control requirements as Lots C and E. In locations not accessible to the rollers, the mixture shall be compacted with mechanical tampers. Compaction shall continue until each layer through the full depth is compacted to at least 100 percent of laboratory maximum density. Any materials that are found to be unsatisfactory shall be removed and replaced with satisfactory material or reworked to produce a satisfactory material.

3.8 PROOF ROLLING

Proof rolling of the areas designated shall be in addition to compaction specified above for Lots C and E, and is also required for the entire area of Lot F, and shall consist of application of 30 coverages with a heavy rubber-tired roller having four tires abreast with each tire loaded to 30,000 pounds and tires inflated to In the areas designated, proof rolling shall be applied to the top lift of layer on which surface course is laid and to each layer of the base course. Water content of the lift of the layer on which the surface course is placed and each layer of the aggregate surface course shall be maintained at optimum or at the percentage directed from the start of compaction to the completion of a proof rolling. Aggregate depressed below required grade by proof rolling shall recieve addtional aggregate to bring surface to required grade and proof rolled again.

3.9 EDGES OF AGGREGATE-SURFACED ROAD

Approved material shall be placed along the edges of the aggregate surface course in such quantity as to compact to the thickness of the course being constructed. When the course is being constructed in two or more layers, at least 1 foot of shoulder width shall be rolled and compacted simultaneously with the rolling and compacting of each layer of the surface course.

3.10 SMOOTHNESS TEST

The surface of each layer shall not show any deviations in excess of 3/8 inch when tested with a 10 foot straightedge applied both parallel with and at right angles to the centerline of the area to be paved. Deviations exceeding this amount shall be corrected by the Contractor by removing

material, replacing with new material, or reworking existing material and compacting, as directed.

3.11 THICKNESS CONTROL

The completed thickness of the aggregate surface course shall be within 1/2 inch, plus or minus, of the thickness indicated on plans. The thickness of the aggregate surface course shall be measured at intervals in such manner that there will be a thickness measurement for at least each 500 square yards of the aggregate surface course. The thickness measurement shall be made by test holes at least 3 inches in diameter through the aggregate surface course. When the measured thickness of the aggregate surface course is more than 1/2 inch deficient in thickness, the Contractor, at no additional expense to the Government, shall correct such areas by scarifying, adding mixture of proper gradation, reblading, and recompacting, as directed. Where the measured thickness of the aggregate surface course is more than 1/2 inch thicker than that indicated, it shall be considered as conforming with the specified thickness requirements plus 1/2 inch. The average job thickness shall be the average of the job measurements determined as specified above, but shall be within 1/4 inch of the thickness indicated. When the average job thickness fails to meet this criterion, the Contractor shall, at no additional expense to the Government, make corrections by scarifying, adding or removing mixture of proper gradation, and reblading and recompacting, as directed.

3.12 DENSITY TESTS

Density shall be measured in the field in accordance with the most stringent method from ASTM D 1556, ASTM D 2167, or ASTM D 2922. For the method presented in ASTM D 1556 the base plate as shown in the drawing shall be used. For the method presented in ASTM D 2922 the calibration curves shall be checked and adjusted, if necessary, using only the sand cone method as described in paragraph Calibration of the ASTM publication. Tests performed in accordance with ASTM D 2922 result in a wet unit weight of soil and when using this method, ASTM D 3017 shall be used to determine the moisture content of the soil. The calibration curves furnished with the moisture gauges shall also be checked along with density calibration checks as described in ASTM D 3017. The calibration checks of both the density and moisture gauges shall be made by the prepared containers of material method, as described in paragraph Calibration of ASTM D 2922, on each different type of material being tested at the beginning of a job and at intervals, as directed.

3.13 WEAR TEST

Wear tests shall be made in conformance with ASTM C 131.

3.14 MAINTENANCE

The aggregate surface course shall be maintained in a condition that will meet all specification requirements until accepted.

-- End of Section --

SECTION 02551

BITUMINOUS PAVING FOR STREETS

PART 1 GENERAL

1.1 REFERENCES

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

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 242	(1985; R 1990) Mineral Filler for Bituminous Paving Mixtures
ASTM D 977	(1991) Emulsified Asphalt
ASTM D 1856	(1979; R 1984) Recovery of Asphalt from Solution by Abson Method
ASTM D 2172	(1992) Quantitative Extraction of Bitumen from Bituminous Paving Mixtures

NEW YORK STATE DEPARTMENT OF TRANSPORTATION (NYSDOT)

NYSDOT Standard Specifications	(1990) Standard Specifications, Construction and Material

1.2 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 01300SUBMITTAL PROCEDURES:

SD-09 Reports

Bituminous Pavement; GA.

Bituminous Base Course; GA

Subbase; GA

Prime Coat; GA

Tack Coat; GA

SD-18 Records

Waybills and Delivery Tickets; FIO.

Waybills and delivery tickets, during progress of the work.

1.3 PLANT, EQUIPMENT, MACHINES, AND TOOLS

1.3.1 General

The bituminous plant shall be of such capacity to produce the quantities of bituminous mixtures required. Hauling equipment, paving machines, rollers, miscellaneous equipment, and tools shall be provided in sufficient numbers and capacity and in proper working condition to place the bituminous paving mixtures at a rate equal to the plant output.

1.3.2 Mixing Plants

The mixing plant shall be an automatic or semiautomatic controlled commercially manufactured unit designed and operated to consistently produce a mixture within the job-mix formula (JMF). Drum mixers shall be prequalified at the production rate to be used during actual mix production. The prequalification tests will include extraction and recovery of the asphalt cement in accordance with ASTM D 2172 and ASTM D 1856. The penetration of the recovered asphalt binder shall not be less than 60 percent of the original penetration, as measured in accordance with ASTM D 5.

1.3.3 Straightedge

The Contractor shall furnish and maintain at the site, in good condition, one 12-foot straightedge for each bituminous paver. Straightedge shall be made available for Government use. Straightedges shall be constructed of aluminum or other lightweight metal and shall have blades of box or box-girder cross section with flat bottom reinforced to insure rigidity and accuracy. Straightedges shall have handles to facilitate movement on pavement.

1.4 WEATHER LIMITATIONS

Unless otherwise directed, bituminous courses shall not be constructed when temperature of the surface of the existing pavement or base course is below 40 degrees F.

1.5 PROTECTION OF PAVEMENT

After final rolling, no vehicular traffic of any kind shall be permitted on the pavement until the pavement has cooled to 140 degrees F.

1.6 GRADE AND SURFACE-SMOOTHNESS REQUIREMENTS

Finished surface of bituminous courses, when tested as specified below and in paragraph ACCEPTABILITY OF WORK, shall conform to gradeline and elevations shown and to surface-smoothness requirements specified.

1.6.1 Plan Grade

The grade of the completed surface shall not deviate more than 0.05 foot from the plan grade.

1.6.2 Surface Smoothness

When a 12-foot straightedge is laid on the surface parallel with the centerline of the paved area or transverse from crown to pavement edge, the surface shall vary not more than1/4 inch from the straightedge.

1.7 GRADE CONTROL

Lines and grades shall be established and maintained by means of line and grade stakes placed at site of work in accordance with the SPECIAL CLAUSES. Elevations of bench marks used by the Contractor for controlling pavement operations at the site of work will be determined, established, and maintained by the Government. Finished pavement elevations shall be established and controlled at the site of work by the Contractor in accordance with bench mark elevations furnished by the Contracting Officer.

1.8 SOURCE OF MATERIALS

After selecting the source of bituminous and aggregate materials, a notification shall be submitted to the Contracting Officer within fifteen days after the award of contract for his approval.

1.9 DELIVERY, STORAGE, AND HANDLING OF MATERIALS

1.9.1 Mineral Aggregates

Mineral aggregates shall be delivered to the site of the bituminous mixing plant and stockpiled in such manner as to preclude fracturing of aggregate particles, segregation, contamination, or intermingling of different materials in the stockpiles or cold-feed hoppers. Mineral filler shall be delivered, stored, and introduced into the mixing plant in a manner to preclude exposure to moisture or other detrimental conditions.

1.9.2 Bituminous Materials

Bituminous materials shall be maintained at appropriate temperature during storage but shall not be heated by application of direct flame to walls of storage tanks or transfer lines. Storage tanks, transfer lines, and weigh buckets shall be thoroughly cleaned before a different type or grade of bitumen is introduced into the system. The asphalt cement shall be heated sufficiently to allow satisfactory pumping of the material; however, the storage temperature shall be maintained below 300 degrees F.

1.10 ACCESS TO PLANT AND EQUIPMENT

The Contracting Officer shall have access at all times to all parts of the paving plant for checking adequacy of the equipment in use; inspecting operation of the plant; verifying weights, proportions, and character of materials; and checking temperatures maintained in preparation of the mixtures.

1.11 WAYBILLS AND DELIVERY TICKETS

Before the final statement is allowed, the Contractor shall file with the Contracting Officer certified waybills and certified delivery tickets for all aggregates and bituminous materials actually used in construction.

PART 2 PRODUCTS

2.1 BITUMINOUS HOT MIX

Shall consist of coarse aggregate, fine aggregate, mineral filler, bituminous material, and approved additives, if required, of the qualities and in the proportions specified and shall conform to the requirements of the NYSDOT Standard Specifications for Bituminous Pavements.

2.1.1 Aggregates

Aggregates shall consist of crushed stone, crushed gravel, crushed slag, screening, sand, and mineral filler, as required.

2.1.1.1 Coarse Aggregate

Coarse aggregate shall consist of clean, sound, durable particles meeting the requirements of NYSDOT Standard Specifications Section 703-02.

2.1.1.2 Fine Aggregate

Fine aggregate shall consist of clean, sound, durable particles including natural sand or crushed stone, slag, or gravel that meets requirements for NYSPDOT Standard Specifications Section 703-01.

2.1.1.3 Mineral Filler

Mineral filler shall conform to ASTM D 242, and NYSDOT Standard Specifications Section 703-08.

2.1.2 Bituminous Material

Asphalt cement for Bituminous (Asphalt Concrete) Pavement shall conform to NYSDOT 702-0500, Grade AC-20.

2.1.3 Additives

The use of additives such as antistripping and antifoaming agents is subject to approval.

2.2 SUBBASE

2.2.1 Aggregates

Aggregates shall consist of crushed stone or slag, gravel, shell, sand, or other sound, durable, approved materials processed and blended or naturally combined. Aggregates shall be within the limits specified for NYSDOT Standard Specifications Type 1 Subbase Course, Section 304-2.

Maximum Allowable Percentage by Weight
Passing Square-Mesh Sieve

Sieve Designation	Subbase Course
3"	100
2"	90-100
1/4"	30-65
NO. 40	5-40
NO. 200	0-10

2.3 ASPHALT CONCRETE BASE COURSE

The Asphalt Concrete base course shall conform to the NYSDOT Standard Specifications Type 1 Base Course, Section 400.

2.4 ASPHALT CONCRETE TOP COURSE

The Asphalt Concrete top course shall conform to the NYSDOT Standard Specifications Type 7 Top Course, Section 400.

2.5 ASPHALT CONCRETE TRUEING AND LEVELING COURSE

The Asphalt Concrete trueing and leveling course shall conform to NYSDOT Standard Specifications Trueing and Leveling Course, Section 400.

2.6 BITUMINOUS TACK AND PRIME COATS

2.6.1 Tack Coat

Asphalt emulsion tack coat shall conform to ASTM D 977, NYSDOT 702-90, Grade HFMS-1 with emulsifier solution.

2.6.2 Prime Coat

Asphalt emulsion prime coat shall conform to ASTM D 977, Grade SS-1.

PART 3 EXECUTION

3.1 STOCKPILING MATERIALS

Prior to stockpiling of material, storage sites shall be cleared and

leveled by the Contractor. All materials, including approved material available from excavation and grading, shall be stockpiled in the manner and at the locations designated. Aggregates shall be stockpiled on the cleared and leveled areas designated by the Contracting Officer so as to prevent segregation. Materials obtained from different sources shall be stockpiled separately.

3.2 PREPARATION OF UNDERLYING MATERIALS

Prior to constructing the subbase course, the underlying course shall be cleaned of all foreign substances. Subgrade for the utility trench shall conform to the requirements of Section 02222 and NYSDOT Standard Specifications.

3.3 PAVEMENT INSTALLATION

The construction requirements for all bituminous paving for streets shall conform to the NYSDOT Standard Specifications, as follows:

Subbase Course;	Section 304-3
Asphalt Concrete - Type 1 Base Course;	Section 401-3
Asphalt Concrete - Type 7 Top Course;	Section 401-3
Asphalt Concrete - Trueing and Leveling;	Section 401-3.

3.4 PRIME COATING

Surfaces of previously constructed base course shall be sprayed with a coat of bituminous material.

3.5 TACK COATING

Contact surfaces of previously constructed pavement, curbs, manholes, and other structures shall be sprayed with a thin coat of bituminous material.

3.6 ACCESS ROAD PAVEMENT REPAIR

The existing asphalt pavement Access Road to Lot E shall b repaired, within the limits shown on the Contract Drawings. All loose asphalt shall be saw cut and removed to firm pavement.

An asphalt concrete trueing and leveling course shall be applied, in accordance with NYSDOT Standard Specifications Section 401-3, on the prepared deteriorated areas and depressional areas.

An asphalt concrete top course (resurfacing) shall be applied to the entire access road in accordance with NYSDOT Standard Specifications Section 401-3.

-- End of Section --

SECTION 02555

BITUMINOUS SURFACE TREATMENT

PART 1 GENERAL

1.1 REFERENCES

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

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM C 29	(1991a) Unit Weight and Voids in Aggregate
ASTM C 88	(1990) Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate
ASTM C 131	(1989) Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
ASTM C 136	(1993) Sieve Analysis of Fine and Coarse Aggregates
ASTM D 75	(1987; R 1992) Sampling Aggregates
ASTM D 140	(1993) Sampling Bituminous Materials
ASTM D 490	(1992) Road Tar
ASTM D 633	(1987; R 1991) Volume Correction Table for Road Tar
ASTM D 946	(1982; R 1993) Penetration-Graded Asphalt Cement for Use in Pavement Construction
ASTM D 977	(1991) Emulsified Asphalt
ASTM D 1250	(1980; R 1990) Petroleum Measurement Tables
ASTM D 2027	(1976; R 1992) Cutback Asphalt (Medium-Curing Type)
ASTM D 2028	(1976; R 1992) Cutback Asphalt (Rapid-Curing Type)
ASTM D 2397	(1991) Cationic Emulsified Asphalt
ASTM D 3381	(1992) Viscosity-Graded Asphalt Cement for Use in Pavement Construction

1.2 MEASUREMENT

The bituminous material and aggregate to be paid for will be the measured quantities used in the accepted work.

1.2.1 Bituminous Material

The amount of bituminous material to be paid for will be measured in gallons of material used in the accepted work, corrected to gallons at 60 degrees F in accordance with ASTM D 1250, using a coefficient of expansion of

0.00025 per degree F for asphalt emulsion.

1.2.2 Aggregate

The amount of aggregate paid for will be the number of pounds of aggregate placed and accepted in the completed work or placed in authorized stockpiles.

1.3 WAYBILLS AND DELIVERY TICKETS

Before the final statement is allowed, the Contractor shall file with the Contracting Officer certified waybills and delivery tickets for aggregate and bituminous material used in the bituminous surface treatment. The Contractor shall not remove bituminous material from the tank car or storage tank until initial outage and temperature measurements have been taken; nor shall the car or tank be released until final outage has been taken.

1.4 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be in accordance with Section01300 SUBMITTAL PROCEDURES:

SD-09 Reports

Tests; GA.

Copies of test results, within 24 hours after completion of each test.

SD-18 Records

Waybills and Delivery Tickets; FIO.

Copies of waybills and delivery tickets shall be submitted during progress of the work.

1.5 SAFETY PRECAUTIONS

No smoking, or open flames shall be permitted within 25 feet of heating, distributing, or transferring operations of bituminous materials other than bituminous emulsions.

1.6 EQUIPMENT, TOOLS, AND MACHINES

1.6.1 Bituminous Distributors

The distributors shall have pneumatic tires of such width and number that the load produced on the base surface does not exceed 650 pounds per inch of tire width. Distributors shall be designed and equipped to distribute bituminous material uniformly at even heat on various widths of surface at readily determined and controlled rates ranging from 0.05 to 2.00 gallons per square yard, with a pressure range of 25 to 75 psi. The allowable variation from any specified rate shall not exceed 5 percent. Distributor equipment shall include a separate power unit for the bitumen pump, full-circulation spray bars, tachometer, pressure gauges, volume-measuring devices, a thermometer for reading the temperature of tank contents, and a hose attachment suitable for applying bituminous material to areas not accessible with distributor spray bar. The distributor shall be equipped for circulation and agitation of bituminous material during the heating process.

1.6.2 Single-Pass, Surface-Treatment Machines

The machines shall be capable of spraying bituminous material and spreading aggregate in one pass. Bituminous spraying equipment shall conform to the

requirements given above for a bituminous distributor. The machine shall be capable of spreading aggregates at controlled amounts per square yard as specified. In addition, the single-pass, surface-treatment machine shall be capable of placing a surface treatment adjacent to an existing surface treatment, forming a joint of the same thickness and uniformity as other portions of the surface treatment. Ridges or blank spaces will not be permitted. Joints in the second application shall be formed at least 1 foot from those formed in the first application.

1.6.3 Heating Equipment for Storage Tanks

The equipment shall consist of coils and equipment for producing steam or hot oil and be designed to prevent the introduction of steam or hot oil into the material. An armored thermometer with a range of 100 to 400 degrees F shall be affixed to the tank so the temperature of the bituminous material may be determined at all times.

1.6.4 Power Rollers

Power rollers shall be steel-wheeled or pneumatic-tired type, conforming to the following requirements:

a. Steel-wheeled rollers shall have at least one steel drum and weigh a minimum of 5 tons. Steel wheels of the rollers shall be equipped with adjustable scrapers.

b. Pneumatic-tired rollers shall be self-propelled and have wheels mounted on two axles in such manner that the rear tires will not follow in the tracks of the forward group. Tires shall be uniformly inflated to not less than 60 psi nor more than 80 psi pressure. The pneumatic-tired rollers shall be equipped with boxes or platforms for ballast loading and shall be loaded so that the tire print width of each wheel is not less than the clear distance between tire prints.

1.6.5 Mechanical Spreaders

The spreaders shall be adjustable and capable of spreading aggregate at controlled amounts per square yard, as specified.

1.6.6 Brooms and Blowers

The machines shall be of the power type, capable of cleaning surfaces to be treated.

1.6.7 Scales

The scales shall be standard truck scales of the beam type equipped with a weight-recording device. The scales shall be sufficient in size and capacity to accommodate the trucks used in hauling aggregates. The scales shall be tested and approved by an inspector of the State Inspection Bureau charged with scale inspection within the state of New York. If an official of the inspection bureau is not available, the scales shall be tested in accordance with state specifications by the Contractor in the presence of the Contracting Officer. The Contractor shall have the necessary number of standard weights on hand at all times for testing the scales.

1.6.8 Weighhouse

The house shall be weatherproof and shall be constructed in a manner to afford adequate protection for the indicating and recording devices of the scales.

1.7 SAMPLING AND TESTING

The sampling and testing shall be the responsibility of the Contractor.

Sampling and testing shall be performed by an approved commercial testing laboratory, or by the Contractor, subject to approval. Sampling shall be in accordance with ASTM D 75 for aggregates and ASTM D 140 for bituminous material, unless otherwise directed. Tests shall be performed in sufficient number to insure that materials meet specified requirements.

1.7.1 Wear Test

The wear test shall be performed in accordance with ASTM C 131 to ensure that aggregates have a percentage of wear not exceeding 40 percent after 500 revolutions. One test shall be performed for aggregates in stockpiles or at the source.

1.7.2 Soundness Test

The soundness test shall be performed as specified by ASTM C 88 to ensure that aggregates have a weight loss not greater than 9 percent when subjected to five cycles of the magnesium sulfate test. One test shall be performed for aggregates in stockpiles or at the source.

