



Solicitation No.  
**N40192-16-R-1305**

**FY16 MILCON P-635**  
**MUNICIPAL SOLID WASTE LANDFILL CLOSURE**

**ANDERSEN AIR FORCE BASE, GUAM**

REQUEST FOR PROPOSAL DOCUMENTS

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REQUEST FOR PROPOSAL DOCUMENTS

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**N40192-16-R-1305**

**FY16 MILCON P-635  
MUNICIPAL SOLID WASTE LANDFILL CLOSURE**

**ANDERSEN AIR FORCE BASE, GUAM**

**PART A  
PROPOSAL FORMS AND DOCUMENTS**

<b>SOLICITATION, OFFER, AND AWARD</b> <i>(Construction, Alteration, or Repair)</i>	1. SOLICITATION NO. N40192-16-R-1305	2. TYPE OF SOLICITATION <input type="checkbox"/> SEALED BID (IFB) <input checked="" type="checkbox"/> NEGOTIATED (RFP)	3. DATE ISSUED 24-Jun-2016	PAGE OF PAGES 1 OF 51
	<b>IMPORTANT - The "offer" section on the reverse must be fully completed by offeror.</b>			

4. CONTRACT NO.	5. REQUISITION/PURCHASE REQUEST NO.	6. PROJECT NO.
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7. ISSUED BY COMMANDING OFFICER - NAVFAC MARIANAS IPT MILCON PSC 455, BOX 195 FPO AP 96540-2937  TEL: _____ FAX: _____	CODE N40192	8. ADDRESS OFFER TO <i>(If Other Than Item 7)</i> CODE  <b>See Item 7</b>  TEL: _____ FAX: _____
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9. FOR INFORMATION CALL:	A. NAME TERESA F. AGUON	B. TELEPHONE NO. <i>(Include area code) (NO COLLECT CALLS)</i> 671-333-3171
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**SOLICITATION**

**NOTE: In sealed bid solicitations "offer" and "offeror" mean "bid" and "bidder".**

10. THE GOVERNMENT REQUIRES PERFORMANCE OF THE WORK DESCRIBED IN THESE DOCUMENTS *(Title, identifying no., date):*

REQUEST FOR PROPOSAL N40192-16-R-1305  
FY16 MILCON P-635, MUNICIPAL SOLID WASTE LANDFILL CLOSURE  
ANDERSEN AIR FORCE BASE, GUAM

DESCRIPTION OF WORK: See Continuation Page

THIS PROCUREMENT IS UNRESTRICTED.  
North American Industry Classification System Code is 562212, Solid Waste Landfill; Size Standard: \$38.5M

PROPOSAL DOCUMENTS:  
- Solicitation, Offer, and Award (SF1442)  
- Instructions to Offerors  
- Representations and Certifications

CONTRACT DOCUMENTS:  
- Solicitation, Offer, and Award (SF1442)  
- Contract Clauses  
- NAVFAC Specification WON 1333930  
- NAVFAC Drawings WON 1333930  
- Other Pertinent Documents

11. The Contractor shall begin performance within 15 calendar days and complete it within 570 calendar days after receiving  award,  notice to proceed. This performance period is  mandatory,  negotiable. (See FAR 52.211-10 \_\_\_\_\_.)

12 A. THE CONTRACTOR MUST FURNISH ANY REQUIRED PERFORMANCE AND PAYMENT BONDS? <i>(If "YES," indicate within how many calendar days after award in Item 12B.)</i> <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	12B. CALENDAR DAYS 10
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13. ADDITIONAL SOLICITATION REQUIREMENTS:

A. Sealed offers in original and 3 copies to perform the work required are due at the place specified in Item 8 by 04:30 PM (hour) local time 09 Aug 2016 (date). If this is a sealed bid solicitation, offers must be publicly opened at that time. Sealed envelopes containing offers shall be marked to show the offeror's name and address, the solicitation number, and the date and time offers are due.

B. An offer guarantee  is,  is not required.

C. All offers are subject to the (1) work requirements, and (2) other provisions and clauses incorporated in the solicitation in full text or by reference.

D. Offers providing less than 120 calendar days for Government acceptance after the date offers are due will not be considered and will be rejected.

**SOLICITATION, OFFER, AND AWARD (Continued)***(Construction, Alteration, or Repair)***OFFER (Must be fully completed by offeror)**14. NAME AND ADDRESS OF OFFEROR *(Include ZIP Code)*15. TELEPHONE NO. *(Include area code)*16. REMITTANCE ADDRESS *(Include only if different than Item 14)***See Item 14**

CODE

FACILITY CODE

17. The offeror agrees to perform the work required at the prices specified below in strict accordance with the terms of this solicitation, if this offer is accepted by the Government in writing within \_\_\_\_\_ calendar days after the date offers are due. *(Insert any number equal to or greater than the minimum requirements stated in Item 13D. Failure to insert any number means the offeror accepts the minimum in Item 13D.)*

AMOUNTS

SEE SCHEDULE OF PRICES

18. The offeror agrees to furnish any required performance and payment bonds.

**19. ACKNOWLEDGMENT OF AMENDMENTS***(The offeror acknowledges receipt of amendments to the solicitation -- give number and date of each)*

AMENDMENT NO.

DATE

20A. NAME AND TITLE OF PERSON AUTHORIZED TO SIGN OFFER *(Type or print)*

20B. SIGNATURE

20C. OFFER DATE

**AWARD (To be completed by Government)**

21. ITEMS ACCEPTED:

22. AMOUNT

23. ACCOUNTING AND APPROPRIATION DATA

24. SUBMIT INVOICES TO ADDRESS SHOWN IN *(4 copies unless otherwise specified)***ITEM**

25. OTHER THAN FULL AND OPEN COMPETITION PURSUANT TO

 10 U.S.C. 2304(c) 41 U.S.C. 253(c)

26. ADMINISTERED BY

CODE

27. PAYMENT WILL BE MADE BY:

CODE

**CONTRACTING OFFICER WILL COMPLETE ITEM 28 OR 29 AS APPLICABLE**

28. NEGOTIATED AGREEMENT *(Contractor is required to sign this document and return \_\_\_\_\_ copies to issuing office.)* Contractor agrees to furnish and deliver all items or perform all work, requisitions identified on this form and any continuation sheets for the consideration stated in this contract. The rights and obligations of the parties to this contract shall be governed by (a) this contract award, (b) the solicitation, and (c) the clauses, representations, certifications, and specifications or incorporated by reference in or attached to this contract.

29. AWARD *(Contractor is not required to sign this document.)*

Your offer on this solicitation, is hereby accepted as to the items listed. This award commutes the contract, which consists of (a) the Government solicitation and your offer, and (b) this contract award. No further contractual document is necessary.

30A. NAME AND TITLE OF CONTRACTOR OR PERSON AUTHORIZED TO SIGN *(Type or print)*31A. NAME OF CONTRACTING OFFICER *(Type or print)*

30B. SIGNATURE

30C. DATE

TEL:

EMAIL:

31B. UNITED STATES OF AMERICA BY

31C. AWARD DATE

Section 00010 - Solicitation Contract Form

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0001	Total Base Bid FFP Total sum of Base Bid SubCLINs 000101 and 000102 for all work complete and in accordance with RFP N40192-16-R-1305 NAVFAC specifications and drawings for WON 1333930 to construct a landfill closure capping system for the municipal solid waste landfill area at Andersen Air Force Base (AAFB), Guam, but NOT including work in CLIN 0002. FOB: Destination		Project	<hr/>	
					<hr/>
					NET AMT

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
000101	Base Bid Construction FFP Total price for the entire work to provide all necessary labor, material, transportation, supervision, equipment, and other incidental work required to construct a landfill closure capping system in accordance with the drawings and specifications, not including work in SubCLIN 000102 and CLIN 0002. FOB: Destination		Lump Sum	<hr/>	
					<hr/>
					NET AMT

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
000102	Base Bid MEC Clearance FFP Total price for the Munitions and Explosives of Concern (MEC) Clearance as described in Specification 01 57 19.01 20, complete and in accordance with the Request for Proposal, not including work in CLIN 0002. These costs include, but are not necessarily limited to, MEC equipment and personnel mobilization/demobilization, MEC specific traffic control, community outreach, MEC work plans, MEC reporting, MEC Personnel, reduced production rates associated with vegetation clearance and soil excavation in layers to the initial soil clearance depth (i.e. 36-inches), additional costs to shield equipment operators for excavations to construction depth, soil screening and/or broadcasting for all excavations to construction depth, equipment and scanning, and anomaly excavation and clearance. This price does not include the normal (i.e. unburdened with MEC) costs for vegetation clearance and excavation. FOB: Destination		Lump Sum		
NET AMT					

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0002	Option 1 MEC Secondary Soil Clearance FFP Unit price per cubic yard of soil for the MEC secondary soil clearance (below 36-inches of soil depth) by layers of MEC/MPPEH greater than 60 mm, in the event that MEC/MPPEH greater than 60 mm is found during the initial soil clearance, as described in Specification 01 57 19.01 20, complete and in accordance with the Request for Proposal, not including work in SubCLIN 000102. These costs include, but are not necessarily limited to, reduced production rates associated with soil excavation in layers, equipment and scanning, and anomaly excavation and clearance. The unit price in this Option CLIN shall include all material, labor, equipment, supervision, and indirect costs complete for price adjustment in accordance with FAR 52.243-4, Changes. Contracting Officer may exercise this option by written notice within 365 calendar days from date of contract award. FOB: Destination	13,794	Cubic Yard		
NET AMT					

**SF1442 BLOCK 10 CONTINUATION**

READ THE FOLLOWING IN CONJUNCTION WITH THE ACQUISITION REQUIREMENTS.

This procurement is unrestricted.  
NAICS: 562212 Size Standard: \$38.5 Million

Inquiries regarding the Request for Proposal (RFP) shall be submitted electronically using the Request for Information (RFI) form provided with this solicitation. The Point of Contact (POC) for inquiries is Teresa Aguon at (671) 333-3171, by email at [Teresa.Aguon@fe.navy.mil](mailto:Teresa.Aguon@fe.navy.mil). The Government does not intend to respond to inquiries submitted less than 15 days before the proposal receipt date.

**DESCRIPTION OF WORK:**

This is a design-bid-build project to construct a landfill closure capping system for the municipal solid waste landfill area at Andersen Air Force Base on Guam. The landfill closure capping system includes a final cover system, passive landfill gas venting system, final cover slope protection drainage system, upgrades to the leachate system, and an all-weather access road with lined drainage swale.

The estimated price range for this project is between \$5,000,000 and \$10,000,000.

**ENFORCEABILITY OF PROPOSAL:**

Items offered in the contractor's proposal (e.g., key personnel, subcontractors, materials, etc.) are binding on the contractor and shall be provided for the duration of the contract. Substitutions will require prior Contracting Officer's approval and shall be equal or better, in the judgment of the Contracting Officer, than the items originally proposed.

**PROPOSALS MUST SET FORTH FULL, ACCURATE, AND COMPLETE INFORMATION AS REQUIRED BY THIS REQUEST FOR PROPOSAL (INCLUDING ATTACHMENTS). THE PENALTY FOR MAKING FALSE STATEMENTS IN PROPOSALS IS PRESCRIBED IN 18 U.S.C. 1001.**

**THE GOVERNMENT INTENDS TO EVALUATE PROPOSALS AND AWARD WITHOUT DISCUSSIONS. HOWEVER, THE GOVERNMENT RESERVES THE RIGHT TO CONDUCT DISCUSSIONS IF IT IS LATER DETERMINED BY THE CONTRACTING OFFICER TO BE NECESSARY. THEREFORE, EACH INITIAL OFFER SHOULD CONTAIN THE BEST TERMS FROM A TECHNICAL, COST, AND PRICE STANDPOINT.**

## Section 00100 - Bidding Schedule/Instructions to Bidders

INSTRUCTIONS TO OFFERORS**1. PROJECT MAGNITUDE**

The estimated price range for this project is between \$5,000,000 and \$10,000,000.

**2. INQUIRIES**

Inquiries regarding the Request for Proposal (RFP) shall be submitted electronically using the Request for Information (RFI) form provided as Attachment (1). The Point of Contact (POC) for inquiries is Teresa Aguon at (671) 333-3171, by email at [teresa.aguon@fe.navy.mil](mailto:teresa.aguon@fe.navy.mil). The Government does not intend to respond to inquiries submitted less than 15 days before the proposal receipt date.

**3. PROPOSAL SUBMITTAL REQUIREMENTS****3.1 PROPOSAL FORMAT**

Proposals submitted in response to this solicitation shall be formatted as follows and furnished in the number of copies stated herein.

Proposals shall be submitted in three ring binders or bound, with tabs or separators. Page limits, where stipulated, must be adhered to (page refers to one printed side of a piece of paper). Proposals shall be submitted on 8.5" X 11" paper, using standard margins and no less than 10 pitch font, utilizing both sides of the paper. The format for the proposal follows in paragraphs 3.2 and 3.3 of this section. A cover letter shall accompany the technical and price proposals.

The cover letter shall include —

- a. The solicitation number;
- b. The name, address, telephone and facsimile numbers, and e-mail addresses of the Offeror;
- c. The **DUNS Number, CAGE Code, and Tax Identification Number (TIN)** of the Offeror;
- d. A statement specifying the extent of agreement with all terms, conditions, and provisions included in the solicitation and agreement to furnish any or all items upon which prices are offered at the price set opposite each item;
- e. Names, titles, phone and facsimile numbers, and email addresses of persons authorized to negotiate on the Offeror's behalf with the Government in connection with this solicitation and;
- f. Name, title, and signature of person authorized to sign the proposal. Proposals signed by an agent shall be accompanied by evidence of that agent's authority, unless that evidence has been previously furnished to the issuing office.
  - i. Individuals. A contract with an individual shall be signed by that individual. A contract with an individual doing business as a firm shall be signed by that individual, and the signature shall be followed by the individual's typed, stamped, or printed name and the words "an individual doing business as *[insert name of firm]*."
  - ii. Partnerships. A contract with a partnership shall be signed in the partnership name.
  - iii. Corporations. A contract with a corporation shall be signed in the corporate name, followed by the word "by" and the signature and title of the person authorized to sign.
  - iv. Joint Ventures. A contract with a joint venture may involve any combination of individuals, partnerships, or corporations. The contract shall be signed by each participant in the joint venture in the manner prescribed in paragraphs (a) through (c) above for each type of participant.
  - v. Agents. When an agent is to sign the contract, other than as stated in paragraphs (a) through (d) above, the agent's authorization to bind the principal must be established by evidence satisfactory to the Contracting Officer.

- g. Fully executed true and authentic copy of any applicable legally binding agreement, such as a joint venture agreement, partnership agreement, or teaming agreement.

### 3.2 PROPOSAL PARTS

The format for the proposal is as follows:

#### TECHNICAL PROPOSAL

- Cover Letter: Joint Venture Agreement, Binding Teaming Agreement, or other contractual agreement (if applicable)
- Tab 1: Factor 1, Experience (Exhibit A)
- Tab 2: Factor 2, Safety (TRC, DART, Narrative)
- Tab 3: Factor 3, Past Performance (Exhibit B and/or CPAR Evaluations)

#### PRICE PROPOSAL

- Cover Letter: Joint Venture Agreement, Binding Teaming Agreement, or other contractual agreement (if applicable)
- Factor 4, Price (In Sealed Envelope) – The envelope shall contain the following original documents:

- i. Standard Form SF1442 (Solicitation, Offer, and Award) with the following completed:
  - a. Blocks 14 through 20c
  - b. Section 00010 Prices for all Contract Line Item Numbers (CLINs)
- ii. Representations and Certifications – Section 00600 of RFP and the Online Representations and Certifications Application (ORCA) via the System for Award Management (SAM) website.
- iii. Bid Bond in the amount of \$3M or 20% of the total proposed price, whichever is less

Offerors are asked to submit only the information/exhibits required. Do not submit any additional information such as brochures or other pre-printed materials.

### 3.3 PROPOSAL SUBMISSION

Proposals in response to this RFP must be submitted in the format and number of copies as follows:

- i. One (1) original Technical Proposal
- ii. Three (3) copies of the Technical Proposal
- iii. One (1) electronic copy of the Technical Proposal in Adobe Acrobat PDF format provided on compact disc (CD)
- iv. One (1) original Price Proposal (in sealed envelope)
- v. Three (3) copies of the Price Proposal (in sealed envelope)
- vi. One (1) electronic copy of the Price Proposal in Adobe Acrobat PDF format provided on compact disc (CD). Place the CD in the sealed envelope, along with the copies of the Price Proposal.

The Offeror is responsible for ensuring that all original paper and electronic copies are identical. Should there be a discrepancy between the paper and electronic versions, the original paper copy shall govern.

Proposals must be received by this office no later than the date and time stated in Block 13 of the SF1442. Offerors should address all evaluation factors and shall submit the proposal to the following address:

Naval Facilities Engineering Command Marianas  
 Attention: Teresa F. Aguon  
 Bldg 4175, 2<sup>nd</sup> Floor, Room A206  
 Pedro LG Roberto Drive, Apra Heights,  
 Santa Rita, Guam 96915

**PROPOSALS MUST BE RECEIVED AND DATE/TIME STAMPED BY THE CONTRACTING OFFICER ON OR BEFORE THE DATE AND TIME SPECIFIED IN THE RFP. LATE SUBMITTALS WILL NOT BE CONSIDERED UNLESS IT MEETS THE REQUIREMENTS IN FAR 52.215-1 INSTRUCTIONS TO OFFERORS – COMPETITIVE ACQUISITION.**

Proposal must be clearly marked on the outside of the package with the solicitation number.

**4. PRE-PROPOSAL CONFERENCE AND SITE VISIT**

- a. A pre-proposal conference will be held on **Wednesday July 13, 2016 at 8:30 a.m., Guam time, at Naval Facilities Engineering Command Marianas, Building 4175 A-wing Haggan Conference Room, Santa Rita Office Complex, Guam**, where questions may be answered relative to this RFP. Comments, constructive criticism, and identification/notification of RFP inconsistencies are solicited as well. Due to security requirements, all participants must park in the visitor parking lot and present identification at check-in. Map and directions are available upon request. A one-time site visit of the project location will commence immediately after the pre-proposal conference.
- b. Requests for base access to attend the site visit must be submitted electronically to [teresa.aguon@fe.navy.mil](mailto:teresa.aguon@fe.navy.mil) NO LATER THAN Friday, July 1, 2016 Guam time, using the Base Access List (BAL) in Attachment (2) of the solicitation. Foreign nationals who will be attending the site visit shall complete the Foreign Visitor Request form in Attachment (3) of the solicitation and provide a copy of their passports. Failure to request for base access will result in delays or disapproval to access the site location.
- c. All prospective Offerors are urged to attend the pre-proposal conference. In order to make the conference as productive as possible, Offerors are requested to submit, three (3) days prior to the conference, any questions they may have in writing to Teresa Aguon via email at [teresa.aguon@fe.navy.mil](mailto:teresa.aguon@fe.navy.mil). The submission of written questions will not preclude anyone from posing questions during the pre-proposal conference. During the conference, written, signed questions will be accepted, and may be answered during the conference if time permits. **ALL QUESTIONS MUST BE IN WRITING.**
- d. Failure of a prospective Offeror to submit any questions or to attend the conference will be construed to mean that the Offeror fully understands all requirements of the solicitation. Prospective Offerors are advised that the pre-proposal conference will be held solely for the purpose of explaining the concepts involved in the project and the specifications, terms, and conditions of this solicitation.
- e. No minutes of this meeting will be issued. All prospective Offerors are advised that this solicitation will remain unchanged unless it is amended in writing. However, if an amendment is issued, normal procedures relating to the acknowledgment and receipt of any such amendment as described in Contract Clause "Amendment to Solicitations" of this section shall be applicable.
- f. The use of cameras, tape recorders, and other recording devices are prohibited during the pre-proposal conference.

**5. JOINT VENTURE, LIMITED LIABILITY COMPANIES AND LIMITED PARTNERSHIP**

- a. Joint Venture Offerors shall provide a copy of the joint venture agreement. The agreement shall include information that identifies the responsibilities for each entity under this contract, demonstrate the relationship between firms, and identify contractual relationships and authorities to bind each entity of the joint venture. The Joint Venture also needs to complete the online representations and certifications for each joint venture member as well as for the joint venture itself.
- b. Joint Ventures and Limited Liability Companies and Limited Partnerships shall submit the following additional documentation regarding their business entities:

- i. A copy of the JV, LLC, or LTD agreement.
- ii. A detailed statement outlining the following in terms of percentages where appropriate:
  1. The relationship of the team/partners/parties in terms of business ownership, capital contribution, profit distribution or loss sharing.
  2. The management approach in terms of who will conduct, direct, supervise, and control.
  3. The structure and decision-making responsibilities of the partners/parties in terms of who will control the manner and method of performance of work.
  4. Identify (by name and title) the personnel having the authority to legally bind the partners/parties (including authority to execute the contract documents and bonds).
- iii. A list of partners/parties, to include company name, DUNS and CAGE Numbers, Address, Point of Contact, e-mail address, phone number and facsimile number

## 6. SYSTEM FOR AWARD MANAGEMENT REGISTRATION

The implementation of the System for Award Management (SAM), among other changes, brings together the capabilities of the former Central Contractor Registration (CCR) and Online Representations and Certifications Application (ORCA).

Firms offering a response to this notice should ensure that they are registered in the System for Award Management (SAM) database (<https://www.sam.gov>), and complete the provisions associated with the annual representations and certifications identified in the Federal Acquisition Regulation (FAR) subpart 4.1202 and Defense FAR Supplement (DFARS) subpart 204.1202. Firms shall also ensure to obtain a registered DUNS number prior to award.

**NOTE: CONTRACTORS MUST COMPLETE BOTH THE FAR AND DFARS REPRESENTATIONS AND CERTIFICATIONS ON THE SAM WEBSITE. CONTRACTORS ARE PROVIDED ACCESS TO THE DFARS PROVISIONS ONLY WHEN THEY ANSWER AFFIRMATIVELY THAT THEY WOULD LIKE TO DO BUSINESS WITH THE DEPARTMENT OF DEFENSE.** Contractors are advised that both FAR and DFARS provisions must be listed on their SAM record in order to participate in this solicitation.

## 7. FEDERAL CONTRACTOR PROGRAM

In accordance with Federal Acquisition Regulation (FAR) 22.1303, any contractor or subcontractor with a contract of \$100,000 or more with the Federal Government must take affirmative action to employ, and advance in employment, qualified special disabled veterans, veterans of the Vietnam era, and other eligible veterans without discrimination based on their disability or veteran's status.

Companies must file an annual VETS-4212 report, which shows the number of targeted veterans in their workforce by job category, hiring location, and number of new hires, including targeted veterans hired during the reporting period and the maximum number and minimum number of employees of such contractor during the period covered by the report. Instructions, information and follow-up assistance is provided at the VETS website at <http://www.dol.gov/vets/vets4212.htm> or employers may contact the VETS-4212 Customer Support Center at (866) 237-0275 or e-mail at [VETS4212-customersupport@dol.gov](mailto:VETS4212-customersupport@dol.gov). **A contract cannot be awarded to a contractor that has not submitted a required annual form VETS-4212, Federal Contractor Veterans' Employment Report (VETS-4212 Report) if subject to the reporting requirements of 38 U.S.C. 4212(d) for that fiscal year.**

## 8. INCURRED EXPENSES

The Government is not responsible for any costs incurred or associated with preparation and submission of a proposal in response to this solicitation.

## 9. PRE-AWARD SURVEY/RESPONSIBILITY DETERMINATION

This pre-award survey/responsibility determination is not part of the technical evaluation. FAR subpart 9.104 requires prospective contractors to demonstrate that they have adequate financial resources to perform the contract or the ability to obtain them; capability to comply with the required performance schedule; satisfactory performance record; and be otherwise eligible to receive an award under applicable laws and regulations. This is notice that the Contracting Officer may request Offerors submit the following information for review and determination prior to award:

- a. Company financial statements (balance sheets and income statements) for the past three years.
- b. Financial resources available to perform the contract. Submit evidence of availability of working/operating capital that will be used for the performance of the contract. If the Offeror plans to rely on financial support from other sources, identify the maximum lines of credit that will be available to include documentation to support the amounts. The maximum lines of credit should be based upon the inclusion of this contract effort. For joint ventures discuss the financial responsibilities among companies and provide the same information for each partner.
- c. Newly-formed entities (e.g. limited liability companies (LLC)), limited partnerships (LTD) and newly created corporate subsidiaries) that are the entity liable on the contract ordinarily have no record or an insufficient record of relevant experience, past performance, and financial capability to support a responsibility determination. In such cases, the Offeror may rely on the resources of the LLC member, parent, limited partner, or other entities related to the Offeror for responsibility purposes where the offer submits a guaranty from the entity providing the resources.
- d. A list of existing commercial and government business commitments to include contract numbers, names of Contracting Officers, telephone numbers, value of contract, completion date and percent complete. If the list of existing commitments is extensive, provide the required information on at least five projects of similar dollar value and a summary of the existing commitments to include number of contracts, total dollar value of all contracts, and total dollar value of work remaining.

## 10. TERRITORY OF GUAM NOTICE CONCERNING TAXES, LICENSES, WITHHOLDINGS

**(NOTE: The information in this Notice to Bidders is provided by the Government of Guam, Department of Revenue and Taxation. Any questions concerning applicability or interpretation should be directed to that Agency at 1240 Army Drive, Barrigada, Guam 96913. Business registration with the Government of Guam is not considered in determining contractor responsiveness or responsibility. Bidders attention is directed to FAR Clause 52.236-7 in the solicitation entitled "PERMITS AND RESPONSIBILITIES".)**

- a. All persons engaging in business in Guam must be licensed to do so by the Government of Guam prior to commencement of business in Guam. Engaging in business includes, but is not limited to, services provided by contractors. Applications for business licenses shall be made to the Department of Revenue and Taxation, License and Registration Branch.
- b. All corporations, domestic (created under the laws of Guam) or foreign (not created under the laws of Guam) must register with the Department of Revenue and Taxation, License and Registration Branch.
- c. Any person engaging in business on Guam must file monthly Business Privilege Tax returns with the Department of Revenue and Taxation.
- d. All corporations with the Guam source of funds must file income tax returns to the Department of Revenue and Taxation on the prescribed forms.
- e. All employers must deposit wage withholdings from their employees to the Treasurer of Guam. Guam Depository Receipts, as well as Quarterly Withholding Statements are required to be filed with the Department of Revenue and Taxation in the same manner as similar returns and statements required to be filed with the U.S. Internal Revenue Service.
- f. Failure to comply with the above may result in criminal or civil penalties as provided by law.

**SOLICITATION PROVISIONS**

## CLAUSES INCORPORATED BY REFERENCE

52.204-7	System for Award Management	JUL 2013
52.204-16	Commercial and Government Entity Code Reporting	JUL 2015
52.236-28	Preparation of Proposals--Construction	OCT 1997
252.203-7005	Representation Relating to Compensation of Former DoD Officials	NOV 2011
252.204-7004 Alt A	System for Award Management Alternate A	FEB 2014
252.215-7008	Only One Offer	OCT 2013
252.236-7008	Contract Prices-Bidding Schedules	DEC 1991

## CLAUSES INCORPORATED BY FULL TEXT

52.211-2 AVAILABILITY OF SPECIFICATIONS, STANDARDS, AND DATA ITEM DESCRIPTIONS LISTED IN THE ACQUISITION STREAMLINING AND STANDARDIZATION INFORMATION SYSTEM (ASSIST) (APR 2014)

(a) Most unclassified Defense specifications and standards may be downloaded from the following ASSIST websites:

- (1) ASSIST (<https://assist.dla.mil/online/start/>);
- (2) Quick Search (<http://quicksearch.dla.mil/>);
- (3) ASSISTdocs.com (<http://assistdocs.com>).

(b) Documents not available from ASSIST may be ordered from the Department of Defense Single Stock Point (DoDSSP) by--

- (1) Using the ASSIST Shopping Wizard (<https://assist.dla.mil/wizard/index.cfm>);
- (2) Phoning the DoDSSP Customer Service Desk (215) 697-2179, Mon-Fri, 0730 to 1600 EST; or
- (3) Ordering from DoDSSP, Building 4, Section D, 700 Robbins Avenue, Philadelphia, PA 19111-5094, Telephone (215) 697-2667/2179, Facsimile (215) 697-1462.

(End of provision)

52.211-14 NOTICE OF PRIORITY RATING FOR NATIONAL DEFENSE, EMERGENCY PREPAREDNESS, AND ENERGY PROGRAM USE (APR 2008)

Any contract awarded as a result of this solicitation will be    DX rated order;   x   DO rated order certified for national defense, emergency preparedness, and energy program use under the Defense Priorities and Allocations

System (DPAS) (15 CFR 700), and the Contractor will be required to follow all of the requirements of this regulation.

(End of provision)

#### 52.215-1 INSTRUCTIONS TO OFFERORS--COMPETITIVE ACQUISITION (JAN 2004)

(a) Definitions. As used in this provision--

“Discussions” are negotiations that occur after establishment of the competitive range that may, at the Contracting Officer's discretion, result in the offeror being allowed to revise its proposal.

“In writing or written” means any worded or numbered expression which can be read, reproduced, and later communicated, and includes electronically transmitted and stored information.

“Proposal modification” is a change made to a proposal before the solicitation's closing date and time, or made in response to an amendment, or made to correct a mistake at any time before award.

“Proposal revision” is a change to a proposal made after the solicitation closing date, at the request of or as allowed by a Contracting Officer as the result of negotiations.

“Time”, if stated as a number of days, is calculated using calendar days, unless otherwise specified, and will include Saturdays, Sundays, and legal holidays. However, if the last day falls on a Saturday, Sunday, or legal holiday, then the period shall include the next working day.

(b) Amendments to solicitations. If this solicitation is amended, all terms and conditions that are not amended remain unchanged. Offerors shall acknowledge receipt of any amendment to this solicitation by the date and time specified in the amendment(s).