1.8 WEATHER LIMITATIONS

Bituminous surface treatment shall be applied only when the existing surface or base course is dry. Bituminous surface treatment shall not be applied when either the atmospheric temperature, in the shade, is below 50 degrees F or the pavement surface to be treated is below 70 degrees F unless otherwise directed.

PART 2 PRODUCTS

2.1 MATERIALS

Mineral aggregate and bituminous material of the following types, gradations, grades, and consistencies that meet the requirements of stripping, wear, and soundness tests as specified in paragraph SAMPLING AND TESTING shall be used.

2.1.1 Mineral Aggregate

The aggregate shall consist of crushed stone in conformance with NYSDOT Material Designation 703-0201 and shall be of such nature that thorough coating of bituminous material used in the work will not strip off upon contact with water. Moisture content of the aggregate shall be such that the aggregate will be readily coated with the bituminous material. Drying may be required, as directed. Aggregate shall conform to the gradation shown below. Gradation of the aggregates shall be determined by ASTM C 136.

REGATE GRADATION

SINGLE BITUMINOUS SURFACE TREATMENT

(PERCENT BY WEIGHT PASSING)

NYSDOT Standard Specification Sieve Designation	Designation 1st
1 inch	--
3/4 inch	--
1/2 inch	100
3/8 inch	--
1/4 inch	0-15
No. 4	--

REGATE GRADATION

SINGLE BITUMINOUS SURFACE TREATMENT

(PERCENT BY WEIGHT PASSING)

NYSDOT Standard Specification Sieve Designation	Designation 1st
No. 8	--
No. 16	--
No. 200	0-1.0

2.1.1.1 Crushed Stone

Crushed stone shall consist of clean, sound, durable particles, free of soft or disintegrated pieces, dust, or foreign matter.

2.1.2 Bituminous Materials

The bituminous material shall conform to NYSDOT Material Designation 702-3101, Grade RS-2, Rapid Setting Asphalt Emulsion.

PART 3 EXECUTION

3.1 QUANTITIES OF MATERIALS PER SQUARE YARD

The bituminous material and aggregate shall be spread within the quantity limits shown below on the entire surface of Lots C, E, and F as specified on the Contract Drawings. The individual quantities of bituminous material and aggregate may be varied to meet specific field conditions at all times during progress of the work, as directed, without adjustments to contract prices. Aggregate weights shown are for aggregates having a specific gravity of 2.65. If the specific gravity of the aggregate used is other than 2.65, appropriate adjustments shall be made in number of pounds required to ensure a constant volume of aggregate per square yard of treatment.

QUANTITIES (PER SQUARE YARD

[FOR SINGLE SURFACE TREATMENT]

Gradation No.	Material (Gallon)	Bituminous Aggregate (Pounds)
NYSDOT 1st	0.45	20-24

3.2 PREPARATION OF SURFACE

Immediately before applying the first application of bituminous material, the surface shall be cleaned of loose material with power brooms or power blowers. Care shall be taken to remove all loose or foreign matter.

3.3 APPLICATION OF BITUMINOUS SURFACE TREATMENT

All Lots (C, E and F) shall be proof rolled prior to the application of the bituminous surface treatment, as specified in SECTION 02546 AGGREGATE

SURFACE COURSE.

3.3.1 Application of Bituminous Material

Bituminous material shall be applied to the entire surface of Lots C, E and F by means of a bituminous distributor at a temperature within the range of 130 to 170 degrees F, as directed. The bituminous material shall be applied within the limits specified in paragraph QUANTITIES OF MATERIAL PER SQUARE YARD. Bituminous material shall be applied in such a manner that uniform distribution is obtained over all surfaces treated. Unless the distributor is equipped to obtain a satisfactory result at the junction of previous and subsequent applications, building paper shall be spread on the surface for a sufficient distance back from the ends of each application so that flow through the sprays may be started and stopped on the paper in order that all sprays will operate at full force on the surface treated. Immediately after application, the building paper shall be removed and destroyed. Areas inaccessible to the distributor shall be properly treated with bituminous material using the hose attachment.

3.3.2 Spreading of Aggregate

Immediately following application of bituminous material on the surface of Lots C, E and F, aggregate shall be spread uniformly over the surface within the limits of the quantities specified in paragraph QUANTITIES OF MATERIAL PER SQUARE YARD. Spreading shall be done with mechanical spreaders. Aggregate shall be spread evenly by hand on all areas missed by the mechanical spreader. Equipment spreading aggregate shall be operated so that bituminous material will be covered before any vehicle travels thereon. When hand spreading is employed on inaccessible areas, aggregate shall be spread directly from trucks. Additional aggregate shall be spread by hand over areas having insufficient cover, and spreading shall continue during these operations when necessary.

3.4 BROOMING AND ROLLING

The surface shall be rolled with a pneumatic-tired and a steel-wheeled roller after sufficient aggregate is spread. Rolling shall continue until no more aggregate can be worked into the treated surface. The use of the steel-wheeled roller will be discontinued, or a lighter weight steel wheel roller substituted, as directed, if the roller being used causes excessive crushing and shattering of the aggregate. If the aggregate is not distributed properly, the surface shall be broomed as soon as possible after the first coverage by the roller, but not until the surface has set sufficiently to prevent excessive marking. Brooming, rolling, and supplemental spreading of aggregate shall continue until the surface is cured and rolled sufficiently to key and set the aggregate. In places not accessible to rollers, the aggregate shall be compacted with pneumatic tampers. Aggregate that becomes contaminated with foreign matter shall be removed, replaced with clean aggregate, and rerolled, as directed. The Contractor shall maintain and protect the treated areas by use of barricades for a period not to exceed 30 days.

-- End of Section --

SECTION 02720

STORM-DRAINAGE AND GAS VENT SYSTEM

PART 1 GENERAL

1.1 REFERENCES

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

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 123	(1989a) Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
ASTM A 444	(1989) Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process for Storm Sewer and Drainage Pipe
ASTM A 742	(1993) Steel Sheet, Metallic Coated and Polymer Precoated for Corrugated Steel Pipe
ASTM A 760	(1995a) Corrugated Steel Pipe, Metallic-Coated for Sewers and Drains
ASTM A 798	(1994) Installing Factory-Made Corrugated Steel Pipe for Sewers and Other Applications
ASTM D 1557	(1991) Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/cu. ft. (2,700 kN-m/cu. m.))
ASTM D 1784	(1992) Rigid Poly(Vinyl Chloride) (PVC) Compounds and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds
ASTM D 2167	(1994) Density and Unit Weight of Soil in Place by the Rubber Balloon Method
ASTM D 2922	(1991) Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
ASTM D 3017	(1988; R 1993) Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth)
ASTM D 3034	(1994) Type PSM Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings
ASTM F 679	(1989) Poly(Vinyl Chloride) (PVC) Large-Diameter Plastic Gravity Sewer Pipe and Fittings
ASTM F 714	(1994) Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Outside Diameter
ASTM F 794	(1995a) Poly(Vinyl Chloride) (PVC) Profile Gravity Sewer Pipe and Fittings Based on Controlled Inside Diameter

ASTM F 894	(1995) Polyethylene (PE) Large Diameter Profile Wall Sewer and Drain Pipe
ASTM F 949	(1993a) Poly(Vinyl Chloride) (PVC) Corrugated Sewer Pipe with a Smooth Interior and Fittings

1.2 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 01300 SUBMITTAL PROCEDURES:

SD-06 Instructions

Placing Pipe; GA.

Printed copies of the manufacturer's recommendations for installation procedures of the material being placed, prior to installation.

SD-14 Samples

Pipe for Culverts and Storm Drains; GA.

1.3 DELIVERY, STORAGE, AND HANDLING

1.3.1 Delivery and Storage

Materials delivered to site shall be inspected for damage, unloaded, and stored with a minimum of handling. Materials shall not be stored directly on the ground. The inside of pipes and fittings shall be kept free of dirt and debris.

1.3.2 Handling

Materials shall be handled in such a manner as to ensure delivery to the trench in sound, undamaged condition. Pipe shall be carried to the trench, not dragged.

PART 2 PRODUCTS

2.1 PIPE FOR CULVERTS AND STORM DRAINS

Pipe for culverts and storm drains shall be of the sizes indicated and shall conform to the requirements specified.

2.1.1 Corrugated Steel Pipe

ASTM A 760, zinc coated pipe of:

Type I pipe with annular corrugations.

2.2 PIPE FOR GAS VENT STACKS

Pipe for gas vent stacks shall be of the sizes indicated and shall conform to the requirements specified.

2.2.1 PVC Pipe

ASTM D 3034, Type PSM with a maximum SDR of 35, Size 15 inches or less in diameter. PVC shall be certified by the compounder as meeting the requirements of ASTM D 1784, cell Class 12454B. The pipe stiffness shall be greater than or equal to 735/D for cohesionless material pipe trench backfills.

2.2.1.1 PVC Pipe Fittings

Fittings shall be compatible with the pipe supplied and shall have a strength not less than that of the pipe. Fittings shall conform to the respective specifications and other requirements specified below.

2.2.1.1.1 Plastic Pipe

PVC composite pipe fittings shall conform to ASTM D 2680.

2.3 MISCELLANEOUS MATERIALS

2.3.1 Concrete

Unless otherwise specified, concrete and reinforced concrete shall conform to the requirements for 3500 psi concrete under Section 03307 CONCRETE FOR MINOR STRUCTURES. The concrete mixture shall have air content by volume of concrete, based on measurements made immediately after discharge from the mixer, of 5 to 7 percent when maximum size of coarse aggregate exceeds 1-1/2 inches. Air content shall be determined in accordance with ASTM C 231. The concrete covering over steel reinforcing shall not be less than 1 inch thick for covers and not less than 1-1/2 inches thick for walls and flooring. Concrete covering deposited directly against the ground shall have a thickness of at least 3 inches between steel and ground. Expansion-joint filler material shall conform to ASTM D 1751, or ASTM D 1752, or shall be resin-impregnated fiberboard conforming to the physical requirements of ASTM D 1752.

PART 3 EXECUTION

3.1 EXCAVATION FOR PIPE CULVERTS, STORM DRAINS, AND DRAINAGE STRUCTURES

Excavation of trenches and for appurtenances and backfilling for culverts, storm drains and gas vent stacks shall be in accordance with the applicable portions of Section 02222 EXCAVATION, TRENCHING, AND BACKFILLING and the requirements specified below.

3.1.1 Trenching

The width of trenches at any point below the top of the pipe shall be not greater than the outside diameter of the pipe plus 12 inches to permit satisfactory jointing and thorough tamping of the bedding material under and around the pipe. Sheeting and bracing where required shall be placed within the trench width as specified. Care shall be taken not to overexcavate. Where trench widths are exceeded, redesign with a resultant increase in cost of stronger pipe or special installation procedures shall be necessary. Cost of this redesign and increased cost of pipe or installation shall be borne by the Contractor without additional cost to the Government.

3.1.2 Removal of Rock

Rock in either ledge or boulder formation shall be replaced with suitable materials to provide a compacted earth cushion having a thickness between unremoved rock and the pipe of at least 8 inches or 1/2 inch for each foot of fill over the top of the pipe, whichever is greater, but not more than three-fourths the nominal diameter of the pipe. Where bell-and-spigot pipe is used, the cushion shall be maintained under the bell as well as under the straight portion of the pipe. Rock excavation shall be as specified and defined in Section 02222 EXCAVATION, TRENCHING, BACKFILLING AND RIP RAP.

3.1.3 Removal of Unstable Material

Where wet or otherwise unstable soil incapable of properly supporting the

pipe, as determined by the Contracting Officer, is unexpectedly encountered in the bottom of a trench, such material shall be removed to the depth required and replaced to the proper grade with select granular material, compacted as provided in paragraph BACKFILLING. When removal of unstable material is due to the fault or neglect of the Contractor in his performance of shoring and sheeting, water removal, or other specified requirements, such removal and replacement shall be performed at no additional cost to the government.

3.2 INSTALLATION OF GAS VENT STACKS

Installation of the gas vent stacks will be as specified in the Contract Drawings in accordance to Section 02222 EXCAVATION, TRENCHING, BACKFILLING AND RIP RAP and in accordance with SECTION 02272 SEPARATION/ FILTRATION GEOTEXTILE.

3.3 BEDDING

The bedding surface for the pipe shall provide a firm foundation of uniform density throughout the entire length of the pipe.

3.3.1 Corrugated Metal Pipe

Bedding for corrugated metal pipe and pipe arch shall be in accordance with ASTM A 798. It is not required to shape the bedding to the pipe geometry.

3.4 PLACING PIPE

Each pipe shall be carefully examined before being laid, and defective or damaged pipe shall not be used. Pipelines shall be laid to the grades and alignment indicated. Proper facilities shall be provided for lowering sections of pipe into trenches. Lifting lugs in vertically elongated metal pipe shall be placed in the same vertical plane as the major axis of the pipe. Under no circumstances shall pipe be laid in water, and no pipe shall be laid when trench conditions or weather are unsuitable for such work. Diversion of drainage or dewatering of trenches during construction shall be provided as necessary. All pipe in place shall be inspected before backfilling, and those pipes damaged during placement shall be removed and replaced.

3.4.1 Corrugated Metal Pipe

Laying shall be with the separate sections joined firmly together, with the outside laps of circumferential joints pointing upstream, and with longitudinal laps on the sides. Interior coating shall be protected against damage from insertion or removal of struts or tie wires. Lifting lugs shall be used to facilitate moving pipe without damage to exterior or interior coatings.

3.5 JOINTS

3.5.1 Corrugated Metal Pipe

3.5.1.1 Field Joints

Transverse field joints shall be of such design that the successive connection of pipe sections will form a continuous line free of appreciable irregularities in the flow line. In addition, the joints shall meet the general performance requirements described in ASTM A 798. Suitable transverse field joints which satisfy the requirements for one or more of the joint performance categories can be obtained with the following types of connecting bands furnished with suitable band-end fastening devices: corrugated bands, bands with projections, flat bands, and bands of special design that engage factory reformed ends of corrugated pipe. The space between the pipe and connecting bands shall be kept free from dirt and grit so that corrugations fit snugly. The connecting band, while being

tightened, shall be tapped with a soft-head mallet of wood, rubber or plastic, to take up slack and ensure a tight joint. Field joints for each type of corrugated metal pipe shall maintain pipe alignment during construction and prevent infiltration of fill material during the life of the installations. The type, size, and sheet thickness of the band and the size of angles or lugs and bolts shall be as indicated or where not indicated, shall be as specified in the applicable standards or specifications for the pipe.

3.6 DRAINAGE STRUCTURES

3.6.1 Headwalls

Construction shall be in conformance with SECTION 03307 CONCRETE FOR MINOR STRUCTURES and as indicated on the Contract Drawings.

3.7 BACKFILLING

3.7.1 Backfilling Pipe in Trenches

After the pipe has been properly bedded, selected material from excavation or borrow, at a moisture content that will facilitate compaction, shall be placed along both sides of pipe in layers not exceeding 6 inches in compacted depth. The backfill shall be brought up evenly on both sides of pipe for the full length of pipe. Care shall be taken to ensure thorough compaction of the fill under the haunches of the pipe. Each layer shall be thoroughly compacted with mechanical tampers or rammers. This method of filling and compacting shall continue until the fill has reached an elevation of at least 12 inches above the top of the pipe where applicable. The remainder of the trench shall be backfilled and compacted by spreading and rolling or compacted by mechanical rammers or tampers in layers not exceeding 12 inches. Tests for density will be made as necessary to ensure conformance to the compaction requirements specified elsewhere in this paragraph. Where it is necessary in the opinion of the Contracting Officer, any sheeting or portions of bracing used shall be left in place and the contract will be adjusted accordingly. Untreated sheeting shall not be left in place beneath structures or pavements.

3.7.2 Movement of Construction Machinery

In compacting by rolling or operating heavy equipment parallel with the pipe, displacement of or injury to the pipe shall be avoided. Movement of construction machinery over a culvert or storm drain at any stage of construction shall be at the Contractor's risk. Any damaged pipe shall be repaired or replaced.

3.7.3 Compaction

3.7.3.1 General

Backfill materials shall be as shown on the drawings and as specified in Section 02222 EXCAVATION, TRENCHING, AND BACKFILLING.

3.7.3.2 Minimum Density

Backfill over and around the pipe and backfill around and adjacent to drainage structures shall be compacted at the approved moisture content to the following applicable minimum density (densities) which will be determined as specified in this paragraph.

a. Under the access roads and shoulder areas, the density shall be not less than 95 percent of maximum density up to the ground surface

b. Under nontraffic areas, density shall be not less than that of the surrounding material.

3.7.4 Determination of Density

Testing shall be the responsibility of the Contractor and performed at no additional cost to the Government. One test per culvert shall be performed or a minimum of 100 ft on center. Testing shall be performed by an approved commercial testing laboratory or by the Contractor subject to approval. Tests shall be performed in sufficient number to ensure that specified density is being obtained. Laboratory tests for moisture-density relations shall be made in accordance with ASTM D 1557 except that mechanical tampers may be used provided the results are correlated with those obtained with the specified hand tamper. Field density tests shall be determined in accordance with ASTM D 2167 or ASTM D 2922. When ASTM D 2922 is used, the calibration curves shall be checked and adjusted, if necessary, using the sand cone method as described in paragraph Calibration of the referenced publications. ASTM D 2922 results in a wet unit weight of soil and when using this method ASTM D 3017 shall be used to determine the moisture content of the soil. The calibration curves furnished with the moisture gauges shall be checked along with density calibration checks as described in ASTM D 3017 or ASTM D 2922. Test results shall be furnished to the Contracting Officer. The calibration checks of both the density and moisture gauges shall be made at the beginning of a job on each different type of material encountered and at intervals as directed.

-- End of Section --

SECTION 02841

W-BEAM GUIDE RAIL

PART 1 GENERAL

1.01 SUMMARY

This Section specifies requirements for W-beam and Thrie-beam guide rail.

1.02 REFERENCES

The following is a listing of the publications referenced in this Section:

American Association of State Highway and Transportation Officials (AASHTO)

AASHTO M 30	Zinc-Coated Steel Wire Rope and Fittings for Highway Guardrail
AASHTO M 102	Steel Forgings, Carbon and Alloy, for General Industrial Use
AASHTO M 133	Preservatives and Pressure Treatment Process for Timber
AASHTO M 180	Corrugated Sheet Steel Beams for Highway Guardrail

American Society for Testing and Material (ASTM)

ASTM A 36	Structural Steel
ASTM A 123	Zinc (Hot-Galvanized) Coatings on Products Fabricated from Rolled, Pressed and Forged Steel Shapes, Plates, Bars and Strip
ASTM A 153	Zinc Coating (Hot-Dip) on Iron and Steel Hardware
ASTM A 563	Carbon and Alloy Steel Nuts

1.03 QUALITY ASSURANCE

A. Guide rails and appurtenances may, at the option of the Engineer, be inspected at the place of manufacture.

B. Furnish certificate for each type material specified in 2.01, certifying that such material complies with the applicable specified requirements.

C. Guide rails and appurtenances will be visually inspected when delivered to the construction site. Any such material that does not meet requirements of this Section or is damaged, shall be removed from the construction site and replaced with satisfactory material.

D. All stages of installation will be inspected by the Engineer for compliance with the provisions hereof and conformance to required line and grade. Any failures to comply shall be immediately corrected to the satisfaction of the Engineer.

1.2 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 01300 SUBMITTAL PROCEDURES:

SD-09 Reports

Materials Certificate; GA

Furnish certificate of each material specified in paragraph 2.01 certifying conformance to the applicable material specification.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Steel Guide Rail and Terminal Sections

AASHTO M 180, CLASS B, TYPE 2, for W-Beam or Thrie Beam, as shown on the Contract Drawings.

B. Posts, Spacers, Plates, Rub Rail and Anchorage Units

ASTM A 36 of type and size shown on the Contract Drawings, galvanized in accordance with ASTM A 123. No punching, drilling, cutting or welding will be permitted after galvanizing. When shown on the Contract Drawings, provide rub rail.