(c) Submission, modification, revision, and withdrawal of proposals. (1) Unless other methods (e.g., electronic commerce or facsimile) are permitted in the solicitation, proposals and modifications to proposals shall be submitted in paper media in sealed envelopes or packages (i) addressed to the office specified in the solicitation, and (ii) showing the time and date specified for receipt, the solicitation number, and the name and address of the offeror. Offerors using commercial carriers should ensure that the proposal is marked on the outermost wrapper with the information in paragraphs (c)(1)(i) and (c)(1)(ii) of this provision.

(2) The first page of the proposal must show--

(i) The solicitation number;

(ii) The name, address, and telephone and facsimile numbers of the offeror (and electronic address if available);

(iii) A statement specifying the extent of agreement with all terms, conditions, and provisions included in the solicitation and agreement to furnish any or all items upon which prices are offered at the price set opposite each item;

(iv) Names, titles, and telephone and facsimile numbers (and electronic addresses if available) of persons authorized to negotiate on the offeror's behalf with the Government in connection with this solicitation; and

(v) Name, title, and signature of person authorized to sign the proposal. Proposals signed by an agent shall be accompanied by evidence of that agent's authority, unless that evidence has been previously furnished to the issuing office.

(3) Submission, modification, or revision, of proposals.

(i) Offerors are responsible for submitting proposals, and any modifications, or revisions, so as to reach the Government office designated in the solicitation by the time specified in the solicitation. If no time is specified in the solicitation, the time for receipt is 4:30 p.m., local time, for the designated Government office on the date that proposal or revision is due.

(ii)(A) Any proposal, modification, or revision received at the Government office designated in the solicitation after the exact time specified for receipt of offers is "late" and will not be considered unless it is received before award is made, the Contracting Officer determines that accepting the late offer would not unduly delay the acquisition; and--

(1) If it was transmitted through an electronic commerce method authorized by the solicitation, it was received at the initial point of entry to the Government infrastructure not later than 5:00 p.m. one working day prior to the date specified for receipt of proposals; or

(2) There is acceptable evidence to establish that it was received at the Government installation designated for receipt of offers and was under the Government's control prior to the time set for receipt of offers; or

(3) It is the only proposal received.

(B) However, a late modification of an otherwise successful proposal that makes its terms more favorable to the Government, will be considered at any time it is received and may be accepted.

(iii) Acceptable evidence to establish the time of receipt at the Government installation includes the time/date stamp of that installation on the proposal wrapper, other documentary evidence of receipt maintained by the installation, or oral testimony or statements of Government personnel.

(iv) If an emergency or unanticipated event interrupts normal Government processes so that proposals cannot be received at the office designated for receipt of proposals by the exact time specified in the solicitation, and urgent Government requirements preclude amendment of the solicitation, the time specified for receipt of proposals will be deemed to be extended to the same time of day specified in the solicitation on the first work day on which normal Government processes resume.

(v) Proposals may be withdrawn by written notice received at any time before award. Oral proposals in response to oral solicitations may be withdrawn orally. If the solicitation authorizes facsimile proposals, proposals may be withdrawn via facsimile received at any time before award, subject to the conditions specified in the provision at 52.215-5, Facsimile Proposals. Proposals may be withdrawn in person by an offeror or an authorized representative, if the identity of the person requesting withdrawal is established and the person signs a receipt for the proposal before award.

(4) Unless otherwise specified in the solicitation, the offeror may propose to provide any item or combination of items.

(5) Offerors shall submit proposals in response to this solicitation in English, unless otherwise permitted by the solicitation, and in U.S. dollars, unless the provision at FAR 52.225-17, Evaluation of Foreign Currency Offers, is included in the solicitation.

(6) Offerors may submit modifications to their proposals at any time before the solicitation closing date and time, and may submit modifications in response to an amendment, or to correct a mistake at any time before award.

(7) Offerors may submit revised proposals only if requested or allowed by the Contracting Officer.

(8) Proposals may be withdrawn at any time before award. Withdrawals are effective upon receipt of notice by the

Contracting Officer.

(d) Offer expiration date. Proposals in response to this solicitation will be valid for the number of days specified on the solicitation cover sheet (unless a different period is proposed by the offeror).

(e) Restriction on disclosure and use of data. Offerors that include in their proposals data that they do not want disclosed to the public for any purpose, or used by the Government except for evaluation purposes, shall--

(1) Mark the title page with the following legend: This proposal includes data that shall not be disclosed outside the Government and shall not be duplicated, used, or disclosed--in whole or in part--for any purpose other than to evaluate this proposal. If, however, a contract is awarded to this offeror as a result of--or in connection with-- the submission of this data, the Government shall have the right to duplicate, use, or disclose the data to the extent provided in the resulting contract. This restriction does not limit the Government's right to use information contained in this data if it is obtained from another source without restriction. The data subject to this restriction are contained in sheets [insert numbers or other identification of sheets]; and

(2) Mark each sheet of data it wishes to restrict with the following legend: Use or disclosure of data contained on this sheet is subject to the restriction on the title page of this proposal.

(f) Contract award. (1) The Government intends to award a contract or contracts resulting from this solicitation to the responsible offeror(s) whose proposal(s) represents the best value after evaluation in accordance with the factors and subfactors in the solicitation.

(2) The Government may reject any or all proposals if such action is in the Government's interest.

(3) The Government may waive informalities and minor irregularities in proposals received.

(4) The Government intends to evaluate proposals and award a contract without discussions with offerors (except clarifications as described in FAR 15.306(a)). Therefore, the offeror's initial proposal should contain the offeror's best terms from a cost or price and technical standpoint. The Government reserves the right to conduct discussions if the Contracting Officer later determines them to be necessary. If the Contracting Officer determines that the number of proposals that would otherwise be in the competitive range exceeds the number at which an efficient competition can be conducted, the Contracting Officer may limit the number of proposals in the competitive range to the greatest number that will permit an efficient competition among the most highly rated proposals.

(5) The Government reserves the right to make an award on any item for a quantity less than the quantity offered, at the unit cost or prices offered, unless the offeror specifies otherwise in the proposal.

(6) The Government reserves the right to make multiple awards if, after considering the additional administrative costs, it is in the Government's best interest to do so.

(7) Exchanges with offerors after receipt of a proposal do not constitute a rejection or counteroffer by the Government.

(8) The Government may determine that a proposal is unacceptable if the prices proposed are materially unbalanced between line items or subline items. Unbalanced pricing exists when, despite an acceptable total evaluated price, the price of one or more contract line items is significantly overstated or understated as indicated by the application of cost or price analysis techniques. A proposal may be rejected if the Contracting Officer determines that the lack of balance poses an unacceptable risk to the Government.

(9) If a cost realism analysis is performed, cost realism may be considered by the source selection authority in evaluating performance or schedule risk.

(10) A written award or acceptance of proposal mailed or otherwise furnished to the successful offeror within the time specified in the proposal shall result in a binding contract without further action by either party.

(11) If a post-award debriefing is given to requesting offerors, the Government shall disclose the following information, if applicable:

- (i) The agency's evaluation of the significant weak or deficient factors in the debriefed offeror's offer.
- (ii) The overall evaluated cost or price and technical rating of the successful and the debriefed offeror and past performance information on the debriefed offeror.
- (iii) The overall ranking of all offerors, when any ranking was developed by the agency during source selection.
- (iv) A summary of the rationale for award.
- (v) For acquisitions of commercial items, the make and model of the item to be delivered by the successful offeror.
- (vi) Reasonable responses to relevant questions posed by the debriefed offeror as to whether source-selection procedures set forth in the solicitation, applicable regulations, and other applicable authorities were followed by the agency.

(End of provision)

#### 52.216-1 TYPE OF CONTRACT (APR 1984)

The Government contemplates award of a **Firm Fixed Price** contract resulting from this solicitation.

(End of provision)

#### 52.217-5 EVALUATION OF OPTIONS (JUL 1990)

Except when it is determined in accordance with FAR 17.206(b) not to be in the Government's best interests, the Government will evaluate offers for award purposes by adding the total price for all options to the total price for the basic requirement. Evaluation of options will not obligate the Government to exercise the option(s).

(End of provision)

#### 52.219-4 NOTICE OF PRICE EVALUATION PREFERENCE FOR HUBZONE SMALL BUSINESS CONCERNS (OCT 2014)

- (a) Definitions. See 13 CFR 125.6(e) for definitions of terms used in paragraph (d).
- (b) Evaluation preference. (1) Offers will be evaluated by adding a factor of 10 percent to the price of all offers, except--
  - (i) Offers from HUBZone small business concerns that have not waived the evaluation preference; and
  - (ii) Otherwise successful offers from small business concerns.

(2) The factor of 10 percent shall be applied on a line item basis or to any group of items on which award may be made. Other evaluation factors described in the solicitation shall be applied before application of the factor.

(3) When the two highest rated offerors are a HUBZone small business concern and a large business, and the evaluated offer of the HUBZone small business concern is equal to the evaluated offer of the large business after considering the price evaluation preference, award will be made to the HUBZone small business concern.

(c) Waiver of evaluation preference. A HUBZone small business concern may elect to waive the evaluation preference, in which case the factor will be added to its offer for evaluation purposes. The agreements in paragraphs (d) and (e) of this clause do not apply if the offeror has waived the evaluation preference.

\_\_\_ Offeror elects to waive the evaluation preference.

(d) Agreement. A HUBZone small business concern agrees that in the performance of the contract, in the case of a contract for

(1) Services (except construction), at least 50 percent of the cost of personnel for contract performance will be spent for employees of the concern or employees of other HUBZone small business concerns;

(2) Supplies (other than procurement from a nonmanufacturer of such supplies), at least 50 percent of the cost of manufacturing, excluding the cost of materials, will be performed by the concern or other HUBZone small business concerns;

(3) General construction. (i) At least 15 percent of the cost of contract performance to be incurred for personnel will be spent on the prime contractor's employees;

(ii) At least 50 percent of the cost of the contract performance to be incurred for personnel will be spent on the prime contractor's employees or on a combination of the prime contractor's employees and employees of HUBZone small business concern subcontractors;

(iii) No more than 50 percent of the cost of contract performance to be incurred for personnel will be subcontracted to concerns that are not HUBZone small business concerns; or

(4) Construction by special trade contractors. (i) At least 25 percent of the cost of contract performance to be incurred for personnel will be spent on the prime contractor's employees;

(ii) At least 50 percent of the cost of the contract performance to be incurred for personnel will be spent on the prime contractor's employees or on a combination of the prime contractor's employees and employees of HUBZone small business concern subcontractors;

(iii) No more than 50 percent of the cost of contract performance to be incurred for personnel will be subcontracted to concerns that are not HUBZone small business concerns.

(e) A HUBZone joint venture agrees that the aggregate of the HUBZone small business concerns to the joint venture, not each concern separately, will perform the applicable percentage of work requirements.

(f)(1) When the total value of the contract exceeds \$25,000, a HUBZone small business concern nonmanufacturer agrees to furnish in performing this contract only end items manufactured or produced by HUBZone small business concern manufacturers.

(2) When the total value of the contract is equal to or less than \$25,000, a HUBZone small business concern nonmanufacturer may provide end items manufactured by other than a HUBZone small business concern manufacturer provided the end items are produced or manufactured in the United States.

(3) Paragraphs (f)(1) and (f)(2) of this section do not apply in connection with construction or service contracts.

(g) Notice. The HUBZone small business offeror acknowledges that a prospective HUBZone awardee must be a HUBZone small business concern at the time of award of this contract. The HUBZone offeror shall provide the Contracting Officer a copy of the notice required by 13 CFR 126.501 if material changes occur before contract award

that could affect its HUBZone eligibility. If the apparently successful HUBZone offeror is not a HUBZone small business concern at the time of award of this contract, the Contracting Officer will proceed to award to the next otherwise successful HUBZone small business concern or other offeror.

(End of clause)

52.222-23 NOTICE OF REQUIREMENT FOR AFFIRMATIVE ACTION TO ENSURE EQUAL EMPLOYMENT OPPORTUNITY FOR CONSTRUCTION (FEB 1999)

(a) The offeror's attention is called to the Equal Opportunity clause and the Affirmative Action Compliance Requirements for Construction clause of this solicitation.

(b) The goals for minority and female participation, expressed in percentage terms for the Contractor's aggregate workforce in each trade on all construction work in the covered area, are as follows:

Goals for minority participation for each trade	Goals for female participation for each trade
	<b><u>6.9%</u></b>

These goals are applicable to all the Contractor's construction work performed in the covered area. If the Contractor performs construction work in a geographical area located outside of the covered area, the Contractor shall apply the goals established for the geographical area where the work is actually performed. Goals are published periodically in the Federal Register in notice form, and these notices may be obtained from any Office of Federal Contract Compliance Programs office.

(c) The Contractor's compliance with Executive Order 11246, as amended, and the regulations in 41 CFR 60-4 shall be based on (1) its implementation of the Equal Opportunity clause, (2) specific affirmative action obligations required by the clause entitled "Affirmative Action Compliance Requirements for Construction," and (3) its efforts to meet the goals. The hours of minority and female employment and training must be substantially uniform throughout the length of the contract, and in each trade. The Contractor shall make a good faith effort to employ minorities and women evenly on each of its projects. The transfer of minority or female employees or trainees from Contractor to Contractor, or from project to project, for the sole purpose of meeting the Contractor's goals shall be a violation of the contract, Executive Order 11246, as amended, and the regulations in 41 CFR 60-4. Compliance with the goals will be measured against the total work hours performed.

(d) The Contractor shall provide written notification to the Deputy Assistant Secretary for Federal Contract Compliance, U.S. Department of Labor, within 10 working days following award of any construction subcontract in excess of \$10,000 at any tier for construction work under the contract resulting from this solicitation. The notification shall list the --

- (1) Name, address, and telephone number of the subcontractor;
  - (2) Employer's identification number of the subcontractor;
  - (3) Estimated dollar amount of the subcontract;
  - (4) Estimated starting and completion dates of the subcontract; and
  - (5) Geographical area in which the subcontract is to be performed.
- (e) As used in this Notice, and in any contract resulting from this solicitation, the "covered area" is **Guam**.

(End of provision)

52.225-12 NOTICE OF BUY AMERICAN REQUIREMENT-- CONSTRUCTION MATERIALS UNDER TRADE AGREEMENTS (MAY 2014)

(a) Definitions. "Commercially available off-the-shelf (COTS) item," "construction material," "designated country construction material," "domestic construction material," and "foreign construction material," as used in this provision, are defined in the clause of this solicitation entitled "Buy American -- Construction Materials Under Trade Agreements" (Federal Acquisition Regulation (FAR) clause 52.225-11).

(b) Requests for determination of inapplicability. An offeror requesting a determination regarding the inapplicability of the Buy American statute should submit the request to the Contracting Officer in time to allow a determination before submission of offers. The offeror shall include the information and applicable supporting data required by paragraphs (c) and (d) of FAR clause 52.225-11 in the request. If an offeror has not requested a determination regarding the inapplicability of the Buy American statute before submitting its offer, or has not received a response to a previous request, the offeror shall include the information and supporting data in the offer.

(c) Evaluation of offers. (1) The Government will evaluate an offer requesting exception to the requirements of the Buy American statute, based on claimed unreasonable cost of domestic construction materials, by adding to the offered price the appropriate percentage of the cost of such foreign construction material, as specified in paragraph (b)(4)(i) of FAR clause 52.225-11.

(2) If evaluation results in a tie between an offeror that requested the substitution of foreign construction material based on unreasonable cost and an offeror that did not request an exception, the Contracting Officer will award to the offeror that did not request an exception based on unreasonable cost.

(d) Alternate offers. (1) When an offer includes foreign construction material, other than designated country construction material, that is not listed by the Government in this solicitation in paragraph (b)(3) of FAR clause 52.225-11, the offeror also may submit an alternate offer based on use of equivalent domestic or designated country construction material.

(2) If an alternate offer is submitted, the offeror shall submit a separate Standard Form 1442 for the alternate offer, and a separate price comparison table prepared in accordance with paragraphs (c) and (d) of FAR clause 52.225-11 for the offer that is based on the use of any foreign construction material for which the Government has not yet determined an exception applies.

(3) If the Government determines that a particular exception requested in accordance with paragraph (c) of FAR clause 52.225-11 does not apply, the Government will evaluate only those offers based on use of the equivalent domestic or designated country construction material, and the offeror shall be required to furnish such domestic or

designated country construction material. An offer based on use of the foreign construction material for which an exception was requested-- (i) Will be rejected as nonresponsive if this acquisition is conducted by sealed bidding; or

(ii) May be accepted if revised during negotiations.

(End of provision)

#### 52.228-1 BID GUARANTEE (SEP 1996)

(a) Failure to furnish a bid guarantee in the proper form and amount, by the time set for opening of bids, may be cause for rejection of the bid.

(b) The bidder shall furnish a bid guarantee in the form of a firm commitment, e.g., bid bond supported by good and sufficient surety or sureties acceptable to the Government, postal money order, certified check, cashier's check, irrevocable letter of credit, or, under Treasury Department regulations, certain bonds or notes of the United States. The Contracting Officer will return bid guarantees, other than bid bonds, (1) to unsuccessful bidders as soon as practicable after the opening of bids, and (2) to the successful bidder upon execution of contractual documents and bonds (including any necessary coinsurance or reinsurance agreements), as required by the bid as accepted.-

(c) The amount of the bid guarantee shall be **20 percent** of the bid price or **\$3M**, whichever is less.-

(d) If the successful bidder, upon acceptance of its bid by the Government within the period specified for acceptance, fails to execute all contractual documents or furnish executed bond(s) within 10 days after receipt of the forms by the bidder, the Contracting Officer may terminate the contract for default.-

(e) In the event the contract is terminated for default, the bidder is liable for any cost of acquiring the work that exceeds the amount of its bid, and the bid guarantee is available to offset the difference.

(End of provision)

#### 52.233-2 SERVICE OF PROTEST (SEP 2006)

(a) Protests, as defined in section 33.101 of the Federal Acquisition Regulation, that are filed directly with an agency, and copies of any protests that are filed with the Government Accountability Office (GAO), shall be served on the Contracting Officer (addressed as follows) by obtaining written and dated acknowledgment of receipt from **NAVFAC Marianas PSC 455, Box 195 FPO AP 96540-2937.**

(b) The copy of any protest shall be received in the office designated above within one day of filing a protest with the GAO.

(End of provision)

#### 52.236-27 SITE VISIT (CONSTRUCTION) (FEB 1995) – ALTERNATE I (FEB 1995)

(a) The clauses at 52.236-2, Differing Site Conditions, and 52.236-3, Site Investigations and Conditions Affecting the Work, will be included in any contract awarded as a result of this solicitation. Accordingly, offerors or quoters are urged and expected to inspect the site where the work will be performed.

(b) An organized site visit has been scheduled **to commence immediately after the pre-proposal conference at 8:30am on Wednesday July 13, 2016.**

(c) Participants will meet at **Naval Facilities Engineering Command (NAVFAC) Marianas, Building 4175 A-wing, 1<sup>st</sup> Floor Haggan Conference Room, Santa Rita Office Complex, Guam.**

(End of provision)

#### 52.252-1 SOLICITATION PROVISIONS INCORPORATED BY REFERENCE (FEB 1998)

This solicitation incorporates one or more solicitation provisions by reference, with the same force and effect as if they were given in full text. Upon request, the Contracting Officer will make their full text available. The offeror is cautioned that the listed provisions may include blocks that must be completed by the offeror and submitted with its quotation or offer. In lieu of submitting the full text of those provisions, the offeror may identify the provision by paragraph identifier and provide the appropriate information with its quotation or offer. Also, the full text of a solicitation provision may be accessed electronically at this/these address(es):

**Federal Acquisition Regulation (FAR):**

**<http://www.acquisition.gov/far/>**

**<http://farsite.hill.af.mil/>**

**Defense Acquisition Regulation Supplement (DFARS):**

**<http://www.acq.osd.mil/dpap/dars/dfarspgi/current/index.html>**

**<http://farsite.hill.af.mil/vfdfara.htm>**

(End of provision)

#### 5252.228-9300 INDIVIDUAL SURETY/SURETIES (JUN 1994)

As prescribed in FAR 28.203(a), individual sureties will be permitted. In order for the Contracting Officer to make a determination as to the acceptability of individuals proposed as sureties, as prescribed in FAR 28-203(b), all proposers who submit bonds which are executed by individual sureties are requested to furnish additional information in support of SF-28, Affidavit of Individual Surety, with the bonds. Pursuant to Instruction 3(b) of Standard Form 24, the Bond, Standard Form 25, the Performance Bond, and the Standard Form 25A, the Payment Bond, the Contracting Officer requests the following information:

(a) **Equity Securities (Stock):**

(1) State the place(s) of incorporation and address of the principal place of business for each issuing corporation listed.

(2) State whether the security issued was issued by public or private offering and give the place of registration of the security.

(3) State whether the security is presently, actively traded.

(b) **Debt Securities (Bonds) and Certificates of Deposit:**

(1) List the type of bonds held and their maturity dates.

(2) State the name, address, and telephone number of the issuing agency, firm or individual.

(3) State the complete address(es) where the bonds are held.

(4) State whether the bonds have been pledged as security or have otherwise been encumbered.

(c) **Real Property Interests:**

(1) Provide complete recording data for the conveyance of each parcel or interest listed to the individual proposed as surety.

- (2) State whether the values listed are based upon personal evaluation or evaluation of an experienced real estate appraiser. If available, provide copies of written appraisals.
  - (3) State the method(s) of valuation upon which appraisal is based.
  - (4) Provide the assessed value of each property interest listed utilized by the appropriate tax assessor for purposes of property taxation.
  - (5) Provide the telephone number, including area code, for the tax assessor who performed the most recent tax assessment.
  - (6) State whether each real property interest listed is currently under lien or in any way encumbered and the dollar amount of each such lien or encumbrance.
- (d) Persons Proposed as Individual Sureties:
- (1) A current list of all other bonds (bid, performance, and payment) on which the individual is a surety and bonds for which the individual is requesting to be a surety.
  - (2) A statement as to the percent of completion of projects for which the individual is bound on a performance bond.
- This information is necessary to enable the Contracting Officer to evaluate the sufficiency of the surety's net worth in a timely manner.

(End of provision)

#### 5252.228-9302 BID GUARANTEE (OCT 2004)

To assure the execution of the contract and the performance and payment bonds, each bidder/offeror shall submit with its bid/offer a guarantee bond (Standard Form 24) executed by a surety company holding a certificate of authority from the Secretary of the Treasury as an acceptable surety, or other security as provided in FAR Clause 52.228-1, "Bid Guarantee". Security shall be in a penal sum equal to at least 20 percent of the largest amount for which award can be made under the bid submitted, but in no case to exceed \$3,000,000. A copy of the agent's authority to sign bonds for the surety company shall accompany the bid guarantee bond.

(End of provision)

SECTION 00210

**EVALUATION FACTORS FOR AWARD**

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## **1.1 SOURCE SELECTION**

This competitive construction procurement issued on an unrestricted basis uses source selection procedures to select the responsible Offeror whose proposal conforms to the requirements of the solicitation and is determined to provide the best value to the Government, price and other factors considered. The Government reserves the right to eliminate from consideration for award any or all offers at any time prior to award of the contract; to negotiate with Offerors in the competitive range; and to award the contract to the Offeror submitting the lowest price technically acceptable (LPTA) proposal.

## **1.2 INTENT TO AWARD WITHOUT DISCUSSIONS**

The Government intends to evaluate proposals and award a contract without discussions with offerors (except clarifications as described in FAR 15.306(a)). The Government reserves the right to conduct discussions if the Contracting Officer later determines them to be necessary. In addition, if the Contracting Officer determines that the number of proposals that would otherwise be in the competitive range exceeds the number at which an efficient competition can be conducted, the Contracting Officer may limit the number of proposals in the competitive range to the greatest number that will permit an efficient competition among the most highly rated proposals.

## **1.3 BASIS OF AWARD**

The LPTA process is selected as appropriate for this acquisition because the best value is expected to result from selection of the technically acceptable proposal with the lowest evaluated price. An overall non-price rating must be at least "ACCEPTABLE" in order to be eligible for award. An "UNACCEPTABLE" rating in any factor results in the overall non-price proposal being rated "UNACCEPTABLE" unless corrected through discussions. An overall non-price rating of "UNACCEPTABLE" makes a proposal ineligible for award.

## **1.4 ENFORCEABILITY OF PROPOSAL**

The proposal must set forth full, accurate and complete information as required by this solicitation. The Government will rely on such information in the award of the contract. By submission of the offer, the Offeror agrees that all items proposed (e.g., key personnel, subcontractors, materials, etc.) will be utilized for the duration of the contract and any substitutions will require prior Contracting Officer's approval and shall be equal or better, in the judgment of the Contracting Officer, than the items originally proposed.

## **PART II EVALUATION FACTORS**

### **2.1 EVALUATION CRITERIA**

- a. The contract resulting from this solicitation will be awarded to the responsible Offeror whose offer, conforming to the solicitation, is determined to be the lowest price technically acceptable (LPTA) proposal based on the evaluation factors set forth in the solicitation.
- b. “Relevant” means sufficiently similar to the instant acquisition to provide indicators of expected performance. For example, construction similarity and complexity, contract type, and dollar value. The Government will only consider projects for construction of a landfill closure capping system.
- c. Past performance information on “relevant projects” meeting the definition in paragraph (b) will constitute the primary consideration in the Government’s evaluation under this factor. The Government may, however, review and consider past performance information on other construction projects as made available to the Government from other sources such as the Contractor Performance Assessment Report (CPAR) or Construction Contractor Appraisal Support System (CCASS) and inquiries with previous clients / owners. The Government will determine the relevance of the past performance information received on other construction projects, as well as consider the source, context and currency of such information in its evaluation.
- d. Offerors who submit past performance and experience information of a parent, sister, predecessor or other affiliated company must describe what involvement such company will have on the instant acquisition. The proposal should clearly indicate how the resources of the parent, sister, predecessor or other affiliated company- its workforce, management, facilities, or other resources – will be provided or relied upon for contract performance.
- e. The Contracting Officer may discount favorable past performance and experience of a subcontractor unless the prime contractor clearly provides, in its proposal, evidence of a **binding teaming agreement or other contractual agreement** which creates legal responsibility on the part of the subcontractors.
- f. The Offeror will not be rated “ACCEPTABLE” or “UNACCEPTABLE” if the Offeror does not have a record of relevant past performance or if a record of past performance is unavailable. However, an Offeror with “ACCEPTABLE” relevant past performance may be considered more favorably than an Offeror with no past performance information.
- g. The Government, in compliance with FAR 15.305(a)(2)(ii), will allow Offerors to provide information on any problems encountered on any identified contracts, and any corrective actions taken by the Offeror.

### **2.2 PRICE EVALUATION**

The price proposal will be evaluated (1) to determine the reasonableness of the Offeror’s proposal, (2) in accordance with DFARS 252.236-7010 Overseas Military Construction – Preference for U.S. Firms, and also (3) in accordance with FAR 52.219-4, Notice of Price Evaluation Preference for HUBZone Small Business Concerns, if applicable. Total price to be evaluated will include the base bid and all options.

### **2.3 EVALUATION FACTORS AND PROPOSAL SUBMISSION REQUIREMENTS**

- a. The Offeror’s proposal shall contain a response to each of the evaluation factors and shall be in the form prescribed by this solicitation. Evaluation factors are divided into two categories: Non-Price (Factors 1 through 3) and Price (Factor 4). The evaluation factors for this acquisition are:

FACTOR 1 – Experience  
FACTOR 2 – Safety  
FACTOR 3 – Past Performance  
FACTOR 4 – Price

- b. The distinction between experience and past performance is experience pertains to the types of work and volume of work completed by a contractor that are comparable to the types of work covered by this requirement, in terms of size, scope, and complexity. Past performance relates to how well a contractor has performed.

- c. Definitions:

DEFICIENCY: A material failure of a proposal to meet a Government requirement or a combination of significant weaknesses in a proposal that increases the risk of unsuccessful contract performance to an unacceptable level.

SIGNIFICANT WEAKNESS: A flaw that appreciably increases the risk of unsuccessful contract performance.

WEAKNESS: A flaw in the proposal that increases the risk of unsuccessful contract performance.

ACCEPTABLE FEATURES: A proposed method or technique in the proposal that addresses solicitation requirements such that no further explanation or documentation is necessary.

PAST PERFORMANCE: Relates to how well an Offeror has performed; e.g., the quality of work accomplished, schedule compliance, client satisfaction.

EXPERIENCE: Pertains to work currently or previously performed by an Offeror, which is the same or similar to the work that may be ordered under this contract.

PROJECT: A single undertaking of construction activities or tasks resulting in the closure construction of a minimum one (1) acre municipal solid waste landfill in accordance with Resource Conservation and Recovery Act (RCRA) Subpart C or D criteria similar in scope to the work described in this solicitation.

OFFEROR: Refers to the Contractor submitting the proposal as Offeror, including joint ventures, whose name appears in Block 14 of Standard Form 1442 (Solicitation, Offer and Award).

TEN-YEAR PERIOD: Refers to period of time for which projects may be submitted for experience or past performance. The ten-year period is calculated by counting back ten years from the date of issuance of this RFP.

PAGE: Refers to one printed side of a piece of paper. (For example, 5 pieces of paper printed on both sides would result in 10 pages of narrative.)

- d. The following describes each evaluation factor, submittal requirements and basis for assigning ratings:

(1) **Factor 1, Experience:**

- (a) Proposal Submission Requirements: In Tab 1 of the technical proposal, the Offeror shall submit the following information:
- (i) Submit a minimum of three (3) and a maximum of five (5) construction projects for the Offeror that best demonstrates your experience on relevant projects that are similar in size, scope, and complexity to the RFP. For purposes of this evaluation, a relevant project is further defined as closure construction of a minimum one (1) acre municipal solid waste landfill in accordance with Resource Conservation and Recovery Act (RCRA) Subpart C or D criteria.
  - (ii) Projects submitted for the Offeror shall be 100% completed within the past 10 years of the date of issuance of this RFP with construction costs of at least \$5 million.