C. Bolts and Nuts

Conform to AASHTO M 180.

D. Miscellaneous Hardware for End Treatments

When end treatments are shown on the Contract Drawings, conform to ASSHTO M 180 except as follows:

1. Guide rail end treatment cables shall conform to AASHTO M 30,Type 1 with Class A coating. Swaged fittings shall be fabricated from forged steel conforming to AASHTO M 102.

2. Nuts for guide rail end treatment shall conform to ASTM A 563, Grade A.

3. Plates and rods for guide rail end treatment shall be structural steel conforming to ASTM A 36 and galvanized in accordance with ASTM A 123.

E. Timber Posts for Breakaway Cable Terminals

Where shown on the Contract Drawings, provide timber posts having a stress grade of 1200 pounds per square inch or more as tested in accordance with requirements of West Coast Lumber Inspection Bureau, Southern Pine Inspection Bureau or other appropriate Timber Association. Posts may be rough sawn or dressed and shall be treated with a preservative conforming to ASSHTO M 133 with retention property of six pounds of creosote per cubic foot of timber, minimum.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Posts shall be set to the required depth. Posts shall be plumb, properly spaced and to the prescribed line and grade as shown on the Contract Drawings.

B. Prior to driving the posts or excavating for concrete footings, the exact location of underground utilities which may conflict with the posts shall be determined. Post spacing may be adjusted by six inches or double spacers may be used, as approved by the Engineer, to eliminate such conflicts.

C. Damaged to utilities due to the performance of the Work shall be located and repaired at no additional cost to the Authority.

D. The rail elements shall be erected with the top edge in a straight line or smooth curve, parallel or concentric to the roadway. Where a vertical transition is required, the top edge of rail elements shall form the chords of a smooth vertical curve. No punching, drilling, reaming, cutting or welding of the rail elements will be permitted in the field.

E. Where earth is of a type that cannot be drilled using a mechanical earth auger, obtain approval from the Engineer for an alternate method of installing posts.

F. If concrete footings are required, support posts at proper line and grade as shown on the Contract Drawings in such a manner so that they will not be displaced during concreting operations.

G. Use erectors trained by manufacturer.

H. Touch up all damage to the zinc coating with an approved type paint.

I. Paint portions of posts to be imbedded in concrete with two heavy coats of an approved bitumastic paint.

3.02 STAGING FOR INSTALLATION ADJACENT TO EXISTING ROADWAYS

Install W-beam and Thrie-beam guide rail in the following sequence:

A. Approach terminal end shall be the first section installed

B. Posts and rails shall be constructed in the direction of traffic.

C. At the end of a work period, all posts which have been installed shall have the rail elements attached.

D. New guide rail shall be installed prior to the removal of an existing system, if any, unless otherwise shown on the Contract Drawings.

END OF SECTION

SECTION 03307

CONCRETE FOR MINOR STRUCTURES

PART 1 GENERAL

1.1 REFERENCES

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

ACI INTERNATIONAL (ACI)

ACI 308	(1992) Standard Practice for Curing Concrete
ACI 318/318R	(1992) Building Code Requirements for Reinforced Concrete
ACI 318M/318RM	(1992) Building Code Requirements for Reinforced Concrete
ACI 347	(1989) Formwork for Concrete

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 185	(1990a) Steel Welded Wire Fabric, Plain, for Concrete Reinforcement
ASTM A 615/A 615M	(1994) Deformed and Plain Billet-Steel Bars for Concrete Reinforcement
ASTM C 31	(1991) Making and Curing Concrete Test Specimens in the Field
ASTM C 33	(1993) Concrete Aggregates
ASTM C 39	(1993a) Compressive Strength of Cylindrical Concrete Specimens
ASTM C 94	(1995) Ready-Mixed Concrete
ASTM C 143	(1990a) Slump of Portland Cement Concrete
ASTM C 150	(1995) Portland Cement
ASTM C 171	(1992) Sheet Materials for Curing Concrete
ASTM C 172	(1992) Sampling Freshly Mixed Concrete
ASTM C 231	(1991b) Air Content of Freshly Mixed Concrete by the Pressure Method
ASTM C 260	(1995) Air-Entraining Admixtures for Concrete
ASTM C 309	(1993) Liquid Membrane - Forming Compounds for Curing Concrete
ASTM C 494	(1992) Chemical Admixtures for Concrete

ASTM C 595	(1994) Blended Hydraulic Cements
ASTM C 618	(1994) Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Portland Cement Concrete
ASTM C 685	(1993a) Concrete Made by Volumetric Batching and Continuous Mixing
ASTM C 920	(1987) Elastomeric Joint Sealants
ASTM D 75	(1987; R 1992) Sampling Aggregates
ASTM D 98	(1993) Calcium Chloride
ASTM E 96	(1994) Water Vapor Transmission of Materials

ARMY CORPS OF ENGINEERS, WATERWAYS EXPERIMENT STATION (COE)

COE CRD-C 400	(1963) Water for Use in Mixing or Curing Concrete

1.2 DESIGN AND PERFORMANCE REQUIREMENTS

The Contractor holds the primary responsibility for all Quality Control testing necessary to meet design and performance requirements. In addition, the Government will maintain the option to sample and test joint sealer, joint filler material, waterstop, aggregates and concrete to determine compliance with the specifications. The Contractor shall provide facilities and labor as may be necessary to assist the Government in procurement of representative test samples. Samples of aggregates will be obtained at the point of batching in accordance with ASTM D 75. Concrete will be sampled in accordance with ASTM C 172. Slump and air content will be determined in accordance with ASTM C 143 and ASTM C 231, respectively, when cylinders are molded. Compression test specimens will be made, cured, and transported in accordance with ASTM C 31. Compression test specimens will be tested in accordance with ASTM C 39. Samples for strength tests will be taken not less than once each shift in which concrete is produced. A minimum of three specimens will be made from each sample; two will be tested at 28 days for acceptance, and one will be tested at 7 days for information.

1.2.1 Strength

Acceptance test results will be the average strengths of two specimens tested at 28 days. The strength of the concrete will be considered satisfactory so long as the average of three consecutive acceptance test results equal or exceed the specified compressive strength, f'c, and no individual acceptance test result falls below f'c by more than 500 psi.

1.2.2 Construction Tolerances

A Class "C" finish shall apply to all surfaces except those specified to receive a Class "D" finish. A Class "D" finish shall apply to all surfaces which will be permanently concealed after construction. The surface requirements for the classes of finish required shall be as specified in ACI 347.

1.2.3 Concrete Mixture Proportions

Concrete mixture proportions shall be the responsibility of the Contractor. Mixture proportions shall include the dry weights of cementitious material(s); the nominal maximum size of the coarse aggregate; the specific gravities, absorptions, and saturated surface-dry weights of fine and coarse aggregates; the quantities, types, and names of admixtures; and

quantity of water per cubic yard of concrete. All materials included in the mixture proportions shall be of the same type and from the same source as will be used on the project. Specified compressive strength f'c shall be 3,500 psi at 28 days . The maximum nominal size coarse aggregate shall be 3/4 inch, in accordance with ACI 318/318R. The air content shall be between 5 and 7 percent. The slump shall be between 2 and 4 inches. The maximum water cement ratio shall be 0.50.

1.3 SUBMITTALS

The Contractor shall be solely responsible for the conformance of the concrete material to the specification and for all quality control testing. The Governement has the option to perform additional check tests.

Government approval is required for all submittals with a "GA" design ation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01300 SUBMITTAL PROCEDURES:

SD-01 Data

Air-Entraining Admixture; FIO. Curing Materials; FIO. Reinforcing Steel; GA.

Manufacturer's literature is available from suppliers which demonstrates compliance with applicable specifications for the above materials.

Batching and Mixing Equipment; GA.

Batching and mixing equipment will be accepted on the basis of manufacturer's data which demonstrates compliance with the applicable specifications.

Conveying and Placing Concrete; GA.

The methods and equipment for transporting, handling, depositing, and consolidating the concrete shall be submitted prior to the first concrete placement.

SD-09 Reports

Aggregates; GA.

Aggregates will be accepted on the basis of certificates of compliance and test reports that show the material(s) meets the quality and grading requirements of the specifications under which it is furnished.

Concrete Mixture Proportions; GA.

Thirty days prior to placement of concrete, the contractor shall submit the mixture proportions that will produce concrete of the quality required. Applicable test reports shall be submitted to verify that the concrete mixture proportions selected will produce concrete of the quality specified.

SD-13 Certificates

Cementitious Materials; GA.

Certificates of compliance attesting that the concrete materials meet the requirements of the specifications shall be submitted in accordance with the Special Clause "CERTIFICATES OF COMPLIANCE". Cementitious material will be accepted on the basis of a manufacturer's certificate of compliance, accompanied by mill test reports that the material(s) meet the requirements of the specification under which it is furnished.

Aggregates; GA.

Aggregates will be accepted on the basis of certificates of compliance and tests reports that show the material(s) meet the quality and grading requirements of the specifications under which it is furnished.

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 Cementitious Materials

Cement shall be Portland cement and shall conform to appropriate specifications listed:

2.1.1.1 Portland Cement

ASTM C 150, Type II.

2.1.2 Aggregates

Aggregates shall meet the quality and grading requirements of ASTM C 33 Class Designations 4M or better.

2.1.3 Admixtures

Admixtures to be used, when required or approved, shall comply with the appropriate specification listed. Chemical admixtures that have been in storage at the project site for longer than 6 months or that have been subjected to freezing shall be retested at the expense of the contractor at the request of the Contracting Officer and shall be rejected if test results are not satisfactory.

2.1.3.1 Air-Entraining Admixture

ASTM C 260

2.1.4 Water

Water for mixing and curing shall be fresh, clean, potable, and free from injurious amounts of oil, acid, salt, or alkali, except that unpotable water may be used if it meets the requirements of COE CRD-C 400.

2.1.5 Reinforcing Steel

Reinforcing steel bar shall conform to the requirements of ASTM A 615/A 615M, Grade 60. Welded steel wire fabric shall conform to the requirements of ASTM A 185. Details of reinforcement not shown shall be in accordance with ACI 318/318R, Chapters 7 and 12.

2.1.6 Expansion Joint Filler Strips, Premolded

Premolded expansion joint filler strip shall be sponge rubber conforming to ASTM D 1752, Type I.

2.1.7 Waterstops

Waterstops shall conform to COE CRD-C 572.

2.1.8 Formwork

The design and engineering of the formwork as well as its construction, shall be the responsibility of the Contractor.

2.1.9 Form Coatings

Forms for exposed surfaces shall be coated with a nonstaining form oil,

which shall be applied shortly before concrete is placed.

2.1.10 Vapor Barrier

Vapor barrier shall be polyethylene sheeting with a minimum thickness of 6 mils or other equivalent material having a vapor permeance rating not exceeding 0.5 perms as determined in accordance with ASTM E 96.

2.1.11 Curing Materials

2.1.11.1 Impervious Sheet Materials

Impervious sheet materials, ASTM C 171, type optional, except polyethylene film, if used, shall be white opaque.

2.1.12.2 Admixtures

In cold weather, a non-chloride based accelerating admixture may be used subject to approval. Accelerating admixtures shall be non-corrosive, contain less than 0.2 percent chlorides, and conform to ASTM C 494, Type C.

2.1.13 JOINT TIES AND ANCHORS

Provide ties and anchors conforming to ASTM A 82. All ties and anchors shall be hot-dip galvanized per ASTM A 153, Class B-2.

PART 3 EXECUTION

3.1 PREPARATION

3.1.1 General

Construction joints shall be prepared to expose coarse aggregate, and the surface shall be clean, damp, and free of laitance. Ramps and walkways, as necessary, shall be constructed to allow safe and expeditious access for concrete and workmen. Snow, ice, standing or flowing water, loose particles, debris, and foreign matter shall have been removed. Earth foundations shall be satisfactorily compacted. Spare vibrators shall be available. The entire preparation shall be accepted by the Government prior to placing.

3.1.2 Embedded Items

Reinforcement shall be secured in place; joints, anchors, and other embedded items shall have been positioned. Internal ties shall be arranged so that when the forms are removed all metal will be not less than 2 inches from concrete surfaces permanently exposed to view or exposed to water on the finished structures. Embedded items shall be free of oil and other foreign matters such as loose coatings or rust, paint, and scale. The embedding of wood in concrete will be permitted only when specifically authorized or directed. All equipment needed to place, consolidate, protect, and cure the concrete shall be at the placement site and in good operating condition.

3.1.3 Formwork Installation

Forms shall be properly aligned, adequately supported, and mortar-tight. The form surfaces shall be smooth and free from irregularities, dents, sags, or holes when used for permanently exposed faces. All exposed joints and edges shall be chamfered, unless otherwise indicated.

3.1.4 Vapor Barrier Installation

Vapor barriers shall be applied over gravel fill. Edges shall be lapped not less than 6 inches. All joints shall be sealed with pressure-sensitive adhesive not less than 2 inches wide. The vapor barrier shall be protected

at all times to prevent injury or displacement prior to and during concrete placement.

3.1.5 Production of Concrete

3.1.5.1 Ready-Mixed Concrete

Ready-mixed concrete shall conform to ASTM C 94 except as otherwise specified.

3.1.5.2 Concrete Made by Volumetric Batching and Continuous Mixing

Concrete made by volumetric batching and continuous mixing shall conform to ASTM C 685.

3.1.5.3 Batching and Mixing Equipment

The contractor shall have the option of using an on-site batching and mixing facility. The facility shall provide sufficient capacity to prevent cold joints. The method of measuring materials, batching operation, and mixer shall be submitted for review. On-site plant shall conform to the requirements of either ASTM C 94 or ASTM C 685.

3.1.6 Equipment and Accessories

3.1.6.1 Waterstops

Waterstops shall be installed and spliced as directed by the manufacturer.

3.2 CONVEYING AND PLACING CONCRETE

3.2.1 General

Concrete placement shall not be permitted when weather conditions prevent proper placement and consolidation without approval. When concrete is mixed and/or transported by a truck mixer, the concrete shall be delivered to the site of the work and discharge shall be completed within 1-1/2 hours or 45 minutes when the placing temperature is 85 degrees F or greater unless a retarding admixture is used. Concrete shall be conveyed from the mixer to the forms as rapidly as practicable by methods which prevent segregation or loss of ingredients. Concrete shall be in place and consolidated within 15 minutes after discharge from the mixer. Concrete shall be deposited as close as possible to its final position in the forms and be so regulated that it may be effectively consolidated in horizontal layers 18 inches or less in thickness with a minimum of lateral movement. The placement shall be carried on at such a rate that the formation of cold joints will be prevented.

3.2.2 Consolidation

Each layer of concrete shall be consolidated by rodding, spading, or internal vibrating equipment. External vibrating equipment may be used when authorized. Internal vibration shall be systematically accomplished by inserting the vibrator through the fresh concrete in the layer below at a uniform spacing over the entire area of placement. The distance between insertions shall be approximately 1.5 times the radius of action of the vibrator and overlay the adjacent, just vibrated area by a few inches. The vibrator shall penetrate rapidly to the bottom of the layer and at least6 inches into the layer below, if such a layer exists. It shall be held stationary until the concrete is consolidated and then withdrawn slowly at the rate of about 3 inches per second.

3.2.3 Cold-Weather Requirements

No concrete placement shall be made when the ambient temperature is below 35 degrees F or if the ambient temperature is below 40 degrees F and

falling. Suitable cover ing and other means as approved shall be provided for maintaining the concrete at a temperature of at least 50 degrees F for not less than 72 hours after placing and at a temperature above freezing for the remainder of the curing period. Salt, chemicals, or other foreign materials shall not be mixed with the concrete to prevent freezing. Any concrete damaged by freezing shall be removed and replaced at the expense of the contractor.

3.2.4 Hot-Weather Requirements

When the rate of evaporation of surface moisture, as determined by use of Figure 1 of ACI 308, is expected to exceed 0.2 pound per square foot per hour, provisions for windbreaks, shading, fog spraying, or covering with a light-colored material shall be made in advance of placement, and such protective measures shall be taken as quickly as finishing operations will allow.

3.3 FORM REMOVAL

Forms shall not be removed before the expiration of 72 hours after concrete placement except where otherwise specifically authorized. Supporting forms and shoring shall not be removed until the concrete has cured for at least 5 days. When conditions on the work are such as to justify the requirement, forms will be required to remain in place for longer periods.

3.4 FINISHING

3.4.1 General

No finishing or repair will be done when either the concrete or the ambient temperature is below 50 degrees F.

3.4.2 Finishing Formed Surfaces

All fins and loose materials shall be removed, and surface defects including tie holes shall be filled. All honeycomb areas and other defects shall be repaired. All unsound concrete shall be removed from areas to be repaired. Surface defects greater than 1/2 inch in diameter and holes left by removal of tie rods in all surfaces not to receive additional concrete shall be reamed or chipped and filled with dry-pack mortar. The prepared area shall be brush-coated with an approved epoxy resin or latex bonding compound or with a neat cement grout after dampening and filled with mortar or concrete. The cement used in mortar or concrete for repairs to all surfaces permanently exposed to view shall be a blend of portland cement and white cement so that the final color when cured will be the same as adjacent concrete.

3.4.3 Finishing Unformed Surfaces

All unformed surfaces that are not to be covered by additional concrete or backfill shall be float finished to elevations shown, unless otherwise specified. Surfaces to receive additional concrete or backfill shall be brought to the elevations shown and left as a true and regular surface. Exterior surfaces shall be sloped for drainage unless otherwise shown. Joints shall be carefully made with a jointing tool. Unformed surfaces shall be finished to a tolerance of 3/8 inch for a float finish determined by a 10 foot straightedge placed on surfaces shown on the plans to be level or having a constant slope. Finishing shall not be performed while there is excess moisture or bleeding water on the surface. No water or cement shall be added to the surface during finishing.

3.5 CURING AND PROTECTION

Beginning immediately after placement and continuing for at least 7 days, all concrete shall be cured and protected from premature drying, extremes in temperature, rapid temperature change, freezing, mechanical damage, and

exposure to rain or flowing water. All materials and equipment needed for adequate curing and protection shall be available and at the site of the placement prior to the start of concrete placement. Preservation of moisture for concrete surfaces not in contact with forms shall be accomplished by one of the following methods:

a. Continuous sprinkling or ponding.

b. Application of absorptive mats or fabrics kept continuously wet.

c. Application of sand kept continuously wet.

d. Application of impervious sheet material conforming to ASTM C 171.

e. Application of membrane-forming curing compound conforming to ASTM C 309, Type 1-D, on surfaces permanently exposed to view and Type 2 on other surfaces shall be accomplished in accordance with manufacturer's instructions.

The preservation of moisture for concrete surfaces placed against wooden forms shall be accomplished by keeping the forms continuously wet for 7 day. If forms are removed prior to end of the required curing period, other curing methods shall be used for the balance of the curing period. During the period of protection removal, the temperature of the air in contact with the concrete shall not be allowed to drop more than 25 degrees F within a 24 hour period.

3.6 TESTS AND INSPECTIONS

3.6.1 General

The individuals who sample and test concrete as required in this specification shall have demonstrated a knowledge and ability to perform the necessary test procedures equivalent to the ACI minimum guidelines for certification of Concrete Field Testing Technicians, Grade I.

3.6.2 Inspection Details and Frequency of Testing

3.6.2.1 Preparations for Placing

Foundation or construction joints, forms, and embedded items shall be inspected in sufficient time prior to each concrete placement by the Contractor to certify that it is ready to receive concrete.

3.6.2.2 Air Content

Air content shall be checked at least once during each shift that concrete is placed. Samples shall be obtained in accordance with ASTM C 172and tested in accordance with ASTM C 231.

3.6.2.3 Slump

Slump shall be checked once during each shift that concrete is produced. Samples shall be obtained in accordance with ASTM C 172 and tested in accordance with ASTM C 143.