- (iii) A project is defined as a construction project performed under a single task order or contract. For multiple award and indefinite delivery/indefinite quantity type contracts, the contract as a whole shall not be submitted as a project; rather Offerors shall submit the work performed under a single task order as a project.
- (iv) The attached Construction Experience Project Data Sheet in Exhibit A is MANDATORY and SHALL be used to submit project information. Previous versions of Exhibit A WILL NOT be considered. Except as specifically requested, the Government will not consider information submitted in addition to this form. Individual blocks on this form may be expanded; however, total length for each project data sheet shall not exceed one (1) double-sided page (or two (2) single-sided pages).
- (v) For all submitted projects, the description of the project shall clearly describe the scope of work performed and the relevancy to the project requirements of this RFP (i.e., unique features, area, construction methods).
- (vi) If the Offeror is a Joint Venture (JV), relevant project experience should be submitted for projects completed by the Joint Venture entity. If the JV entity does not have shared experience, project experience shall be submitted for each individual JV member. Offerors who fail to submit experience for all JV members may be rated lower. Offerors are still limited to a total of five (5) projects combined.
- (vii) If an Offeror is utilizing experience information of affiliates/subsidiaries/parent/LLC/LTD member companies (name is not exactly as stated on the SF1442), the proposal shall clearly demonstrate that the affiliate/subsidiary/parent firm will have meaningful involvement in the performance of the contract in order for experience the affiliate/subsidiary/parent/LLC/LTD member companies to be considered. The proposal shall state specific commitments of technical resources (e.g. personnel, equipment) that the affiliate/subsidiary/parent/LLC/LTD member companies commit to the performance of this contract. In particular, the proposal will clearly state the specific commitments of resources of the affiliate/subsidiary/parent/LLC/LTD member that will be located at the worksites and company offices in the city/area of the project. The proposal shall also describe specific roles of the affiliate/subsidiary/parent/LLC/LTD member companies in terms of the work it will either self-perform or manage on behalf of the Offeror in performance of the contract. Any projects submitted in excess of the five (5) will not be considered.
- (viii) The Offeror may utilize experience of a subcontractor that will perform major or critical aspects of the requirement to demonstrate construction experience under this evaluation factor. The Offer must provide a teaming agreement and an explanation of the meaningful involvement that the subcontractor will have in performance of this contract.

(b) Basis of Evaluation:

The requirement for acceptability will be based upon the projects submitted by the Offeror in its proposal. The Offeror must have at least three (3) projects completed within the past 10 years of the date of issuance of this RFP with construction costs of at least \$5 million that demonstrate relevant experience in closure construction of a minimum one (1) acre municipal solid waste landfill in accordance with Resource Conservation and Recovery Act (RCRA) Subpart C or D criteria similar in scope, size, and complexity to this project.

(2) **Factor 2, Safety:**

- (a) Proposal Submission Requirements: In Tab 2 of the technical proposal, the Offeror shall submit a narrative not to exceed four (4) pages describing the following:

- (i) Safety program performance, including, but not limited to the Occupational Safety and Health Association (OSHA) Total Recordable Case (TRC) rate and OSHA Days Away, Restricted Duty or Transferred (DART) rates for the most recent five (5) complete calendar years. The narrative shall address any observed trend, serious mishaps, including fatalities, and any mitigating circumstances associated with the TRC and DART rates. If negative trends are noted, the narrative shall address corrective measures taken to prevent repeat occurrences of similar mishaps. For a partnership or joint venture, TRC and DART rates are required for each contractor who is part of the partnership or joint venture.
  - (ii) Describe the plan that the Offeror will implement to qualify, evaluate, select and oversee its potential subcontractors. Offerors must submit both (1) a plan to include the safety performance of subcontractors in the selection process for all levels of subcontractors and (2) a plan to monitor the safety of those subcontractors during contract performance, highlighting what specific management practices will be in place for providing deliberate safety program management and mishap prevention support to those sub-contractors whose TRC rate is greater than 2.75 and whose DART rate is greater than 3.0.
- (b) Basis of Evaluation: The Government is seeking to determine whether the Offeror has an acceptable safety record. The Government will evaluate the Offeror's overall safety record as evidenced by the TRC and DART rates, if the Offeror's plan includes safety in the evaluation and selection of subcontractors, and if the narrative includes a plan to monitor the safety performance of subcontractors during performance. The evaluation will collectively consider the following.
- (i) OSHA Total Recordable Case (TRC) Rate

The Government will evaluate the OSHA TRC Rate to determine if the Offeror's OSHA TRC rate is above 2.75. OSHA TRC rates above 2.75, in any of the previous five years, will be considered UNACCEPTABLE, unless an adequate explanation is provided to address any serious mishaps, including fatalities, and any mitigating circumstances associated with the high TRC rate and to address corrective measures taken to prevent repeat occurrences of similar mishaps.
  - (ii) OSHA Days Away from Work, Restricted Duty, or Job Transfer (DART) Rate

The Government will evaluate the OSHA DART Rate to determine if the Offeror's OSHA DART rate is above 3.0. OSHA DART rates above 3.0, in any of the previous five years, will be considered UNACCEPTABLE, unless an adequate explanation is provided to address any serious mishaps, including fatalities, and any mitigating circumstances associated with the high DART rate and to address corrective measures taken to prevent repeat occurrences of similar mishaps.
  - (iii) Offeror Technical Approach to Safety

The Government will evaluate the narrative to determine if subcontractor safety performance will be considered in the qualification, evaluation, and selection of all levels of subcontractors on the upcoming project, and both the plan to monitor the safety of those subcontractors during contract performance, highlighting what specific management practices will be in place for providing deliberate safety program management and mishap prevention support to those sub-contractors whose TRC rate is greater than 2.75 and whose DART rate is greater than 3.0. Offerors who fail to address these items (i.e. whether the safety performance of subcontractors will be evaluated in the selection process for all levels of subcontractors and whether the safety of those subcontractors will be monitored during contract performance) will be rated UNACCEPTABLE.

(3) **Factor 3, Past Performance.**

- (a) Proposal Submission Requirements: In Tab 3 of the technical proposal, submit applicable Contractor Performance Assessment Reports (CPAR) evaluations or Past Performance Questionnaires (PPQ) and information on problems encountered on projects submitted under Factor 1, Experience, as follows. Projects that do not correspond to projects submitted under Factor 1 and pages that exceed the maximum number allowed will be removed prior to evaluation and will not be considered.
- (i) If a completed CPAR or Construction Contractor Appraisal Support System (CCASS) evaluation is available, it shall be submitted with the proposal for each project included in Factor 1, Experience. If there is not a completed CPAR or CCASS evaluation, then a PPQ (Exhibit B) shall be submitted. AN OFFEROR SHALL NOT SUBMIT A PPQ WHEN A COMPLETED CPARS IS AVAILABLE.
  - (ii) The PPQ included in the solicitation as Exhibit B is provided for the offeror to submit to clients for projects included in Factor 1, Experience. Completed PPQs should be submitted in the proposal. If the Offeror is unable to obtain a completed PPQ from a client for a project(s) before proposal closing date, the Offeror shall complete and submit with the proposal the first page of the PPQ, which will provide contract and client information for the respective project(s). The Government may make reasonable attempts to contact the client noted for that project(s) to obtain the PPQ information. However, Offerors should follow-up with clients/references to help ensure timely submittal of questionnaires. If the client requests, questionnaires may be submitted directly to the Government's point of contact, Teresa F. Aguon, Contract Specialist, at [teresa.aguon@fe.navy.mil](mailto:teresa.aguon@fe.navy.mil).
  - (iii) Offerors must resubmit and shall not incorporate by reference into their proposal any PPQs or CPARs previously submitted for other RFPs. However, this does not preclude the Government from utilizing previously submitted PPQ information in the past performance evaluation.
  - (iv) Offerors may provide any information on problems encountered and the corrective actions taken on projects submitted under Factor 1, Experience. Offerors may also address any adverse past performance issues. Explanations shall not exceed two (2) double-sided pages (or four (4) single-sided pages) in total.
  - (v) In addition to the above, the Government may review any other sources of information for evaluating past performance. Other sources may include, but are not limited to, past performance information retrieved through the Past Performance Information Retrieval System (PPIRS) using all CAGE/DUNS numbers of team members (partnership, joint venture, teaming arrangement, or parent company/subsidiary/affiliate) identified in the offeror's proposal, inquiries of owner representative(s), and any other known sources not provided by the offeror.
  - (vi) While the Government may elect to consider data from other sources, the burden of providing detailed, current, accurate and complete past performance information rests with the Offeror.
  - (vii) Performance award or additional information submitted will not be considered.
- (b) Basis of Evaluation:
- (i) This evaluation focuses on how well the Offeror performed on the relevant projects submitted under Factor 1, Experience and past performance on other projects currently documented in known sources. Based on the Offeror's performance record, the Government has a reasonable expectation that the Offeror will successfully perform the required effort, or the Offeror's performance record is unknown.

- (ii) The Government will consider the currency and relevance of the information, the source of the information, context of the data, and general trends in the Contractor's performance. This evaluation is separate and distinct from the Contracting Officer's responsibility determination.
- (iii) In the case of an Offeror without a record of relevant past performance or for whom information on past performance is not available or so sparse that no meaningful past performance rating can be reasonably assigned, the Offeror may not be evaluated favorably or unfavorably on past performance. Therefore, the Offeror shall be determined to have unknown past performance. In the context of acceptability/unacceptability, "unknown" shall be considered "acceptable."

(4) **Factor 4, Price.**

- (a) Proposal Submission Requirements: The Offeror shall submit the following in the order shown below in a sealed envelope.

Envelope is to be clearly marked in the bottom right corner as follows:

Offeror's Name  
 PRICE PROPOSAL SUBMITTED UNDER RFP N40192-16-R-1305  
 FY16 MILCON P-635, MUNICIPAL SOLID WASTE LANDFILL CLOSURE,  
 ANDERSEN AIR FORCE BASE, GUAM  
 DO NOT OPEN IN MAILROOM

- (i) Price – Offeror is to complete the Schedule of Prices for all Contract Line Item Numbers (CLINs) in Section 00010 of the SF1442.
  - (ii) Representations and Certifications – Offeror is to complete Section 00600 of the RFP and the Online Representations and Certifications Application (ORCA) via the System for Award Management (SAM) website at <https://www.sam.gov/>.
  - (iii) Bid Bond – Offeror is to provide a bid bond in the amount of 20% of the proposed price or \$3M, whichever is less.
- (b) Basis of Evaluation: In accordance with FAR 52.217-5, Evaluation of Options, except when it is determined in accordance with FAR 17.206(b) not to be in the Government's best interests, the Government will evaluate the total price for all options to the total price for the basic requirement. The price proposal will be evaluated in accordance with DFARS 252.236-7010 Overseas Military Construction - Preference for U.S. Firms, and also in accordance with FAR 52.219-4, Notice of Price Evaluation Preference for HUBZone Small Business Concerns, if applicable. Each applicable price evaluation preference or adjustment shall be calculated independently against an Offeror's offer. These individual preference amounts shall be added together to arrive at the total evaluated price for that offer. Price will be evaluated for reasonableness based on:
    - (i) Comparison of proposed total prices received in response to the solicitation.
    - (ii) Comparison of proposed total prices with the Independent Government Estimate.

## 2.4 FINAL SELECTION

Final selection will be made to the responsible Offeror whose offer, conforming to the solicitation, is determined to be the lowest price technically acceptable (LPTA) proposal based on the evaluation factors set forth in the solicitation.

## Section 00600 - Representations &amp; Certifications

## CLAUSES INCORPORATED BY FULL TEXT

## 52.204-8 ANNUAL REPRESENTATIONS AND CERTIFICATIONS (APR 2016)

(a)(1) The North American Industry Classification System (NAICS) code for this acquisition is **562212, Solid Waste Landfill**.

(2) The small business size standard is **\$38,500,000**.

(3) The small business size standard for a concern which submits an offer in its own name, other than on a construction or service contract, but which proposes to furnish a product which it did not itself manufacture, is 500 employees.

(b)(1) If the provision at 52.204-7, System for Award Management, is included in this solicitation, paragraph (d) of this provision applies.

(2) If the provision at 52.204-7 is not included in this solicitation, and the offeror is currently registered in System for Award Management (SAM), and has completed the Representations and Certifications section of SAM electronically, the offeror may choose to use paragraph (d) of this provision instead of completing the corresponding individual representations and certifications in the solicitation. The offeror shall indicate which option applies by checking one of the following boxes:

(     ) Paragraph (d) applies.

(     ) Paragraph (d) does not apply and the offeror has completed the individual representations and certifications in the solicitation.

(c) (1) The following representations or certifications in SAM are applicable to this solicitation as indicated:

(i) 52.203-2, Certificate of Independent Price Determination. This provision applies to solicitations when a firm-fixed-price contract or fixed-price contract with economic price adjustment is contemplated, unless—

(A) The acquisition is to be made under the simplified acquisition procedures in Part 13;

(B) The solicitation is a request for technical proposals under two-step sealed bidding procedures; or

(C) The solicitation is for utility services for which rates are set by law or regulation.

(ii) 52.203-11, Certification and Disclosure Regarding Payments to Influence Certain Federal Transactions. This provision applies to solicitations expected to exceed \$150,000.

(iii) 52.204-3, Taxpayer Identification. This provision applies to solicitations that do not include the provision at 52.204-7, System for Award Management.

(iv) 52.204-5, Women-Owned Business (Other Than Small Business). This provision applies to solicitations that—

(A) Are not set aside for small business concerns;

(B) Exceed the simplified acquisition threshold; and

- (C) Are for contracts that will be performed in the United States or its outlying areas.
- (v) 52.209-2; Prohibition on Contracting with Inverted Domestic Corporations--Representation.
- (vi) 52.209-5; Certification Regarding Responsibility Matters. This provision applies to solicitations where the contract value is expected to exceed the simplified acquisition threshold.
- (vii) 52.209-11, Representation by Corporations Regarding Elinquent Tax Liability or a Felony Conviction under any Federal Law. This provision applies to all solicitations.
- (viii) 52.214-14, Place of Performance--Sealed Bidding. This provision applies to invitations for bids except those in which the place of performance is specified by the Government.
- (ix) 52.215-6, Place of Performance. This provision applies to solicitations unless the place of performance is specified by the Government.
- (x) 52.219-1, Small Business Program Representations (Basic & Alternate I). This provision applies to solicitations when the contract will be performed in the United States or its outlying areas.
- (A) The basic provision applies when the solicitations are issued by other than DoD, NASA, and the Coast Guard.
- (B) The provision with its Alternate I applies to solicitations issued by DoD, NASA, or the Coast Guard.
- (xi) 52.219-2, Equal Low Bids. This provision applies to solicitations when contracting by sealed bidding and the contract will be performed in the United States or its outlying areas.
- (xii) 52.222-22, Previous Contracts and Compliance Reports. This provision applies to solicitations that include the clause at 52.222-26, Equal Opportunity.
- (xiii) 52.222-25, Affirmative Action Compliance. This provision applies to solicitations, other than those for construction, when the solicitation includes the clause at 52.222-26, Equal Opportunity.
- (xiv) 52.222-38, Compliance with Veterans' Employment Reporting Requirements. This provision applies to solicitations when it is anticipated the contract award will exceed the simplified acquisition threshold and the contract is not for acquisition of commercial items.
- (xv) 52.223-1, Biobased Product Certification. This provision applies to solicitations that require the delivery or specify the use of USDA-designated items; or include the clause at 52.223-2, Affirmative Procurement of Biobased Products Under Service and Construction Contracts.
- (xvi) 52.223-4, Recovered Material Certification. This provision applies to solicitations that are for, or specify the use of, EPA-designated items.
- (xvii) 52.225-2, Buy American Certificate. This provision applies to solicitations containing the clause at 52.225-1.
- (xviii) 52.225-4, Buy American--Free Trade Agreements--Israeli Trade Act Certificate. (Basic, Alternates I, II, and III.) This provision applies to solicitations containing the clause at 52.225-3.
- (A) If the acquisition value is less than \$25,000, the basic provision applies.

- (B) If the acquisition value is \$25,000 or more but is less than \$50,000, the provision with its Alternate I applies.
- (C) If the acquisition value is \$50,000 or more but is less than \$77,533, the provision with its Alternate II applies.
- (D) If the acquisition value is \$77,533 or more but is less than \$100,000, the provision with its Alternate III applies.
- (xix) 52.225-6, Trade Agreements Certificate. This provision applies to solicitations containing the clause at 52.225-5.
- (xx) 52.225-20, Prohibition on Conducting Restricted Business Operations in Sudan--Certification. This provision applies to all solicitations.
- (xxi) 52.225-25, Prohibition on Contracting with Entities Engaging in Certain Activities or Transactions Relating to Iran—Representation and Certification. This provision applies to all solicitations.
- (xxii) 52.226-2, Historically Black College or University and Minority Institution Representation. This provision applies to solicitations for research, studies, supplies, or services of the type normally acquired from higher educational institutions.

(2) The following representations or certifications are applicable as indicated by the Contracting Officer:

[Contracting Officer check as appropriate.]

- X   (i) 52.204-17, Ownership or Control of Offeror.
- (ii) 52.204-20, Predecessor of Offeror.
- (iii) 52.222-18, Certification Regarding Knowledge of Child Labor for Listed End Products.
- (iv) 52.222-48, Exemption from Application of the Service Contract Labor Standards to Contracts for Maintenance, Calibration, or Repair of Certain Equipment--Certification.
- (v) 52.222-52 Exemption from Application of the Service Contract Labor Standards to Contracts for Certain Services--Certification.
- (vi) 52.223-9, with its Alternate I, Estimate of Percentage of Recovered Material Content for EPA-Designated Products (Alternate I only).
- (vii) 52.227-6, Royalty Information.
- (A) Basic.
- (B) Alternate I.
- (viii) 52.227-15, Representation of Limited Rights Data and Restricted Computer Software.
- (d) The offeror has completed the annual representations and certifications electronically via the SAM website accessed through <https://www.acquisition.gov>. After reviewing the SAM database information, the offeror verifies by submission of the offer that the representations and certifications currently posted electronically that apply to this

solicitation as indicated in paragraph (c) of this provision have been entered or updated within the last 12 months, are current, accurate, complete, and applicable to this solicitation (including the business size standard applicable to the NAICS code referenced for this solicitation), as of the date of this offer and are incorporated in this offer by reference (see FAR 4.1201); except for the changes identified below [offeror to insert changes, identifying change by clause number, title, date]. These amended representation(s) and/or certification(s) are also incorporated in this offer and are current, accurate, and complete as of the date of this offer.

FAR Clause	Title	Date	Change
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Any changes provided by the offeror are applicable to this solicitation only, and do not result in an update to the representations and certifications posted on SAM.

(End of provision)

52.209-7 INFORMATION REGARDING RESPONSIBILITY MATTERS (JULY 2013)

(a) Definitions. As used in this provision--

Administrative proceeding means a non-judicial process that is adjudicatory in nature in order to make a determination of fault or liability (e.g., Securities and Exchange Commission Administrative Proceedings, Civilian Board of Contract Appeals Proceedings, and Armed Services Board of Contract Appeals Proceedings). This includes administrative proceedings at the Federal and State level but only in connection with performance of a Federal contract or grant. It does not include agency actions such as contract audits, site visits, corrective plans, or inspection of deliverables.

Federal contracts and grants with total value greater than \$10,000,000 means--

- (1) The total value of all current, active contracts and grants, including all priced options; and
- (2) The total value of all current, active orders including all priced options under indefinite-delivery, indefinite-quantity, 8(a), or requirements contracts (including task and delivery and multiple-award Schedules).

Principal means an officer, director, owner, partner, or a person having primary management or supervisory responsibilities within a business entity (e.g., general manager; plant manager; head of a division or business segment; and similar positions).

(b) The offeror ( ) has ( ) does not have current active Federal contracts and grants with total value greater than \$10,000,000.

(c) If the offeror checked “has” in paragraph (b) of this provision, the offeror represents, by submission of this offer, that the information it has entered in the Federal Awardee Performance and Integrity Information System (FAPIIS) is current, accurate, and complete as of the date of submission of this offer with regard to the following information:

- (1) Whether the offeror, and/or any of its principals, has or has not, within the last five years, in connection with the award to or performance by the offeror of a Federal contract or grant, been the subject of a proceeding, at the Federal or State level that resulted in any of the following dispositions:

- (i) In a criminal proceeding, a conviction.
  - (ii) In a civil proceeding, a finding of fault and liability that results in the payment of a monetary fine, penalty, reimbursement, restitution, or damages of \$5,000 or more.
  - (iii) In an administrative proceeding, a finding of fault and liability that results in--
    - (A) The payment of a monetary fine or penalty of \$5,000 or more; or
    - (B) The payment of a reimbursement, restitution, or damages in excess of \$100,000.
  - (iv) In a criminal, civil, or administrative proceeding, a disposition of the matter by consent or compromise with an acknowledgment of fault by the Contractor if the proceeding could have led to any of the outcomes specified in paragraphs (c)(1)(i), (c)(1)(ii), or (c)(1)(iii) of this provision.
- (2) If the offeror has been involved in the last five years in any of the occurrences listed in (c)(1) of this provision, whether the offeror has provided the requested information with regard to each occurrence.
- (d) The offeror shall post the information in paragraphs (c)(1)(i) through (c)(1)(iv) of this provision in FAPIIS as required through maintaining an active registration in the System for Award Management database via <https://www.acquisition.gov> (see 52.204-7).

(End of provision)

#### 252.204-7007 ALTERNATE A, ANNUAL REPRESENTATIONS AND CERTIFICATIONS (JAN 2015)

Substitute the following paragraphs (d) and (e) for paragraph (d) of the provision at FAR 52.204-8:

- (d)(1) The following representations or certifications in the System for Award Management (SAM) database are applicable to this solicitation as indicated:
- (i) 252.209-7003, Reserve Officer Training Corps and Military Recruiting on Campus--Representation. Applies to all solicitations with institutions of higher education.
  - (ii) 252.216-7008, Economic Price Adjustment--Wage Rates or Material Prices Controlled by a Foreign Government. Applies to solicitations for fixed-price supply and service contracts when the contract is to be performed wholly or in part in a foreign country, and a foreign government controls wage rates or material prices and may during contract performance impose a mandatory change in wages or prices of materials.
  - (iii) 252.222-7007, Representation Regarding Combating Trafficking in Persons, as prescribed in 222.1771. Applies to solicitations with a value expected to exceed the simplified acquisition threshold.
  - (iv) 252.225-7042, Authorization to Perform. Applies to all solicitations when performance will be wholly or in part in a foreign country.
  - (v) 252.225-7049, Prohibition on Acquisition of Commercial Satellite Services from Certain Foreign Entities--Representations. Applies to solicitations for the acquisition of commercial satellite services.

(vi) 252.225-7050, Disclosure of Ownership or Control by the Government of a Country that is a State Sponsor of Terrorism. Applies to all solicitations expected to result in contracts of \$150,000 or more.

(vii) 252.229-7012, Tax Exemptions (Italy)--Representation. Applies to solicitations when contract performance will be in Italy.

(viii) 252.229-7013, Tax Exemptions (Spain)--Representation. Applies to solicitations when contract performance will be in Spain.

(ix) 252.247-7022, Representation of Extent of Transportation by Sea. Applies to all solicitations except those for direct purchase of ocean transportation services or those with an anticipated value at or below the simplified acquisition threshold.

(2) The following representations or certifications in SAM are applicable to this solicitation as indicated by the Contracting Officer: [Contracting Officer check as appropriate.]

\_\_\_ (i) 252.209-7002, Disclosure of Ownership or Control by a Foreign Government.

\_\_\_ (ii) 252.225-7000, Buy American--Balance of Payments Program Certificate.

\_\_\_ (iii) 252.225-7020, Trade Agreements Certificate.

\_\_\_ Use with Alternate I.

(iv) 252.225-7031, Secondary Arab Boycott of Israel.

\_\_\_ (v) 252.225-7035, Buy American--Free Trade Agreements--Balance of Payments Program Certificate.

\_\_\_ Use with Alternate I.

\_\_\_ Use with Alternate II.

\_\_\_ Use with Alternate III.

\_\_\_ Use with Alternate IV.

\_\_\_ Use with Alternate V.

(e) The offeror has completed the annual representations and certifications electronically via the SAM Web site at <https://www.acquisition.gov/>. After reviewing the SAM database information, the offeror verifies by submission of the offer that the representations and certifications currently posted electronically that apply to this solicitation as indicated in FAR 52.204-8(c) and paragraph (d) of this provision have been entered or updated within the last 12 months, are current, accurate, complete, and applicable to this solicitation (including the business size standard applicable to the NAICS code referenced for this solicitation), as of the date of this offer, and are incorporated in this offer by reference (see FAR 4.1201); except for the changes identified below \_\_\_ [offeror to insert changes, identifying change by provision number, title, date]. These amended representation(s) and/or certification(s) are also incorporated in this offer and are current, accurate, and complete as of the date of this offer.

FAR/DFARS Clause #	Title	Date	Change

Any changes provided by the offeror are applicable to this solicitation only, and do not result in an update to the representations and certifications located in the SAM database.

(End of provision)

252.236-7010 OVERSEAS MILITARY CONSTRUCTION-PREFERENCE FOR UNITED STATES FIRMS  
(JAN 1997)

(a) Definition.

"United States firm," as used in this provision, means a firm incorporated in the United States that complies with the following:

(1) The corporate headquarters are in the United States;

(2) The firm has filed corporate and employment tax returns in the United States for a minimum of 2 years (if required), has filed State and Federal income tax returns (if required) for 2 years, and has paid any taxes due as a result of these filings; and

(3) The firm employs United States citizens in key management positions.

(b) Evaluation. Offers from firms that do not qualify as United States firms will be evaluated by adding 20 percent to the offer.

(c) Status. The offeror \_\_\_\_ is, \_\_\_\_ is not a United States firm.

(End of provision)

## Section 00700 - Contract Clauses

## CLAUSES INCORPORATED BY REFERENCE

52.202-1	Definitions	NOV 2013
52.203-3	Gratuities	APR 1984
52.203-5	Covenant Against Contingent Fees	MAY 2014
52.203-6	Restrictions On Subcontractor Sales To The Government	SEP 2006
52.203-7	Anti-Kickback Procedures	MAY 2014
52.203-8	Cancellation, Rescission, and Recovery of Funds for Illegal or Improper Activity	MAY 2014
52.203-10	Price Or Fee Adjustment For Illegal Or Improper Activity	MAY 2014
52.203-12	Limitation On Payments To Influence Certain Federal Transactions	OCT 2010
52.203-13	Contractor Code of Business Ethics and Conduct	OCT 2015
52.203-17	Contractor Employee Whistleblower Rights and Requirement To Inform Employees of Whistleblower Rights	APR 2014
52.204-4	Printed or Copied Double-Sided on Postconsumer Fiber Content Paper	MAY 2011
52.204-9	Personal Identity Verification of Contractor Personnel	JAN 2011
52.204-10	Reporting Executive Compensation and First-Tier Subcontract Awards	OCT 2015
52.204-13	System for Award Management Maintenance	JUL 2013
52.204-14	Service Contract Reporting Requirements	JAN 2014
52.204-18	Commercial and Government Entity Code Maintenance	JUL 2015
52.204-19	Incorporation by Reference of Representations and Certifications.	DEC 2014
52.209-6	Protecting the Government's Interest When Subcontracting With Contractors Debarred, Suspended, or Proposed for Debarment	OCT 2015
52.209-10	Prohibition on Contracting With Inverted Domestic Corporations	NOV 2015
52.210-1	Market Research	APR 2011
52.211-13	Time Extensions	SEP 2000
52.211-15	Defense Priority And Allocation Requirements	APR 2008
52.215-2	Audit and Records--Negotiation	OCT 2010
52.215-11	Price Reduction for Defective Certified Cost or Pricing Data--Modifications	AUG 2011
52.215-13	Subcontractor Certified Cost or Pricing Data--Modifications	OCT 2010
52.219-8	Utilization of Small Business Concerns	OCT 2014
52.219-9 (Dev)	Small Business Subcontracting Plan (Deviation 2013-00014)	OCT 2015
52.219-16	Liquidated Damages-Subcontracting Plan	JAN 1999
52.219-28	Post-Award Small Business Program Rerepresentation	JUL 2013
52.222-1	Notice To The Government Of Labor Disputes	FEB 1997
52.222-3	Convict Labor	JUN 2003
52.222-4	Contract Work Hours and Safety Standards- Overtime Compensation	MAY 2014
52.222-21	Prohibition Of Segregated Facilities	APR 2015
52.222-26	Equal Opportunity	APR 2015
52.222-27	Affirmative Action Compliance Requirements for Construction	APR 2015
52.222-35	Equal Opportunity for Veterans	OCT 2015
52.222-37	Employment Reports on Veterans	FEB 2016

52.222-40	Notification of Employee Rights Under the National Labor Relations Act	DEC 2010
52.222-50	Combating Trafficking in Persons	MAR 2015
52.222-54	Employment Eligibility Verification	OCT 2015
52.223-2	Affirmative Procurement of Biobased Products Under Service and Construction Contracts	SEP 2013
52.223-3 Alt I	Hazardous Material Identification and Material Safety Data (Jan 1997) - Alternate I	JUL 1985
52.223-5 Alt I	Pollution Prevention and Right-to-Know Information (May 2011) Alternate I	MAY 2011
52.223-6	Drug-Free Workplace	MAY 2001
52.223-15	Energy Efficiency in Energy-Consuming Products	DEC 2007
52.223-17	Affirmative Procurement of EPA-Designated Items in Service and Construction Contracts	MAY 2008
52.223-18	Encouraging Contractor Policies To Ban Text Messaging While Driving	AUG 2011
52.223-19	Compliance with Environmental Management Systems	MAY 2011
52.225-13	Restrictions on Certain Foreign Purchases	JUN 2008
52.227-1	Authorization and Consent	DEC 2007
52.227-2	Notice And Assistance Regarding Patent And Copyright Infringement	DEC 2007
52.227-4	Patent Indemnity-Construction Contracts	DEC 2007
52.228-2	Additional Bond Security	OCT 1997
52.228-5	Insurance - Work On A Government Installation	JAN 1997
52.228-11	Pledges Of Assets	JAN 2012
52.228-12	Prospective Subcontractor Requests for Bonds	MAY 2014
52.228-14	Irrevocable Letter of Credit	NOV 2014
52.228-15	Performance and Payment Bonds--Construction	OCT 2010
52.229-3	Federal, State And Local Taxes	FEB 2013
52.232-5	Payments under Fixed-Price Construction Contracts	MAY 2014
52.232-17	Interest	MAY 2014
52.232-23	Assignment Of Claims	MAY 2014
52.232-27	Prompt Payment for Construction Contracts	MAY 2014
52.232-33	Payment by Electronic Funds Transfer--System for Award Management	JUL 2013
52.232-39	Unenforceability of Unauthorized Obligations	JUN 2013
52.233-1	Disputes	MAY 2014
52.233-3	Protest After Award	AUG 1996
52.233-4	Applicable Law for Breach of Contract Claim	OCT 2004
52.234-4	Earned Value Management System	MAY 2014
52.236-1	Performance of Work by the Contractor	APR 1984
52.236-2	Differing Site Conditions	APR 1984
52.236-3	Site Investigation and Conditions Affecting the Work	APR 1984
52.236-4	Physical Data	APR 1984
52.236-5	Material and Workmanship	APR 1984
52.236-6	Superintendence by the Contractor	APR 1984
52.236-7	Permits and Responsibilities	NOV 1991
52.236-8	Other Contracts	APR 1984
52.236-9	Protection of Existing Vegetation, Structures, Equipment, Utilities, and Improvements	APR 1984
52.236-10	Operations and Storage Areas	APR 1984
52.236-11	Use and Possession Prior to Completion	APR 1984
52.236-12	Cleaning Up	APR 1984
52.236-13 Alt I	Accident Prevention (Nov 1991) - Alternate I	NOV 1991

52.236-15	Schedules for Construction Contracts	APR 1984
52.236-16	Quantity Surveys	APR 1984
52.236-17	Layout of Work	APR 1984
52.236-21 Alt I	Specifications and Drawings for Construction (Feb 1997) - Alternate I	APR 1984
52.236-26	Preconstruction Conference	FEB 1995
52.242-13	Bankruptcy	JUL 1995
52.242-14	Suspension of Work	APR 1984
52.243-4	Changes	JUN 2007
52.244-2	Subcontracts	OCT 2010
52.244-6	Subcontracts for Commercial Items	FEB 2016
52.245-1 Alt I	Government Property (Apr 2012) Alternate I	APR 2012
52.245-9	Use And Charges	APR 2012
52.246-12	Inspection of Construction	AUG 1996
52.246-21	Warranty of Construction	MAR 1994
52.247-64	Preference for Privately Owned U.S. - Flag Commercial Vessels	FEB 2006
52.248-3	Value Engineering-Construction	OCT 2015
52.249-2 Alt I	Termination for Convenience of the Government (Fixed-Price) (Apr 2012) - Alternate I	SEP 1996
52.249-10	Default (Fixed-Price Construction)	APR 1984
52.252-6	Authorized Deviations In Clauses	APR 1984
52.253-1	Computer Generated Forms	JAN 1991
252.201-7000	Contracting Officer's Representative	DEC 1991
252.203-7000	Requirements Relating to Compensation of Former DoD Officials	SEP 2011
252.203-7001	Prohibition On Persons Convicted of Fraud or Other Defense-Contract-Related Felonies	DEC 2008
252.203-7002	Requirement to Inform Employees of Whistleblower Rights	SEP 2013
252.203-7003	Agency Office of the Inspector General	DEC 2012
252.203-7004	Display of Fraud Hotline Poster(s)	OCT 2015
252.204-7003	Control Of Government Personnel Work Product	APR 1992
252.204-7006	Billing Instructions	OCT 2005
252.204-7012	Safeguarding Covered Defense Information and Cyber Incident Reporting.	DEC 2015
252.204-7015	Notice of Authorized Disclosure of Information for Litigation Support	MAY 2016
252.209-7004	Subcontracting With Firms That Are Owned or Controlled By The Government of a Country that is a State Sponsor of Terrorism	OCT 2015
252.211-7007	Reporting of Government-Furnished Property	AUG 2012
252.215-7000	Pricing Adjustments	DEC 2012
252.219-7003 (Dev)	Small Business Subcontracting Plan (DOD Contracts)--Basic (Deviation 2013-O0014)	OCT 2014
252.222-7006	Restrictions on the Use of Mandatory Arbitration Agreements	DEC 2010
252.223-7001	Hazard Warning Labels	DEC 1991
252.223-7006	Prohibition On Storage, Treatment, and Disposal of Toxic or Hazardous Materials	SEP 2014
252.225-7048	Export-Controlled Items	JUN 2013
252.227-7033	Rights in Shop Drawings	APR 1966
252.231-7000	Supplemental Cost Principles	DEC 1991
252.232-7003	Electronic Submission of Payment Requests and Receiving Reports	JUN 2012
252.232-7010	Levies on Contract Payments	DEC 2006

252.236-7000	Modification Proposals-Price Breakdown	DEC 1991
252.236-7001	Contract Drawings, and Specifications	AUG 2000
252.236-7005	Airfield Safety Precautions	DEC 1991
252.236-7013	Requirement for Competition Opportunity for American Steel Producers, Fabricators, and Manufacturers	JUN 2013
252.242-7004	Material Management And Accounting System	MAY 2011
252.243-7001	Pricing Of Contract Modifications	DEC 1991
252.243-7002	Requests for Equitable Adjustment	DEC 2012
252.244-7000	Subcontracts for Commercial Items	JUN 2013
252.244-7001	Contractor Purchasing System Administration	MAY 2014
252.245-7001	Tagging, Labeling, and Marking of Government-Furnished Property	APR 2012
252.245-7002	Reporting Loss of Government Property	APR 2012
252.245-7003	Contractor Property Management System Administration	APR 2012
252.245-7004	Reporting, Reutilization, and Disposal	MAR 2015
252.246-7000	Material Inspection And Receiving Report	MAR 2008
252.247-7023	Transportation of Supplies by Sea	APR 2014

#### CLAUSES INCORPORATED BY FULL TEXT

##### 52.211-10 COMMENCEMENT, PROSECUTION, AND COMPLETION OF WORK (APR 1984)

The Contractor shall be required to (a) commence work under this contract within **15** calendar days after the date the Contractor receives the notice to proceed, (b) prosecute the work diligently, and (c) complete the entire work ready for use not later than **570 calendar days (Also refer to NFAS Clause 5252.211-9301 Phased Construction Schedule)**. The time stated for completion shall include final cleanup of the premises.

(End of clause)

##### 52.211-12 LIQUIDATED DAMAGES--CONSTRUCTION (SEP 2000)

(a) If the Contractor fails to complete the work within the time specified in the contract, the Contractor shall pay liquidated damages to the Government in the amount of **\$4,550.00** for each calendar day of delay until the work is completed or accepted.

(b) If the Government terminates the Contractor's right to proceed, liquidated damages will continue to accrue until the work is completed. These liquidated damages are in addition to excess costs of repurchase under the Termination clause.

(End of clause)

##### 52.217-7 OPTION FOR INCREASED QUANTITY--SEPARATELY PRICED LINE ITEM (MAR 1989)

The Government may require the delivery of the numbered line item, identified in the Schedule as an option item, in the quantity and at the price stated in the Schedule. The Contracting Officer may exercise the option by written notice to the Contractor within **365 calendar days**. Delivery of added items shall continue at the same rate that like items are called for under the contract, unless the parties otherwise agree.

(End of clause)

52.225-11 BUY AMERICAN ACT --CONSTRUCTION MATERIALS UNDER TRADE AGREEMENTS (FEB 2016) ALTERNATE I (MAY 2014)

(a) Definitions. As used in this clause--

Australian, Chilean, or Moroccan construction material means a construction material that--

- (1) Is wholly the growth, product, or manufacture of Australia, Chile, or Morocco; or
- (2) In the case of a construction material that consists in whole or in part of materials from another country, has been substantially transformed in Australia, Chile, or Morocco into a new and different construction material distinct from the materials from which it was transformed.

Bahrainian, Mexican, or Omani construction material means a construction material that—

- (1) Is wholly the growth, product, or manufacture of Bahrain, Mexico; or Oman
- (2) In the case of a construction material that consists in whole or in part of materials from another country, has been substantially transformed in Bahrain, Mexico, or Oman into a new and different construction material distinct from the materials from which it was transformed.

Caribbean Basin country construction material means a construction material that--

- (1) Is wholly the growth, product, or manufacture of a Caribbean Basin country; or
- (2) In the case of a construction material that consists in whole or in part of materials from another country, has been substantially transformed in a Caribbean Basin country into a new and different construction material distinct from the materials from which it was transformed.

Component means an article, material, or supply incorporated directly into a construction material.

Construction material means an article, material, or supply brought to the construction site by the Contractor or subcontractor for incorporation into the building or work. The term also includes an item brought to the site preassembled from articles, materials, or supplies. However, emergency life safety systems, such as emergency lighting, fire alarm, and audio evacuation systems, that are discrete systems incorporated into a public building or work and that are produced as complete systems, are evaluated as a single and distinct construction material regardless of when or how the individual parts or components of those systems are delivered to the construction site. Materials purchased directly by the Government are supplies, not construction material.

Cost of components means--

- (1) For components purchased by the Contractor, the acquisition cost, including transportation costs to the place of incorporation into the construction material (whether or not such costs are paid to a domestic firm), and any applicable duty (whether or not a duty-free entry certificate is issued); or
- (2) For components manufactured by the Contractor, all costs associated with the manufacture of the component, including transportation costs as described in paragraph (1) of this definition, plus allocable overhead costs, but excluding profit. Cost of components does not include any costs associated with the manufacture of the construction material.

Designated country means any of the following countries:

- (1) A World Trade Organization Government Procurement Agreement (WTO GPA) country (Armenia, Aruba, Austria, Belgium, Bulgaria, Canada, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hong Kong, Hungary, Iceland, Ireland, Israel, Italy, Japan, Korea (Republic of), Latvia, Liechtenstein, Lithuania, Luxembourg, Malta, Montenegro, Netherlands, New Zealand, Norway, Poland, Portugal, Romania, Singapore, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Taiwan or United Kingdom);
- (2) A Free Trade Agreement (FTA) country (Australia, Bahrain, Canada, Chile, Colombia, Costa Rica, Dominican Republic, El Salvador, Guatemala, Honduras, Korea (Republic of), Mexico, Morocco, Nicaragua, Oman, Panama, Peru, or Singapore);
- (3) A least developed country (Afghanistan, Angola, Bangladesh, Benin, Bhutan, Burkina Faso, Burundi, Cambodia, Central African Republic, Chad, Comoros, Democratic Republic of Congo, Djibouti, Guinea, Eritrea, Ethiopia, Gambia, Guinea, Guinea-Bissau, Haiti, Kiribati, Laos, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Mozambique, Nepal, Niger, Rwanda, Samoa, Sao Tome and Principe, Senegal, Sierra Leone, Solomon Islands, Somalia, South Sudan, Tanzania, Timor-Leste, Togo, Tuvalu, Uganda, Vanuatu, Yemen, or Zambia); or
- (4) A Caribbean Basin country (Antigua and Barbuda, Aruba, Bahamas, Barbados, Belize, Bonaire, British Virgin Islands, Curacao, Dominica, Grenada, Guyana, Haiti, Jamaica, Montserrat, Saba, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Sint Eustatius, Sint Maarten, or Trinidad and Tobago).

Domestic construction material means--

- (1) An unmanufactured construction material mined or produced in the United States; or
- (2) A construction material manufactured in the United States, if the cost of its components mined, produced, or manufactured in the United States exceeds 50 percent of the cost of all its components. Components of foreign origin of the same class or kind for which nonavailability determinations have been made are treated as domestic.

Foreign construction material means a construction material other than a domestic construction material.

Least developed country construction material means a construction material that--

- (1) Is wholly the growth, product, or manufacture of a least developed country; or
- (2) In the case of a construction material that consists in whole or in part of materials from another country, has been substantially transformed in a least developed country into a new and different construction material distinct from the materials from which it was transformed.

“Free Trade Agreement country construction material” means a construction material that—

- (1) Is wholly the growth, product, or manufacture of a Free Trade Agreement (FTA) country; or
- (2) In the case of a construction material that consists in whole or in part of materials from another country, has been substantially transformed in a FTA country into a new and different construction material distinct from the materials from which it was transformed.

“Least developed country construction material” means a construction material that—

- (1) Is wholly the growth, product, or manufacture of a least developed country; or

(2) In the case of a construction material that consists in whole or in part of materials from another country, has been substantially transformed in a least developed country into a new and different construction material distinct from the materials from which it was transformed.

United States means the 50 States, the District of Columbia, and outlying areas.

WTO GPA country construction material means a construction material that--

(1) Is wholly the growth, product, or manufacture of a WTO GPA country; or

(2) In the case of a construction material that consists in whole or in part of materials from another country, has been substantially transformed in a WTO GPA country into a new and different construction material distinct from the materials from which it was transformed.

(b) Construction materials.

(1) This clause implements 41 U.S.C. chapter 83, Buy American, by providing a preference for domestic construction material. In accordance with 41 U.S.C. 1907, the component test of the Buy American statute is waived for construction material that is a COTS item. (See FAR 12.505(a)(2)). In addition, the Contracting Officer has determined that the WTO GPA and all the Free Trade Agreements except the Bahrain FTA, NAFTA, and the Oman FTA apply to the this acquisition. Therefore, the Buy American statute restrictions are waived for designated country construction materials other than Bahrainian, Mexican, or Omani construction materials.

(2) The Contractor shall use only domestic or designated country construction material other than Bahrainian, Mexican, or Omani construction material in performing this contract, except as provided in paragraphs (b)(3) and (b)(4) of this clause.

(3) The requirement in paragraph (b)(2) of this clause does not apply to the construction materials or components listed by the Government as follows:

**None.**

(4) The Contracting Officer may add other foreign construction material to the list in paragraph (b)(3) of this clause if the Government determines that--

(i) The cost of domestic construction material would be unreasonable. The cost of a particular domestic construction material subject to the restrictions of the Buy American statute is unreasonable when the cost of such material exceeds the cost of foreign material by more than 6 percent;

(ii) The application of the restriction of the Buy American statute to a particular construction material would be impracticable or inconsistent with the public interest; or

(iii) The construction material is not mined, produced, or manufactured in the United States in sufficient and reasonably available commercial quantities of a satisfactory quality.

(c) Request for determination of inapplicability of the Buy American statute. (1)(i) Any Contractor request to use foreign construction material in accordance with paragraph (b)(4) of this clause shall include adequate information for Government evaluation of the request, including--

(A) A description of the foreign and domestic construction materials;

(B) Unit of measure;

(C) Quantity;

(D) Price;

(E) Time of delivery or availability;

(F) Location of the construction project;

(G) Name and address of the proposed supplier; and

(H) A detailed justification of the reason for use of foreign construction materials cited in accordance with paragraph (b)(3) of this clause.

(ii) A request based on unreasonable cost shall include a reasonable survey of the market and a completed price comparison table in the format in paragraph (d) of this clause.

(iii) The price of construction material shall include all delivery costs to the construction site and any applicable duty (whether or not a duty-free certificate may be issued).

(iv) Any Contractor request for a determination submitted after contract award shall explain why the Contractor could not reasonably foresee the need for such determination and could not have requested the determination before contract award. If the Contractor does not submit a satisfactory explanation, the Contracting Officer need not make a determination.

(2) If the Government determines after contract award that an exception to the Buy American statute applies and the Contracting Officer and the Contractor negotiate adequate consideration, the Contracting Officer will modify the contract to allow use of the foreign construction material. However, when the basis for the exception is the unreasonable price of a domestic construction material, adequate consideration is not less than the differential established in paragraph (b)(4)(i) of this clause.

(3) Unless the Government determines that an exception to the Buy American statute applies, use of foreign construction material is noncompliant with the Buy American statute.

(d) Data. To permit evaluation of requests under paragraph (c) of this clause based on unreasonable cost, the Contractor shall include the following information and any applicable supporting data based on the survey of suppliers:

Foreign and Domestic Construction Materials Price Comparison

Construction material description	Unit of measure	Quantity	Price (dollars) \1\
Item 1:			
Foreign construction material....	.....	.....	.....
Domestic construction material...	.....	.....	.....
Item 2:			
Foreign construction material....	.....	.....	.....
Domestic construction material...	.....	.....	.....

\1\ Include all delivery costs to the construction site and any applicable duty (whether or not a duty-free entry certificate is issued).

List name, address, telephone number, and contact for suppliers surveyed. Attach copy of response; if oral, attach summary.

Include other applicable supporting information.

(End of clause)

**52.252-2 CLAUSES INCORPORATED BY REFERENCE (FEB 1998)**

This contract incorporates one or more clauses by reference, with the same force and effect as if they were given in full text. Upon request, the Contracting Officer will make their full text available. Also, the full text of a clause may be accessed electronically at this/these address(es):

**Federal Acquisition Regulation (FAR):**

<http://www.acquisition.gov/far/>

<http://farsite.hill.af.mil/>

**Defense Acquisition Regulation Supplement (DFARS):**

<http://www.acq.osd.mil/dpap/dars/dfarspgi/current/index.html>

<http://farsite.hill.af.mil/vfdfara.htm>

(End of clause)

**252.222-7000 RESTRICTIONS ON EMPLOYMENT OF PERSONNEL (MAR 2000)**

(a) The Contractor shall employ, for the purpose of performing that portion of the contract work in **Guam**, individuals who are residents thereof and who, in the case of any craft or trade, possess or would be able to acquire promptly the necessary skills to perform the contract.

(b) The Contractor shall insert the substance of this clause, including this paragraph (b), in each subcontract awarded under this contract.

(End of clause)

**252.232-7006 WIDE AREA WORKFLOW PAYMENT INSTRUCTIONS (MAY 2013)**

(a) Definitions. As used in this clause--

Department of Defense Activity Address Code (DoDAAC) is a six position code that uniquely identifies a unit, activity, or organization.

Document type means the type of payment request or receiving report available for creation in Wide Area WorkFlow (WAWF).

Local processing office (LPO) is the office responsible for payment certification when payment certification is done external to the entitlement system.

(b) Electronic invoicing. The WAWF system is the method to electronically process vendor payment requests and receiving reports, as authorized by DFARS 252.232-7003, Electronic Submission of Payment Requests and Receiving Reports.

(c) WAWF access. To access WAWF, the Contractor shall--

(1) Have a designated electronic business point of contact in the System for Award Management at <https://www.acquisition.gov>; and

(2) Be registered to use WAWF at <https://wawf.eb.mil/> following the step-by-step procedures for self-registration available at this Web site.

(d) WAWF training. The Contractor should follow the training instructions of the WAWF Web-Based Training Course and use the Practice Training Site before submitting payment requests through WAWF. Both can be accessed by selecting the “Web Based Training” link on the WAWF home page at <https://wawf.eb.mil/>.

(e) WAWF methods of document submission. Document submissions may be via Web entry, Electronic Data Interchange, or File Transfer Protocol.

(f) WAWF payment instructions. The Contractor must use the following information when submitting payment requests and receiving reports in WAWF for this contract/order:

(1) Document type. The Contractor shall use the following document type(s).

**Navy Construction/Facilities Management Invoice**

(2) Inspection/acceptance location. The Contractor shall select the following inspection/acceptance location(s) in WAWF, as specified by the contracting officer.

**N40192/ROICCA**

(3) Document routing. The Contractor shall use the information in the Routing Data Table below only to fill in applicable fields in WAWF when creating payment requests and receiving reports in the system.

Routing Data Table\*

Field Name in WAWF	Data to be entered in WAWF
Pay Official DoDAAC	<b><u>N68732</u></b>
Issue By DoDAAC	<b><u>N40192</u></b>
Admin DoDAAC	<b><u>N40192</u></b>
Inspect By DoDAAC	<b><u>N40192/ROICCA</u></b>
Ship To Code	<b><u>N40192/ROICCA</u></b>
Ship From Code	_____
Mark For Code	_____
Service Approver (DoDAAC)	_____
Service Acceptor (DoDAAC)	_____
Accept at Other DoDAAC	_____
LPO DoDAAC	<b><u>N40192/ROICCA</u></b>
DCAA Auditor DoDAAC	_____
Other DoDAAC(s)	_____

(4) Payment request and supporting documentation. The Contractor shall ensure a payment request includes appropriate contract line item and subline item descriptions of the work performed or supplies delivered, unit price/cost per unit, fee (if applicable), and all relevant back-up documentation, as defined in DFARS Appendix F, (e.g. timesheets) in support of each payment request.

(5) WAWF email notifications. The Contractor shall enter the email address identified below in the “Send Additional Email Notifications” field of WAWF once a document is submitted in the system.

**Not Applicable**

(g) WAWF point of contact. (1) The Contractor may obtain clarification regarding invoicing in WAWF from the following contracting activity's WAWF point of contact.

**Jacqueline Cruz / jacqueline.cruz@fe.navy.mil**

(2) For technical WAWF help, contact the WAWF helpdesk at 866-618-5988.

(End of clause)

**5252.201-9300 CONTRACTING OFFICER AUTHORITY (JUN 1994) ALTERNATE I (JUN 1994)**

(a) In no event shall any understanding or agreement between the Contractor and any Government employee other than the Contracting Officer on any contract, modification, change order, letter or verbal direction to the Contractor be effective or binding upon the Government. All such actions must be formalized by a proper contractual document executed by an appointed Contracting Officer. The Contractor is hereby put on notice that in the event a Government employee other than the Contracting Officer directs a change in the work to be performed or increases the scope of the work to be performed, it is the Contractor's responsibility to make inquiry of the Contracting Officer before making the deviation. Payments will not be made without being authorized by an appointed Contracting Officer with the legal authority to bind the Government.

(b) Some remedial action may be performed by the architect-engineer firm in order to prevent continued contamination that immediately endangers population or property.

(c) The Contractor shall provide a statement with his bid or proposal which concisely describes all relevant facts concerning any past, present, or currently planned interest (financial, contractual, organizational, or otherwise) relating to the work to be performed hereunder. The Contractor warrants that, to the best of the Contractor's knowledge and belief, there are no relevant facts or circumstances which could give rise to an organizational conflict of interest, as defined in FAR Subpart 9.5, or that the Contractor has disclosed all such relevant information prior to award. If a potential conflict is discovered after award, the Contractor shall make a full disclosure in writing to the Contracting Officer. The disclosure shall include a description of action which the Contractor proposes to take, after consultation with the Contracting Officer, to avoid, mitigate, or neutralize the conflict of interest.

(d) In addition, the Contractor shall notify the Contracting Officer, in writing, of its intention to compete for, or accept the award of any contract for similar or related work for any Department of Defense, other Agency of the federal government, or state regulatory agency which may involve Navy sites. Such notification shall be made before the Contractor either competes for or accepts any such contract.

(e) Remedies: The Government may terminate this contract for convenience, in whole or in part, if it deems such termination necessary to avoid an organizational conflict of interest. If the Contractor was aware of a potential organization conflict of interest prior to award or discovered an actual or potential conflict after award and did not disclose or misrepresented relevant information to the Contracting Officer, the Government may terminate the contract for default, or debar the Contractor from Government contracting, or pursue such other remedies as may be permitted by law or this contract.

(f) The Contractor further agrees to insert in any subcontract or consultant agreement hereunder, provisions which shall conform substantially to the language of this clause, including this paragraph (f). (End of clause)

(End of clause)

## 5252.211-9301 PHASED CONSTRUCTION SCHEDULE (SEP 1996)

Within the overall project schedule, commence and complete the work in phases. Complete each phase of the work within the number of calendar days stated in the following schedule:

- a. Schedule start day: The day designated as the beginning of a particular phase; the number listed is the number of calendar days from the award of contract.
- b. Completion day: The day designated as the end of a given phase and the day the work in that phase must be completed; the number listed is the number of calendar days from the award of the contract.
- c. Schedule:

Phase	Description	Schedule Start Day	Completion Day
<b>I</b>	<b>Completion of ESS work plan, completion of community outreach, and completion of DGM scanning and reporting</b>	<b>15</b>	<b>180</b>
<b>II</b>	<b>Removal of obstructions and MEC clearance of borrow site 2.85 acres</b>	<b>181</b>	<b>270</b>
<b>III</b>	<b>Completion of remaining</b>	<b>271</b>	<b>570</b>

- d. If the work of a particular phase is complete and accepted before the scheduled completion day, immediately begin work on the subsequent phase unless otherwise restricted.

(End of clause)

## 5252.228-9305 NOTICE OF BONDING REQUIREMENTS (DEC 2000)

- (a) Within **10 calendar days** after receipt of award, the bidder/offeror to whom the award is made shall furnish the following bond(s) each with satisfactory security:

**X** A Performance Bond (Standard Form 25). The performance bond shall be in a penal sum equal to 100% percent of the contract price.

**X** A Payment Bond (Standard Form 25A). The payment bond shall be in a penal sum equal to 100% of the contract price.

- (b) Any surety company holding a certificate of authority from the Secretary of Treasury as an acceptable Surety on Federal bonds will be accepted. Individual sureties will be permitted as prescribed in FAR 28.203 and FAC 5252.228-9300. Alternative types of security in lieu of furnishing sureties on performance and/or payment bonds will be permitted as prescribed in FAR 28.204, and will be held for at least one year after the completion of the contract. Additional bond security may be required as prescribed in FAR 52.228-2. Bonds shall be accompanied by a document authenticating the agent's authority to sign bonds for the surety company.

- (c) The contract time for purposes of fixing the completion date, default, and liquidated damages shall begin to run from the date of award, regardless of when performance and payment bonds or deposits in lieu of surety are executed.

(End of clause)

## 5252.236-9303 ACCIDENT PREVENTION (NOV 1998)

(a) The Contractor will maintain an accurate record of, and will report to the Contracting Officer in the manner and on the forms prescribed by the Contracting Officer, all accidents resulting in death, traumatic injury, occupational disease, and damage to property, materials, supplies and equipment incident to work performed under this contract.

(b) Compliance with the provisions of this article by subcontractors will be the responsibility of the Contractor.

(c) Prior to commencement of the work, the Contractor may be required to:

- (1) submit in writing his proposals for effectuating provision for accident prevention;
- (2) meet in conference with representatives of the Contracting Officer to discuss and develop mutual understandings relative to administration of the overall safety program.

(End of clause)

## 5252.236-9304 UTILITIES FOR CONSTRUCTION AND TESTING (JUN 1994)

The Contractor shall be responsible for obtaining, either from available Government sources or local utility companies, all utilities required for construction and testing. The Contractor shall provide these utilities at his expense, paid for at the current utility rate delivered to the job site. The Contractor shall provide and maintain all temporary utility connections and distribution lines, and all meters required to measure the amount of each utility used.

(End of clause)

## 5252.236-9310 RECORD DRAWINGS (OCT 2004)

The Contractor shall maintain at the job site two sets of full size prints of the contract drawings, accurately marked in red with adequate dimensions, to show all variations between the construction actually provided and that indicated or specified in the contract documents, including buried or concealed construction. Special attention shall be given to recording the horizontal and vertical location of all buried utilities that differ from the final government-accepted drawings. Existing utility lines and features revealed during the course of construction, shall also be accurately located and dimensioned. Variations in the interior utility systems shall be clearly defined and dimensioned; and coordinated with exterior utility connections at the building five foot line, where applicable. Existing topographic features which differ from those shown on the contract drawings shall also be accurately located and recorded. Where a choice of materials or methods is permitted herein, or where variations in scope or character of methods is permitted herein, or where variations in scope or character of work from that of the original contract are authorized, the drawings shall be marked to define the construction actually provided. The representations of such changes shall conform to standard drafting practice and shall include such supplementary notes, legends, and details as necessary to clearly portray the as built construction. These drawings shall be available for review by the Contracting Officer at all times. Upon completion of the work, both sets of the marked up prints shall be certified as correct, signed by the Contractor, and delivered to the Contracting Officer for his approval before acceptance. Requests for partial payments will not be approved if the marked prints are not kept current, and request for final payment will not be approved until the marked prints are delivered to the Contracting Officer.

(End of clause)

## 5252.242-9300 GOVERNMENT REPRESENTATIVES (OCT 1996)

(a) The contract will be administered by an authorized representative of the Contracting Officer. In no event, however, will any understanding or agreement, modification, change order, or other matter deviating from the terms of the contract between the Contractor and any person other than the Contracting Officer be effective or binding upon the Government, unless formalized by proper contractual documents executed by the Contracting Officer prior to completion of this contract. The authorized representative as indicated hereinafter:

X (1) The Contracting Officer's Representative (COR) will be designated by the Contracting Officer as the authorized representative of the Contracting Officer. The COR is responsible for monitoring performance and the technical management of the effort required hereunder, and should be contacted regarding questions or problems of a technical nature.

X (2) The designated Contract Specialist will be the Administrative Contracting Officer's representative on all other contract administrative matters. The Contract Specialist should be contacted regarding all matters pertaining to the contract or task/delivery orders.

X (3) The designated Property Administrator is the Administrative Contracting Officer's representative on property matters. The Property Administrator should be contacted regarding all matters pertaining to property administration.

(End of clause)

## 5252.242-9305 PRE-PERFORMANCE CONFERENCE (JUL 1995)

Within 15 days of contract award, prior to commencement of the work, the Contractor will meet in conference with representatives of the Contracting Officer, at a time to be determined by the Contracting Officer, to discuss and develop mutual understanding relative to scheduling and administering work.