3.6.2.4 Consolidation and Protection

The Contractor shall ensure that the concrete is properly consolidated, finished, protected, and cured.

3.6.3 Action Required

3.6.3.1 Placing

The placing foreman shall not permit placing to begin until he has verified

that an adequate number of acceptable vibrators, which are in working order and have competent operators, are available. Placing shall not be continued if any pile is inadequately consolidated.

3.6.3.2 Air Content

Whenever a test result is outside the specification limits, the concrete shall not be delivered to the forms and an adjustment shall be made to the dosage of the air-entrainment admixture.

3.6.3.3 Slump

Whenever a test result is outside the specification limits, the concrete shall not be delivered to the forms and an adjustment should be made in the batch weights of water and fine aggregate. The adjustments are to be made so that the water-cement ratio does not exceed that specified in the submitted concrete mixture proportion.

3.6.4 Reports

The results of all tests and inspections conducted at the project site shall be reported informally at the end of each shift and in writing weekly and shall be delivered within 3 days after the end of each weekly reporting period. See Section 01451 CONTRACTOR QUALITY CONTROL.

-- End of Section --

SECTION 16528

EXTERIOR LIGHTING

PART 1 GENERAL

1.1 REFERENCES

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

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI C2	(1996) National Electrical Safety Code
ANSI C78.1	(1991; C78.1a) Rapid-Start Types - Dimensional and Electrical Characteristics
ANSI C78.1350	(1990) 400-Watt, 100-Volt, S51 Single-Ended High-Pressure Sodium Lamps
ANSI C78.1351	(1989) 250-Watt, 100-Volt S50 Single-Ended High-Pressure Sodium Lamps
ANSI C78.1355	(1989) 150-Watt, 55-Volt S55 High-Pressure Sodium Lamps
ANSI C80.1	(1990) Rigid Steel Conduit - Zinc Coated
ANSI C82.4	(1992) Ballasts for High-Intensity-Discharge and Low-Pressure Sodium Lamps (Multiple-Supply Type)
ANSI C119.1	(1986) Sealed Insulated Underground Connector Systems Rated 600 Volts
ANSI C136.2	(1985) Luminaires Voltage Classification
ANSI C136.9	(1990) Socket Support Assemblies for Metal Heads
ANSI C136.10	(1988) Locking-type Photo control Devices and Mating Receptacles - Physical and Electrical Interchangeability and Testing for Roadway Lighting Equipment
ANSI C136.15	(1986) High-Intensity-Discharge Lamps in Luminaires - Field Identification

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 123	(1989a) Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
ASTM A 153	(1982; R 1987) Zinc Coating (Hot-Dip) on Iron and Steel Hardware
ASTM B 2	(1988) Medium-Hard-Drawn Copper Wire
ASTM B 8	(1993) Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft

ILLUMINATING ENGINEERING SOCIETY OF NORTH AMERICA (IESNA)

RP-20-85	Lighting for Parking Facilities

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)

IEEE C62.41	(1991) Surge Voltages in Low-Voltage AC Power Circuits
IEEE Std 81	(1983) Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Ground System

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

NEMA 250	(1991) Enclosures for Electrical Equipment (1000 Volts Maximum)
NEMA OS 1	(1989) Sheet-Steel Outlet Boxes, Device Boxes, Covers, and Box Supports
NEMA OS 2	(1986; Errata Aug 1986; R 1991) Nonmetallic Outlet Boxes, Device Boxes, Covers and Box Supports
NEMA TC 6	(1990) PVC and ABS Plastic Utilities Duct for Underground Installation
NEMA TC 9	(1990) Fittings for ABS and PVC Plastic Utilities Duct for Underground Installation

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 70	(1993) National Electrical Code

UNDERWRITERS LABORATORIES (UL)

UL 6	(1993) Rigid Galvanized Steel
UL 467	(1993) Grounding and Bonding Equipment
UL 486A	(1991; Rev Oct 1991) Wire Connectors and Soldering Lugs for Use with Copper Conductors
UL 514A	(1991) Metallic Outlet Boxes
UL 514B	(1992; Rev thru Apr 1995) Fittings for Conduit and Outlet Boxes
UL 514C	(1988; Rev Apr 1995) Nonmetallic Outlet Boxes, Flush-Device Boxes, and Covers
UL 651	(1989; Rev thru Dec 1989) Schedule 40 and 80 Rigid PVC Conduit
UL 651A	(1989; Rev thru Dec 1989) Type EB and A Rigid PVC Conduit and HDPE Conduit
UL 1029	(1994) High-Intensity-Discharge Lamp Ballasts

UL 1449	(1985; Errata Apr 1986) Transient Voltage Surge Suppressors
UL 1572	(1991; Rev thru Jul 1994) High Intensity Discharge Lighting Fixtures

1.2 SYSTEM DESCRIPTION

1.2.1 Lighting System

The lighting system shall be configured as specified and shown. The system shall include all fixtures, hardware, poles, cables, connectors, adapters and appurtenances needed to provide a fully functional lighting system.

1.2.2 General Material Requirements

The following materials shall be supplied for the lighting improvements. This list reflects the general material requirements detailed below, but does not necessarily represent the entire and complete material requirements to be supplied by the Contractor for completion of all lighting improvements as specified in the Contract documents.

1. 400W HPS, 208V Parking / Roadway 16"sq. Type III lighting fixture. Supplied with 0-15° tilting means and hardware for 6"sq. steel pole top mounting
Ruud cat.# PR...540M; Cooper Lighting HPRY-GL-3-400MT 208V) or equal

2. 150W HPS, 208V Parking/Roadway 12"sq Type II lighting fixture, supplied with hardware for 6" wooden pole top mounting and 3/4" conduit connection for wiring.
Cooper Lighting HPRY-AL-2-150MT, 208V, Ruud cat.# MPR...515, or equal

3. 6"sq x 30' steel pole, bronze finish suitable for 80 MPH wind velocity, supplied complete with oversized 3" x 8" minimum hand hole, cover, internal ground lug, base cover, base template and anchor bolts.
Cooper Lighting Ruud cat.# PS6S308..BZ, or equal

4. Hand hole covers for item 3 above, supplied with 120V GFCI duplex receptacles and cover with locking feature.
Ruud cat.# REC-GFIBZ, or equal

5. 15A, 120V external photocell

6. 15A, 208V external photo cell

7. Terminal box "A", 16" x 14" x 6" NEMA type 3R min, supplied with conduit hubs, terminals and breakers mounted on DIN rail, per Detail E10 Tag: Box "A"

8. Pole base DIN rail mounted terminal and fuse or breaker strip

9. Lighting control contactor box "CP1" assembled For Lots "C" and "E"

10. Lighting control contactor box "CP2" assembled For Lot "F"

11. Breaker panel, 125A, 208V, Bus and main lugs, 3-phase, 4-wire, NEMA 3R supplied complete with:
1 - 70A, 3-pole breaker 22,000AIC Sq-D #QO 370VH. Tag: Lighting & receptacles
1 - 50A, 3-pole breaker 22,000AIC Sq-D #QO 350VH. Tag: Construction power
1 - 15A, 2-pole breaker 22,000AIC Sq-D #QO 215VH. Tag: Pole light
2 - 2" conduit hubs on bottom, and 1 - 2" & 1 - 3/4" conduit hubs

on top
Sq-D class 1130 #QO312L125GRB

12. 15A, 2-pole, 208V, UL1077/TEC 947.2, circuit breaker DIN rail mounted
Sq-D Class 860 #MG 17436; Altech type V-EA #2B16; Bussmann dual fuse disconnect #CHCC2I

13. 20A, 1-pole, 120V, UL1077/TEC 947.2, circuit breaker DIN rail mounted
Sq-D Class 860 #MG 24119; Altech type V-EA #1B20; Bussmann fuse disconnect #CHCC1I

14. DIN rail mounted #12 - #4 power terminal blocks
Sq-D Class 9080 #M16/12G or #GC6; Altech type RK 16

15. DIN rail mounted #18 - #12 terminal blocks
Sq-D class 9080 #M4/6B; Altech type RK2.5 or RK 2.5-4

16. 40A, 208V, 3-pole circuit breaker DIN rail mounted
Sq-D class 860 #MG 24152; Altech type 3B40

17. 20A, 208V, 3-pole circuit breaker DIN rail mounted
Sq-D class 860 #MG 24149; Altech type 3B20

18. 40A, 208V, 3-pole contactor 120Vac coil DIN rail mounted
Sq-D D- line #LC1D411

19. 20A, 208V, 3-pole contactor 120Vac coil, DIN rail mounted
Sq-D D- line #LC1D2510

20. Hand-Off-Auto 2-pole, 3 position, Key operated selector switch, NEMA 4 similar to Sq-D class 9001 #KN160SP

21. Slotted DIN rail. 1 Lot

22. Auxiliary relay 3 PDT, 120Vac coil supplied with DIN rail mounting socket Tag: R1
Sq-D #KU13M1P14-120

23. 3/4" x 10' minimum copperweld groundrod supplied with 3' #6 copper pigtail.

24. Terminal box 16"x14"x6" NEMA 4 supplied with 2 - 2" conduit hubs on bottom and 1 - 3/4" conduit hub on top and pad locking feature
Hoffmann #A-164CHS

25. Terminal box 20"x16"x6" NEMA 4 Supplied complete with pad locking feature and 3 - 2" conduit hubs on bottom
Hoffmann cat # C-SD20166

26 3-pole, 208V, 25A GFCI breaker DIN rail mounted
Altech type F122.03

27. 3/4" rigid galvanized steel conduit (RGS) and fittings

28. 2" rigid galvanized steel conduit (RGS) and fittings

29. 2" PVC Sch. 80 conduit, fittings

30. #4 600V copper wire, color coded THW, or THWN

31. #6 600V copper wire, color coded THW, or THWN

32. #8 600 V copper wire, color coded THW, or THWN

33. #12 copper fixture wire, color coded

34. 2" PVC to GRS couplings

35. 2" C weather head for 4 #4 wires

36. 15A, 120V, 1-pole UL1077/IEC 947-2 DIN rail mounted circuitbreaker Sq-D class 860 #MG17406 Altech type #1B16

37. 20A, 120V, GFCI, Duplex receptacle in wietherproof box, supplied with weatherproof cover.

1.2.3 Electrical Requirements

The equipment shall operate from a voltage source as shown, plus or minus 10 percent, and 60 Hz, plus or minus 2 percent.

1.2.4 Interface Between Lighting System and Power Distribution

Conductors from the load side of the primary and secondary power panels that serve lighting equipment shall be as indicated on wiring diagrams and noted on material list.

1.2.5 Nameplates

Each major component of equipment shall have a nonferrous metal or engraved plastic nameplate which shall show, as a minimum, the manufacturer's name and address, the catalog or style number, the electrical rating in volts, and the capacity in amperes or watts.

1.2.6 Standard Products

Materials and equipment shall be standard products of manufacturer regularly engaged in the manufacture of such products. Items of equipment shall essentially duplicate equipment that has been in satisfactory use at least 2 years prior to bid opening.

1.3 CORROSION PROTECTION

1.3.1 Aluminum Materials

Aluminum shall not be used in contact with earth or concrete. Aluminum conductors shall not be used.

1.3.2 Ferrous Metal Materials

1.3.2.1 Hardware

Ferrous metal hardware shall be hot-dip galvanized in accordance with ASTM A 153 and ASTM A 123.

1.3.3 Finishing

Painting required for surfaces not otherwise specified and finish painting of items only primed at the factory, shall be as specified herein.

1.4 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 01300 SUBMITTAL PROCEDURES:

SD-01 Data

Equipment and Materials; GA.

Data published by the manufacturer of each item on the list of equipment and material, to permit verification that the item proposed is of the correct size, properly rated or applied, or is otherwise suitable for the application and fully conforms to the requirements specified.

SD-04 Drawings

Lighting System; GA.

Detail drawings for the complete system and for poles, lighting fixtures, cable boxes, handholes, controllers and convenience outlets. Data shall include:

a. Lamp strike and restrike times.

b. System startup and shutdown operations.

c. A typical zone layout showing light locations, isolux patterns, and lighting ratios.

SD-09 Reports

Ground Resistance Measurements; GA.

The measured resistance to ground of each separate grounding installation, indicating the location of the rods, the resistance of the soil in ohms per millimeter and the soil conditions at the time the measurements were made. The information shall be in writing.

PART 2 PRODUCTS

2.1 STANDARD PRODUCT

Material and equipment shall be the standard product of a manufacturer regularly engaged in the manufacture of the product and shall essentially duplicate items that have been in satisfactory use for at least 2 years prior to bid opening. Items of the same classification shall be identical including equipment, assemblies, parts, and components.

2.2 BRACKET ARMS

2.2.1 Floodlight Brackets

Floodlight brackets shall be coordinated with the floodlight support provided.

2.3 CABLE

The Contractor shall provide all wire and cable not indicated as government furnished equipment. Wire and cable components shall be able to withstand the jobsite environment for a minimum of 20 years.

2.3.1 Insulated Cable

Cable shall be copper conductors and type THW, THWN or XHHW insulation conforming to UL 44, and shall include green ground conductor. Cable shall be provided with insulation of a thickness not less than that given in column [A] [B] of TABLE 15.1 of UL 854. Cable shall be rated 600 volts. Parts of the cable system such as splices and terminations shall be rated not less than 600 volts. The size and number of conductors and the number of cables shall be as indicated. Conductors No. 8 AWG and larger shall be

stranded.

2.3.2 Bare Copper Conductors for Grounding Only

Medium-hard-drawn copper conductors shall conform to ASTM B 2 and ASTM B 8.

2.4 CABLE SPLICES AND CONNECTORS

Cable splices and connectors shall conform to UL 486A. Underground splices shall not be used.

2.5 CONDUIT, DUCTS AND FITTINGS

2.5.1 Conduit, Rigid Steel

Rigid steel conduit shall conform to ANSI C80.1 and UL 6.

2.5.2 Conduit Coatings

Underground metallic conduit and fittings shall be coated with a plastic resin system conforming to NEMA RN 1, Type 40. Epoxy systems may also be used.

2.5.3 Conduit Fittings and Outlets

2.5.3.1 Boxes, Metallic Outlets

NEMA OS 1 and UL 514A.

2.5.3.2 Boxes, Nonmetallic, Outlet and Flush-Device Boxes and Covers

NEMA OS 2 and UL 514C.

2.5.3.3 Boxes, Switch (Enclosed), Surface Mounted

UL 98.

2.5.3.4 Fittings for Conduit and Outlet Boxes

UL 514B.

2.5.3.5 Fittings, PVC, for Use with Rigid PVC Conduit and Tubing

UL 514B.

2.6 GROUND RODS

Ground rods shall be of copper clad steel conforming to UL 467 not less than 3/4 inch in diameter by 10 feet in length of the sectional type driven full length into earth.

2.7 POLES

Metal poles shall be the pole manufacturer's standard design for supporting the number of fixtures indicated. Poles shall be designed for a wind velocity of 80 mph at the base of the pole, for a wind gust factor of 1.3, and for the height and drag factors recommended by AASHTO LTS-2. The effective projected area of luminaires and other pole-mounted devices shall be taken into account in pole design. Poles shall have grounding provisions. The type of pole shaft material provided shall not be mixed on any project. Grounding connection shall be provided near the bottom of each metal pole. Scratched, stained, chipped, or dented poles shall not be installed.

2.7.1 Steel Poles

Steel poles and accessories shall have DeltaGuard bronze finish. Pole shafts shall be one piece. Poles shall be welded construction with no bolts, rivets, or other means of fastening except as specifically approved. Pole markings shall be approximately 3 to 4 feet above grade and shall include manufacturer, year of manufacture, top and bottom diameters, length, and a loading tree. Attachment requirements shall be provided as indicated, including grounding provisions. Climbing facilities are not required. Bases shall be of the anchor bolt-mounted type.

2.7.2 Wood Poles

Existing wooden pole shall be relocated from Lots and used on access ways.

2.7.3 Anchor Bolts

Anchor bolts shall be the pole manufacturer's standard, but not less than necessary to meet the pole wind and ice loading, herein and other specified design requirements.

2.8 ELECTRICAL ENCLOSURES

The Contractor shall provide metallic enclosures as needed to house the lighting equipment. Enclosures shall conform to NEMA ICS 6 and NEMA 250. Enclosures shall be provided with lockable or padlock handles. The enclosures shall be as specified or as shown on the drawings.

2.8.1 Exposed-to-Weather Enclosures

Enclosures to house lighting equipment in an outdoor environment shall meet the requirements of a NEMA 3R and 4 weatherproof enclosure as defined in NEMA 250.

2.9 ILLUMINATION

2.9.1 General Lighting

Luminaires, ballasts, lamps, and control devices required for general area floodlighting shall be in accordance with sheet 51 of Standard Detail No. 40-06-04, attached to these specifications.

2.10 LAMPS AND BALLASTS, HIGH INTENSITY DISCHARGE (HID) SOURCES

2.10.1 High-Pressure Sodium

Lamps shall conform to ANSI C78.1350, ANSI C78.1351 or ANSI C78.1355. Ballasts shall conform to ANSI C82.4, or UL 1029. High-pressure sodium lamps shall be clear.

2.11 LUMINAIRE COMPONENTS

Luminaire components shall conform to the following: attachments, ANSI C136.3; voltage classification, ANSI C136.2; field identification marking, ANSI C136.15; interchangeability, ANSI C136.6 and ANSI C136.9; and sockets, ANSI C136.11.

2.12 LIGHTING CONTROL EQUIPMENT

2.12.1 Photo-Control Devices

Photo-control devices shall conform to ANSI C136.10. Each photo-control element shall be a replaceable, weatherproof assembly adjustable operation range of approximately 0.5 to 5.0 foot-candles.

2.12.2 Magnetic Contactor

Magnetic contactors shall be electrically operated and held, and shall

conform to NEMA ICS 1 and NEMA ICS 2. The contactor shall be suitable for 208 volts, three phase, 60 Hz. Coil voltage shall be 120 volts. Maximum continuous ampere rating and number of poles shall be as indicated on drawings. Enclosures for contactors shall be NEMA 3R or 4. Each contactor shall be provided with a spare, normally open auxiliary contact. Terminal lugs shall be coordinated with the wire size.

2.13 PHOTOMETRIC DISTRIBUTION CLASSIFICATION

Photometrics shall conform to IESNA ARP-8.

2.14 LUMINAIRES, FLOODLIGHTING

2.14.1 HID and Incandescent

HID lighting fixtures shall conform to UL 1572.

2.15 FIXTURES

Standard fixtures shall be as detailed on Standard Detail No. 40-06-04, Sheet Nos. 51 which accompany and form a part of this specification. Special fixtures shall be as indicated on the drawings. Illustrations shown on these sheets or on the drawings are indicative of the general type desired and are not intended to restrict selection to fixtures of any particular manufacturer. Fixtures of similar design, equivalent light distribution and brightness characteristics, equal finish and quality will be acceptable as approved.

2.15.1 Accessories

Accessories such as straps, mounting plates, nipples, or brackets shall be provided for proper installation.

2.15.2 In-Line Fuse

An in-line 2-pole circuit breaker shall be provided for each fixture mounted on a DIN rail.

PART 3 EXECUTION

3.1 GENERAL

The Contractor shall install all system components, including government furnished equipment, and appurtenances in accordance with the manufacturer's instructions, ANSI C2, and contract documents, and shall furnish necessary hardware, fixtures, cables, wire, connectors, interconnections, services, and adjustments required for a complete and operable system.

3.1.1 Current Site Conditions

The Contractor shall verify that site conditions are in agreement with the design package. The Contractor shall report all changes to the site or conditions that will affect performance of the system to the Government. The Contractor shall not take any corrective action without written permission from the Government.