(End of clause)

## Section 00800 - Special Contract Requirements

LABOR REQUIREMENTS**1. CONTRACT WORK HOURS AND SAFETY STANDARDS ACT**

With the exception of Defense Policy Review Initiative (DPRI) projects, construction contracts in Guam are subject to the Contract Work Hours and Safety Standards Act but are not subject to Davis-Bacon Act and therefore, the following FAR clauses shall be modified to reflect this applicability and included in this contract.

- a. FAR 52.222-11, Subcontracts (Labor Standards), except that the list of applicable clauses in paragraph b shall be modified to refer only to the clauses: Contract Work Hours and Safety Standards Act-Overtime Compensation, Subcontracts (Labor Standards), and Contract Termination-Debarment, Disputes Concerning Labor Standards.
- b. FAR 52.222-12, Contract Termination-Debarment, except that the list of applicable clauses in the first sentence shall be modified to refer only to the Contract Work Hours and Safety Standards Act-Overtime Compensation, Subcontracts (Labor Standards).

**2. NOTICE CONCERNING LABOR RATES**

- a. Davis-Bacon Act does not apply to this project.
- b. Offerors maintain the responsibility to comply with the Government of Guam's Labor Certification process and current prevailing wage rates, as applicable. The notice for prevailing wage rates for construction is attached as Attachment (4) and provided for information only.
- c. Inquiries should be directed to the Department of Labor, Government of Guam, Wage and Hour Division, P.O. Box 9970, Tamuning, Guam 96931-9970, telephone 671-475-7050/51/24.

**REQUEST FOR INFORMATION (RFI)**

SOLICITATION N40192-16-R-1305

The Government does not intend to respond to inquiries submitted less than 15 days before the proposal receipt date shown in the solicitation. Please submit questions via email to Teresa Aguon at [Teresa.Aguon@fe.navy.mil](mailto:Teresa.Aguon@fe.navy.mil).

FIRM NAME:

POC:

ADDRESS:

TELEPHONE NUMBER:

E-MAIL ADDRESS:

Question is regarding (if known):

Section of the Request for Proposal:

Paragraph:

Page number:

QUESTION:

# ANDERSEN AAFB ACCESS LISTING REQUEST

Base Access List (BAL)					
<b>Authority:</b> AFI 31-113, Chapter 4 Identity Vetting and Fitness Determination					
<b>Purpose:</b> Installation Access Listing for personnel requesting access to Andersen AFB (AAFB).					
<b>SSN and DOB:</b> Are used for further proofing and vetting of an individual requesting base access.					
<b>Routine Use(s):</b> The Visitor Control Center/Base Access Office will use <b>NAME, DOB</b> and <b>FULL SSN</b> to perform fitness determination on all individuals listed in this document and issue an AF Form 75 / Visitor Pass.					
<b>Disclosure:</b> Disclosure is voluntary. Failure to disclose all required information will result in that person not being allowed to enter Andersen AFB property.					
<b>TRACKING NUMBER</b>					
<b>DATE</b>					
<b>REQUESTOR:</b> NAVFAC Marianas 36CES/FEAD			<b>COMPANY NAME:</b>		
<b>SCHEDULED DATES</b> (i.e. Feb14 – Jul 2015)		13 July 2016	-	13 July 2016	
<b>ACCESS</b> (check all that apply)/ <b>TIME</b> (i.e. 24/7)		<input type="checkbox"/> Su	<input type="checkbox"/> Mo	<input type="checkbox"/> Tu	<input checked="" type="checkbox"/> We
		<input type="checkbox"/> Th	<input type="checkbox"/> Fr	<input type="checkbox"/> Sa	TIME 0800-1600
<b>PURPOSE:</b> Attend a pre-proposal site visit at the AAFB Landfill for Solicitation N40192-16-R-1305, FY16 MILCON P-635, Municipal Solid Waste Landfill Closure, AAFB Guam.					
<b>***ACCESS TO ANDERSEN AFB RESTRICTED AREAS IS PROHIBITED***</b>					
<b>BLOCK I. Personal Data</b>					
#	Last Name	First Name	MI.	Date of Birth (yyyymmdd)	FULL Social Security Number
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
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19					
20					
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22					
23					
24					
25					

3. Please contact Teresa F. Aguon, Contract Specialist, at 333-3171 or [teresa.aguon@fe.navy.mil](mailto:teresa.aguon@fe.navy.mil) if you have any questions.

VINCENT J. CARBULLIDO, GS-13  
SUPERVISORY CONTRACT SPECIALIST

## Foreign National Access Request Form Ver 2.5

	Visitor's Escort (If Escort is sponsored, complete Primary Sponsor block)	Escort's Sponsor Info (if required): (AD, Guard, Res, Civ)	
First Name			
Middle Name:			
Last Name:			
Date of Birth:	<small>DD / MMM / YYYY</small> _____ / _____ / _____ <small>DD / MMM / YYYY</small>	RANK	<small>DD / MMM / YYYY</small> _____ / _____ / _____ <small>DD / MMM / YYYY</small>
Contact Phone Number:			
SSN:			
Organization:			
Home Address:	<small>Street</small> _____ <small>City</small> , Guam <small>ZIP</small> _____	<small>Street</small> _____ <small>City</small> , Guam <small>ZIP</small> _____	
	Visitor 1	Visitor 2	Visitor 3
First Name:			
Middle Name:			
Last Name:			
Date of Birth:	<small>DD / MMM / YYYY</small> _____ / _____ / _____ <small>DD / MMM / YYYY</small>	<small>DD / MMM / YYYY</small> _____ / _____ / _____ <small>DD / MMM / YYYY</small>	<small>DD / MMM / YYYY</small> _____ / _____ / _____ <small>DD / MMM / YYYY</small>
Country of Citizenship:			
Identification Type	<input type="checkbox"/> Passport <input type="checkbox"/> U.S. Visa <input type="checkbox"/> Resident Card <input type="checkbox"/> Other _____	<input type="checkbox"/> Passport <input type="checkbox"/> U.S. Visa <input type="checkbox"/> Resident Card <input type="checkbox"/> Other _____	<input type="checkbox"/> Passport <input type="checkbox"/> U.S. Visa <input type="checkbox"/> Resident Card <input type="checkbox"/> Other _____
Occupation:			
Relationship to Escort:			
How long is your stay on Guam?	From <small>DD / MMM / 20</small> <small>DD / MMM / YYYY</small> To: <small>DD / MMM / 20</small> <small>DD / MMM / YYYY</small> Other: _____	From <small>DD / MMM / 20</small> <small>DD / MMM / YYYY</small> To: <small>DD / MMM / 20</small> <small>DD / MMM / YYYY</small> Other: _____	From <small>DD / MMM / 20</small> <small>DD / MMM / YYYY</small> To: <small>DD / MMM / 20</small> <small>DD / MMM / YYYY</small> Other: _____
Purpose of visit to Andersen?			
Address while on Guam:	<small>Street</small> _____ <small>City</small> , Guam <small>ZIP</small> _____	<small>Street</small> _____ <small>City</small> , Guam <small>ZIP</small> _____	<small>Street</small> _____ <small>City</small> , Guam <small>ZIP</small> _____

**PRIVACY ACT STATEMENT: AUTHORITY: Title 5 USC Section 301, Departmental Regulation**

**Principle Purpose:** To implement AFI 31-201, Installation Security and 31-218, Air Force Motor Vehicle Traffic Supervision. **ROUTINE PURPOSE:** To request and record the issuance of a Visitor Pass when the use of another form is not authorized or specified. Failure to provide any information requested may result in non-issuance of the Visitor Pass. Disclosure of SSN is voluntary acceptance of these terms constitutes approval for a background check to be conducted as part of the request approval process. The information is necessary for validation of identity and determination of entry eligibility on to Andersen Air Force Base. Failure to provide this information may result in non-issuance determination by the issuing authority.



**EDDIE BAZA CALVO**  
Governor

**RAY TENORIO**  
Lieutenant Governor

*Office of the Governor of Guam*

**COMMON CONSTRUCTION PREVAILING  
WAGE RATES FOR GUAM**

Pursuant to 8 CFR 214.2(h)(6)(v)(F)(2), U.S. Citizenship and Immigration Services (USCIS) must approve specific wage data and prevailing wage rates used for construction occupations on Guam. The following prevailing wage rates apply only to H-2B workers and similarly employed U.S. workers on Guam. USCIS has reviewed the Government of Guam's proposed rates and has approved the adjusted rates. These rates shall be effective for Temporary Labor Certification applications filed on or after Tuesday February 16, 2016.

<u>OCCUPATION</u>	<u>HOURLY WAGE RATES</u>
CAMP COOK	\$10.54
CARPENTER	\$14.20
CEMENT MASON	\$14.33
ELECTRICIAN	\$18.83
HVAC and REFRIGERATION MECHANICS	\$16.76
CONSTRUCTION EQUIPMENT MECHANIC	\$17.63
HEAVY EQUIPMENT OPERATOR	\$15.40
REINFORCING METAL WORKER	\$13.62
PAINTER	\$14.33
PIPEFITTER	\$17.41
PLASTERER	\$15.24
PLUMBER	\$17.41
SHEET METAL WORKER	\$15.92
STRUCTURAL STEEL WORKER	\$13.34
WELDER	\$17.92

These prevailing wage rates are effective for both new and extension temporary labor certifications. The prevailing wage rate on applications approved prior to the implementation of these new rates shall remain in effect for the duration of the existing labor certifications.

For further information, please contact Maria Connelley, Director of Labor, at (671) 475-7075, or Greg Massey, Administrator for the Alien Labor Processing & Certification Division (ALPCD) at (671) 475-8005.

/s/ **EDDIE BAZA CALVO**  
Governor of Guam

**FEB 16 2016**

## CONSTRUCTION EXPERIENCE PROJECT DATA SHEET

Project No. (check one) :  CON #1     CON #2     CON #3     CON #4     CON #5

1. Experience for:     Primary Construction Firm     Joint Venture Partner     Teaming Partner     Other (explain)

Firm Name:

Address:

Phone Number:

DUNS Number:

Point of Contact:

Contact Phone Number:

2. Work Performed as:     Prime Contractor     Subcontractor     Other, e.g. Joint-Venture Partner (explain in Block 8)

If subcontractor, who was prime (Name/Phone #):

3. Contract Number:

Delivery/Task Order Number:

Title:

Location:

4. Type of work:

New Construction     Renovation     Repair     Alteration     Other (explain):

5. Type of Contract/Task Order:

Firm-Fixed Price     Cost Reimbursement/Time and Material     Other (explain):

6. Construction Project:

Award Date (mm/dd/yy):

Completion Date (mm/dd/yy):

Construction Award Amount:

Percent of Project Work Self-Performed:

Value of Work Performed as a Subcontractor (if applicable):

Final Construction Cost (including any modifications):

Type of Construction:     Design-Build     Design-Bid-Build     Other (explain)

If Design-Build, identify the Lead Design Firm:

If Design-Bid-Build, identify the Designer of Record:

7. Provide a detailed description of the project and the relevancy to the project requirements of this RFP (i.e.: unique features, square footage, construction methods). If design-build, include a description of the design-effort.

8. Provide a detailed description of what work your firm self-performed on this project:

9. Other Information:

***END OF PROJECT DATA SHEET***

**NAVFAC/USACE PAST PERFORMANCE QUESTIONNAIRE (Form PPQ-0)**

**CONTRACT INFORMATION (Contractor to complete Blocks 1-4)**

**1. Contractor Information**

Firm Name: \_\_\_\_\_ CAGE Code: \_\_\_\_\_  
Address: \_\_\_\_\_ DUNs Number: \_\_\_\_\_  
Phone Number: \_\_\_\_\_  
Email Address: \_\_\_\_\_  
Point of Contact: \_\_\_\_\_ Contact Phone Number: \_\_\_\_\_

**2. Work Performed as:**  Prime Contractor  Subcontractor  Joint Venture  Other (Explain)

Percent of project work performed: \_\_\_\_\_  
If subcontractor, who was the prime (Name/Phone #): \_\_\_\_\_

**3. Contract Information**

Contract Number: \_\_\_\_\_  
Delivery/Task Order Number (if applicable): \_\_\_\_\_  
Contract Type:  Firm Fixed Price  Cost Reimbursement  Other (Please specify): \_\_\_\_\_  
Contract Title: \_\_\_\_\_  
Contract Location: \_\_\_\_\_

Award Date (mm/dd/yy): \_\_\_\_\_  
Contract Completion Date (mm/dd/yy): \_\_\_\_\_  
Actual Completion Date (mm/dd/yy): \_\_\_\_\_  
Explain Differences: \_\_\_\_\_

Original Contract Price (Award Amount): \_\_\_\_\_  
Final Contract Price (to include all modifications, if applicable): \_\_\_\_\_  
Explain Differences: \_\_\_\_\_

**4. Project Description:**

Complexity of Work  High  Med  Routine  
How is this project relevant to project of submission? (Please provide details such as similar equipment, requirements, conditions, etc.) \_\_\_\_\_

**CLIENT INFORMATION (Client to complete Blocks 5-8)**

**5. Client Information**

Name: \_\_\_\_\_  
Title: \_\_\_\_\_  
Phone Number: \_\_\_\_\_  
Email Address: \_\_\_\_\_

**6. Describe the client's role in the project:** \_\_\_\_\_

**7. Date Questionnaire was completed (mm/dd/yy):** \_\_\_\_\_

**8. Client's Signature:** \_\_\_\_\_

**NOTE: NAVFAC REQUESTS THAT THE CLIENT COMPLETES THIS QUESTIONNAIRE AND SUBMITS DIRECTLY BACK TO THE OFFEROR. THE OFFEROR WILL SUBMIT THE COMPLETED QUESTIONNAIRE TO NAVFAC WITH THEIR PROPOSAL, AND MAY DUPLICATE THIS QUESTIONNAIRE FOR FUTURE SUBMISSION ON NAVFAC SOLICITATIONS. CLIENTS ARE HIGHLY ENCOURAGED TO SUBMIT QUESTIONNAIRES DIRECTLY TO THE OFFEROR. HOWEVER, QUESTIONNAIRES MAY BE SUBMITTED DIRECTLY TO NAVFAC. PLEASE CONTACT THE OFFEROR FOR NAVFAC POC INFORMATION. THE GOVERNMENT RESERVES THE RIGHT TO VERIFY ANY AND ALL INFORMATION ON THIS FORM.**

*ADJECTIVE RATINGS AND DEFINITIONS TO BE USED TO BEST REFLECT  
YOUR EVALUATION OF THE CONTRACTOR'S PERFORMANCE*

<b>RATING</b>	<b>DEFINITION</b>	<b>NOTE</b>
<b>(E) Exceptional</b>	Performance meets contractual requirements and exceeds many to the Government/Owner's benefit. The contractual performance of the element or sub-element being assessed was accomplished with few minor problems for which corrective actions taken by the contractor was highly effective.	An Exceptional rating is appropriate when the Contractor successfully performed multiple significant events that were of benefit to the Government/Owner. A singular benefit, however, could be of such magnitude that it alone constitutes an Exceptional rating. Also, there should have been NO significant weaknesses identified.
<b>(VG) Very Good</b>	Performance meets contractual requirements and exceeds some to the Government's/Owner's benefit. The contractual performance of the element or sub-element being assessed was accomplished with some minor problems for which corrective actions taken by the contractor were effective.	A Very Good rating is appropriate when the Contractor successfully performed a significant event that was a benefit to the Government/Owner. There should have been no significant weaknesses identified.
<b>(S) Satisfactory</b>	Performance meets minimum contractual requirements. The contractual performance of the element or sub-element contains some minor problems for which corrective actions taken by the contractor appear or were satisfactory.	A Satisfactory rating is appropriate when there were only minor problems, or major problems that the contractor recovered from without impact to the contract. There should have been NO significant weaknesses identified. Per DOD policy, a fundamental principle of assigning ratings is that contractors will not be assessed a rating lower than Satisfactory solely for not performing beyond the requirements of the contract.
<b>(M) Marginal</b>	Performance does not meet some contractual requirements. The contractual performance of the element or sub-element being assessed reflects a serious problem for which the contractor has not yet identified corrective actions. The contractor's proposed actions appear only marginally effective or were not fully implemented.	A Marginal is appropriate when a significant event occurred that the contractor had trouble overcoming which impacted the Government/Owner.
<b>(U) Unsatisfactory</b>	Performance does not meet most contractual requirements and recovery is not likely in a timely manner. The contractual performance of the element or sub-element contains serious problem(s) for which the contractor's corrective actions appear or were ineffective.	An Unsatisfactory rating is appropriate when multiple significant events occurred that the contractor had trouble overcoming and which impacted the Government/Owner. A singular problem, however, could be of such serious magnitude that it alone constitutes an unsatisfactory rating.
<b>(N) Not Applicable</b>	No information or did not apply to your contract	Rating will be neither positive nor negative.

Contractor Information (Firm Name): \_\_\_\_\_  
Client Information (Name): \_\_\_\_\_

**TO BE COMPLETED BY CLIENT**

PLEASE CIRCLE THE ADJECTIVE RATING WHICH BEST REFLECTS  
YOUR EVALUATION OF THE CONTRACTOR'S PERFORMANCE.

<b>1. QUALITY:</b>	
a) Quality of technical data/report preparation efforts	E VG S M U N
b) Ability to meet quality standards specified for technical performance	E VG S M U N
c) Timeliness/effectiveness of contract problem resolution without extensive customer guidance	E VG S M U N
d) Adequacy/effectiveness of quality control program and adherence to contract quality assurance requirements (without adverse effect on performance)	E VG S M U N
<b>2. SCHEDULE/TIMELINESS OF PERFORMANCE:</b>	
a) Compliance with contract delivery/completion schedules including any significant intermediate milestones. <i>(If liquidated damages were assessed or the schedule was not met, please address below)</i>	E VG S M U N
b) Rate the contractor's use of available resources to accomplish tasks identified in the contract	E VG S M U N
<b>3. CUSTOMER SATISFACTION:</b>	
a) To what extent were the end users satisfied with the project?	E VG S M U N
b) Contractor was reasonable and cooperative in dealing with your staff (including the ability to successfully resolve disagreements/disputes; responsiveness to administrative reports, businesslike and communication)	E VG S M U N
c) To what extent was the contractor cooperative, businesslike, and concerned with the interests of the customer?	E VG S M U N
d) Overall customer satisfaction	E VG S M U N
<b>4. MANAGEMENT/ PERSONNEL/LABOR</b>	
a) Effectiveness of on-site management, including management of subcontractors, suppliers, materials, and/or labor force?	E VG S M U N
b) Ability to hire, apply, and retain a qualified workforce to this effort	E VG S M U N
c) Government Property Control	E VG S M U N
d) Knowledge/expertise demonstrated by contractor personnel	E VG S M U N
e) Utilization of Small Business concerns	E VG S M U N
f) Ability to simultaneously manage multiple projects with multiple disciplines	E VG S M U N
g) Ability to assimilate and incorporate changes in requirements and/or priority, including planning, execution and response to Government changes	E VG S M U N
h) Effectiveness of overall management (including ability to effectively lead, manage and control the program)	E VG S M U N
<b>5. COST/FINANCIAL MANAGEMENT</b>	
a) Ability to meet the terms and conditions within the contractually agreed price(s)?	E VG S M U N

Contractor Information (Firm Name): \_\_\_\_\_  
Client Information (Name): \_\_\_\_\_

b) Contractor proposed innovative alternative methods/processes that reduced cost, improved maintainability or other factors that benefited the client	E	VG	S	M	U	N
c) If this is/was a Government cost type contract, please rate the Contractor's timeliness and accuracy in submitting monthly invoices with appropriate back-up documentation, monthly status reports/budget variance reports, compliance with established budgets and avoidance of significant and/or unexplained variances (under runs or overruns)	E	VG	S	M	U	N
d) Is the Contractor's accounting system adequate for management and tracking of costs? <i>If no, please explain in Remarks section.</i>	Yes			No		
e) If this is/was a Government contract, has/was this contract been partially or completely terminated for default or convenience or are there any pending terminations? <i>Indicate if show cause or cure notices were issued, or any default action in comment section below.</i>	Yes			No		
f) Have there been any indications that the contractor has had any financial problems? <i>If yes, please explain below.</i>	Yes			No		
<b>6. SAFETY/SECURITY</b>						
a) To what extent was the contractor able to maintain an environment of safety, adhere to its approved safety plan, and respond to safety issues? (Includes: following the users rules, regulations, and requirements regarding housekeeping, safety, correction of noted deficiencies, etc.)	E	VG	S	M	U	N
b) Contractor complied with all security requirements for the project and personnel security requirements.	E	VG	S	M	U	N
<b>7. GENERAL</b>						
a) Ability to successfully respond to emergency and/or surge situations (including notifying COR, PM or Contracting Officer in a timely manner regarding urgent contractual issues).	E	VG	S	M	U	N
b) Compliance with contractual terms/provisions ( <i>explain if specific issues</i> )	E	VG	S	M	U	N
c) Would you hire or work with this firm again? ( <i>If no, please explain below</i> )	Yes			No		
d) In summary, provide an overall rating for the work performed by this contractor.	E	VG	S	M	U	N

**Please provide responses to the questions above (*if applicable*) and/or additional remarks. Furthermore, please provide a brief narrative addressing specific strengths, weaknesses, deficiencies, or other comments which may assist our office in evaluating performance risk (*please attach additional pages if necessary*):**

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Solicitation No.  
**N40192-16-R-1305**

**FY16 MILCON P-635  
MUNICIPAL SOLID WASTE LANDFILL CLOSURE**

**ANDERSEN AIR FORCE BASE, GUAM**

**PART B  
NAVFAC SPECIFICATIONS WON 1333930**



WORK ORDER NO. 1333930

**SPECIFICATIONS**

For  
Municipal Solid Waste Landfill Cells 1 and 2 Closure  
At  
Andersen Air Force Base, Guam

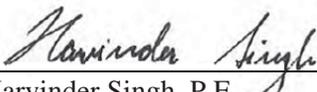
DESIGN AND SPECIFICATIONS PREPARED BY:



PACIFIC PROGRAM-DESIGN MANAGEMENT SERVICES JV  
100 WALNUT STREET, SUITE 1600  
PASADENA, CA 91124-0001

A/E Contract No. N62742-08-D-0009

**SUBMITTED BY:**

  
Harvinder Singh, P.E.

3/25/2016

Date

**APPROVED BY:**



Digitally signed by SABLAN.VINCENT.E.1184891847  
DN: c=US, o=U.S. Government, ou=DoD, ou=PKI,  
ou=USN, cn=SABLAN.VINCENT.E.1184891847  
Date: 2016.06.02 10:07:24 +10'00'

2June2016

For Commander, NAVFAC Marianas:

Date

FOR OFFICIAL USE ONLY (FOUO)

PPDMS # 60225266  
As-Awarded  
25 March 2016

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-- End of Project Table of Contents --

## DOCUMENT 00 01 15

## LIST OF DRAWINGS

## PART 1 GENERAL

## 1.1 SUMMARY

This section lists the drawings for the project pursuant to contract clause "DFARS 252.236-7001, Contract Drawings, Maps and Specifications."

## 1.2 CONTRACT DRAWINGS

Contract drawings are as follows:

DRAWING NO.	NAVFAC DWG NO.	TITLE
1.	T-001	COVER SHEET - LOCATION MAP AND VICINITY MAP
2.	C-001	ABBREVIATIONS, LEGEND, NOTES, AND DRAWING INDEX
3.	C-002	HISTORICAL BORROW PIT BOUNDARY
4.	C-110	OVERALL SITE PLAN
5.	C-111	CELLS 1 AND 2 EXISTING GRADES AND DEMOLITION PLAN
6.	C-112	BORROW AREA EXISITNG GRADES AND DEMOLITION PLAN
7.	C-121	BORROW AREA EXCAVATION PLAN
8.	C-130	CELLS 1 AND 2 SITE PLAN AND HORIZONTAL CONTROL
9.	C-131	FINAL GRADING PLAN
10.	C-132	UNDER DRAIN SYSTEM LAYOUT
11.	C-133	COORDINATE TABLES
12.	C-301	CROSS SECTIONS - BORROW AREA
13.	C-302	CROSS SECTIONS - CELLS 1 AND 2
14.	C-303	CROSS SECTIONS - CELLS 1 AND 2
15.	C-501	CONSTRUCTION DETAILS - 1 OF 3
16.	C-502	CONSTRUCTION DETAILS - 2 OF 3
17.	C-503	CONSTRUCTION DETAILS - 3 OF 3
18.	E100	PARTIAL ELECTRICAL AND MECHANICAL SITE PLAN

-- End of Document --

## SECTION 01 11 00

## SUMMARY OF WORK

## PART 1 GENERAL

## 1.1 SUBMITTALS

Submit the following to the Navy Project Manager/Resident Officer in Charge of Construction (<ROICC) in accordance with Section 01 33 00, "Submittal Procedures", and the General Specification Requirements as part of the bid package and will include Division 00 Procurement and Contracting Requirements and Division 01 General Requirements (herein referred to as General Specification Requirements), and the following.

## 1.1.1 Records

- a. Site Work Plan (SWP)
- b. Environmental Protection Plan
- c. Environmental Conditions Report
- d. Site Health and Safety Plan (SHSP)
- e. Contract Management System (CMS) Reports
- f. Quality Control (QC) Plan
- g. QC Meeting Minutes
- h. Contractor QC Report/Contractor Production Reports
- i. QC Testing Plan and Log
- j. QC Test Results Summary Report
- k. Rework Items List
- l. Weekly Activity Summary Report
- m. Permits
- n. Waste Manifests and load tickets
- o. Construction Completion Report
- p. As-Built Survey Drawings, DD Form 1354, eOMSI, and red-lined Design Drawings
- q. Record of Materials

## 1.1.2 Preconstruction Submittals

Within 60 calendar days after receipt of the Notice to Proceed, the Contractor shall submit to the NPM/ROICC the preconstruction submittals

identified in the General Specification Requirements and as defined herein. Commencement of site work shall not occur until all preconstruction submittals have been accepted by the Navy Project Manager /ROICC.

#### 1.1.2.1 Site Work Plan

The Contractor shall prepare a SWP for all field activities to be conducted under this project. The SWP shall include the following elements:

- a. Construction Schedule: The schedule shall be a time-scaled logic diagram displaying project activities to comply with the schedule requirements presented in paragraph 1.5.2;
- b. Grading Sequencing Plan: The grading sequencing plan shall identify the approach to be used in excavating, placing, and compacting on-site soils and relocated debris as well as import fill. The plan shall also specify the methods to be used to ensure that final grade lines are achieved and conform to the lines and grades shown in the project drawings. The plan shall conform to the requirements presented in the following Section 31 23 00.00 20 "Excavation and Fill";
- c. Erosion Control Plan in general accordance with the General Specification Requirements and applicable regulations/permits;
- d. Storm Water Pollution Prevention Plan (SWPPP) in general accordance with the General Specification Requirements and applicable regulations/permits;
- e. Traffic Control Plan in general accordance with the General Specification Requirements;
- f. Revegetation Plan in accordance with Section 32 92 19, "Seeding";
- g. Waste Management Plan in accordance with the General Specification Requirements; and
- h. Sampling and Analysis Plan (SAP), comprised of Field Sampling Plan (FSP) and Quality Assurance Project Plan (QAPP). The plan shall be submitted and accepted by the Navy's Quality Assurance Officer (QAO).

#### 1.1.2.2 Environmental Protection Plan

Submit as an attachment to the SWP in accordance with the General Specification Requirements.

#### 1.1.2.3 Environmental Conditions Report

Submit as an attachment to the SWP in accordance with the General Specification Requirements.

#### 1.1.2.4 Site Health and Safety Plan

The Contractor shall prepare a SHSP that provides health and safety information for all aspects of construction associated with this project. The plan shall be site-specific and shall include an activity hazard

analysis (AHA) for all tasks performed. The SHSP shall be prepared in accordance with the requirements specified in the General Specification Requirements.

#### 1.1.2.5 Quality Control (QC) Plan

The CQA/CQC Plan has been presented in Attachment E of the Closure Plan.

#### 1.1.3 Administrative and Close-Out Submittals

##### 1.1.3.1 Administrative Submittals

The following Administrative Submittals shall be made by the Contractor to the Navy Project Manager/ROICC as specified in applicable sections of these specifications and within the time frame outlined herein:

- a. Submittals as required by each section of these specifications and which are not included in the SWP shall be made not less than 20 working days prior to the respective item of work to begin or to be ordered from the supplier, whichever applies; and
- b. Submittals required by the General Specification Requirements, including Contract Management System (CMS) Reports (which include monthly cost reports), Contractor QC Report/Contractor Production Reports, QC Meeting Minutes, the QC Testing Plan and Log, and the Rework Items List.
- c. The Contractor's Site Superintendent shall keep a detailed daily log listing time and nature of all on-site activities. On Monday of each week during the construction period, the Contractor's Site Superintendent shall prepare a Weekly Activity Summary Report attached to which shall be a copy of each daily log from the week immediately preceding. Copies of each Weekly Activity Summary Report, along with its respective attachments shall be provided to the Navy Project Manager/ROICC.

##### 1.1.3.2 Close-Out Submittals

- a. As-Built Survey Drawings, DD Form 1354, eOMSI, and red-lined Design Drawings, and Record of Materials shall be submitted by the Contractor to the Navy Project Manager/ROICC in accordance with the General Specification Requirements;
- b. Construction Completion Report: At the conclusion of field activities, the Contractor shall prepare a Construction Completion Report which shall summarize all field activities conducted. The Construction Completion Report shall evaluate the data collected during the closure construction and shall draw a conclusion regarding whether the Contractor has achieved the objectives of the original design and/or Navy Project Manager/ROICC-accepted deviations. The Contractor shall submit 3 hard copies and 1 electronic copy of the report to the Navy Project Manager/ROICC within 60 calendar days of the completion of field activities. At a minimum, this report shall include the following:

(1) a narrative of construction activities describing the procedures implemented and any deviations from the procedures proposed in the SWP;

- (2) a summary of all sampling and analyses conducted at the site (i.e., the QC Test Results Summary Report required by the General Specification Requirements);
- (3) a list summarizing all materials used at the site;
- (4) copies of all waste Manifests and load tickets generated during waste disposal activities);
- (5) As-Built Survey Drawings and design data (including final site survey results); and,
- (6) copies of all laboratory data reports generated during the removal action (including geotechnical and chemical test results).