3.1.2 Existing Equipment

The Contractor shall connect to and utilize existing lighting equipment and devices as shown. Lighting equipment that is usable in their original configuration without modification may be reused with Government approval. The Contractor shall perform a field survey, including testing and inspection of existing lighting equipment and power lines intended to be incorporated into the lighting system, and furnish a report to the Government. For those items considered nonfunctioning, specification

sheets, or written functional requirements to support the findings and the estimated cost to correct the deficiency shall be provided with the report. As part of the report, the Contractor shall include the scheduled need date for connection to all existing equipment. The Contractor shall make written requests and obtain approval prior to disconnecting any power lines and equipment, and creating equipment downtime. Such work shall proceed only after receiving Government approval of these requests. If any device fails after the Contractor has commenced work on that device, the Contractor shall diagnose the failure and perform any necessary corrections to the equipment. The Government is responsible for maintenance and repair of Government equipment. The Contractor shall be held responsible for repair costs due to Contractor negligence or abuse of Government equipment.

3.2 ENCLOSURE PENETRATIONS

Enclosure penetrations shall be from the bottom unless the system design requires penetrations from other directions. Penetrations of interior enclosures involving transitions of conduit from interior to exterior, and penetrations on exterior enclosures shall be sealed with rubber silicone sealant to preclude the entry of water. The conduit riser shall terminate in a hot-dipped galvanized metal cable terminator. The terminator shall be filled with an approved sealant as recommended by the cable manufacturer, and in such a manner that the cable is not damaged.

3.3 PREVENTION OF CORROSION

3.3.1 Steel Conduits

Steel conduits shall not be installed within concrete slabs-on-grade. Steel conduits installed underground or under slabs-on-grade, or penetrating slabs-on-grade, shall be field wrapped with 0.010 inch thick pipe-wrapping plastic tape applied with a 50 percent overlap, or shall have a factory-applied plastic resin, epoxy coating.

3.3.2 Cold Galvanizing

Field welds and/or brazing on factory galvanized boxes, enclosures, conduits, etc. shall be coated with a cold galvanized paint containing at least 95 percent zinc by weight.

3.4 CABLE INSTALLATION

Cable and all parts of the cable system such as splices and terminations shall be rated not less than 600 volts. The size and number of conductors and the number of cables shall be as indicated. Conductors No. 8 AWG and larger shall be stranded. Each circuit shall be identified by means of fiber or nonferrous metal tags, or approved equal, in each handhole and junction box, and at each terminal.

3.4.1 Splices

Splices above grade shall be made on power blocks as noted on the respective details.

3.4.2 Installation in PVC Conduits

Ground and neutral conductors shall be installed with the associated phase conductors. Cable splices shall be made in handholes only.

3.5 PVC CONDUITS SCHEDULE 80

3.5.1 Requirements

Numbers and size of conduits shall be as indicated. Short radius manufactured 90 degree conduit bends may be used only for pole or equipment risers, unless specifically indicated as acceptable. The minimum

manufactured bend radius shall be for conduits of less than in diameter Otherwise, long sweep bends having a minimum radius of 25 feet shall be used for a change of direction of more than 5 degrees, either horizontally or vertically. Both curved and straight sections may be used to form long sweep bends, but the maximum curve used shall be 30 degrees and manufactured bends shall be used.

3.5.2 Treatment

Conduits shall be kept clean of concrete, dirt, or foreign substances during construction. Field cuts requiring tapers shall be made with proper tools and shall match factory tapers. A coupling recommended by the conduit manufacturer shall be used when an existing conduit is connected to a conduit of different material or shape. Conduits shall be stored to avoid warping and deterioration with ends sufficiently plugged to prevent entry of any water or solid substances. Conduits shall be thoroughly cleaned before being laid. Plastic conduits shall be stored on a flat surface and protected from the direct rays of the sun.

3.5.3 Nonencased Direct-Burial

Top of conduit lines shall be 24 inches below finished grade and shall be installed with a minimum of 3 inches of earth around each conduit. Bottom of trenches shall be smooth and free of stones, soft spots, and sharp objects. Where bottoms of trenches comprise materials other than sand, a 3 inch layer of sand shall be laid first and compacted to approximate densities of surrounding firm soil before installing ducts. The first 6 inch layer of backfill cover shall be sand compacted as previously specified. The rest of the excavation shall be backfilled and compacted in 3 to 6 inch layers.

3.5.4 Installation of Couplings

Joints in each type of conduit shall be made up in accordance with the manufacturer's recommendation for the particular type of conduit and coupling selected and as approved.

3.5.4.1 Plastic PVC Conduits

Conduit joints shall be made by brushing a plastic solvent on insides of plastic coupling fittings and on outsides of duct ends. Each duct and fitting shall then be slipped together with a quick 1/4 turn to set the joint tightly.

3.5.5 Conduit Run Markers

Conduit run markers shall be provided at the ends of long conduit line stubouts or for other conduit locations that are indeterminate because of conduit curvature or terminations. In addition to markers, a 5 mil brightly colored plastic tape, not less than 3 inches in width and suitably inscribed at not more than 10 feet on centers with a continuous metallic backing and a corrosion-resistant 1 mil metallic foil core to permit easy location of the conduit run, shall be placed approximately 12 inches below finished grade levels of such lines.

3.6 POLE INSTALLATION

Pole lengths shall provide a luminaire mounting height of 30 feet. Electrical cabling shall be provided to the light pole as specified in Section 3.4. The mount interfaces shall have ac power connected, and the pole wiring harness shall be connected to the luminaire.

3.6.1 Pole Brackets

Brackets shall be installed as specified by the manufacturer and as shown on drawings. Mounting hardware shall be sized appropriately to secure the

mount, luminaire, and housing with wind and ice loading normally encountered at the site. Pole brackets for floodlights shall have the number of tenons indicated. Where indicated on drawings, adjustable heads shall be installed on the brackets to position the luminaires. Identical brackets shall be used with one type of luminaire.

3.6.2 Concrete Foundations

Concrete foundations shall have anchor bolts accurately set in the foundation using a template supplied by the pole manufacturer. Once the concrete has cured, the pole shall be set on the foundation, leveled on the foundation bolts, and secured with the holding nuts. The space between the foundation and the pole base shall be grouted. Concrete and grout work shall conform to Section 03300 CONCRETE FOR BUILDING CONSTRUCTION. Concrete shall be 3000 psi at 28 days.

3.6.3 Rigid Steel Conduit Ells

Rigid steel conduit ells shall be provided for all wood poles, where required. Rigid steel conduit shall be connected to the ells and shall extend to a minimum height of 10 feet above grade. Conduit ells shall be provided where specified or indicated on drawings.

3.6.4 Relocated Wood Pole Installation

In general, relocated pole installation shall conform to existing adjacent pole installation. Hole excavation for the relocated wood poles shall be pre-augered as specified on the Contract Drawings and in Section 02222 for excavation. Wood poles shall be set straight and firm. In normal firm ground, minimum pole-setting depths shall be as listed in Table I, and specified on the Contract Drawings. In rocky or swampy ground, pole-setting depths shall be decreased or increased respectively in accordance with the local utility's published standards and as approved. Poles in straight runs shall be in a straight line. Curved poles shall be placed with curvatures in the direction of the pole line. Poles shall be set to maintain as even a grade as practicable. When the average ground run is level, consecutive poles shall not vary more than 5 feet in height. When the ground is uneven, poles differing in length shall be kept to minimum by locating poles to avoid the highest and lowest ground points. If it becomes necessary to shorten a pole, a piece shall be sawed off the top end and roofed. If any pole is shortened after treatment, the shortened end of the pole shall be given an application of hot preservative. Where poles are set on hilly terrain, along edges of cuts or embankments, or where soil may be washed out, special precautions shall be taken to ensure durable pole foundations, and the setting depth shall be measured from the lower side of the pole. Holes shall be dug large enough to permit proper use of tampers to the full depth of a hole. Concrete (3000 psi) shall be placed into a hole around the wood pole. Surplus earth shall be placed around a pole in a cone and packed tightly to drain water from poles.

TABLE I - MINIMUM POLE-SETTING DEPTH

(Feet and Inches)

Length Overall Feet	Straight Lines	Curves, Corners, and Points of Extra Strain
20	5-0	5-0
25	5-6	5-6
30	5-6	5-6

TABLE I - MINIMUM POLE-SETTING DEPTH

(Feet and Inches)

Length Overall Feet	Straight Lines	Curves, Corners, and Points of Extra Strain
35	6-0	6-0
40	6-0	6-6
45	6-6	7-0
50	7-0	7-6
55	7-6	8-0
60	8-0	8-6

3.6.5 Steel Pole Installation

Steel poles shall be mounted on cast-in-place foundations with a single timber pile as specified in Section 03300. Conduit elbows shall be provided for cable entrances into pole interiors.

3.6.5.1 Cast-In-Place Foundations

Concrete foundations, sized as indicated, shall have anchor bolts accurately set in foundations using templates supplied by the pole manufacturer. Concrete work and grouting is specified in Section 03300 CONCRETE FOR BUILDING CONSTRUCTION. After the concrete has cured, pole anchor bases shall be set on foundations and leveled by shimming between anchor bases and foundations or by setting anchor bases on leveling nuts and grouting. Poles shall be set plumb. Anchor bolts shall be the manufactures standard, and not less than necessary to meet the pole wind loading and other specified design requirements.

3.7 LIGHTING

3.7.1 Lamps

Lamps of the proper type, wattage, and voltage rating shall be delivered to the project in the original containers and installed in the fixtures just before completion of the project.

3.7.2 Fixture Installation

Standard fixtures shall be installed as detailed on Standard Detail No. 04-06-04, Sheet Nos. 51, which accompany and form a part of this specification. Fixtures of similar design, equivalent light-distribution and brightness characteristics, and equal finish and quality will be acceptable as approved.

3.7.2.1 Accessories

Accessories such as straps, mounting plates, nipples, or brackets shall be installed as required for proper installation.

3.7.2.2 In-Line Fuses

2-pole in-line circuit breakers shall be provided for each fixture.

3.8 LIGHTING CONTROL SYSTEM

3.8.1 Photo-Control

Lighting luminaires shall be controlled in parking areas by a photo-control element or by photo cell-contactor combination as noted on Contract Drawing.

3.8.2 Magnetic Contactors

See section 2.20.4.

3.9 GROUNDING

Grounding shall be in conformance with NFPA 70, the contract drawings, and the following. Grounding conductors shall be soft-drawn, stranded copper.

3.9.1 Ground Rods and Pole Butt Electrodes

The resistance to ground shall be measured using the fall-of-potential method described in IEEE Std 81. The maximum resistance shall not exceed 25 ohms under normally dry conditions. Whenever the required ground resistance is not met, additional electrodes shall be provided interconnected with grounding conductors, to achieve the specified ground resistance. The additional electrodes shall be 3/4 inch diameter rods spaced to suit the area. In high ground resistance, UL listed chemically charged ground rods may be used. If the resultant resistance exceeds 25 ohms measured not less than 48 hours after rainfall, the Contracting Officer shall be notified immediately. Connections below grade shall be fusion welded. Connections above grade shall be fusion welded or shall use UL 467 approved connectors.

3.9.2 Items to be Grounded

Ground conductors, metallic conduits, junction boxes, and noncurrent-carrying metallic parts of equipment shall be grounded. Connections above grade shall be made with solderless connectors, and those below grade shall be made by a fusion-welding process.

3.9.3 Lighting Pole

One ground rod shall be provided at each pole. Bases of metal lighting poles shall be connected to ground rods by means of No. 6 AWG bare copper wire. Lighting fixture brackets on wood and concrete poles shall be grounded to a No. 6 AWG bare copper grounding conductor connected to the ground rod.

3.10 TESTS

3.10.1 Operating Test

After the installation is completed and at such time as the Contracting Officer may direct, the Contractor shall conduct an operating test for approval. The equipment shall be demonstrated to operate in accordance with the requirements specified. The test shall be performed in the presence of the Contracting Officer. The Contractor shall furnish instruments and personnel required for the test, and the Government will furnish the necessary electric power.

3.10.2 Ground Resistance Measurements

The resistance to ground shall be measured by the fall-of-potential method described in IEEE Std 81. The maximum resistance shall not exceed 35 ohms under normal dry conditions. Wherever the required ground resistance is not met, additional electrodes shall be provided.

The contractor shall maintain a separate set of drawings, elementary diagrams and wiring diagrams of the lighting to be used for "as-built" drawings. This set shall be accurately kept up to date by the Contractor with all changes and additions to the lighting system. In addition to being complete and accurate, this set of drawings shall be kept neat and

shall not be used for installation purposes. Upon completion of the as-built drawings, a representative of the Government will review the as-built work with the Contractor. If the as-built work is not complete, the Contractor will be so advised and shall complete the work as required.

3.11 Construction Trailer Park and Lighting Supply

3.11.1

Temporary Power supplies for construction trailers and incidental power requirements shall be supplied from Power pole "A10" mounted distribution panel via 3-pole, or as required, breakers, rated 22,000 AIC.

3.11.2

Depending on trailer location, the power shall be supplied via 2 inch PVC underground conduit to local distribution panel Homeline 3R or equal, rated 10,000 AIC. Local branches shall be connected via exposed 1 inch RGS conduits or underground cables.

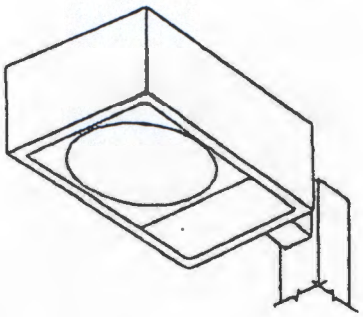
3.11.3

For incidental construction area power requirement 3/c or 4/c power cables can be used, suitably protected in traffic areas.

3.11.4

After completion of contract, the Contractor shall remove the above-ground temporary installation and dispose of the material as directed by USMA maintenance personnel.

-- End of Section --



TYPE 401

Enclosed, Integrally Ballasted, Rectangular Shaped,
Side Mounted, High Intensity Discharge Lighting Fixture

First Suffix	Second Suffix	Description
A		Rated for mercury vapor lamp
B		Rated for metal halide lamp
C		Rated for high pressure sodium lamp
	1	IES type II medium light distribution
	2	IES type III medium light distribution
	3	IES type V medium light distribution.

Fixture shall conform to UL 1572. Fixture housing shall have sides and doorframe of one-piece extruded aluminum with welded joints and top of crowned sheet aluminum. The top shall be spot welded and sealed watertight. The housing shall be rigidly attached to a square shaped mounting arm of extruded aluminum. The fixture door shall have a flat heat and impact resistant lens of 3/16-inch nominal, tempered glass, and shall be hinged and held in place with captive screws of the same finish as the door. The lens and door shall enclose the lamp compartment. The reflector shall be aluminum of the manufacturer's standard commercial product finish suitable for the lamp type and rating. The ballast shall be of the high power factor type. The ballast and power components shall be mounted on a single bracket and shall be removable. The fixture, including the mounting arm, shall be gasketed to allow air movement but prevent the entry of dust and insects. Ballast shall be of the constant wattage autotransformer type for mercury vapor lamps, lead-peak autotransformer type for metal halide lamps, and regulating type for high pressure sodium lamps. Ballast shall be capable of starting and operating the lamp at ambient temperatures ranging from minus 20 degrees F to 105 degrees F. A square extruded aluminum pole including anchor type base, anchor bolts and mounting hardware shall be provided by the fixture manufacturer and shall be the manufacturer's standard commercial product for the number of fixtures and wind load indicated or specified. The fixture housing mounting arm shall have a dark duranodic bronze finish. The fixture shall be prewired and shall have a mogul base glazed porcelain lampholder.

Fixture type indicated on this sheet shall also conform to requirements specified and indicated in the contract documents.

APPENDIX

Soil Borings and Monitoring Well Construction Logs

HTW DRILLING LOG

HOLE No. LCMW-01

1. COMPANY NAME: Woodward-Clyde Federal Services	2. DRILLING SUBCONTRACTOR: Huntingdon-Empire
SHEET 1 OF 2 SHEETS	
3. PROJECT: RFA of Ten Landfills at USMA	4. LOCATION: West Point, New York
5. NAME OF DRILLER: John Leonhardt, Shane Stone	6. MANUFACTURER'S DESIGNATION OF DRILL: Acker Soil Max
7. SIZE AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: Truck-mounted drill rig; 6.25" ID hollow stem augers (HSA); 2" OD split-spoon; 130 lb hammer; Air Compression; Roller bit	8. HOLE LOCATION: Lot C
	9. SURFACE ELEVATION: 455.93 feet
	10. DATE STARTED: 9/27/94 — 11. DATE COMPLETED: 9/28/94
12. OVERBURDEN THICKNESS: 11 feet	15. DEPTH GROUNDWATER ENCOUNTERED: 11 feet
13. DEPTH DRILLED INTO ROCK: 4 feet	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: 12 feet after well installation
14. TOTAL DEPTH OF HOLE: 15 feet	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY):

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
	4	0	0

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	SEMI-VOCs	METALS	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
	0	0	0	0	0 %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. NAME OF INSPECTOR
		Flush		Jackie Hertczman

DEPTH (FEET) a	SMPL INT b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX No. e	ANALYTICAL SAMPLE No. f	BLOW COUNTS g	REMARKS
2		SP, dark brown, m-c SAND, trace of silt and f-c, subangular, gravel, dry, loose sand	Background HNu reading Back: 1.8 ppm Not used due to rainy weather	S-1		7 10 100/0.3'	1510 - Sampled Recovery: 0.7'
4		Changed drilling method to roller bit and air compression					Hitting large rock at 2' BGS, changing to roller bit 9/28/94 0836 - Roller bit to 5' BGS
6		SP, dark brown, m-f SAND, trace of silt and subangular gravel, with pieces of shot rock, wet from last nights rain, dense sand	Back: 1.0 ppm Sample: 1.2 ppm	S-2		40 100/0.2'	0900 - Sampled Recovery: 0.4'
8		SP, dark brown, m-f SAND, trace of silt and subangular gravel, with pieces of shot rock, dry, dense sand	0.7 ppm	S-3		35 100/ 0.1'	0920 -Sampled Recovery: 0.7'
10		GM, brown, fine subangular gravelly sand, trace of silt, pieces of shot rock, moist, wet at bottom of spoon	8.0 ppm	S-4		70 50 60 100/0.3'	0945 - Sampled Recovery: 1.4'

HTW DRILLING LOG

HOLE No LCMW-01

PROJECT: RFA of Ten Landfills at USMA

INSPECTOR: Jackie Hentzman

SHEET 2 OF 2 SHEETS

DEPTH a	SMPL INT. b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX No. e	ANALYTICAL SAMPLE No. f	BLOW COUNTS g	REMARKS h
				S-4 cont.			
12		BEDROCK					At 11.0' BGS. Water encountered
14							Well installed at 13' BGS due to hole collapsing
16		Bottom of boring at 15 feet					
18							
20							
22							
24							
26							

Modified MRK Form 55

Woodward-Clyde Federal Services

Log prepared 6/2/95

PROJECT: RFA of Ten Landfills at USMA

Project No. 2091

HOLE No. LCMW-01

HTW DRILLING LOG

HOLE No. LCMW-02

1. COMPANY NAME: Woodward-Clyde Federal Services	2. DRILLING SUBCONTRACTOR: Huntingdon-Empire
SHEET 1 OF 2 SHEETS	
3. PROJECT: RFA of Ten Landfills at USMA	4. LOCATION: West Point, New York
5. NAME OF DRILLER: John Leonhardt, Shane Stone	6. MANUFACTURER'S DESIGNATION OF DRILL: Acker Soil Max
7. SIZE AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: Truck-mounted drill rig; 6.25" ID hollow stem augers (HSA); 2" OD split-spoon; 130 lb hammer; Air Compression; Roller bit	8. HOLE LOCATION: Lot C
	9. SURFACE ELEVATION: 454.75 feet
	10. DATE STARTED: 9/28/94 — 11. DATE COMPLETED: 9/29/94
12. OVERBURDEN THICKNESS: 26 feet	15. DEPTH GROUNDWATER ENCOUNTERED: 20 feet
13. DEPTH DRILLED INTO ROCK	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: 23.4 feet after well installation
14. TOTAL DEPTH OF HOLE: 26 feet	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
	7	0	0

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	SEMI-VOCs	METALS	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
	0	0	0	0	0 %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. NAME OF INSPECTOR
		Flush		Jackie Hertczman/Don Heck

DEPTH (FEET) a	SMPL INT. b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX No. e	ANALYTICAL SAMPLE No. f	BLOW COUNTS g	REMARKS
2		SP, dark brown, m-c SAND, trace of fine subangular gravel, moist, pieces of paper and shot rock, loose sand	Background HNu reading Back: 2.0 ppm Sample: 0.3 ppm	S-1		5 7 12 12	1510 - Sampled Recovery: 0.7'
4		Pieces of quartz	None	S-2		100/0.3'	1520 - Sampled No recovery
6		Pieces of concrete	2.2 ppm	S-3		45 100/0	1530 - Sampled Recovery: 0.1'
		Changed drilling method to roller bit and air compression					1625 - Began to roller bit
8		Cuttings - concrete Cuttings - wood	None				9/29/94
10		SP, dark brown, m-c SAND, trace of f-m subangular gravel, some shot rock, dry, dense sand SP, dark brown, m-c SAND, trace of silt, pieces of wood and coal, moist, medium dense sand	1.3 ppm	S-4		55 40 12 14	0855 - Sampled Recovery: 1.3'

HTW DRILLING LOG

HOLE No LCMW-02

PROJECT: RFA of Ten Landfills at USMA

INSPECTOR: Jackie Hertzman/Don Heck

SHEET 2 OF 2 SHEETS

DEPTH a	SMPL INT. b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX No. e	ANALYTICAL SAMPLE No. f	BLOW COUNTS g	REMARKS h
12		SP, dark brown, m-c SANDm trace of silt, pieces of shot rock, dry, loose sand	1.2 ppm	S-5		3 5 12 100/0.4'	0943 - Sampled Recovery: 0.3'
14							
16		GP, dark brown, m-f gravelly SAND, pieces of shot rock, dry, dense sand	5.1 ppm	S-6		35 120/0.5'	1100 - Sampled Recovery: 0.5'
18							
20							
22		SW, brownish-gray, m-c SAND, with some m-c gravels, saturated, dense sand	5.8 ppm	S-7		35 100/0.4'	1309 - Sampled Recovery: 1'
24							
26		Bottom of boring at 26 feet					Roller bit to 26' BGS

Modified MRK Form 55
Woodward-Clyde Federal Services
Log prepared 6/2/95

PROJECT
RFA of Ten Landfills at USMA
Project No. 2091

HOLE No.
LCMW-02

HTW DRILLING LOG

HOLE No. LCMW-03

1. COMPANY NAME	Woodward-Clyde Federal Services
2. DRILLING SUBCONTRACTOR	Huntingdon-Empire
SHEET / OF	1 / 3 SHEETS
3. PROJECT	RFA of Ten Landfills at USMA
4. LOCATION	West Point, New York
5. NAME OF DRILLER	Tom Farrell, Steve MacDonald
6. MANUFACTURER'S DESIGNATION OF DRILL	Failing F-10
7. SIZE AND TYPES OF DRILLING AND SAMPLING EQUIPMENT	Truck-mounted drill rig 6.25" ID hollow stem augers (HSA) 2" OD split-spoon 130 lb hammer Air Compression Roller bit
8. HOLE LOCATION	Lot C
9. SURFACE ELEVATION	456.85 feet
10. DATE STARTED	9/29/94
11. DATE COMPLETED	10/3/94
12. OVERBURDEN THICKNESS	31 feet
13. DEPTH DRILLED INTO ROCK	
14. TOTAL DEPTH OF HOLE	31 feet
15. DEPTH GROUNDWATER ENCOUNTERED	20 feet
16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED	28.1 feet after well installation
17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
	8	0	0

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	SEMI-VOCs	METALS	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
	0	0	0	0	0 %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. NAME OF INSPECTOR
		Flush		Don Heck/Jackie Hertczman

DEPTH (FEET) a	SMPL INT. b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX No. e	ANALYTICAL SAMPLE No. f	BLOW COUNTS g	REMARKS
2		Gray, f-c, SAND, trace of silt and subangular gravel, d gravel, dry, pieces of shot rock	Background HNu reading Back: 5.7 ppm Sample: 7.0 ppm	S-1		24 18 31 20	1356 - Sampled Recovery: 0.9'
4		Gray, f-c SAND, trace of silt and some subangular gravel, dry, pieces of shot rock	6.2 ppm	S-2		58 34 27 41	1424 - Sampled Recovery: 1.2'
6		Grayish-brown, f-c SAND, and landfill debris (paper and wood), with trace of silt and shot rock, dry to moist	Peak: 51.2 ppm	S-3		5 4 7 9	1437 - Sampled Recovery: 1'
8		Brown, f-c SAND, and landfill debris (paper and glass), with trace of fine gravels, dry to moist	5.0 ppm	S-4		4 3 4 7	1439 - Sampled Recovery: 0.3'
10				S-5		21 18 5 3	1502 - Sampled No recovery due to broken split-spoon

HTW DRILLING LOG

HOLE No. LCMW-03

PROJECT	INSPECTOR	SHEET OF
RFA of Ten Landfills at USMA	Don Heck/Jackie Herrzman	2 OF 3 SHEETS

DEPTH a	SMPL. INT b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX No. e	ANALYTICAL SAMPLE No. f	BLOW COUNTS g	REMARKS h
							9/30/94
12							
14							
16		SM, brown, m-f silty SAND, trace of fine subangular gravel, moist, medium dense sand	Peak: 10.2 ppm	S-6		7 14 21 19	1015 - Sampled Recovery: 1.4'
		Shot rock					
18							
20							
		SM, brown, m-f silty SAND, wet					
		SP, gray, m-c SAND, trace of silt, wet, medium dense sand	Peak: 30 ppm	S-7		21 33 100/0.5'	1040 - Sampled Recovery: 1.5'
22		SW, gray-white gravelly, fine, SAND, dry, medium dense sand					
24							
		Changed drilling method to roller bit and air compression		S-8		150/0.3'	1130 - Sampled No recovery
26							

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Woodward-Clyde Federal Services
Log prepared 6/2/95

PROJECT
RFA of Ten Landfills at USMA
Project No. 2091

HOLE No.
LCMW-03

HTW DRILLING LOG

HOLE No. LCMW-03

PROJECT: RFA of Ten Landfills at USMA

INSPECTOR: Don Heck/Jackie Herkzman

SHEET 3 OF 3 SHEETS

DEPTH a	SMPL INT. b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX No e	ANALYTICAL SAMPLE No f	BLOW COUNTS g	REMARKS h
							Roller bit to 31' BGS
28							
30							
		Bottom of boring at 31 feet					
32							
34							
36							
38							
40							
42							

Modified MRK Form 55
Woodward-Clyde Federal Services
Log prepared 6/2/95

PROJECT
RFA of Ten Landfills at USMA
Project No. 2091

HOLE No.
LCMW-03

HTW DRILLING LOG

HOLE No. LEMW-01

1. COMPANY NAME: Woodward-Clyde Federal Services	2. DRILLING SUBCONTRACTOR: Huntingdon-Empire
SHEET 1 OF 2 SHEETS	
3. PROJECT: RFA of Ten Landfills at USMA	4. LOCATION: West Point, New York
5. NAME OF DRILLER: Bill Bosworth, Shane Stone	6. MANUFACTURER'S DESIGNATION OF DRILL: Acker Soil Max
7. SIZE AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: Truck-mounted drill rig; 6.25" ID hollow stem augers (HSA); 2" OD split-spoon; 130 lb hammer	8. HOLE LOCATION: Lot E
	9. SURFACE ELEVATION: 506.12 feet
	10. DATE STARTED: 8/29/94 — 11. DATE COMPLETED: 8/30/94
12. OVERBURDEN THICKNESS: 22.5 feet	15. DEPTH GROUNDWATER ENCOUNTERED: 9.95 feet
13. DEPTH DRILLED INTO ROCK	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: 14 feet after 24 hours
14. TOTAL DEPTH OF HOLE: 22.5 feet	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
	7	0	0

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	SEMI-VOCs	METALS	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
	0	0	0	0	0 %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. NAME OF INSPECTOR
		Flush		Warren Parry/Don Heck

DEPTH (FEET) a	SMPL. INT. b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX No. e	ANALYTICAL SAMPLE No. f	BLOW COUNTS g	REMARKS
2		Dark gray, gravel, with some silt, moist	Background HNu reading Back: 3.3 ppm Sample: 4.0 ppm	S-1		34 57 31 34	1500 - Sampled Recovery: 1.2'
4		Dark gray, gravel, with some silt, moist	3.5 ppm	S-2		19 29 14 7	1503 - Sampled Recovery: 0.6'
6		Brown-green, m-c SAND, with some gravel, dry Dark gray, Silty SAND, with some wood chips and plastic at spoon tip, dry, medium dense sand	Peak: 6.7 ppm	S-3		18 11 10 11	1529 - Sampled Recovery: 0.5' At 5' BGS, wood in cuttings with foul odor
8		Grayish-brown, c-f SAND, with some loose gravel, and pieces of stained wood chips, metal, and plastic, dry, dense sand. (Wood and rock imbedded in spoon tip)	Peak: 7.1 ppm	S-4		38 100/0.4'	1606 - Sampled Recovery: 0.6' At 8' BGS, tin cans and metal
10		Grayish-brown, m-f SAND, with a trace of silt and gravel, and some paper, metal, and glass fragments, dry, medium dense sand	Peak: 28 ppm	S-5		12 13 20 20	1634 - Sampled Recovery: 0.6'

HTW DRILLING LOG

HOLE No. LEMW-01

PROJECT: RFA of Ten Landfills at USMA

INSPECTOR: Warren Perry/Don Heck

SHEET 2 OF 2 SHEETS

DEPTH a	SMPL INT b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX No. e	ANALYTICAL SAMPLE No. f	BLOW COUNTS g	REMARKS h
12							At 11 to 12' BGS. Metal Metal debris and wood in cuttings
14							AT 14' BGS: Larger rocks and water in rods and auger plug.
16		Dark grey-green, c-m SAND, with some gravel and a trace of silt, saturated, dense sand	4.7 ppm	S-6		44 27 31 23	1712 - Sampled Recovery: 1.2'
18							8/30/94
20							
22		Brownish-gray, coarse SAND with some gravel, saturated, dense sand Brown, c-m SAND, with some gravel and a trace of silt, saturated, dense sand	0.6 ppm	S-7		51 29 49 52	0852 - Sampled Recovery: 2'
24		Bottom of boring at 22.5 feet					
26							

Modified MRK Form 55
Woodward-Clyde Federal Services
Log prepared 6/2/95

PROJECT
RFA of Ten Landfills at USMA
Project No. 2091

HOLE No.
LEMW-01

HTW DRILLING LOG

HOLE No. LEMW-02

1. COMPANY NAME	Woodward-Clyde Federal Services
2. DRILLING SUBCONTRACTOR	Huntingdon-Empire
SHEET / OF	1 / 3 SHEETS
3. PROJECT	RFA of Ten Landfills at USMA
4. LOCATION	West Point, New York
5. NAME OF DRILLER	John Leonhardt, Shane Stone
6. MANUFACTURER'S DESIGNATION OF DRILL	Acker Soil Max
7. SIZE AND TYPES OF DRILLING AND SAMPLING EQUIPMENT	Truck-mounted drill rig 6.25" ID hollow stem augers (HSA) 2" OD split-spoon 130 lb hammer 6" dia. roller bit with air compression
8. HOLE LOCATION	Lot E
9. SURFACE ELEVATION	501.69 feet
10. DATE STARTED	9/19/94
11. DATE COMPLETED	9/20/94
12. OVERBURDEN THICKNESS	17 feet
13. DEPTH DRILLED INTO ROCK	14.5 feet
14. TOTAL DEPTH OF HOLE	31.5 feet
15. DEPTH GROUNDWATER ENCOUNTERED	28.2 feet
16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED	28.7 feet after 1 hour
17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	
18. GEOTECHNICAL SAMPLES	DISTURBED: 6; UNDISTURBED: 0
19. TOTAL NUMBER OF CORE BOXES	0
20. SAMPLES FOR CHEMICAL ANALYSIS	VOC: 0; SEMI-VOCs: 0; METALS: 0; OTHER (SPECIFY): 0
21. TOTAL CORE RECOVERY	0 %
22. DISPOSITION OF HOLE	BACKFILLED; MONITORING WELL: Flush; OTHER (SPECIFY)
23. NAME OF INSPECTOR	Don Heck

DEPTH (FEET) a	SMPL. INT. b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX No. e	ANALYTICAL SAMPLE No. f	BLOW COUNTS g	REMARKS
2		SP, gray, f-c SAND, trace of f-c subangular gravel, dry, dense sand, with pieces of shot rock	Background HNu reading Back: 1.4 ppm Sample: 2.4 ppm	S-1		28 47 41 22	1426 - Sampled Recovery: 1'
4		SM, gray, f-c SAND, trace of fine angular gravel ,dry, medium dense sand	1.9 ppm	S-2		11 12 10 24	1431 - Sampled Recovery: 0.7'
6		SM, gray, f-c SAND, with f-c subrounded gravel, dry, medium desne sand, with Landfill material: glass and paper	Peak: 10.0 ppm	S-3		17 8 9 25	1509 - Sampled Recovery: 0.4'
8		GP, gray, subangular gravel, with some wood and paper debris in spoon tip	3.5 ppm	S-4		100/0.2'	1513 - Sampled Recovery: 0.2'
10		SC, brownish-gray, m-f, with trace of fine gravels, dry SM, brown, f-c SAND, with trace of silty-clay, dry, and some shot rock	2.0 ppm	S-5		7 21 42 19	1536 - Sampled Recovery: 1.3'

HTW DRILLING LOG

HOLE No. LEMW-02

PROJECT: RFA of Ten Landfills at USMA

INSPECTOR: Don Heck

SHEET 2 OF 3 SHEETS

DEPTH a	SMPL. INT. b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX No. e	ANALYTICAL SAMPLE No. f	BLOW COUNTS g	REMARKS h
12							
14		SW, light gray-brown, f-c SAND, with trace of subangular, gravel, dry, very dense	1.4 ppm	S-6		100/0.4'	1703 - Sampled Recovery: 0.6'
16							
18		BEDROCK Changed drilling method to roller bit and air compression					Rock begins at 17' BGS Began to roller bit
20							
22							
24							
26							

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Woodward-Clyde Federal Services
Log prepared 6/2/95

PROJECT
RFA of Ten Landfills at USMA
Project No. 2091

HOLE No.
LEMW-02

HTW DRILLING LOG

HOLE No. LEMW-02

PROJECT: RFA of Ten Landfills at USMA

INSPECTOR: Don Heck

SHEET 3 OF 3 SHEETS

DEPTH a	SMPL INT. b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX No. e	ANALYTICAL SAMPLE No f	BLOW COUNTS g	REMARKS h
28							
30							
32		Bottom of bonngs at 31.5 feet					
34							
36							
38							
40							
42							

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Woodward-Clyde Federal Services
Log prepared 6/2/95

PROJECT
RFA of Ten Landfills at USMA
Project No. 2091

HOLE No.
LEMW-02

HTW DRILLING LOG

HOLE No: LEMW-03

1. COMPANY NAME	Woodward-Clyde Federal Services
2. DRILLING SUBCONTRACTOR	Huntingdon-Empire
SHEET / OF	1 / 4 SHEETS
3. PROJECT	RFA of Ten Landfills at USMA
4. LOCATION	West Point, New York
5. NAME OF DRILLER	Bill Bosworth, Shane Stone
6. MANUFACTURER'S DESIGNATION OF DRILL	Acker Soil Max
7. SIZE AND TYPES OF DRILLING AND SAMPLING EQUIPMENT	Truck-mounted drill rig; 6.25" ID hollow stem augers (HSA); 2" OD split-spoon; 130 lb hammer
8. HOLE LOCATION	Lot E
9. SURFACE ELEVATION	509.43 feet
10. DATE STARTED	8/30/94
11. DATE COMPLETED	9/2/94
12. OVERBURDEN THICKNESS	43.4 feet
13. DEPTH DRILLED INTO ROCK	
14. TOTAL DEPTH OF HOLE	43.4 feet
15. DEPTH GROUNDWATER ENCOUNTERED	43 feet
16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED	42.5 feet after 2 hours
17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	
18. GEOTECHNICAL SAMPLES	DISTURBED: 14; UNDISTURBED: 0
19. TOTAL NUMBER OF CORE BOXES	0
20. SAMPLES FOR CHEMICAL ANALYSIS	VOC: 0; SEMI-VOCs: 0; METALS: 0; OTHER (SPECIFY): 0
21. TOTAL CORE RECOVERY	0 %
22. DISPOSITION OF HOLE	BACKFILLED: ; MONITORING WELL: Flush; OTHER (SPECIFY):
23. NAME OF INSPECTOR	Don Heck

DEPTH (FEET) a	SMPL. INT b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX No. e	ANALYTICAL SAMPLE No. f	BLOW COUNTS g	REMARKS
2		Asphalt Dark gray, m-f silty SAND, with some gravel and paper in spoon tip, dry, medium dense sand sand	Background HNu reading Back: 0.6 ppm Sample: 1.0 ppm	S-1		30 12 14 7	1453 - Sampled Recovery: 1.2'
4		Dark grayish-brown, c-f silty SAND, with some gravel and tar-like paste, dry, very loose sand	0.9 ppm	S-2		7 4 2 3	1509 - Sampled Recovery: 0.4'
6		Gray, c-f GRAVEL, dry, very loose sand	0.3 ppm	S-3		3 2 1 1	1522 - Sampled Recovery: 0.3' At 5' BGS: metal debris
8		Grayish-brown, m-c sandy-silt, with a trace of clay, dry, medium dense sand	0.7 ppm	S-4		19 14 27 55	1535 - Sampled Recovery: 0.6' At 7' BGS: Landfill material (rags)
10		Dark gray, f-m silty SAND, with a trace of clay and some rocks, dry, medium dense sand	0.9 ppm	S-5		7 10 14 19	1552 - Sampled Recovery: 1.2'

HTW DRILLING LOG

HOLE No LEMW-03

PROJECT: RFA of Ten Landfills at USMA

INSPECTOR: Don Heck

SHEET 2 OF 4 SHEETS

DEPTH a	SMPL. INT. b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX No e	ANALYTICAL SAMPLE No. f	BLOW COUNTS g	REMARKS h
12		Light gray, c-m SILT, with some gravel, dry	0.4 ppm	S-6		8 9 8 6	1607 - Sampled Recovery: 0.3'
14							
16		Dark gray, coarse, silty SAND, with a trace of gravel, and some plastic and paper debris (plastic stuck in spoon tip), dry, medium dense sand	Peak: 32.5 ppm	S-7		27 11 14 14	1639 - Sampled Recovery: 0.5'
18							8/30/94
20							
22		SW, gray, SAND, with some rocks, dry, very dense sand	Peak: 2.7 ppm	S-8		81 75 29 27	1706 - Sampled Recovery: 1'
24							
26		SM, dark gray, with a trace of gravel, wet, with wood and rock in spoon tip	0.5 ppm	S-9		30 11 7 7	1803 - Sampled Recovery: 0.2' (Wood in spoon tip)

Modified MRK Form 55
Woodward-Clyde Federal Services
Log prepared 6/2/95

PROJECT
RFA of Ten Landfills at USMA
Project No. 2091

HOLE No.
LEMW-03

HTW DRILLING LOG

HOLE No LEMW-03

PROJECT: RFA of Ten Landfills at USMA

INSPECTOR: Don Heck

SHEET 3 OF 4 SHEETS

DEPTH a	SMPL INT. b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX No. e	ANALYTICAL SAMPLE No. f	BLOW COUNTS g	REMARKS h
				S-9, cont.			
							8/31/94
28							
30							
		SW, gray, with landfill material (paper and wood debris), dry	Peak: 17.5 ppm	S-10		24 8 7 6	0907 - Sampled Recovery: 0.6'
32		Brown, landfill material (wood debris), with some silt, dry	9.8 ppm	S-11		100/0.5'	0923 - Sampled Recovery: 0.3'
34							
		SW, light gray, with some fragments of gravel (Gneiss), dry	9.0 ppm	S-12		93 100/0.4'	1554 - Sampled Recovery: 0.75'
36							
38							
40							
		SW, gray, c-m SAND, with some gravel and a trace of silt, moist at tip of spoon, dry, very dense sand	8.9 ppm	S-13		19 63 100 88	1732 - Sampled Recovery: 1.4'
42							