## 1.2 GENERAL DESCRIPTION

The construction at Municipal Solid Waste (MSW) Landfill Cells 1 and 2 will include a final cover system as well as a stormwater management/erosion control system. The final cover system is intended to prevent infiltration of moisture into the deposited waste, thus reducing the potential production of leachate and potential groundwater contamination. Construction work includes the furnishing of all labor, material, and equipment to perform the following:

- a. Mobilization to the MSW Landfill;
- b. Verification of the location and status of subsurface utilities that may be impacted by construction;
- c. Clearing and grubbing the designated work areas;
- d. Establishment of erosion and sediment control using best management practices (BMP) measures that will remain throughout the duration of construction;
- e. Stripping and temporary stockpiling of soils from Cells 1 and 2;
- f. Site grading at Cells 1 and 2;
- g. Excavation of Soil at the Borrow Site;
- h. Placement and compaction of cover system at Cells 1 and 2;
- i. Placement of a 6-inch thick topsoil layer and hydroseeding;
- j. Jute/erosion mat will be applied on the surface on the final slope of 5:1 or steeper;
- k. Installation of passive LFG vents within the landfill cover;
- l. Six landfill gas vents are planned to be relocated to accommodate the new maintenance road;
- m. Installation of landfill settlement monuments within and adjacent to the landfill cap;
- n. Miscellaneous repairs to the leachate collection system;

- o. Installation of a stormwater management/erosion control system;
- p. Survey of the post-closure topography including the Borrow Site;
- q. Demobilization, including final site preparation and/or cleanup;and
- r. Incidental related work.

### 1.3 LOCATION

The work shall be located at the MSW Landfill Cells 1 and 2 at Andersen Air Force Base, Guam, as shown in the Project Drawings.

### 1.4 PROJECT INFORMATION

#### 1.4.1 Project Drawings and Specifications

One set of reproducible large scale contract drawings, maps and specifications will be furnished to the Contractor without charge, except for applicable publications incorporated into the technical provisions by reference. The work shall conform to the contract drawings and maps, all of which form a part of these specifications and are available in the office of the Navy Project Manager/ROICC. In the case of conflict between the project drawings and specifications, the specifications shall take precedence; however, such conflicts shall be brought to the attention of the design engineer for clarification.

### 1.5 PROJECT SCHEDULE, PHASING, AND TIME CONSTRAINTS

#### 1.5.1 Commencement, Prosecution, and Completion of Work

The Contractor shall submit to the Navy Project Manager/ROICC all required preconstruction submittals as defined under paragraph entitled "Preconstruction Submittals" above. Following acceptance of the preconstruction submittals by the Navy Project Manager/ROICC, the Contractor shall be required to (a) commence work under this contract within 5 calendar days after the date the Contractor receives the notice to proceed, (b) execute the work diligently, and (c) complete the work in accordance with the project schedule in the accepted Site Work Plan. The time stated for completion shall include final cleanup of the premises, including the time required for the establishment of a healthy vegetative cover with at least 90 percent coverage over the revegetation area at or within 1 year of seeding.

#### 1.5.2 Construction Schedule

The overall project schedule shall be within the number of work days stated in the following schedule.

- a. Schedule Start Day: Five (5) working days after final acceptance of preconstruction submittals.
- b. Completion Day: Construction work shall be completed in accordance with the accepted project schedule.

## PART 2 PRODUCTS

Not Used.

### PART 3 EXECUTION

#### 3.1 FACILITIES AND SERVICES

##### 3.1.1 Availability of Utilities Services

- a. The Contractor shall be responsible for establishing utility accounts and connection with local utility companies.
- b. The Contractor shall make system utility connections to potable water and electricity, including providing backflow preventing devices on connections to domestic water lines as necessary for potable water supply; providing meters; establishing accounts; and make disconnections upon completion of work.
- c. The Contractor shall mobilize and maintain temporary sanitary facilities for the field crew; the Contractor shall remove the sanitary facilities from the site at the conclusion of construction activities.

##### 3.1.2 Contractor's Storage Area

Storage Size and Location: During the course of field activities, the Contractor shall be allowed to store equipment adjacent to the site in a location to be determined by the Navy Project Manager/ROICC. The Contractor shall be responsible for securing the storage area from unauthorized access. If requested by the Contractor, additional storage area may be available, the exact location of which will be determined by the Navy Project Manager/ROICC.

#### 3.2 RESTRICTIONS ON OPERATIONS

##### 3.2.1 Work Outside Regular Hours

If the Contractor desires to carry on work outside regular hours (7:30 am to 4:30 pm Monday through Friday), including Saturdays, Sundays, and Government holidays, an application shall be delivered to the Navy Project Manager/ROICC. The Contractor shall allow ample time to enable satisfactory arrangements to be made by the Government to inspect the work in progress. If work is to be conducted during periods of darkness, the different parts of the work shall be lighted in a manner accepted by the Navy Project Manager/ROICC.

##### 3.2.2 Security Requirements

The Contractor shall erect temporary security equipment consisting, at a minimum, of fencing, barriers, and signs to prevent unauthorized access to construction area. This equipment shall be erected prior to commencement of work at the landfill area. Fencing and other barriers shall remain in place until construction activities are concluded; all temporary fencing shall be removed during demobilization.

##### 3.2.3 Existing Conditions and Extra Obligations of the Contractor

Navy Project Manager/ROICC acceptance is required prior to restricting use of any roads during construction. The Navy Project Manager/ROICC shall be notified a minimum of 15 calendar days prior to road closure. The Contractor shall ensure that the road shall be safe, clear, and free from mud or debris at the end of each day. Requirements for traffic control in

the event construction disrupts normal traffic patterns shall be incorporated into the SHSP, which shall be prepared by the Contractor according to the requirements of the General Specification Requirements. The Contractor shall conduct work without disruption to Andersen AFB activities (outside landfill area).

#### 3.2.4 Historical and Archaeological Resources

While items of possible historical or archaeological interest are not expected in or around the landfill, the Contractor shall carefully preserve and report immediately to the Navy Project Manager/ROICC items of possible historic or archaeological interest which are discovered in the course of work.

### 3.3 ACTIONS REQUIRED OF THE CONTRACTOR

#### 3.3.1 Location of Underground Facilities

The Contractor shall verify the elevations of existing piping, utilities, and any type of underground obstruction not indicated or specified to be removed but indicated in locations to be traversed by piping, ducts, and other work. Elevations shall be verified by the Contractor before the new work is laid closer than the nearest manhole or other structure at which an adjustment in grade could be made.

#### 3.3.2 Permits and Approvals

The Contractor shall be responsible for obtaining all permits/permissions, approvals, and/or authorization as required. Permits/permission may include, but are not necessarily limited to grading, vehicular traffic interruption, and work around power line structures and appurtenant facilities.

#### 3.3.3 Fugitive Dust Emissions

The Contractor shall conduct air monitoring, perform air sampling (perimeter/and or personnel sampling if necessary) and provide dust controls as necessary.

#### 3.3.4 Storm Protection

The Contractor shall take precautions to minimize any danger to persons and protect the work and any nearby Government property during periods of high winds (>11 m/s [25 mph]) and/or precipitation. Precautions shall include, but not be limited to closing openings, removing loose material, tools, and equipment from exposed locations, and removing or securing all other temporary work. Openings shall be closed in the work area if storms of lesser intensity pose a threat to the work or any nearby Government property.

At the end of each working day or when it rains, the waste filling operation at the CU would cease and waste surface would be covered with a tarp. BMPs (dirt berm, silt fence, straw wattle) would be administered to prevent run-on from entering the cell.

#### 3.3.5 Loose Debris

The Contractor shall be responsible for preventing loose debris, including but not limited to refuse, vegetation, and dust from entering properties

adjacent to the site.

### 3.3.6 Daily Site Cleanup

The Contractor shall ensure that the construction site is secured at the end of each work day. All equipment and material shall be stored in the Contractor's storage area or within the project construction area. No loose debris, trash, or project soil shall be present outside of the Contractor's storage or work areas at the end of each working day.

### 3.3.7 Existing Work

Remove or alter existing work in such a manner as to prevent injury or damage to any portions of the existing work which remain. Repair or replace portions of existing work which have been altered during construction operations to match existing or adjoining work, as approved by the Contracting Officer. At the completion of operations, existing work shall be in a condition equal to or better than that which existed before new work started.

-- End of Section --

## SECTION 01 14 00

## WORK RESTRICTIONS

## PART 1 GENERAL

## 1.1 DEFINITIONS

## 1.1.1 State

"State" when used in reference to states of the United States also includes the Territory of Guam.

## 1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval.. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

List of Contact Personnel; G

## 1.3 SPECIAL SCHEDULING REQUIREMENTS

- a. The Contractor must be ready for operation as approved by Contracting Officer.
- b. Have materials, equipment, and personnel required to perform the work at the site prior to the commencement of the work.
- c. The Contractor must conduct his operations so as to cause the least possible interference with normal operations of the activity.
- d. Permission to interrupt any Activity roads, and/or utility service must be requested in writing a minimum of 15 calendar days prior to the desired date of interruption.
- e. The work under this contract requires special attention to the scheduling and conduct of the work in connection with existing operations. Identify on the construction schedule each factor which constitutes a potential interruption to operations.

## 1.4 CONTRACTOR ACCESS AND USE OF PREMISES

## 1.4.1 Activity Regulations

Ensure that Contractor personnel employed on the Activity become familiar with and obey Activity regulations including safety, fire, traffic and security regulations. Keep within the limits of the work and avenues of ingress and egress. Wear hard hats in designated areas. Do not enter any restricted areas unless required to do so and until cleared for such entry. Mark Contractor equipment for identification.

## 1.4.1.1 Subcontractors and Personnel Contacts

Provide a list of contact personnel of the Contractor and subcontractors

including addresses and telephone numbers for use in the event of an emergency. As changes occur and additional information becomes available, correct and change the information contained in previous lists.

#### 1.4.1.2 Identification Badges and Installation Access

Application for and use of badges will be as directed. Obtain access to the installation by participating in the Navy Commercial Access Control System (NCACS), or by obtaining passes each day from the Base Pass and Identification Office. Costs for obtaining passes through the NCACS are the responsibility of the Contractor. One-day passes, issued through the Base Pass and Identification Office, will be furnished without charge. Furnish a completed EMPLOYMENT ELIGIBILITY VERIFICATION (DHS FORM I-9) form for all personnel requesting badges. This form is available at <http://www.uscis.gov/portal/site/uscis> by searching or selecting Employment Verification (Form I-9). Immediately report instances of lost or stolen badges to the Contracting Officer.

- a. NCACS Program: NCACS is a voluntary program in which Contractor personnel who enroll, and are approved, are subsequently granted access to the installation for a period up to one year, or the length of the contract, whichever is less, and are not required to obtain a new pass from the Base Pass and Identification Office for each visit. The Government performs background screening and credentialing. Throughout the year the Contractor employee must continue to meet background screening standards. Periodic background screenings are conducted to verify continued NCACS participation and installation access privileges. Under the NCACS program, no commercial vehicle inspection is required, other than for Random Anti-Terrorism Measures (RAM) or in the case of an elevation of Force Protection Conditions (FPCON). Information on costs and requirements to participate and enroll in NCACS is available at <http://www.rapidgate.com> or by calling 1-877-727-4342. Contractors should be aware that the costs incurred to obtain NCACS credentials, or costs related to any means of access to a Navy Installation, are not reimbursable. Any time invested, or price(s) paid, for obtaining NCACS credentials will not be compensated in any way or approved as a direct cost of any contract with the Department of the Navy.
- b. One-Day Passes: Participation in the NCACS is not mandatory, and if the Contractor chooses to not participate, the Contractor's personnel will have to obtain daily passes, be subject to daily mandatory vehicle inspection, and will have limited access to the installation. The Government will not be responsible for any cost or lost time associated with obtaining daily passes or added vehicle inspections incurred by non-participants in the NCACS.

#### 1.4.1.3 No Smoking Policy

Smoking is prohibited within and outside of all buildings on installation, except in designated smoking areas. This applies to existing buildings, buildings under construction and buildings under renovation. Discarding tobacco materials other than into designated tobacco receptacles is considered littering and is subject to fines. The Contracting Officer will identify designated smoking areas.

#### 1.4.2 Working Hours

Regular working hours must consist of an 9 hour period established by the

Contractor Officer, between 7.30 a.m. and 4:30 p.m., Monday through Friday, , excluding Government holidays.

#### 1.4.3 Work Outside Regular Hours

Work outside regular working hours requires Contracting Officer approval. Make application 15 calendar days prior to such work to allow arrangements to be made by the Government for inspecting the work in progress, giving the specific dates, hours, location, type of work to be performed, contract number and project title. Based on the justification provided, the Contracting Officer may approve work outside regular hours. During periods of darkness, the different parts of the work must be lighted in a manner approved by the Contracting Officer. Make utility cutovers after normal working hours or on Saturdays, Sundays, and Government holidays unless directed otherwise.

#### 1.4.4 Utility Cutovers and Interruptions

- a. Make utility cutovers and interruptions after normal working hours or on Saturdays, Sundays, and Government holidays. Conform to procedures required in the paragraph "Work Outside Regular Hours."
- b. Ensure that new utility lines are complete, except for the connection, before interrupting existing service.
- c. Interruption to water, sanitary sewer, storm sewer, telephone service, electric service, air conditioning, heating, fire alarm, compressed air are considered utility cutovers pursuant to the paragraph entitled "Work Outside Regular Hours."
- d. Operation of Station Utilities: The Contractor must not operate nor disturb the setting of control devices in the station utilities system, including water, sewer, electrical, and steam services. The Government will operate the control devices as required for normal conduct of the work. The Contractor must notify the Contracting Officer giving reasonable advance notice when such operation is required.

### PART 2 PRODUCTS

Not Used

### PART 3 EXECUTION

Not Used

-- End of Section --

## SECTION 01 20 00.00 20

## PRICE AND PAYMENT PROCEDURES

## 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 within the text by the basic designation only.

## U.S. ARMY CORPS OF ENGINEERS (USACE)

EP-1110-1-8 (2009) Construction Equipment Ownership and Operating Expense Schedule

## 1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval.. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

## SD-01 Preconstruction Submittals

## Schedule of Prices G

## 1.3 SCHEDULE OF PRICES

## 1.3.1 Data Required

This contract requires the use of a cost-loaded Network Analysis Schedule (NAS). The information required for the Schedule of Prices will be entered as an integral part of the Network Analysis Schedule. Within 15 calendar days of notice of award, prepare and deliver to the Contracting Officer a Schedule of Prices (construction contract) as directed by the Contracting Officer. Provide a detailed breakdown of the contract price, giving quantities for each of the various kinds of work, unit prices, and extended prices. Costs shall be summarized and totals provided for each construction category.

## 1.3.2 Schedule Instructions

Payments will not be made until the Schedule of Prices has been submitted to and accepted by the Contracting Officer.

## 1.4 CONTRACT MODIFICATIONS

In conjunction with the Contract Clause "DFARS 252.236-7000, Modification Proposals-Price Breakdown," and where actual ownership and operating costs of construction equipment cannot be determined from Contractor accounting records, equipment use rates shall be based upon the applicable provisions of the EP-1110-1-8.

## 1.5 CONTRACTOR'S INVOICE AND CONTRACT PERFORMANCE STATEMENT

## 1.5.1 Content of Invoice

Requests for payment will be processed in accordance with the Contract Clause FAR 52.232-27, Prompt Payment Construction Contracts and FAR 52.232-5, Payments Under Fixed-Price Construction Contracts. The requests for payment shall include the documents listed below.

- a. The Contractor's invoice, on NAVFAC Form 7300/30 furnished by the Government, showing in summary form, the basis for arriving at the amount of the invoice. Form 7300/30 shall include certification by Quality Control (QC) Manager as required by the contract.
- b. The Earned Value Report from the cost-loaded NAS, showing in detail: the estimated cost, percentage of completion, and value of completed performance for each of the construction categories stated in this contract.
- c. Updated Project Schedule and reports required by the contract.
- d. Contractor Safety Self Evaluation Checklist.
- e. Other supporting documents as requested.
- f. Updated copy of submittal register.
- g. Invoices not completed in accordance with contract requirements will be returned to the Contractor for correction of the deficiencies.

## 1.5.2 Submission of Invoices

If NFAS Clause 5252.232-9301 is included in the contract, the documents listed in paragraph "CONTENT OF INVOICE" shall be provided in their entirety as attachments in Wide Area Work Flow (WAWF) for each invoice submitted. The maximum size of each WAWF attachment is two megabytes, but there are no limits on the number of attachments. If a document cannot be attached in WAWF due to system or size restriction it shall be provided as instructed by the Contracting Officer.

## 1.5.3 Final Invoice

- a. A final invoice shall be accompanied by the certification, and the Contractor's Final Release. If the Contractor is incorporated, the Final Release shall contain the corporate seal. An officer of the corporation shall sign and the corporate secretary shall certify the Final Release.
- b. For final invoices being submitted via WAWF, the original Contractor's Final Release Form must be provided directly to the respective Contracting Officer prior to submission of the final invoice. Once receipt of the original Final Release Form has been confirmed by the Contracting Officer, the Contractor shall then submit final invoice and attach a copy of the Final Release Form.
- c. Final invoices not accompanied by the Contractor's Final Release and required certification will be considered incomplete and will be returned to the Contractor.

## 1.6 PAYMENTS TO THE CONTRACTOR

Payments will be made on submission of itemized requests by the Contractor which comply with the requirements of this section, and will be subject to reduction for overpayments or increase for underpayments made on previous payments to the Contractor.

### 1.6.1 Obligation of Government Payments

The obligation of the Government to make payments required under the provisions of this contract will, at the discretion of the Contracting Officer, be subject to reductions and/or suspensions permitted under the FAR and agency regulations including the following in accordance with "FAR 32.503-6:

- a. Reasonable deductions due to defects in material or workmanship;
- b. Claims which the Government may have against the Contractor under or in connection with this contract;
- c. Unless otherwise adjusted, repayment to the Government upon demand for overpayments made to the Contractor; and
- d. Failure to provide up to date record drawings not current as stated in Contract Clause "FAC 5252.236-9310, Record Drawings."

### 1.6.2 Payment for Onsite and Offsite Materials

Progress payments may be made to the contractor for materials delivered on the site, for materials stored off construction sites, or materials that are in transit to the construction sites under the following conditions:

- a. FAR 52.232-5(b) Payments Under Fixed Price Construction Contracts.
- b. Materials delivered on the site but not installed, including completed preparatory work, and off-site materials to be considered for progress payment shall be major high cost, long lead, special order, or specialty items, not susceptible to deterioration or physical damage in storage or in transit to the construction site.
- c. Materials to be considered for progress payment prior to installation shall be specifically and separately identified in the Contractor's estimates of work submitted for the Contracting Officer's approval in accordance with Schedule of Prices requirement of this contract. Requests for progress payment consideration for such items shall be supported by documents establishing their value and that the title requirements of the clause at FAR 52.232-5 have been met.
- d. Materials are adequately insured and protected from theft and exposure.
- e. Provide a written consent from the surety company with each payment request for offsite materials.
- f. Materials to be considered for progress payments prior to installation shall be stored either in Hawaii, Guam, Puerto Rico, or the Continental United States. Other locations are subject to written approval by the Contracting Officer.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

-- End of Section --

## SECTION 01 30 00

## ADMINISTRATIVE REQUIREMENTS

## PART 1 GENERAL

## 1.1 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

## SD-01 Preconstruction Submittals

View location map; G

Progress and completion pictures; G

## 1.2 VIEW LOCATION MAP

Submit to the Contracting Officer, prior to or with the first submittals, a sketch or drawing indicating the required photographic locations. Update as required if the locations are moved.

## 1.3 PROGRESS AND COMPLETION PICTURES

Photographically document site conditions prior to start of construction operations. Provide monthly, and within one month of the completion of work, digital photographs, 1600x1200x24 bit true color minimum resolution inJPEG file format showing the sequence and progress of work. Take a minimum of 20 digital photographs each week throughout the entire project from a minimum of ten views from points located by the Contracting Officer. Submit a view location sketch indicating points of view. Submit with the monthly invoice two sets of digital photographs each set on a separate CD-R, cumulative of all photos to date. Indicate photographs demonstrating environmental procedures. Photographs for each month shall be in a separate monthly directory and each file shall be named to indicate its location on the view location sketch. The view location sketch shall also be provided on the CD as digital file. All file names shall include a date designator. Cross reference submittals in the appropriate daily report. Photographs shall be provided for unrestricted use by the Government.

## 1.4 MINIMUM INSURANCE REQUIREMENTS

Procure and maintain during the entire period of performance under this contract the following minimum insurance coverage:

- a. Comprehensive general liability: \$500,000 per occurrence
- b. Automobile liability: \$200,000 per person, \$500,000 per occurrence for bodily injury, \$20,000 per occurrence for property damage
- c. Workmen's compensation as required by Federal and State workers' compensation and occupational disease laws.

- d. Employer's liability coverage of \$100,000, except in States where workers compensation may not be written by private carriers,
- e. Others as required by State law.

#### 1.5 SUPERVISION

Have at least one qualified supervisor capable of reading, writing, and conversing fluently in the English language on the job site during working hours. In addition, if a Quality Control (QC) representative is required on the contract, then that individual shall also have fluent English communication skills.

#### 1.6 PRECONSTRUCTION CONFERENCE

After award of the contract but prior to commencement of any work at the site, meet with the Contracting Officer to discuss and develop a mutual understanding relative to the administration of the value engineering and safety program, preparation of the schedule of prices or earned value report, shop drawings, and other submittals, scheduling programming, prosecution of the work, and clear expectations of the "Interim DD Form 1354" Submittal. Major subcontractors who will engage in the work shall also attend.

#### 1.7 FACILITY TURNOVER PLANNING MEETINGS (NAVFAC Red Zone - NRZ)

Key personnel will meet to identify strategies to ensure the project is carried to expeditious closure and turnover to the Client. Start the turnover process at the Pre Construction Conference meeting and convene at the Facility Turnover Meetings once the project has reached approximately 75 percent completion or three to six months prior to Beneficial Occupancy Date (BOD), whichever comes first. The Contracting Officer's Representative will lead the meetings and guide discussions based on an agenda provided by the Government. The facility Turnover effort shall include the following:

- a. Pre Construction Meeting - Contracting Officer's Technical Representative (COTR) will provide the NRZ Checklist and the Contractor, Client, and NAVFAC Representatives will compare Contractor's schedule to NRZ Checklist items.
- b. Facility Turnover Meetings
  1. Fill in the NRZ Checklist including Contractor, Client, and NAVFAC Checklist Items and assign a person responsible for each item and a due date. The Contractor's Representative will facilitate the assignment of responsibilities, fill out the NRZ Checklist, and discuss "Interim DD Form 1354" requirements.
  2. Review the Contractor's updated schedule. The Contractor shall develop a POAM for the completion of all Contractor, Client, and NAVFAC Checklist items.
  3. Confirm that all NRZ Checklist items will be completed on time for the scheduled Facility Turnover.

#### 1.8 PARTNERING

To most effectively accomplish this contract, the Government requires the

formation of a cohesive partnership within the Project Team whose members are from the Government, the Contractor and their Subcontractors. Key personnel from the Supported Command, the End User (who will occupy the facility), NAVFAC (Echelon III and IV), the Navy Region/Installation, the Contractor and Subcontractors, and the Designer of Record will be invited to participate in the Partnering process. The Partnership will draw on the strength of each organization in an effort to achieve a project that is without any safety mishaps, conforms to the Contract, and stays within budget and on schedule.

The Contracting Officer will provide Information on the Partnering Process and a list of key and optional personnel who should attend the Partnering meeting.

#### 1.8.1 Informal Partnering

The Contracting Officer will organize the Partnering Sessions with key personnel of the project team, including Contractor personnel and Government personnel.

The Initial Partnering session should be a part of the Pre-Construction Meeting. Partnering sessions will be held at a location agreed to by the Contracting Officer and the Contractor (typically a conference room provided by the ROICC office or the Contractor).

The Initial Informal Partnering Session will be conducted and facilitated using electronic media (a video and accompanying forms) provided by the Contracting Officer.

The Partners will determine the frequency of the follow-on sessions.

#### 1.9 AVAILABILITY OF CADD DRAWING FILES

After award and upon request, the electronic "Computer-Aided Drafting and Design (CADD)" drawing files will only be made available to the Contractor for use in preparation of construction drawings and data related to the referenced contract subject to the following terms and conditions.

Data contained on these electronic files shall not be used for any purpose other than as a convenience in the preparation of construction drawings and data for the referenced project. Any other use or reuse shall be at the sole risk of the Contractor and without liability or legal exposure to the Government. The Contractor shall make no claim and waives to the fullest extent permitted by law, any claim or cause of action of any nature against the Government, its agents or sub consultants that may arise out of or in connection with the use of these electronic files. The Contractor shall, to the fullest extent permitted by law, indemnify and hold the Government harmless against all damages, liabilities or costs, including reasonable attorney's fees and defense costs, arising out of or resulting from the use of these electronic files.

These electronic CADD drawing files are not construction documents. Differences may exist between the CADD files and the corresponding construction documents. The Government makes no representation regarding the accuracy or completeness of the electronic CADD files, nor does it make representation to the compatibility of these files with the Contractors hardware or software. In the event that a conflict arises between the signed and sealed construction documents prepared by the Government and the furnished CADD files, the signed and sealed

construction documents shall govern. The Contractor is responsible for determining if any conflict exists. Use of these CADD files does not relieve the Contractor of duty to fully comply with the contract documents, including and without limitation, the need to check, confirm and coordinate the work of all contractors for the project.

If the Contractor uses, duplicates and/or modifies these electronic CADD files for use in producing construction drawings and data related to this contract, all previous indicia of ownership (seals, logos, signatures, initials and dates) shall be removed.

#### 1.10 ELECTRONIC MAIL (E-MAIL) ADDRESS

The Contractor shall establish and maintain electronic mail (e-mail) capability along with the capability to open various electronic attachments in Microsoft, Adobe Acrobat, and other similar formats. Within 10 days after contract award, the Contractor shall provide the Contracting Officer a single (only one) e-mail address for electronic communications from the Contracting Officer related to this contract including, but not limited to contract documents, invoice information, request for proposals, and other correspondence. The Contracting Officer may also use email to notify the Contractor of base access conditions when emergency conditions warrant, such as hurricanes, terrorist threats, etc. Multiple email address will not be allowed.

It is the Contractor's responsibility to make timely distribution of all Contracting Officer initiated e-mail with its own organization including field office(s). The Contractor shall promptly notify the Contracting Officer, in writing, of any changes to this email address.

#### PART 2 PRODUCTS

Not Used

#### PART 3 EXECUTION

Not Used

-- End of Section --

## SECTION 01 32 01.00 10

## PROJECT SCHEDULE

## 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 within the text by the basic designation only.

## AACE INTERNATIONAL (AACE)

AACE 29R-03 (2011) Forensic Schedule Analysis  
AACE 52R-06 (2006) Time Impact Analysis - As Applied  
in Construction

## U.S. ARMY CORPS OF ENGINEERS (USACE)

ER 1-1-11 (1995) Administration -- Progress,  
Schedules, and Network Analysis Systems

## 1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submit the following in accordance with Section 01 33 00  
SUBMITTAL PROCEDURES:

## SD-01 Preconstruction Submittals

Project Scheduler Qualifications; G  
Preliminary Project Schedule; G  
Initial Project Schedule; G  
Periodic Schedule Update; G

## 1.3 PROJECT SCHEDULER QUALIFICATIONS

Designate an authorized representative to be responsible for the preparation of the schedule and all required updating and production of reports. The authorized representative must have a minimum of 2-years experience scheduling construction projects similar in size and nature to this project with scheduling software that meets the requirements of this specification. Representative must have a comprehensive knowledge of CPM scheduling principles and application.

## PART 2 PRODUCTS

## 2.1 SOFTWARE

The scheduling software utilized to produce and update the schedules required herein must be capable of meeting all requirements of this specification.

### 2.1.1 Government Default Software

The Government intends to use Primavera P6.

### 2.1.2 Contractor Software

Scheduling software used by the contractor must be commercially available from the software vendor for purchase with vendor software support agreements available. The software routine used to create the required sdef file must be created and supported by the software manufacturer.

#### 2.1.2.1 Primavera

If Primavera P6 is selected for use, provide the "xer" export file in a version of P6 importable by the Government system.

#### 2.1.2.2 Other Than Primavera

If the contractor chooses software other than Primavera P6, that is compliant with this specification, provide for the Government's use two licenses, two computers, and training for two Government employees in the use of the software. These computers will be stand-alone and not connected to Government network. Computers and licenses will be returned at project completion.

## PART 3 EXECUTION

### 3.1 GENERAL REQUIREMENTS

Prepare for approval a Project Schedule, as specified herein, pursuant to FAR Clause 52.236-15, SCHEDULE FOR CONSTRUCTION CONTRACTS. Show in the schedule the proposed sequence to perform the work and dates contemplated for starting and completing all schedule activities. The scheduling of the entire project is required. The scheduling of construction is the responsibility of the Contractor. Contractor management personnel must actively participate in its development. Subcontractors and suppliers working on the project must also contribute in developing and maintaining an accurate Project Schedule. Provide a schedule that is a forward planning as well as a project monitoring tool. Use the Critical Path Method (CPM) of network calculation to generate all Project Schedules. Prepare each Project Schedule using the Precedence Diagram Method (PDM).

### 3.2 BASIS FOR PAYMENT AND COST LOADING

The schedule is the basis for determining contract earnings during each update period and therefore the amount of each progress payment. The aggregate value of all activities coded to a contract CLIN must equal the value of the CLIN.

#### 3.2.1 Activity Cost Loading

Activity cost loading must be reasonable and without front-end loading. Provide additional documentation to demonstrate reasonableness if requested by the Contracting Officer.

#### 3.2.2 Withholdings / Payment Rejection

Failure to meet the requirements of this specification may result in the disapproval of the preliminary, initial or periodic schedule updates and

subsequent rejection of payment requests until compliance is met.

In the event that the Contracting Officer directs schedule revisions and those revisions have not been included in subsequent Project Schedule revisions or updates, the Contracting Officer may withhold 10 percent of pay request amount from each payment period until such revisions to the project schedule have been made.

### 3.3 PROJECT SCHEDULE DETAILED REQUIREMENTS

#### 3.3.1 Level of Detail Required

Develop the Project Schedule to the appropriate level of detail to address major milestones and to allow for satisfactory project planning and execution. Failure to develop the Project Schedule to an appropriate level of detail will result in its disapproval. The Contracting Officer will consider, but is not limited to, the following characteristics and requirements to determine appropriate level of detail:

#### 3.3.2 Activity Durations

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

#### 3.3.3 Procurement Activities

Include activities associated with the critical submittals and their approvals, procurement, fabrication, and delivery of long lead materials, equipment, fabricated assemblies, and supplies. Long lead procurement activities are those with an anticipated procurement sequence of over 90 calendar days.

#### 3.3.4 Mandatory Tasks

Include the following activities/tasks in the initial project schedule and all updates.

- a. Submission, review and acceptance of SD-01 Preconstruction Submittals (individual activity for each).
- b. Submission, review and acceptance of features require design completion
- c. Submission of mechanical/electrical/information systems layout drawings.
- d. Long procurement activities
- e. Submission and approval of O & M manuals.
- f. Submission and approval of as-built drawings.
- g. Submission and approval of DD1354 data and installed equipment lists.
- h. Controls testing plan submission.
- i. Controls testing.

- j. Performance Verification testing.
- k. Other systems testing, if required.
- l. Contractor's pre-final inspection.
- m. Correction of punch list from Contractor's pre-final inspection.
- n. Government's pre-final inspection.
- o. Correction of punch list from Government's pre-final inspection.
- v. Final inspection.

3.3.5 Government Activities

Show Government and other agency activities that could impact progress. These activities include, but are not limited to: approvals, environmental permit approvals by State regulators, inspections, utility tie-in, Government Furnished Equipment (GFE) and Notice to Proceed (NTP) for phasing requirements.

3.3.6 Standard Activity Coding Dictionary

Use the activity coding structure defined in the Standard Data Exchange Format (SDEF) in ER 1-1-11. This exact structure is mandatory. Develop and assign all Activity Codes to activities as detailed herein. A template SDEF compatible schedule backup file is available on the QCS web site: <http://rms.usace.army.mil>.

The SDEF format is as follows:

Field	Activity Code	Length	Description
1	WRKP	3	Workers per day
2	RESP	4	Responsible party
3	AREA	4	Area of work
4	MODF	6	Modification Number
5	BIDI	6	Bid Item (CLIN)
6	PHAS	2	Phase of work
7	CATW	1	Category of work
8	FOW	20	Feature of work*

\*Some systems require that FEATURE OF WORK values be placed in several activity code fields. The notation shown is for Primavera P6. Refer to the specific software guidelines with respect to the FEATURE OF WORK field requirements.

### 3.3.6.1 Workers Per Day (WRKP)

Assign Workers per Day for all field construction or direct work activities, if directed by the Contracting Officer. Workers per day is based on the average number of workers expected each day to perform a task for the duration of that activity.

### 3.3.6.2 Responsible Party Coding (RESP)

Assign responsibility code for all activities to the Prime Contractor, Subcontractor(s) or Government agency(ies) responsible for performing the activity.

- a. Activities coded with a Government Responsibility code include, but are not limited to: Government approvals, Government design reviews, environmental permit approvals by State regulators, Government Furnished Property/Equipment (GFP) and Notice to Proceed (NTP) for phasing requirements.
- b. Activities cannot have more than one Responsibility Code. Examples of acceptable activity code values are: DOR (for the designer of record); ELEC (for the electrical subcontractor); MECH (for the mechanical subcontractor); and GOVT (for USACE).

### 3.3.6.3 Area of Work Coding (AREA)

Assign Work Area code to activities based upon the work area in which the activity occurs. Define work areas based on resource constraints or space constraints that would preclude a resource, such as a particular trade or craft work crew from working in more than one work area at a time due to restraints on resources or space. Activities cannot have more than one Work Area Code.

Not all activities are required to be Work Area coded. A lack of Work Area coding indicates the activity is not resource or space constrained.

### 3.3.6.4 Modification Number (MODF)

Assign a Modification Number Code to any activity or sequence of activities added to the schedule as a result of a Contract Modification, when approved by Contracting Officer. Key all Code values to the Government's modification numbering system. An activity can have only one Modification Number Code.

### 3.3.6.5 Bid Item Coding (BIDI)

Assign a Bid Item Code to all activities using the Contract Line Item Schedule (CLIN) to which the activity belongs, even when an activity is not cost loaded. An activity can have only one BIDI Code.

### 3.3.6.6 Phase of Work Coding (PHAS)

Assign Phase of Work Code to all activities. Examples of phase of work are procurement phase and construction phase. Each activity can have only one Phase of Work code.

- a. Code proposed fast track design and construction phases proposed to allow filtering and organizing the schedule by fast track design and

construction packages.

- b. If the contract specifies phasing with separately defined performance periods, identify a Phase Code to allow filtering and organizing the schedule accordingly.

#### 3.3.6.7 Category of Work Coding (CATW)

Assign a Category of Work Code to all activities. Category of Work Codes include, but are not limited to construction submittal, procurement, fabrication, weather sensitive installation, non-weather sensitive installation, start-up, and testing activities. Each activity can have no more than one Category of Work Code.

#### 3.3.6.8 Feature of Work Coding (FOW)

Assign a Feature of Work Code to appropriate activities based on the Definable Feature of Work to which the activity belongs based on the approved QC plan.

Definable Feature of Work is defined in Section 01 45 00.00 10 QUALITY CONTROL. An activity can have only one Feature of Work Code.

#### 3.3.7 Contract Milestones and Constraints

Milestone activities are to be used for significant project events including, but not limited to, project phasing, project start and end activities, or interim completion dates. The use of artificial float constraints such as "zero free float" or "zero total float" are prohibited.

Mandatory constraints that ignore or effect network logic are prohibited. No constrained dates are allowed in the schedule other than those specified herein. Submit additional constraints to the Contracting Officer for approval on a case by case basis.

##### 3.3.7.1 Project Start Date Milestone and Constraint

The first activity in the project schedule must be a start milestone titled "NTP Acknowledged," which must have a "Start On" constraint date equal to the date that the NTP is acknowledged.

##### 3.3.7.2 End Project Finish Milestone and Constraint

The last activity in the schedule must be a finish milestone titled "End Project."

Constrain the project schedule to the Contract Completion Date in such a way that if the schedule calculates an early finish, then the float calculation for "End Project" milestone reflects positive float on the longest path. If the project schedule calculates a late finish, then the "End Project" milestone float calculation reflects negative float on the longest path. The Government is under no obligation to accelerate Government activities to support a Contractor's early completion.

##### 3.3.7.3 Interim Completion Dates and Constraints

Constrain contractually specified interim completion dates to show negative float when the calculated late finish date of the last activity

in that phase is later than the specified interim completion date.

#### 3.3.7.3.1 Start Phase

Use a start milestone as the first activity for a project phase. Call the start milestone "Start Phase X" where "X" refers to the phase of work.

#### 3.3.7.3.2 End Phase

Use a finish milestone as the last activity for a project phase. Call the finish milestone "End Phase X" where "X" refers to the phase of work.

#### 3.3.8 Calendars

Schedule activities on a Calendar to which the activity logically belongs. Develop calendars to accommodate any contract defined work period such as a 7-day calendar for Government Acceptance activities, etc. Develop the default Calendar to match the physical work plan with non-work periods identified including weekends and holidays. Develop sSeasonal Calendar(s) and assign to seasonally affected activities as applicable.

If an activity is weather sensitive it should be assigned to a calendar showing non-work days on a monthly basis, with the non-work days selected at random across the weeks of the calendar, using the anticipated days provided in the contract clause TIME EXTENSIONS FOR UNUSUALLY SEVERE WEATHER. Assign non-work days over a seven-day week as weather records are compiled on seven-day weeks, which may cause some of the weather related non-work days to fall on weekends.

#### 3.3.9 Open Ended Logic

Only two open ended activities are allowed: the first activity "NTP Acknowledged" may have no predecessor logic, and the last activity -"End Project" may have no successor logic.

Predecessor open ended logic may be allowed in a time impact analyses upon the Contracting Officer's approval.

#### 3.3.10 Default Progress Data Disallowed

Actual Start and Finish dates must not automatically update with default mechanisms included in the scheduling software. Updating of the percent complete and the remaining duration of any activity must be independent functions. Disable program features that calculate one of these parameters from the other. Activity Actual Start (AS) and Actual Finish (AF) dates assigned during the updating process must match those dates provided in the Contractor Quality Control Reports. Failure to document the AS and AF dates in the Daily Quality Control report will result in disapproval of the Contractor's schedule.

#### 3.3.11 Out-of-Sequence Progress

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

the Narrative Report and in the periodic schedule update meetings.

### 3.3.12 Added and Deleted Activities

Do not delete activities from the project schedule or add new activities to the schedule without approval from the Contracting Officer. Activity ID and description changes are considered new activities and cannot be changed without Contracting Officer approval.

### 3.3.13 Original Durations

Activity Original Durations (OD) must be reasonable to perform the work item. OD changes are prohibited unless justification is provided and approved by the Contracting Officer.

### 3.3.14 Leads, Lags, and Start to Finish Relationships

Lags must be reasonable as determined by the Government and not used in place of realistic original durations, must not be in place to artificially absorb float, or to replace proper schedule logic.

- a. Leads (negative lags) are prohibited.
- b. Start to Finish (SF) relationships are prohibited.

### 3.3.15 Retained Logic

Schedule calculations must retain the logic between predecessors and successors ("retained logic" mode) even when the successor activity(s) starts and the predecessor activity(s) has not finished (out-of-sequence progress). Software features that in effect sever the tie between predecessor and successor activities when the successor has started and the predecessor logic is not satisfied ("progress override") are not be allowed.

### 3.3.16 Percent Complete

Update the percent complete for each activity started, based on the realistic assessment of earned value. Activities which are complete but for remaining minor punch list work and which do not restrain the initiation of successor activities may be declared 100 percent complete to allow for proper schedule management.

### 3.3.17 Remaining Duration

Update the remaining duration for each activity based on the number of estimated work days it will take to complete the activity. Remaining duration may not mathematically correlate with percentage found under paragraph entitled Percent Complete.

### 3.3.18 Cost Loading of Closeout Activities

Cost load the "Correction of punch list from Government pre-final inspection" activity(ies) not less than 1 percent of the present contract value. Activity(ies) may be declared 100 percent complete upon the Government's verification of completion and correction of all punch list work identified during Government pre-final inspection(s).

### 3.3.18.1 As-Built Drawings

If there is no separate contract line item (CLIN) for as-built drawings, cost load the "Submission and approval of as-built drawings" activity not less than \$35,000 or 1 percent of the present contract value, which ever is greater, up to \$200,000. Activity will be declared 100 percent complete upon the Government's approval.

### 3.3.18.2 O & M Manuals

Cost load the "Submission and approval of O & M manuals" activity not less than \$20,000. Activity will be declared 100 percent complete upon the Government's approval of all O & M manuals.

### 3.3.19 Anticipated Adverse Weather

Paragraph applicable to contracts with clause entitled TIME EXTENSIONS FOR UNUSUALLY SEVERE WEATHER. Reflect the number of anticipated adverse weather delays allocated to a weather sensitive activity in the activity's calendar.

### 3.3.20 Early Completion Schedule and the Right to Finish Early

An Early Completion Schedule is an Initial Project Schedule (IPS) that indicates all scope of the required contract work will be completed before the contractually required completion date.

- a. No IPS indicating an Early Completion will be accepted without being fully resource-loaded (including crew sizes and manhours) and the Government agreeing that the schedule is reasonable and achievable.
- b. The Government is under no obligation to accelerate work items it is responsible for to ensure that the early completion is met nor is it responsible to modify incremental funding (if applicable) for the project to meet the contractor's accelerated work.

## 3.4 PROJECT SCHEDULE SUBMISSIONS

Provide the submissions as described below. The data CD/DVD, reports, and network diagrams required for each submission are contained in paragraph SUBMISSION REQUIREMENTS. If the Contractor fails or refuses to furnish the information and schedule updates as set forth herein, then the Contractor will be deemed not to have provided an estimate upon which a progress payment can be made.

Review comments made by the Government on the schedule(s) do not relieve the Contractor from compliance with requirements of the Contract Documents.

### 3.4.1 Preliminary Project Schedule Submission

Within 15 calendar days after the NTP is acknowledged submit the Preliminary Project Schedule defining the planned operations detailed for the first 90 calendar days for approval. The approved Preliminary Project Schedule will be used for payment purposes not to exceed 90 calendar days after NTP. Completely cost load the Preliminary Project Schedule to balance the contract award CLINS shown on the Price Schedule. The Preliminary Project Schedule may be summary in nature for the remaining performance period. It must be early start and late finish constrained and logically tied as specified. The Preliminary Project Schedule forms the

basis for the Initial Project Schedule specified herein and must include all of the required plan and program preparations, submissions and approvals identified in the contract (for example, Quality Control Plan, Safety Plan, and Environmental Protection Plan) as well as design activities, planned submissions of all early design packages, permitting activities, design review conference activities, and other non-construction activities intended to occur within the first 90 calendar days. Government acceptance of the associated design package(s) and all other specified Program and Plan approvals must occur prior to any planned construction activities. Activity code any activities that are summary in nature after the first 90 calendar days with Bid Item (CLIN) code (BIDI), Responsibility Code (RESP) and Feature of Work code (FOW).

#### 3.4.2 Initial Project Schedule Submission

Submit the Initial Project Schedule for approval within 42 calendar days after notice to proceed is issued. The schedule must demonstrate a reasonable and realistic sequence of activities which represent all work through the entire contract performance period. No payment will be made for work items not fully detailed in the Project Schedule.

#### 3.4.3 Periodic Schedule Updates

Update the Project Schedule on a regular basis, monthly at a minimum. Provide a draft Periodic Schedule Update for review at the schedule update meetings as prescribed in the paragraph PERIODIC SCHEDULE UPDATE MEETINGS. These updates will enable the Government to assess Contractor's progress.

- a. Update information including Actual Start Dates (AS), Actual Finish Dates (AF), Remaining Durations (RD), and Percent Complete is subject to the approval of the Government at the meeting.
- b. AS and AF dates must match the date(s) reported on the Contractor's Quality Control Report for an activity start or finish.

#### 3.5 SUBMISSION REQUIREMENTS

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

##### 3.5.1 Data CD/DVDs

Provide two sets of data CD/DVDs containing the current project schedule and all previously submitted schedules in the format of the scheduling software (e.g. .xer). Also include on the data CD/DVDs the Narrative Report and all required Schedule Reports. Label each CD/DVD indicating the type of schedule (Preliminary, Initial, Update), full contract number, Data Date and file name. Each schedule must have a unique file name and use project specific settings.

##### 3.5.2 Narrative Report

Provide a Narrative Report with each schedule submission. The Narrative Report is expected to communicate to the Government the thorough analysis of the schedule output and the plans to compensate for any problems, either current or potential, which are revealed through that analysis. Include the following information as minimum in the Narrative Report:

- a. Identify and discuss the work scheduled to start in the next update period.
- b. A description of activities along the two most critical paths where the total float is less than or equal to 20 work days.
- c. A description of current and anticipated problem areas or delaying factors and their impact and an explanation of corrective actions taken or required to be taken.
- d. Identify and explain why activities based on their calculated late dates should have either started or finished during the update period but did not.
- e. Identify and discuss all schedule changes by activity ID and activity name including what specifically was changed and why the change was needed. Include at a minimum new and deleted activities, logic changes, duration changes, calendar changes, lag changes, resource changes, and actual start and finish date changes.
- f. Identify and discuss out-of-sequence work.

### 3.5.3 Schedule Reports

The format, filtering, organizing and sorting for each schedule report will be as directed by the Contracting Officer. Typically, reports contain Activity Numbers, Activity Description, Original Duration, Remaining Duration, Early Start Date, Early Finish Date, Late Start Date, Late Finish Date, Total Float, Actual Start Date, Actual Finish Date, and Percent Complete. Provide the reports electronically in .pdf format. Provide 2 set(s) of hardcopy reports. The following lists typical reports that will be requested:

#### 3.5.3.1 Activity Report

List of all activities sorted according to activity number.

#### 3.5.3.2 Logic Report

List of detailed predecessor and successor activities for every activity in ascending order by activity number.

#### 3.5.3.3 Total Float Report

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

#### 3.5.3.4 Earnings Report by CLIN

A compilation of the Total Earnings on the project from the NTP to the data date, which reflects the earnings of activities based on the agreements made in the schedule update meeting defined herein. Provided a complete schedule update has been furnished, this report serves as the basis of determining progress payments. Group activities by CLIN number and sort by activity number. Provide a total CLIN percent earned value, CLIN percent complete, and project percent complete. The printed report must contain the following for each activity: the Activity Number,

Activity Description, Original Budgeted Amount, Earnings to Date, Earnings this period, Total Quantity, Quantity to Date, and Percent Complete (based on cost).

#### 3.5.3.5 Schedule Log

Provide a Scheduling/Leveling Report generated from the current project schedule being submitted.

#### 3.5.4 Network Diagram

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

##### 3.5.4.1 Continuous Flow

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

##### 3.5.4.2 Project Milestone Dates

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

##### 3.5.4.3 Critical Path

Show all activities on the critical path. The critical path is defined as the longest path.

##### 3.5.4.4 Banding

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

##### 3.5.4.5 Cash Flow / Schedule Variance Control (SVC) Diagram

With each schedule submission, provide a SVC diagram showing 1) Cash Flow S-Curves indicating planned project cost based on projected early and late activity finish dates, and 2) Earned Value to-date.

#### 3.6 PERIODIC SCHEDULE UPDATE

##### 3.6.1 Periodic Schedule Update Meetings

Conduct periodic schedule update meetings for the purpose of reviewing the proposed Periodic Schedule Update, Narrative Report, Schedule Reports, and progress payment. Conduct meetings at least monthly within five days of the proposed schedule data date. Provide a computer with the scheduling software loaded and a projector which allows all meeting participants to view the proposed schedule during the meeting. The Contractor's authorized scheduler must organize, group, sort, filter, perform schedule revisions as needed and review functions as requested by the Contractor and/or Government. The meeting is a working interactive exchange which

allows the Government and Contractor the opportunity to review the updated schedule on a real time and interactive basis. The meeting will last no longer than 8 hours. Provide a draft of the proposed narrative report and schedule data file to the Government a minimum of two workdays in advance of the meeting. The Contractor's Project Manager and scheduler must attend the meeting with the authorized representative of the Contracting Officer. Superintendents, foremen and major subcontractors must attend the meeting as required to discuss the project schedule and work. Following the periodic schedule update meeting, make corrections to the draft submission. Include only those changes approved by the Government in the submission and invoice for payment.

### 3.6.2 Update Submission Following Progress Meeting

Submit the complete Periodic Schedule Update of the Project Schedule containing all approved progress, revisions, and adjustments, pursuant to paragraph SUBMISSION REQUIREMENTS not later than 4 work days after the periodic schedule update meeting.

### 3.7 WEEKLY PROGRESS MEETINGS

Conduct a weekly meeting with the Government (or as otherwise mutually agreed to) between the meetings described in paragraph entitled PERIODIC SCHEDULE UPDATE MEETINGS for the purpose of jointly reviewing the actual progress of the project as compared to the as planned progress and to review planned activities for the upcoming two weeks. Use the current approved schedule update for the purposes of this meeting and for the production and review of reports. At the weekly progress meeting, address the status of RFIs, RFPs and Submittals.

### 3.8 REQUESTS FOR TIME EXTENSIONS

Provide a justification of delay to the Contracting Officer in accordance with the contract provisions and clauses for approval within 10 days of a delay occurring. Also prepare a time impact analysis for each Government request for proposal (RFP) to justify time extensions.

#### 3.8.1 Justification of Delay

Provide a description of the event(s) that caused the delay and/or impact to the work. As part of the description, identify all schedule activities impacted. Show that the event that caused the delay/impact was the responsibility of the Government. Provide a time impact analysis that demonstrates the effects of the delay or impact on the project completion date or interim completion date(s). Evaluate multiple impacts chronologically; each with its own justification of delay. With multiple impacts consider any concurrency of delay. A time extension and the schedule fragment becomes part of the project schedule and all future schedule updates upon approval by the Contracting Officer.

#### 3.8.2 Time Impact Analysis (Prospective Analysis)

Prepare a time impact analysis for approval by the Contracting Officer based on industry standard AACE 52R-06. Utilize a copy of the last approved schedule prior to the first day of the impact or delay for the time impact analysis. If Contracting Officer determines the time frame between the last approved schedule and the first day of impact is too great, prepare an interim updated schedule to perform the time impact analysis. Unless approved by the Contracting Officer, no other changes

may be incorporated into the schedule being used to justify the time impact.

### 3.8.3 Forensic Schedule Analysis (Retrospective Analysis)

Prepare an analysis for approval by the Contracting Officer based on industry standard AACE 29R-03.

### 3.8.4 Fragmentary Network (Fragnet)

Prepare a proposed fragnet for time impact analysis consisting of a sequence of new activities that are proposed to be added to the project schedule to demonstrate the influence of the delay or impact to the project's contractual dates. Clearly show how the proposed fragnet is to be tied into the project schedule including all predecessors and successors to the fragnet activities. The proposed fragnet must be approved by the Contracting Officer prior to incorporation into the project schedule.

### 3.8.5 Time Extension

The Contracting Officer must approve the Justification of Delay including the time impact analysis before a time extension will be granted. No time extension will be granted unless the delay consumes all available Project Float and extends the projected finish date ("End Project" milestone) beyond the Contract Completion Date. The time extension will be in calendar days.

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

### 3.8.6 Impact to Early Completion Schedule

No extended overhead will be paid for delay prior to the original Contract Completion Date for an Early Completion IPS unless the Contractor actually performed work in accordance with that Early Completion Schedule. The Contractor must show that an early completion was achievable had it not been for the impact.

## 3.9 FAILURE TO ACHIEVE PROGRESS

Should the progress fall behind the approved project schedule for reasons other than those that are excusable within the terms of the contract, the Contracting Officer may require provision of a written recovery plan for approval. The plan must detail how progress will be made-up to include which activities will be accelerated by adding additional crews, longer work hours, extra work days, etc.

### 3.9.1 Artificially Improving Progress

Artificially improving progress by means such as, but not limited to, revising the schedule logic, modifying or adding constraints, shortening activity durations, or changing calendars in the project schedule is prohibited. Indicate assumptions made and the basis for any logic, constraint, duration and calendar changes used in the creation of the recovery plan. Any additional resources, manpower, or daily and weekly work hour changes proposed in the recovery plan must be evident at the

work site and documented in the daily report along with the Schedule Narrative Report.

### 3.9.2 Failure to Perform

Failure to perform work and maintain progress in accordance with the supplemental recovery plan may result in an interim and final unsatisfactory performance rating and/or may result in corrective action directed by the Contracting Officer pursuant to FAR 52.236-15 Schedules for Construction Contracts, FAR 52.249-10 Default (Fixed-Price Construction), and other contract provisions.

### 3.9.3 Recovery Schedule

Should the Contracting Officer find it necessary, submit a recovery schedule pursuant to FAR 52.236-15 Schedules for Construction Contracts.

## 3.10 OWNERSHIP OF FLOAT

Except for the provision given in the paragraph IMPACT TO EARLY COMPLETION SCHEDULE, float available in the schedule, at any time, may not be considered for the exclusive use of either the Government or the Contractor including activity and/or project float. Activity float is the number of work days that an activity can be delayed without causing a delay to the "End Project" finish milestone. Project float (if applicable) is the number of work days between the projected early finish and the contract completion date milestone.

## 3.11 TRANSFER OF SCHEDULE DATA INTO RMS/QCS

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

## 3.12 PRIMAVERA P6 MANDATORY REQUIREMENTS

If Primavera P6 is being used, request a backup file template (.xer) from the Government, if one is available, prior to building the schedule. The following settings are mandatory and required in all schedule submissions to the Government:

- a. Activity Codes must be Project Level, not Global or EPS level.
- b. Calendars must be Project Level, not Global or Resource level.
- c. Activity Duration Types must be set to "Fixed Duration & Units".
- d. Percent Complete Types must be set to "Physical".
- e. Time Period Admin Preferences must remain the default "8.0 hr/day, 40 hr/week, 172 hr/month, 2000 hr/year". Set Calendar Work Hours/Day to 8.0 Hour days.

- f. Set Schedule Option for defining Critical Activities to "Longest Path".
- g. Set Schedule Option for defining progressed activities to "Retained Logic".
- h. Set up cost loading using a single lump sum labor resource. The Price/Unit must be \$1/hr, Default Units/Time must be "8h/d", and settings "Auto Compute Actuals" and "Calculate costs from units" selected.
- i. Activity ID's must not exceed 10 characters.
- j. Activity Names must have the most defining and detailed description within the first 30 characters.

-- End of Section --

## SECTION 01 32 17.00 20

## NETWORK ANALYSIS SCHEDULES (NAS)

## PART 1 GENERAL

## 1.1 DESCRIPTION

The Contractor is responsible for scheduling procurement, Contractor quality control and construction, acceptance testing and training. Refer to Specification Section 01 33 00 SUBMITTAL PROCEDURES to determine if any items require Government approval prior to construction; If any are required, that submittal review time shall be included in the schedule.

The schedule is a tool to manage the project, both for Contractor and Government activities. It will also be used to report progress and evaluate time extensions. If cost-loaded, it will provide the basis for progress payments.

The Contractor shall use the Critical Path Method (CPM) and the Precedence Diagram Method (PDM) to satisfy time and cost applications. For consistency, when scheduling software terminology is used in this specification, the terms in Primavera's scheduling programs are used.

## 1.2 SUBMITTALS

The use of a "G" following a submittal indicates that a Government approval action is required. Submittals not having a "G" designation are for Contractor Quality Control approval. Submit the following in accordance with Section 01 33 00.

## SD-01 Preconstruction Submittals

Qualifications; G

Baseline Network Analysis Schedule (NAS); G

## SD-07 Certificates

Monthly Network Analysis Schedule Update; G

## SD-11 Closeout Submittals

As-Built Schedule; G

## 1.3 SCHEDULE ACCEPTANCE PRIOR TO START OF WORK

The Contracting Officer and Contractor shall participate in a preliminary meeting(s) to discuss the proposed schedule and requirements of this section prior to the Contractor preparing the Project Baseline Schedule.

Government review comments on the Contractor's schedule(s) shall not relieve the Contractor from compliance with requirements of the Contract Documents.

Only bonds shall be paid prior to acceptance of the Baseline Network Analysis Schedule (NAS).

The acceptance of a Baseline NAS is a condition precedent to:

1. The Contractor starting work on the demolition or construction stage(s) of the contract.
2. Processing Contractor's pay request(s) for construction activities/items of work.
3. Review of any schedule updates.

Submittal of the Baseline Network Analysis Schedule, and subsequent schedule updates, shall be understood to be the Contractor's certification that the submitted schedule meets all of the requirements of the Contract Documents, represents the Contractor's plan on how the work shall be accomplished, and accurately reflects the work that has been accomplished and how it was sequenced (as-built logic).

#### 1.4 SOFTWARE

Project schedules must be prepared and maintained using Primavera P3, Primavera SureTrak, or Primavera P6. Save files in Concentric P3 or P6 file format, compatible with the Governments version of the scheduling program. Importing data into P3/SureTrak/P6 using data conversion techniques or third party software will be cause for rejection of the submitted schedule.

#### 1.5 QUALIFICATIONS

The designated Scheduler for the project shall have prepared and maintained at least 3 previous schedules of similar size and complexity of this contract using Primavera P3, Primavera SureTrak, or Primavera P6. A resume outlining the qualifications of the Scheduler shall be submitted for acceptance to the Contracting Officer. Payment will not be processed until an acceptable Scheduler is provided.

#### 1.6 NETWORK SYSTEM FORMAT

The system shall include time scaled logic diagrams and specified reports.

##### 1.6.1 Diagrams

Provide Time-scaled Logic Diagram printed in color on ANSI D size sheets. The diagram shall clearly show activities on the critical path. Include the following information for each activity:

- a. Activity ID
- b. Activity Description
- c. Original Duration in Work Days
- d. Remaining duration
- e. Percent Complete
- f. Early Start Date
- g. Early Finish Date

#### h. Total Float

#### 1.6.2 Schedule Activity Properties and Level of Detail

The NAS shall identify all Government, Construction Quality Management (CQM), Construction activities planned for the project and all other activities that could impact project completion if delayed. Separate activities shall be created for each Phase, Area, and Location the activity is occurring. Activity categories included in the schedule are specified below.

With the exception of the Contract Award and Contract Completion Date (CCD) milestone activities, no activity shall be open-ended; each activity shall have predecessor and successor ties. Once an activity exists on the schedule it may not be deleted or renamed to change the scope of the activity and shall not be removed from the schedule logic without approval from the Contracting Officer. The ID number for a deleted activity shall not be re-used for another activity. No more than 20 percent of the activities shall be critical or near critical. Critical is defined as having zero days of Total Float. "Near Critical" is defined as having Total Float of 1 to 14 days. Contractor activities shall be driven by calendars that reflect Saturdays, Sundays and all Federal Holidays as non-work days.