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Woodward-Clyde Federal Services
Log prepared 8/2/95

PROJECT
RFA of Ten Landfills at USMA
Project No. 2091

HOLE No.
LEMW-03

HTW DRILLING LOG

HOLE No. LEMW-03

PROJECT: RFA of Ten Landfills at USMA

INSPECTOR: Don Heck

SHEET 4 OF 4 SHEETS

DEPTH a	SMPL INT. b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX No. e	ANALYTICAL SAMPLE No. f	BLOW COUNTS g	REMARKS h
							9/1/94
		Unsuccessful at mud rotary drilling method at 43.5' BGS Bottom of boring at 43 4 feet					
44		SW, dark brownish-gray, c-m SAND, with some gravel and a trace of silt, wet, rock in spoon tip	3.2 ppm	S-14		100/0.1'	1151- Sampled Recovery: 0.2'
46							
48							
50							
52							
54							
56							
58							

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Woodward-Clyde Federal Services
Log prepared 6/2/95

PROJECT
RFA of Ten Landfills at USMA
Project No. 2091

HOLE No.
LEMW-03

HTW DRILLING LOG

HOLE No: LEMW-04

1. COMPANY NAME	Woodward-Clyde Federal Services
2. DRILLING SUBCONTRACTOR	Huntingdon-Empire
SHEET OF	1 2 SHEETS
3. PROJECT	RFA of Ten Landfills at USMA
4. LOCATION	West Point, New York
5. NAME OF DRILLER	Tom Farrel, Steve MacDonald
6. MANUFACTURER'S DESIGNATION OF DRILL	Failing F-10
7. SIZE AND TYPES OF DRILLING AND SAMPLING EQUIPMENT	Truck-mounted drill rig 6.25" ID hollow stem augers (HSA) 2" OD split-spoon 130 lb hammer 6" dia. roller bit and mud rotary
8. HOLE LOCATION	Lot E
9. SURFACE ELEVATION	507.26 feet
10. DATE STARTED	8/30/94
11. DATE COMPLETED	8/30/94
12. OVERBURDEN THICKNESS	21.5 feet
13. DEPTH DRILLED INTO ROCK	
14. TOTAL DEPTH OF HOLE	21.5 feet
15. DEPTH GROUNDWATER ENCOUNTERED	14 feet
16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED	12.5 feet after 18 hours
17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	
18. GEOTECHNICAL SAMPLES	DISTURBED: 7; UNDISTURBED: 0
19. TOTAL NUMBER OF CORE BOXES	0
20. SAMPLES FOR CHEMICAL ANALYSIS	VOC: 0; SEMI-VOCs: 0; METALS: 0; OTHER (SPECIFY): 0
21. TOTAL CORE RECOVERY	0 %
22. DISPOSITION OF HOLE	BACKFILLED: ; MONITORING WELL: Flush; OTHER (SPECIFY):
23. NAME OF INSPECTOR	Warren Parry

DEPTH (FEET) a	SMPL. INT. b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX No. e	ANALYTICAL SAMPLE No. f	BLOW COUNTS g	REMARKS
2		Gray to dark gray, m-c SAND, large angular gravel, dry, medium dense sand	Background HNu reading Back: 4.6 ppm Sample: 5.3 ppm	S-1		10 12 17 6	0854 - Sampled Recovery: 1.2'
4		Dark brown, medium SAND, large gravel, dry, medium dense sand	4.9 ppm	S-2		22 14 6 6	0904 - Sampled Recovery: 0.4' (Very little recovery, mostly large gravel)
6		Dark gray, medium, SAND, wood and paper, dry, loose sand	5.3 ppm	S-3		5 3 5 5	0912 - Sampled Recovery: 0.4' (Wood and paper) Cobbles in cuttings
8		Dark gray, m-f SAND, trace of silt, wood, and glass fragments, dry, loose sand	6.3 ppm	S-4		4 6 5 5	0930 - Sampled Recovery: 0.5'
10		Dark brown, m-f SAND, trace of silt, some wood, dry to slightly moist	7.2 ppm	S-5		6 18 21 14	0943 - Sampled Recovery: 1' (Spoon broke)

HTW DRILLING LOG

HOLE No. LEMW-04

PROJECT: RFA of Ten Landfills at USMA
INSPECTOR: Warren Parry
SHEET 2 OF 2 SHEETS

DEPTH a	SMPL INT. b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX No. e	ANALYTICAL SAMPLE No. f	BLOW COUNTS g	REMARKS h
12							
14							Water at 14.0' BGS
16		Dark gray, c-m SAND, gravel, some silt and clay, saturated, loose to medium dense sand	3.2 ppm	S-6		13 11 8 7	1100 - Sampled Recovery: 0.1' (Water on rods at 15')
18							Rubber boot, bag, and paper in cuttings
20		Changed drilling method to mud rotary					
		Dark gray, m-f SAND, with some silt, wet, concrete fragments in spoon tip Boulder at 19.5 - 21.5' BGS	2.7 ppm	S-7		50/ 0.2'	1120 - Sampled Recovery: 0.2'
22		Bottom of boring at 21.5 feet					Roller bit to 22'. Hole collapsed below boulder
24							
26							

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Woodward-Clyde Federal Services
Log prepared 6/2/95

PROJECT
RFA of Ten Landfills at USMA
Project No. 2091

HOLE No.
LEMW-04

HTW DRILLING LOG

HOLE No. LEMW-05

1. COMPANY NAME	Woodward-Clyde Federal Services
2. DRILLING SUBCONTRACTOR	Huntingdon-Empire
SHEET / OF	1 / 3 SHEETS
3. PROJECT	RFA of Ten Landfills at USMA
4. LOCATION	West Point, New York
5. NAME OF DRILLER	Tom Farrell, Steve MacDonald
6. MANUFACTURER'S DESIGNATION OF DRILL	Failing F-10
7. SIZE AND TYPES OF DRILLING AND SAMPLING EQUIPMENT	Truck-mounted drill rig 6.25" ID hollow stem augers (HSA) 2" OD split-spoon 130 lb hammer 6" dia. roller bit and mud rotary
8. HOLE LOCATION	Lot E
9. SURFACE ELEVATION	501.51 feet
10. DATE STARTED	8/31/94
11. DATE COMPLETED	9/1/94
12. OVERBURDEN THICKNESS	34.5 feet
13. DEPTH DRILLED INTO ROCK	3 feet
14. TOTAL DEPTH OF HOLE	37.5 feet
15. DEPTH GROUNDWATER ENCOUNTERED	14 feet
16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED	29.2 feet after well installation
17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	
18. GEOTECHNICAL SAMPLES	DISTURBED: 10; UNDISTURBED: 0
19. TOTAL NUMBER OF CORE BOXES	0
20. SAMPLES FOR CHEMICAL ANALYSIS	VOC: 0; SEMI-VOCs: 0; METALS: 0; OTHER (SPECIFY): 0
21. TOTAL CORE RECOVERY	0 %
22. DISPOSITION OF HOLE	BACKFILLED; MONITORING WELL: Flush; OTHER (SPECIFY)
23. NAME OF INSPECTOR	Warren Parry

DEPTH (FEET) a	SMPL. INT. b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX No. e	ANALYTICAL SAMPLE No. f	BLOW COUNTS g	REMARKS
2		Asphalt (0.1') Brown-gray, c-m SAND, gravel, trace of wood fragments, dry, loose sand	Background HNu reading Back: 0.4 ppm Sample: 0.8 ppm	S-1		5 7 9 10	0904 - Sampled Recovery: 1.1'
4		Dark gray, medium SAND, gravel, some asphalt, dry, loose sand	2.3 ppm	S-2		16 9 6 4	0906 - Sampled Recovery: 0.6' At 4' BGS: plastic and tin in cuttings
6		Brown, c-m SAND, with stained wood, gravel, dry, loose sand	1.1 ppm	S-3		5 4 5 12	0917 - Sampled Recovery: 0.2' (Wood near spoon tip)
8		Brown, c-f SAND, organic matter, dry	0.7 ppm	S-4		17 12 6 60	0923 - Sampled Recovery: less than 0.1 foot (Wood at bottom)
10		Dark gray, c-m SAND, wood, fiberboard, cardboard, glass, newspaper, dry	Peak: 55 ppm	S-5		16 19 30 50/0.2'	0945 - Sampled

HTW DRILLING LOG

HOLE No LEMW-05

PROJECT: RFA of Ten Landfills at USMA
INSPECTOR: Warren Parry
SHEET 2 OF 3 SHEETS

DEPTH a	SMPL. INT b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX No. e	ANALYTICAL SAMPLE No. f	BLOW COUNTS g	REMARKS h
12							Auger refusal at 11.5 feet BGS Moved to new location
14							Water at 14.0' BGS
16		SW, dark gray, c-m SAND, newspaper,some subangular gravel, aluminum foil, plastic, dry, medium dense sand	Peak: 26 ppm	S-6		19 11 19 12	1025 - Sampled Recovery: 0.8'
18							Rubber boot, bag, and paper in cuttings
20							
22		SM, dark gray, c-f SILTY SAND, some angular, gravel (Gneiss), glass, cloth, trace of wood, moist, loose sand	0.5 ppm	S-7		14 7 5 4	1055 - Sampled Recovery: 0.5' (Black organic material in spoon)
24							
26		SW, brown, c-m GRAVELLY SAND, some subrounded to subangular gravel, paper, dry, dense sand	0.1 ppm	S-8		16 50/0.4'	1118 - Sampled Recovery: 0.4'

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Woodward-Clyde Federal Services
Log prepared 6/2/95

PROJECT
RFA of Ten Landfills at USMA
Project No. 2091

HOLE No.
LEMW-05

HTW DRILLING LOG

HOLE No. LEMW-05

PROJECT: RFA of Ten Landfills at USMA
INSPECTOR: Warren Parry
SHEET 3 OF 3 SHEETS

DEPTH a	SMPL INT. b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX No. e	ANALYTICAL SAMPLE No. f	BLOW COUNTS g	REMARKS h
				S-8 cont.			Spoon bouncing off a boulder Rock in spoon tip
28							
30							
		SW, gray, c-m SAND, some gravel, trace of silt, moist, dense sand		S-9		19 60 50/0.1'	1155 - Sampled Recovery: 0.9' (Spoon refusal after 1') At 31.5' BGS: Large cobbles
32							
34							Auger refusal at 34.5 feet BGS
		Changed drilling method to mud rotary BEDROCK Large cobbles in tip of spoon (gravel/gneiss) Moisture on spoon and gravel	0.5 ppm	S-10		100/0.0'	1337 - Sampled Recovery: 0.0' (Rock in tip)
36							Roller bit from 34.5' to 37.5' BGS
38		Bottom of boring at 37.5 feet					
40							
42							

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Woodward-Clyde Federal Services
Log prepared 6/2/95

PROJECT: RFA of Ten Landfills at USMA
Project No. 2091

HOLE No. LEMW-05

HTW DRILLING LOG

HOLE No: LESB-06

1. COMPANY NAME	Woodward-Clyde Federal Services
2. DRILLING SUBCONTRACTOR	Huntingdon-Empire
SHEET / OF	1 / 4 SHEETS
3. PROJECT	RFA of Ten Landfills at USMA
4. LOCATION	West Point, New York
5. NAME OF DRILLER	Tom Farrell
6. MANUFACTURER'S DESIGNATION OF DRILL	Failing F-10
7. SIZE AND TYPES OF DRILLING AND SAMPLING EQUIPMENT	Truck-mounted drill rig 6.25" ID hollow stem augers (HSA) 2" OD split-spoon 130 lb hammer 6" dia. roller bit with air compression
8. HOLE LOCATION	Lot E
9. SURFACE ELEVATION	
10. DATE STARTED	9/20/94
11. DATE COMPLETED	10/4/94
12. OVERBURDEN THICKNESS	10 feet
13. DEPTH DRILLED INTO ROCK	38 feet
14. TOTAL DEPTH OF HOLE	48 feet
15. DEPTH GROUNDWATER ENCOUNTERED	None feet
16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED	No water encountered
17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	
18. GEOTECHNICAL SAMPLES	DISTURBED: 5; UNDISTURBED: 0
19. TOTAL NUMBER OF CORE BOXES	0
20. SAMPLES FOR CHEMICAL ANALYSIS	VOC: 0; SEMI-VOCs: 0; METALS: 0; OTHER (SPECIFY): 0
21. TOTAL CORE RECOVERY	0 %
22. DISPOSITION OF HOLE	BACKFILLED; MONITORING WELL; OTHER (SPECIFY): Grouted
23. NAME OF INSPECTOR	Jackie Heitczman

DEPTH (FEET) a	SMPL. INT. b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX No. e	ANALYTICAL SAMPLE No. f	BLOW COUNTS g	REMARKS
2		SW, brown, f-m SAND, trace of subangular, fine gravel, dry, medium dense sand	Background HNu reading Back: 4.1 ppm Sample: 4.2 ppm	S-1		21 25 14 20	1645 - Sampled Recovery: 0.6'
4		SW, brown, f-m SAND, trace of fine, subangular, gravel dry, very loose sand SW, dark brown, fine, SAND, trace of silt and fine subangular gravel, dry	5.2 ppm	S-2		5 4 4 4	1655 - Sampled Recovery: 0.6'
6		SW, dark brown, fine SAND, trace of silt and fine subangular, gravel, dry Black organic material, wood and paper, dry SW, dark brown, m-f SAND, trace of subangular gravel, dry, loose sand	Peak: 9.1 ppm	S-3		7 9 4 2	1659 - Sampled Recovery: 0.9'
8		SW, dark brown, m-f SAND, trace of f-m subangular gravel, dry, pieces of wood	3.2 ppm	S-4		14 100/0.1'	9/21/94 0810 - Sampled Recovery: 0.3'
10						50/0'	0815 - Sampled No recovery

HTW DRILLING LOG

HOLE No. LESB-06

PROJECT: RFA of Ten Landfills at USMA

INSPECTOR: Jackie Hertzman

SHEET 2 OF 4 SHEETS

DEPTH a	SMPL. INT. b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX No. e	ANALYTICAL SAMPLE No. f	BLOW COUNTS g	REMARKS h
		BEDROCK begins Wire, paper, plastic, wood					10/3/94 1320 - Hit rock at
		Changed drilling method to roller bit and air compression					11.5' BGS. Began to roller bit
12							
14							
16							
18							
20							
22							
24							
26							Roller bit

Modified MRK Form 55
Woodward-Clyde Federal Services
Log prepared 6/2/95

PROJECT
RFA of Ten Landfills at USMA
Project No. 2091

HOLE No.
LESB-06

HTW DRILLING LOG

HOLE No. LESB-06

PROJECT: RFA of Ten Landfills at USMA

INSPECTOR: Jackie Hertzman

SHEET 3 OF 4 SHEETS

DEPTH a	SMPL. INT. b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX No. e	ANALYTICAL SAMPLE No. f	BLOW COUNTS g	REMARKS h
28							10/4/94 0815 - Started driling with roller bit
30							
32							
34							
36							
38							1055 - no water at 38' BGS 1205 - Contiuned drilling
40							
42							

Modified MRK Form 55
Woodward-Clyde Federal Services
Log prepared 6/2/95

PROJECT
RFA of Ten Landfills at USMA
Project No. 2091

HOLE No.
LESB-06

HTW DRILLING LOG

HOLE No. LESB-06

PROJECT: RFA of Ten Landfills at USMA

INSPECTOR: Jackie Herczman

SHEET 4 OF 4 SHEETS

DEPTH a	SMPL. INT. b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX No. e	ANALYTICAL SAMPLE No f	BLOW COUNTS g	REMARKS h
44							
46							
48		No water found - No well to be installed Bottom of boring at 48 feet					1345 - Stopped drilling at 48' BGS
50							
52							
54							
56							
58							

Modified MRK Form 55
Woodward-Clyde Federal Services
Log prepared 6/2/95

PROJECT
RFA of Ten Landfills at USMA
Project No. 2091

HOLE No.
LESB-06

HTW DRILLING LOG

HOLE No. LF-1

1. COMPANY NAME: Law Environmental, Inc.	2. DRILLING SUBCONTRACTOR: Parratt-Wolff
SHEET 1 OF 2	
3. PROJECT: West Point Subsurface Investigation	4. LOCATION: West Point – Lot F
5. NAME OF DRILLER: Mark Beck	6. MANUFACTURERS DESIGNATION OF DRILL: CME-55
7. SIZE AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: CME-55; 140 lb. Hammer, 30 in. Drop; 2 ft. Spoon, 2 in. Dia.; 4-1/4 in. Augers	8. HOLE LOCATION: Lot F, Location 1A
	9. SURFACE ELEVATION: 407.15
	10. DATE STARTED: 7-24-93 / 11. DATE COMPLETED: 7-24-93
12. OVERBURDEN THICKNESS: 13.0 ft. +	15. DEPTH GROUNDWATER ENCOUNTERED: ~9.0 ft.
13. DEPTH DRILLED INTO ROCK: —	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: 10.05 ft. below casing, 15.5 hrs.
14. TOTAL DEPTH OF HOLE: 13.0 ft.	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): —

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
7, 6-8 ft.	√	—	—

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY %
—	—	—	—	—	—	—

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Well	—	√	—	

24. CHECKED BY:	25. NAME OF INSPECTOR: J. Ronald Sides

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX No. e	ANALYTICAL SAMPLE No. f	BLOW COUNTS g	REMARKS h
		Firm, Brown to Brown Gray, Clayey, Gravelly, Silty Fine to Medium SAND; Damp	0.2 ppm	0 -2 ft.	—	7 8 9 16	12:14, 7-24-93 REC 50%
	1.0						
	2.0		0.2 ppm	2 - 4 ft.	—	9 40 26 8	REC 30%
	3.0						
	4.0	Gray, Clayey, Silty Sand	0.3 ppm	LF-1A; 4-4.2 ft.	—	50/.2	Spoon ref.
		No Sample	—	—	—	—	—
		Possible Cobbles					
	5.0						

HTW DRILLING LOG

HOLE No. LF-1

PROJECT: West Point Subsurface Investigation

INSPECTOR: Ron Sides

SHEET 2 OF 2

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX No. e	ANALYTICAL SAMPLE No. f	BLOW COUNTS g	REMARKS h
		Hard, Gray, Sandy Clay ; Damp	0.1 ppm	5 - 5.5 ft.	—	50/.5	Refusal
		No Sample					
	6.0	Probable Cobbles					
	7.0	Firm, Gray, Very Sandy Clay; Wood in Tip; Moist	0.3 ppm	7 - 9 ft.	—	37 19 7 13	REC 40%
	8.0						
	9.0	Firm to Stiff, Gray, Very Silty, Fine Sandy Clay; Landfill Material (Newspapers, rubberbands, and woodchips); Wet	6 ppm	9 - 11 ft.	—	33 12 7 5	REC 30%
	10.0						
	11.0		1 ppm	11 - 12.5 ft.	—	12 10 130/.5	REC 20 %
	12.0						
	13.0						15:33, 7-24-93 TD
	14.0						

HTW DRILLING LOG

HOLE No. LF-1A

1. COMPANY NAME: Law Environmental, Inc.	2. DRILLING SUBCONTRACTOR: Parratt-Wolff
SHEET 1 OF 2	
3. PROJECT: West Point Subsurface Investigation	4. LOCATION: West Point – Parking Lot F
5. NAME OF DRILLER: Mark Beck	6. MANUFACTURER'S DESIGNATION OF DRILL: CME-55
7. SIZE AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: CME-55; 140 lb. Hammer, 30 in. Drop; 2 ft. Spoon, 2 in. Dia.; 4-1/4 in. Augers	8. HOLE LOCATION: Lot F- Location 1
	9. SURFACE ELEVATION:
	10. DATE STARTED: 7-9-93 / 11. DATE COMPLETED: 7-9-93
12. OVERBURDEN THICKNESS: 10 ft. +	15. DEPTH GROUNDWATER ENCOUNTERED: 4 ft.
13. DEPTH DRILLED INTO ROCK: 0 ft.	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: 3.55 ft. from casing; 27 hrs.
14. TOTAL DEPTH OF HOLE: 10 ft.	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): —

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
5	√		—

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY %
—	—	—	—	Grout	—	—

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Abandoned	√			

24. CHECKED BY:	25. NAME OF INSPECTOR: J. Ronald Sides

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX No. e	ANALYTICAL SAMPLE No. f	BLOW COUNTS g	REMARKS h
	0	Firm to Very Firm, Brown SAND, Slightly Clayey Silty Gravel	0 ppm		—	11 20 28 45	12:05, 7-9-93
	1.0						
	2.0		0 ppm		—	.4 50/.4	Refusal
	3.0						
	4.0	Very Firm, Gray, Clayey Silty Medium Sand - Wet	0 ppm	4 - 6 ft.	—	15 37 24 16	
	5.0						

HTW DRILLING LOG

HOLE No. LF-1A

PROJECT: West Point Subsurface Investigation

INSPECTOR: Ron Sides

SHEET 2 OF 2

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX No. e	ANALYTICAL SAMPLE No. f	BLOW COUNTS g	REMARKS h
		SAND					
	6.0	Firm, Gray, Clayey Silty Fine to Medium SAND - Average, Medium to Fine Grained; Includes Wood Fragments; Wet	2 ppm	6-8	—	15 7 11 25	
	7.0						
	8.0	Firm, Gray, Clayey Silty SAND; Also Paper, Plastic, Dark Organic Matter - Landfill Materials; Wet	2 ppm	8-10	—	8 19 8 7	
	9.0						
	10.0			TD			13:18, 7-9-93

HTW DRILLING LOG

HOLE No. LF-2

1. COMPANY NAME: Law Environmental, Inc.	2. DRILLING SUBCONTRACTOR: Parratt-Wolff
SHEET 1 OF 4	
3. PROJECT: West Point Subsurface Investigation	4. LOCATION: West Point – Parking Lot F
5. NAME OF DRILLER: Mark Beck	6. MANUFACTURER'S DESIGNATION OF DRILL: CME-55
7. SIZE AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: CME-55; 140 lb. Hammer, 30 in. Drop; 2 ft. Spoon, 2 in. Dia.; 4-1/4 in. Augers; S-Type Casing; Tricone Bit	8. HOLE LOCATION: Lot F- Location 2
	9. SURFACE ELEVATION: 345.27
	10. DATE STARTED: 7-11-93 / 11. DATE COMPLETED: 7-21-93
12. OVERBURDEN THICKNESS: ~10.0 ft. +	15. DEPTH GROUNDWATER ENCOUNTERED: ~23.8 ft. BGS
13. DEPTH DRILLED INTO ROCK: ~20.0 ft.	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: ~23.8 ft. BGS; 45 min.
14. TOTAL DEPTH OF HOLE: 30.0 ft.	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): 15.7 ft. BGS (8-11-93)

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
3	√	—	2

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY %
—	—	—	—	—	—	101%

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Well	—	√	—	

24. CHECKED BY:	25. NAME OF INSPECTOR: J. Ronald Sides

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX No. e	ANALYTICAL SAMPLE No. f	BLOW COUNTS g	REMARKS h
	0	Loose, Grayish-Brown Silt, Sand, Minor Clay	0 ppm	Not Saved	—	10 50/.3	7:20, 7-11-93 Spoon Refusal
	1.0	Probable cobbles					
	2.0						Auger refusal
		No Sample	—	—	—	—	—
		Boulders and cobbles					
	3.0	Spin Casing; Then Tricone					
	4.0						Spoon Refusal
		Gray, Clayey Sand	0 ppm			75/.3	
		No Sample	—	—	—	—	
		Probable boulders and cobbles					
	5.0	Spin Tricone					

SENT BY: 2-12-93 ; 10:00 ;

HTW DRILLING LOG

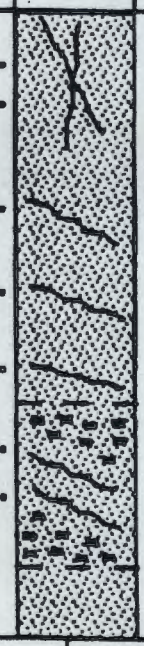
HOLE No. LF-2

PROJECT: West Point Subsurface Investigation

INSPECTOR: Ron Sides

SHEET 2 OF 4

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX No. e	ANALYTICAL SAMPLE No. f	BLOW COUNTS g	REMARKS h
	8.0	No Sample Probable boulders and cobbles Spin Casing; Then Tricone	—	—	—	—	11:40, 7-11-93
	7.0	No Sample Probable cobbles Tricone; Then Spin Casing	—	—	—	—	8:17, 7-12-93
	8.0	Firm, Gray, Clayey Sand	0 ppm	8 - 8.4 ft.	—	100/.4	Spoon Refusal
	9.0	No Sample Probable boulders and cobbles Tricone; Then Spin Casing	—	—	—	—	16:30, 7-12-93
	10.0	No Sample Probable rock Spin; Then Tricone	—	—	—	—	7:30, 7-13-93
	11.0	Biotite- Quartz- Feldspar Gneiss Strong Foliation at 20°	0 ppm	Core Box #1 Run #1	70° 90° 30° 30° 30°		9:23, 7-13-93 REC 100% RQD 77%
	12.0						
	13.0	Biotite- Quartz- Feldspar Gneiss			20° 20°		
	14.0						



MRK FORM JUN 89 55-2
0660-0817.02

PROJECT NAME & NO.
West Point 11-0660-0817

HOLE No. LF-2

HTW DRILLING LOG

HOLE No. LF-2

PROJECT: West Point Subsurface Investigation

INSPECTOR: Ron Sides

SHEET 3 OF 4

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX No. e	ANALYTICAL SAMPLE No. f	BLOW COUNTS g	REMARKS h
		Feldspar Gneiss 30% Biotite 30% Quartz 40% Feldspar - Strong Foliation at 20°			20°		Core followed by Tricone and spin casing to 15.5 ft.
	15.0	Set 4 in. Casing to 15.5 ft.					13:12, 7-13-93
		Biotite- Quartz- Feldspar Gneiss Strong Foliation at 20-30°	0 ppm	Core Box #2 Run #2			13:20, 7-20-93
	16.0						REC 100% RQD 67%
	17.0				70°		
	18.0				70° 20° 20°		
	19.0						
	20.0	Garnet- Biotite- Quartz- Feldspar Gneiss - Trace Garnet Strong Foliation at 30°; Fine to Medium Grained	0 ppm	Run #3	20°		15:45, 7-20-93
	21.0				20° 20° 80° 20°		REC 100% RQD 67%
	22.0						
	23.0				20°		

SENT BY: 2-12-93 ; 10:01 ;

HTW DRILLING LOG

HOLE No. LF-2

PROJECT: West Point Subsurface Investigation

INSPECTOR: Ron Sides

SHEET 4 OF 4

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX No. e	ANALYTICAL SAMPLE No. f	BLOW COUNTS g	REMARKS h
	24.0	Biotite- Quartz- Feldspar Gneiss Medium Grained; Weak Foliation at 25°					16:55, 7-20-93
	25.0	Garnet- Biotite- Quartz- Feldspar Gneiss Mostly Fine to Medium Grained; Strong Foliation at 25°	0 ppm	Run #4 Core Box #3	25°		8:08, 7-21-93
	26.0				25°		REC 104% RQD 36% HNU = 0 ppm
	27.0				25°		
					25°		
	28.0				80°		
					25°		
	29.0	Coarse Feldspar Lens at 29.6 ft.			80°		
	30.0				TD		9:50, 7-21-93

MRK FORM JUN 89 55-2
0660-0817.02

PROJECT NAME & NO. West Point 11-0660-0817

HOLE No. LF-2

HTW DRILLING LOG

HOLE No. LF-3

1. COMPANY NAME: Law Environmental, Inc.	2. DRILLING SUBCONTRACTOR: Parratt-Wolff
SHEET 1 OF 8	
3. PROJECT: West Point Subsurface Investigation	4. LOCATION: West Point – Parking Lot F
5. NAME OF DRILLER: Ron Bush	6. MANUFACTURER'S DESIGNATION OF DRILL: CME-75
7. SIZE AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 4-1/4 HSA to 2 ft.; 5-7/8 Core to 48 ft.; Casing set at 48.2 ft.; HX Core to 48.2 - 60.7 ft.	8. HOLE LOCATION: Lot F- Location 3
	9. SURFACE ELEVATION: 375.77
	10. DATE STARTED: 7-11-93 / 11. DATE COMPLETED: 7-25-93
12. OVERBURDEN THICKNESS: ~18 ft.	15. DEPTH GROUNDWATER ENCOUNTERED: 15 - 16 ft. spoon moist to wet
13. DEPTH DRILLED INTO ROCK: 42.7 ft.	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: 15.45 ft. TOC WL (7-25-93 at completion of drilling)
14. TOTAL DEPTH OF HOLE: 60.7 ft.	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): + 11.0 ft. (above ground surface)

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
5, 7.5-8.2 ft., 9-10.5 ft.			5

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY %
N/A	N/A	N/A	N/A	N/A	N/A	

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Completed Well	N/A	√	N/A	

24. CHECKED BY:	25. NAME OF INSPECTOR: Ian J. Grassie

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX No. e	ANALYTICAL SAMPLE No. f	BLOW COUNTS g	REMARKS h
	0	Very Firm, Rusty Brown to Gray, Fine, Silty SAND and Gravel	0 ppm	0-2 ft.		3 8 14 45	REC 50%
	1.0						
	2.0		0 ppm			50/.3	100% rec. (.3);
		No Sample (Boulder)					Roller bit
	3.0						
		No Sample (Boulder)					
	4.0	Tricone; spin 6" casing					Water loss = 31.5 gal.
	5.0						

HTW DRILLING LOG

HOLE No. LF-3

PROJECT: West Point Subsurface Investigation

INSPECTOR: LJG

SHEET 2 OF 8

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX No. e	ANALYTICAL SAMPLE No. f	BLOW COUNTS g	REMARKS h
	6.0	No Sample (Boulder)					Stop
	7.0	Spinning 6 in. Casing No Sample (Boulder)	N/A	N/A	N/A	N/A	N/A
						60/.5	
	8.0	Dense to Very Dense, Brown, Medium to Fine SAND Spinning Casing No Sample (Boulder)		7.5 - 8.2 ft.		50/.2	REC 100%
	9.0		0 ppm	9 - 10.5 ft.		41 52 50/.5	REC 80%
	10.0	Very Dense, Rusty Brown to Gray, Medium to Fine SAND, some Gravel (Moist)					(End 7-12-93)
	11.0	No Sample (Boulder)					(Start 7-13-93) 7.05 ft. from ground surface to top of water
	12.0			Core Box #1 Rune #1			HX Core REC 66% ROD 66%
	13.0	Light Gray Biotite-Granitic Gneiss, Well Foliated (Boulder)	0 ppm				
	14.0						

Spin 6" casing; Tricone roller bit

HTW DRILLING LOG

PROJECT	INSPECTOR	HOLE No.	SHEET
West Point Subsurface Investigation	IJG	LF-3	3 OF 8

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX No. e	ANALYTICAL SAMPLE No. f	BLOW COUNTS g	REMARKS h
			0 ppm		N/A		
		Brown, Fine SAND and SILT					
	15.0	Dense, Gray, Fine SAND and Gravel; Wet	0 ppm	15-16 ft.	N/A	45 55	REC 100%
		Spin 6" casing; Tricone roller bit					
	16.0						(End 7-12-93)
		(Boulder)				50/.2	(Start 7-14-93)
	17.0						
		(Boulder)					
		Stop Roller Bit and 6 in. case					(End 7-14-93)
	18.0	Start Core	0 ppm	Run #2			(Start 7-15-93)
		Highly Fractured, Weathered, Light Gray Granitic Gneiss; high amount of Mafic Minerals - Medium to Fine Grained, Iron Stain in fractures					HX Core
	19.0		0 ppm				
			0 ppm	Run #3			REC 87%
	20.0						(Lost 15 gal. water)
	21.0						
	22.0						
	23.0						

HTW DRILLING LOG

HOLE No. LF-3

PROJECT: West Point Subsurface Investigation

INSPECTOR: IJG

SHEET 4 OF 8

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX No. e	ANALYTICAL SAMPLE No. f	BLOW COUNTS g	REMARKS h
			0 ppm				
	24.0	End 7-15-93					
		Start 7-20-93		Core Box #2 Run #4			Pumped out 55 gal. and can see water rise quickly
		Light Gray, Biotite-Granitic Gneiss, Well Foliated with Vertical Fractures 24.2-25.2 ft.; some Broken, Well Fractured Zones			Vert. frac.		
	25.0	All Breaks and Fractures Weathered and Silty					
							REC 90% RQD 76%
	26.0				Broken section		
	27.0						Lost 65 gal. water
					Horizontal fractures		
	28.0						
	29.0	Start Coring		Run #5			REC 97% RQD 97%
		Rock (Same as Above)					
		Solid from 30 ft. to 31.8 ft.					
	30.0						
	31.0						Lost 25 gal. (90 gal. lost total)
	32.0						

HTW DRILLING LOG

HOLE No. LF-3

PROJECT: West Point Subsurface Investigation

INSPECTOR: IJG

SHEET 5 OF 8

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX No. e	ANALYTICAL SAMPLE No. f	BLOW COUNTS g	REMARKS h
		Light Gray, Well Foliated, Biotite-Granitic Gneiss	0 ppm				REC 100% RQD 98%
	33.0						+ 30 gal. Water Loss
				Core Box #3	45° frac.		Removed 300 gal. with pump on the drill rig
	34.0						(End 7-20-93) (Start 7-21-93)
			0 ppm	Box 3			.35 ft. recovery
							Core Blockage at 34.2 ft. + .3 ft. cave overnight Recored
	35.0						
		Upper 1.6 ft. Light Gray Biotite-Granitic Gneiss; Grading to Zones of Granitic Pegmatite and Amphibolite Pegmatite (50% Quartz, 50% K-Spar)	0 ppm	Run #6			Complete water loss; 9 gal. per min.
	36.0						
							REC 43% RQD 100% of what was recovered
	37.0						
	38.0				45°		
	39.0						11:38
				Run #7			11:40
		Light Gray, Granitic Gneiss - Well Foliated with Zones of Amphibolite	0 ppm				REC 80% RQD 71%
	40.0						
	41.0						

HTW DRILLING LOG

PROJECT	INSPECTOR	HOLE No.	SHEET OF
West Point Subsurface Investigation	LJG	LF-3	6 of 8

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX No. e	ANALYTICAL SAMPLE No. f	BLOW COUNTS g	REMARKS h
		Light Gray, Biotite-Granitic Gneiss Zones with Pegmatite Texture and Zone with Amphibolite Texture	0 ppm	Box 3			REC 100% RQD 65%
				Box 4			
	42.0	Iron Staining in fracture					
	43.0				30°		
		Light to Dark Gray Biotite-Granitic Gneiss - Well Foliated	0 ppm	Run #8			REC 60% RQD 50%
	44.0		0 ppm	Run #9	Broken		REC 100%
		Small amount of Iron Stain					
	45.0						
					50°		RQD 80%
	46.0						
					45°		
	47.0						Lost 800 gal. H_2O
	48.0	Set 4 in. casing to 48.2 ft.					(End 7-21-93)
				Run #10			(Start 7-22-93)
	49.0	Granitic Gneiss; Vertical Fractures 50 to 51.2 ft.	0 ppm		N/A		REC 83% RQD 0%
	50.0						

HTW DRILLING LOG

HOLE No. LF-3

PROJECT: West Point Subsurface Investigation

INSPECTOR: IJG / Ron Sides

SHEET 7 OF 8

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX No. e	ANALYTICAL SAMPLE No. f	BLOW COUNTS g	REMARKS h
	51.0		0 ppm	Core Box #5 Run #11	N/A		(End 7-22-93) (Start 7-25-93) Roller bit to 48 ft. Start 0734 Stop 0820 REC 97% RQD 72%
	52.0	Light to Medium Gray, Biotite-Granitic Gneiss; Well Foliated; Iron Stains in Fractures					
	53.0					45°	
	54.0						
	55.0					30°	
	56.0					30°	
			0 ppm	Run #12			0 gal. water lost REC 100% RQD 67%
	57.0						
	58.0						
	59.0						

HTW DRILLING LOG

HOLE No.	LF-3

PROJECT	INSPECTOR	SHEET / OF
West Point Subsurface Investigation	Ron Sides	SHEET 8 OF 8

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX No. e	ANALYTICAL SAMPLE No. f	BLOW COUNTS g	REMARKS h
			0 ppm				
	60.0						11:53 WL 15:45 TOC WL
	61.0						TD End 7-25-93

HTW DRILLING LOG

HOLE No. LF-4

1. COMPANY NAME: Law Environmental, Inc.	2. DRILLING SUBCONTRACTOR: Parratt-Wolff
SHEET 1 OF 3	
3. PROJECT: West Point Subsurface Investigation	4. LOCATION: West Point - Parking Lot F
5. NAME OF DRILLER: Mark Beck	6. MANUFACTURER'S DESIGNATION OF DRILL: CME-55
7. SIZE AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: CME-55; 140-lb. Hammer, 30 in. Drop; 2 ft. Spoon, 2 in. Dia.; 4-1/4 in. Augers	8. HOLE LOCATION: Lot F- Location 4
	9. SURFACE ELEVATION: 376.82
	10. DATE STARTED: 7-26-93 / 11. DATE COMPLETED: 7-27-93
12. OVERBURDEN THICKNESS: 15.8 ft. +	15. DEPTH GROUNDWATER ENCOUNTERED: ~9.0 ft.
13. DEPTH DRILLED INTO ROCK: 0 ft.	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: 7.3 ft. below ground; ~13 hrs.
14. TOTAL DEPTH OF HOLE: 15.8 ft.	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): 6.88 ft. TOC (8-11-93)

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
—	—	—	None

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY %
—	—	—	—	—	—	N/A

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Installed well	—	√	—	

24. CHECKED BY:	25. NAME OF INSPECTOR: J. Ronald Sides

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX No. e	ANALYTICAL SAMPLE No. f	BLOW COUNTS g	REMARKS h
	1.0	For Lithology, see description for well LF-3					16:12, 7-26-93
	2.0	Auger Directly					
	3.0						
	4.0						
	5.0						

HTW DRILLING LOG

PROJECT	INSPECTOR	HOLE No.
West Point Subsurface Investigation	Ron Sides	LF-4
		SHEET 2 OF 3

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX No. e	ANALYTICAL SAMPLE No. f	BLOW COUNTS g	REMARKS h
	6.0						
	7.0						
	8.0						
	9.0	For Lithology, see discription forwell LF-3					
	10.0	Auger Directly					
	11.0						
	12.0						
	13.0						
	14.0						

HTW DRILLING LOG

HOLE No. LF-4

PROJECT: West Point Subsurface Investigation

INSPECTOR: Ron Sides

SHEET 3 OF 3

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX No. e	ANALYTICAL SAMPLE No. f	BLOW COUNTS g	REMARKS h
	15.0	Auger Directly					7:15, 7-27-93
	16.0				TD		7:34, 7-27-93

MRK FORM JUN 89 55-2

0660-0817.02

PROJECT NAME & NO. West Point 11-0660-0817

HOLE No. LF-4