#### 1.6.2.1 Activity Categories

- a. Procurement Activities: Examples of procurement activities include, but are not limited to; Material/equipment submittal preparation, submittal and approval of material/equipment; material/equipment fabrication and delivery, and material/equipment on-site. As a minimum, separate procurement activities will be provided for critical items, long lead items, items requiring government approval and material/equipment procurement for which payment will be requested in advance of installation. The Contractor shall show each delivery with relationship tie to the Construction Activity specifically for the delivery.
- b. Government Activities: Government and other agency activities that could impact progress shall be clearly identified. Government activities include, but are not limited to; Government approved submittal reviews, Government conducted inspections/tests, environmental permit approvals by State regulators, utility outages, Design Start, Construction Start, (including Design/Construction Start for each Fast-Track Phase, and delivery of Government Furnished Material/Equipment.
- c. Quality Management (QM) Activities: CQM Activities shall identify the Preparatory Phase and Initial Phase for each Definable Feature of Work identified in the Contractor's Quality Control Plan. These activities shall be added to each Three-Week Look Ahead Schedule referenced in the paragraph entitled "THREE-WEEK LOOK AHEAD SCHEDULE" and will also be included in each monthly update. The Follow-up Phase will be represented by the Construction Activities in the Baseline Schedule and in the schedule updates.
- d. Construction Activities: No on-site construction activity shall have a duration in excess of 20 working days. Separate construction activities shall be created for each Phase, Area, and Location the

activity is occurring. Contractor activities will be driven by calendars that reflect Saturdays, Sundays and all Federal Holidays as non-work days, unless otherwise defined in this contract.

- e. Turnover and Closeout Activities: Include a separate section with all items on the NAVFAC Red Zone Checklist/POAM that are applicable to this project. The checklist will be provided at the Preconstruction Meeting. As a minimum, this will include all testing, specialized inspection activities, Pre-Final inspection, Punch List Completion, Final Inspection and Acceptance. Add a milestone for the Facility Turnover Planning Meeting at approximately 75 percent construction contract completion or three to six months prior to BOD, whichever is sooner.

#### 1.6.2.2 Contract Milestones and Constraints

- a. Project Start Date Milestones: The Contractor shall include as the first activity on the schedule a start milestone titled "Contract Award", which shall have a Mandatory Start constraint equal to the Contract Award Date.
- b. Projected Completion Milestone: The Contractor shall include an unconstrained finish milestone on the schedule titled "Projected Completion". Projected Completion is defined as the point in time the Government would consider the project complete and ready for its intended use. This milestone shall have the Contract Completion (CCD) milestone as its only successor.
- c. Contract Completion Date (CCD) Milestone: The Contractor shall include as the last activity on the schedule a finish milestone titled "Contract Completion (CCD)", which shall have a Mandatory Finish constraint equal to the current Contract Completion Date. Calculation of schedule updates shall be such that if the finish of the "Projected Completion" milestone falls after the contract completion date, then negative float will be calculated on the longest path and if the finish of the "Projected Completion" milestone falls before the contract completion date, the float calculation shall reflect positive float on the longest path. The only predecessor to the Contract Completion Date Milestone shall be the Projected Completion milestone.

#### 1.6.2.3 Activity Code

At a minimum, the Contractor shall establish activity codes identified in this specification and 3 additional activity codes identified by the Contracting Officer. Once established, activity codes and values cannot be changed without approval by the Contracting Officer.

- a. Phase: All activities shall be assigned a 4-digit code value based on the contract phase it occurs in.
- b. Area Code: All activities shall be assigned an area code value identifying the Area in which the activity occurs. Activities shall not belong to more than one area. Area is defined as a distinct space, function or activity category; such as, separate structure(s), sitework, project summary, construction quality management, material/equipment procurement, etc.
- c. Work Item: All activities in the project schedule shall be assigned a 4-digit Work Item code value. Examples of Work Item code values

include but are not limited to water lines, drain lines, building pad and foundation, slab on grade, walls and columns, suspended slab, roof structure, roofing, exterior finish systems, interior rough-in, and finishes, etc.

- d. Location 1: Assign a 4-digit Location 1 code value to activities associated with multistory structures. Code values are used to identify the floor level where an activity is occurring.
- e. Location 2: Assign a 4-digit Location 2 code value to all activities to identify the location within an Area, Work Item or Building Level that an activity is occurring.
- f. Responsibility Code: All activities in the project schedule shall be identified with the party responsible for completing the task. Activities shall not belong to more than one responsible party.

#### 1.6.2.4 Anticipated Weather Delays

The Contractor shall use the National Oceanic and Atmospheric Administration's (NOAA) historical monthly averages for the NOAA location closest to the project sites as the basis for establishing a "Weather Calendar" showing the number of anticipated non-workdays for each month due to adverse weather, Saturdays, Sundays and all Federal Holidays as non-work days.

Assign the Weather Calendar to any activity that could be impacted by adverse weather. The Contracting Officer will issue a modification in accordance with the contract clauses, giving the Contractor a time extension for the difference of days between the anticipated and actual adverse weather delay if the number of actual adverse weather delay days exceeds the number of days anticipated for the month in which the delay occurs and the adverse weather delayed activities critical to contract completion. A lost workday due to weather conditions is defined as a day in which the Contractor cannot work at least 50 percent of the day on the impacted activity.

#### 1.6.3 Schedule Software Settings and Restrictions

- a. Activity Constraints: Date/time constraint(s), other than those required by the contract, will not be allowed unless accepted by the Contracting Officer. Identify any constraints proposed and provide an explanation for the purpose of the constraint in the Narrative Report.
- b. Default Progress Data Disallowed: Actual Start and Actual Finish dates on the CPM schedule shall match the dates on the Contractor Quality Control and Production Reports.
- c. Software Settings: Schedule calculations and Out-of-Sequence progress (if applicable) shall be handled through Retained Logic, not Progress Override. All activity durations and float values will be shown in days. Activity progress will be shown using Remaining Duration. Default activity type will be set to "Task". The project "Must Finish By" date shall be left blank.

#### 1.6.4 Required Tabular Reports

The following reports shall be included with the schedule submittal:

- a. Log Report: Listing of all changes made between the previous schedule and current updated schedule.
- b. Narrative Report: Identify and justify; 1) Progress made in each area of the project; 2) Critical Path; 3) Date/time constraint(s), other than those required by the contract 3) Changes in the following; added or deleted activities, original and remaining durations for activities that have not started, logic, milestones, planned sequence of operations, critical path, and cost loading; 4) Any decrease in previously reported activity Earned Amount; 5) Pending items and status thereof, including permits, changes orders, and time extensions; 6) Status of Contract Completion Date and interim milestones; 7) Current and anticipated delays (describe cause of delay and corrective actions(s)); and 8) Description of current and future schedule problem areas. Each entry in the narrative report will cite the respective Activity ID and Activity Description, the date and reason for the change, and description of the change.
- c. Earned Value Report: Listing all activities having a budget amount cost loaded. Compilation of total earnings on the project from notice to proceed to current progress payment request. Group and sort activities as directed by the Contracting Officer. Show current budget, previous physical percent complete, to-date physical percent complete, previous earned value, to-date earned value and cost to complete on the report for each activity:
- d. Schedule Variance Control (SVC) Diagram: With each schedule submission, provide a SVC diagram showing 1) Cash Flow S-Curves indicating planned project cost based on projected early and late activity finish dates and 2) Earned Value to-date. Revise Cash Flow S-Curves when the contract is modified, or as directed by the Contracting Officer.

## 1.7 SUBMISSION AND ACCEPTANCE

### 1.7.1 Monthly Network Analysis Updates

Contractor and Government representatives shall meet at monthly intervals to review and agree on the information presented in the updated project schedule. The submission of an acceptable, updated schedule to the Government is a condition precedent to the processing of the Contractor's pay request. If a Schedule of Prices is the basis for progress payments, it shall be consistent with the logic and activity breakdowns on the progress schedule. If progress payments are based on a cost-loaded schedule, the Contractor and Government shall agree on percentage of payment for each activity progressed during the update period.

Provide the following with each Schedule submittal:

- a. Time Scaled Logic Diagram.
- b. Reports listed in paragraph entitled "Required Tabular Reports."
- c. Data disks containing the project schedule. Include the back-up native .prx/curren mandated schedule program files.

### 1.7.2 As-Built Schedule

As a condition precedent to the release of retention and making final

payment, submit an "As-Built Schedule," as the last schedule update showing all activities at 100 percent completion. This schedule shall reflect the exact manner in which the project was actually constructed.

#### 1.8 CONTRACT MODIFICATION

Submit a Time Impact Analysis with each cost and time proposal for a proposed change. Time Impact Analysis (TIA) shall illustrate the influence of each change or delay on the Contract Completion Date or milestones. No time extensions will be granted nor delay damages paid unless a delay occurs which consumes all available Project Float, and extends the Projected Finish beyond the Contract Completion Date.

- a. Each TIA shall be in both narrative and schedule form demonstrating the delay impact. The TIA shall identify the predecessors to the new activities and demonstrate the impacts to successor activities. The Contractor shall run the schedule calculations and submit the impacted schedule with the proposal or claim.
- b. The TIA schedule submitted with the proposal shall show all activity progress as of the date of the proposal. If the impact to the schedule occurs prior to the proposal submission, the TIA schedule shall be updated to show all activity progress as of the time of the impact. If the proposed change does not impact the CCD, no TIA shall be required.
- c. Submit Data disks containing the TIA schedule. Include the back-up native .prx/current mandated schedule program files.
- d. Unless the Contracting Officer requests otherwise, only conformed contract modifications shall be added into the Project NAS.

#### 1.9 PROJECT FLOAT

Project Float is the length of time between the Contractor's Projected Finish Milestone and the Contract Completion Date Milestone. Project Float available in the schedule, at any time shall not be for the exclusive use of either the Government or the Contractor.

#### 1.10 THREE-WEEK LOOK AHEAD SCHEDULE

The Contractor shall prepare and issue a 3-Week Look Ahead schedule to provide a more detailed day-to-day plan of upcoming work identified on the Project Network Analysis Schedule. The work plans shall be keyed to NAS activity numbers and updated each week to show the planned work for the current and following two-week period. Additionally, include upcoming outages, closures, preparatory meetings, and initial meetings. Identify critical path activities on the Three-Week Look Ahead Schedule. The detail work plans are to be bar chart type schedules, maintained separately from the Project NAS on an electronic spreadsheet program and printed on 8 ½ by 11 sheets as directed by the Contracting Officer. Activities shall not exceed 5 working days in duration and have sufficient level of detail to assign crews, tools and equipment required to complete the work. Three hard copies and one electronic file of the 3-Week Look Ahead Schedule shall be delivered to the Contracting Officer no later than 8 a.m. each Monday and reviewed during the weekly CQC Coordination Meeting.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

-- End of Section --

SECTION 01 33 00

SUBMITTAL PROCEDURES

PART 1 GENERAL

1.1 DEFINITIONS

1.1.1 Submittal Descriptions (SD)

Submittals requirements are specified in the technical sections. Submittals are identified by Submittal Description (SD) numbers and titles as follows:

SD-01 Preconstruction Submittals

Submittals which are required prior to start of construction (work) or commencing work on site.

Certificates of insurance

Surety bonds

List of proposed Subcontractors

List of proposed products

Construction Progress Schedule

Submittal register

Schedule of prices

Site Health and safety plan

Site Work plan

Quality Control(QC) plan

Environmental protection plan

Environmental conditions report

SD-02 Shop Drawings

Drawings, diagrams and schedules specifically prepared to illustrate some portion of the work.

Diagrams and instructions from a manufacturer or fabricator for use in producing the product and as aids to the Contractor for integrating the product or system into the project.

Drawings prepared by or for the Contractor to show how multiple systems and interdisciplinary work will be coordinated.

SD-03 Product Data

Catalog cuts, illustrations, schedules, diagrams, performance charts, instructions and brochures illustrating size, physical appearance and other characteristics of materials, systems or equipment for some portion of the work.

Samples of warranty language when the contract requires extended product warranties.

#### SD-04 Samples

Fabricated or unfabricated physical examples of materials, equipment or workmanship that illustrate functional and aesthetic characteristics of a material or product and establish standards by which the work can be judged.

#### SD-05 Design Data

Design calculations, mix designs, analyses or other data pertaining to a part of work.

#### SD-06 Test Reports

Report signed by authorized official of testing laboratory that a material, product or system identical to the material, product or system to be provided has been tested in accord with specified requirements. (Testing must have been within three years of date of contract award for the project.)

Report which includes findings of a test required to be performed by the Contractor on an actual portion of the work or prototype prepared for the project before shipment to job site.

Report which includes finding of a test made at the job site or on sample taken from the job site, on portion of work during or after installation.

Investigation reports.

Daily logs and checklists.

Final acceptance test and operational test procedure.

#### SD-07 Certificates

Statements printed on the manufacturer's letterhead and signed by responsible officials of manufacturer of product, system or material attesting that product, system or material meets specification requirements. Must be dated after award of project contract and clearly name the project.

Document required of Contractor, or of a manufacturer, supplier, installer or Subcontractor through Contractor, the purpose of which is to further quality of orderly progression of a portion of the work by documenting procedures, acceptability of methods or personnel qualifications.

Text of posted operating instructions.

#### SD-08 Manufacturer's Instructions

Preprinted material describing installation of a product, system or material, including special notices and Material Safety Data Sheets (MSDSs) concerning impedances, hazards and safety precautions.

#### SD-09 Manufacturer's Field Reports

Documentation of the testing and verification actions taken by manufacturer's representative at the job site, in the vicinity of the job site, or on a sample taken from the job site, on a portion of the work, during or after installation, to confirm compliance with manufacturer's standards or instructions. The documentation must be signed by an authorized official of a testing laboratory or agency and must state the test results; and indicate whether the material, product, or system has passed or failed the test.

Factory test reports.

#### SD-10 Operation and Maintenance Data

Data that is furnished by the manufacturer, or the system provider, to the equipment operating and maintenance personnel, including manufacturer's help and product line documentation necessary to maintain and install equipment. This data is needed by operating and maintenance personnel for the safe and efficient operation, maintenance and repair of the item.

This data is intended to be incorporated in an operations and maintenance manual or control system.

#### SD-11 Closeout Submittals

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

Special requirements necessary to properly close out a construction contract. For example, Record Drawings and as-built drawings. Also, submittal requirements necessary to properly close out a major phase of construction on a multi-phase contract.

Interim "DD Form 1354" with cost breakout for all assets 30 days prior to facility turnover.

##### 1.1.2 Approving Authority

Office or designated person authorized to approve submittal.

##### 1.1.3 Work

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

#### 1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor QC approval. Submit the following in accordance with this section.

## SD-01 Preconstruction Submittals

## Submittal Register; G

## 1.3 SUBMITTAL CLASSIFICATION

Submittals are classified as follows:

## 1.4 PREPARATION

## 1.4.1 Transmittal Form

Transmit each submittal, except sample installations and sample panels to office of approving authority. Transmit submittals with transmittal form prescribed by Contracting Officer and standard for project. On the transmittal form identify Contractor, indicate date of submittal, and include information prescribed by transmittal form and required in paragraph entitled, "Identifying Submittals," of this section. Process transmittal forms to record actions regarding sample[s] .

## 1.4.2 Identifying Submittals

When submittals are provided by a Subcontractor, the Prime Contractor is to prepare, review and stamp with Contractor's approval all specified submittals prior to submitting for Government approval.

Identify submittals, except sample installations and sample panels, with the following information permanently adhered to or noted on each separate component of each submittal and noted on transmittal form. Mark each copy of each submittal identically, with the following:

- a. Project title and location.
- b. Construction contract number.
- c. Date of the drawings and revisions.
- d. Name, address, and telephone number of subcontractor, supplier, manufacturer and any other subcontractor associated with the submittal.
- e. Section number of the specification section by which submittal is required.
- f. Submittal description (SD) number of each component of submittal.
- g. When a resubmission, add alphabetic suffix on submittal description, for example, submittal 18 would become 18A, to indicate resubmission.
- h. Product identification and location in project.

## 1.4.3 Format for SD-02 Shop Drawings

Shop drawings are not to be less than 0.22 by 0.28 m (8 1/2 by 11 inches) nor more than 0.76 by 1.07 m ( 30 by 42 inches), except for full size patterns or templates. Prepare drawings to accurate size, with scale indicated, unless other form is required. Drawings are to be suitable for reproduction and be of a quality to produce clear, distinct lines and letters with dark lines on a white background.

Present 0.22 by 0.28 m ( 8 1/2 by 11 inches) sized shop drawings as part of the bound volume for submittals required by section. Present larger drawings in sets.

Include on each drawing the drawing title, number, date, and revision numbers and dates, in addition to information required in paragraph entitled, "Identifying Submittals," of this section.

Number drawings in a logical sequence. Each drawing is to bear the number of the submittal in a uniform location adjacent to the title block. Place the Government contract number in the margin, immediately below the title block, for each drawing.

Reserve a blank space, on the right hand side of each sheet for the Government disposition stamp.

Dimension drawings, except diagrams and schematic drawings; prepare drawings demonstrating interface with other trades to scale. Use the same unit of measure for shop drawings as indicated on the contract drawings. Identify materials and products for work shown.

Include the nameplate data, size and capacity on drawings. Also include applicable federal, military, industry and technical society publication references.

#### 1.4.4 Format of SD-03 Product Data and SD-08 Manufacturer's Instructions

Present product data submittals for each section as a complete, bound volume. Include table of contents, listing page and catalog item numbers for product data.

Indicate, by prominent notation, each product which is being submitted; indicate specification section number and paragraph number to which it pertains.

Supplement product data with material prepared for project to satisfy submittal requirements for which product data does not exist. Identify this material as developed specifically for project, with information and format as required for submission of SD-07 Certificates.

Include the manufacturer's name, trade name, place of manufacture, and catalog model or number on product data. Also include applicable federal, military, industry and technical society publication references. Should manufacturer's data require supplemental information for clarification, submit as specified for SD-07 Certificates.

Where equipment or materials are specified to conform to industry and technical society reference standards of the organizations such as American National Standards Institute (ANSI), ASTM International (ASTM), National Electrical Manufacturer's Association (NEMA), Underwriters Laboratories (UL), and Association of Edison Illuminating Companies (AEIC), submit proof of such compliance. The label or listing by the specified organization will be acceptable evidence of compliance. In lieu of the label or listing, submit a certificate from an independent testing organization, competent to perform testing, and approved by the Contracting Officer. State on the certificate that the item has been tested in accordance with the specified organization's test methods and that the item complies with the specified organization's reference

standard.

Collect required data submittals for each specific material, product, unit of work, or system into a single submittal and marked for choices, options, and portions applicable to the submittal. Mark each copy of the product data identically. Partial submittals will not be accepted for expedition of construction effort.

Submit manufacturer's instructions prior to installation.

#### 1.4.5 Format of SD-04 Samples

Furnish samples in sizes below, unless otherwise specified or unless the manufacturer has prepackaged samples of approximately same size as specified:

- a. Sample of Equipment or Device: Full size.
- b. Sample of Linear Devices or Materials: 0.25 m (10 inch) length or length to be supplied, if less than 0.25 m (10 inches). Examples of linear devices or materials are conduit and handrails.
- c. Sample of Non-Solid Materials: Pint. Examples of non-solid materials are sand and paint.

#### 1.4.6 Format of SD-05 Design Data and SD-07 Certificates

Provide design data and certificates on 0.22 by 0.28 m (8 1/2 by 11 inches) paper. Provide a bound volume for submittals containing numerous pages.

#### 1.4.7 Format of SD-06 Test Reports and SD-09 Manufacturer's Field Reports

Provide reports on 0.22 by 0.28 m (8 1/2 by 11 inches) paper in a complete bound volume.

Indicate by prominent notation, each report in the submittal. Indicate specification number and paragraph number to which it pertains.

#### 1.4.8 Format of SD-10 Operation and Maintenance Data (O&M)

Comply with the applicable requirements for O&M Data format.

#### 1.4.9 Format of SD-01 Preconstruction Submittals and SD-11 Closeout Submittals

When submittal includes a document which is to be used in project or become part of project record, other than as a submittal, do not apply Contractor's approval stamp to document, but to a separate sheet accompanying document.

### 1.5 QUANTITY OF SUBMITTALS

#### 1.5.1 Number of Copies of SD-02 Shop Drawings

Submit six copies of submittals of shop drawings requiring review and approval only by QC organization and seven copies of shop drawings requiring review and approval by Contracting Officer.

#### 1.5.2 Number of Copies of SD-03 Product Data and SD-08 Manufacturer's Instructions

Submit in compliance with quantity requirements specified for shop drawings.

#### 1.5.3 Number of Samples SD-04 Samples

- a. Submit one sample, or one set of sample showing range of variation, of each required item.
- b. Submit one sample installation, where directed.
- c. Submit one sample of non-solid materials.

#### 1.5.4 Number of Copies SD-05 Design Data and SD-07 Certificates

Submit in compliance with quantity requirements specified for shop drawings.

#### 1.5.5 Number of Copies SD-06 Test Reports and SD-09 Manufacturer's Field Reports

Submit in compliance with quantity and quality requirements specified for shop drawings other than field test results that will be submitted with QC reports.

#### 1.5.6 Number of Copies of SD-10 Operation and Maintenance Data

Submit three copies of O&M Data to the Contracting Officer for review and approval.

#### 1.5.7 Number of Copies of SD-01 Preconstruction Submittals and SD-11 Closeout Submittals

Unless otherwise specified, submit three sets of administrative submittals.

### 1.6 VARIATIONS

Variations from contract requirements require both Designer of Record (DOR) and Government approval pursuant to contract Clause FAR 52.236-21 and will be considered where advantageous to Government.

#### 1.6.1 Considering Variations

Discussion with Contracting Officer prior to submission, after consulting with the DOR, will help ensure functional and quality requirements are met and minimize rejections and re-submittals. When contemplating a variation which results in lower cost, consider submission of the variation as a Value Engineering Change Proposal (VECP).

Specifically point out variations from contract requirements in transmittal letters. Failure to point out deviations may result in the Government requiring rejection and removal of such work at no additional cost to the Government.

#### 1.6.2 Proposing Variations

When proposing variation, deliver written request to the Contracting

Officer, with documentation of the nature and features of the variation and why the variation is desirable and beneficial to Government, including the DOR's written analysis and approval. If lower cost is a benefit, also include an estimate of the cost savings. In addition to documentation required for variation, include the submittals required for the item. Clearly mark the proposed variation in all documentation.

#### 1.6.3 Warranting That Variations Are Compatible

When delivering a variation for approval, Contractor, including its Designer(s) of Record, warrants that this contract has been reviewed to establish that the variation, if incorporated, will be compatible with other elements of work.

#### 1.6.4 Review Schedule Is Modified

In addition to normal submittal review period, a period of 10 working days will be allowed for consideration by the Government of submittals with variations.

### 1.7 SUBMITTAL REGISTER

Prepare and maintain submittal register, as the work progresses. Do not change data which is output in columns (c), (d), (e), and (f) as delivered by Government; retain data which is output in columns (a), (g), (h), and (i) as approved. A submittal register showing items of equipment and materials for which submittals are required by the specifications is provided as an attachment. This list may not be all inclusive and additional submittals may be required.

Column (c): Lists specification section in which submittal is required.

Column (d): Lists each submittal description (SD No. and type, e.g. SD-02 Shop Drawings) required in each specification section.

Column (e): Lists one principal paragraph in specification section where a material or product is specified. This listing is only to facilitate locating submitted requirements. Do not consider entries in column (e) as limiting project requirements.

Column (f): Indicate approving authority for each submittal.

#### 1.7.1 Use of Submittal Register

Submit submittal register. Submit with QC plan and project schedule. Verify that all submittals required for project are listed and add missing submittals. Coordinate and complete the following fields on the register submitted with the QC plan and the project schedule.

#### 1.7.2 Contractor Use of Submittal Register

Update the following fields with each submittal throughout contract.

Column (b) Transmittal Number: Contractor assigned list of consecutive numbers.

Column (j) Action Code (k): Date of action used to record Contractor's review when forwarding submittals to QC.

Column (l) List date of submittal transmission.

Column (q) List date approval received.

#### 1.7.3 Approving Authority Use of Submittal Register

Update the following fields.

Column (b) Transmittal Number: Contractor assigned list of consecutive numbers.

Column (l) List date of submittal receipt.

Column (m) through (p) List Date related to review actions.

Column (q) List date returned to Contractor.

#### 1.7.4 Action Codes

Entries for columns (j) and (o), are to be used as follows (others may be prescribed by Transmittal Form):

##### 1.7.4.1 Government Review Action Codes

"A" - "Approved as submitted"; "Completed"

"B" - "Approved, except as noted on drawings"; "Completed"

"C" - "Approved, resubmission required"; "Resubmit"

"D" - "Returned by correspondence"; "Completed"

"E" - "Disapproved (See attached)"; "Resubmit"

"F" - "Receipt acknowledged"; "Completed"

"G" - "Other (Specify)"; "Resubmit"

"X" - "Receipt acknowledged, does not comply"; "Resubmit"

#### 1.7.5 Copies Delivered to the Government

Deliver one copy of submittal register updated by Contractor to Government with each invoice request.

#### 1.8 SCHEDULING

Schedule and submit concurrently submittals covering component items forming a system or items that are interrelated. Include certifications to be submitted with the pertinent drawings at the same time. No delay damages or time extensions will be allowed for time lost in late submittals.

- a. Coordinate scheduling, sequencing, preparing and processing of submittals with performance of work so that work will not be delayed by submittal processing. Allow for potential resubmittal of requirements.

- b. Submittals called for by the contract documents will be listed on the register. If a submittal is called for but does not pertain to the contract work, the Contractor is to include the submittal in the register and annotate it "N/A" with a brief explanation. Approval by the Contracting Officer does not relieve the Contractor of supplying submittals required by the contract documents but which have been omitted from the register or marked "N/A."
- c. Re-submit register and annotate monthly by the Contractor with actual submission and approval dates. When all items on the register have been fully approved, no further re-submittal is required.
- d. Carefully control procurement operations to ensure that each individual submittal is made on or before the Contractor scheduled submittal date shown on the approved "Submittal Register."
- e. Except as specified otherwise, allow review period, beginning with receipt by approving authority, that includes at least 15 working days for submittals for QC Manager approval and 20 working days for submittals for Contracting Officer approval. Period of review for submittals with Contracting Officer approval begins when Government receives submittal from QC organization.
- f. For submittals requiring review by fire protection engineer, allow review period, beginning when Government receives submittal from QC organization, of 20 working days for return of submittal to the Contractor.
- g. Period of review for each resubmittal is the same as for initial submittal.

#### 1.8.1 Reviewing, Certifying, Approving Authority

The QC organization is responsible for reviewing and certifying that submittals are in compliance with contract requirements. Approving authority on submittals is QC Manager unless otherwise specified for specific submittal. At each "Submittal" paragraph in individual specification sections, a notation "G," following a submittal item, indicates Contracting Officer is approving authority for that submittal item.

#### 1.8.2 Constraints

Conform to provisions of this section, unless explicitly stated otherwise for submittals listed or specified in this contract.

Submit complete submittals for each definable feature of work. Submit at the same time components of definable feature interrelated as a system.

When acceptability of a submittal is dependent on conditions, items, or materials included in separate subsequent submittals, submittal will be returned without review.

Approval of a separate material, product, or component does not imply approval of assembly in which item functions.

#### 1.8.3 QC Organization Responsibilities

- a. Note date on which submittal was received from Contractor on each submittal.

- b. Review each submittal; and check and coordinate each submittal with requirements of work and contract documents.
- c. Review submittals for conformance with project design concepts and compliance with contract documents.
- d. Act on submittals, determining appropriate action based on QC organization's review of submittal.
  - (1) When QC Manager is approving authority, take appropriate action on submittal from the possible actions defined in paragraph entitled, "Approved[/Accepted] Submittals," of the section."
  - (2) When Contracting Officer is approving authority or when variation has been proposed, forward submittal to Government with certifying statement or return submittal marked "not reviewed" or "revise and resubmit" as appropriate. The QC organization's review of submittal determines appropriate action.
- e. Ensure that material is clearly legible.
- f. Stamp each sheet of each submittal with QC certifying statement or approving statement, except that data submitted in bound volume or on one sheet printed on two sides may be stamped on the front of the first sheet only.

- (1) When approving authority is Contracting Officer, QC organization will certify submittals forwarded to Contracting Officer with the following certifying statement:

"I hereby certify that the (equipment) (material) (article) shown and marked in this submittal is that proposed to be incorporated with contract , is in compliance with the contract drawings and specification, can be installed in the allocated spaces, and is submitted for Government approval.

Certified by Submittal Reviewer \_\_\_\_\_, Date \_\_\_\_\_  
(Signature when applicable)

Certified by QC Manager \_\_\_\_\_, Date \_\_\_\_\_"  
(Signature)

- (2) When approving authority is QC Manager, QC Manager will use the following approval statement when returning submittals to Contractor as "Approved" or "Approved as Noted."

"I hereby certify that the (material) (equipment) (article) shown and marked in this submittal and proposed to be incorporated with contract, is in compliance with the contract drawings and specification, can be installed in the allocated spaces, and is approved for use.

Certified by Submittal Reviewer \_\_\_\_\_, Date \_\_\_\_\_  
(Signature when applicable)

Approved by QC Manager \_\_\_\_\_, Date \_\_\_\_\_"  
(Signature)

- g. Sign certifying statement or approval statement. The QC organization

member designated in the approved QC plan is the person signing certifying statements. The use of original ink for signatures is required. Stamped signatures are not acceptable.

- h. Update submittal register [database ]as submittal actions occur and maintain the submittal register at project site until final acceptance of all work by Contracting Officer.
- i. Retain a copy of approved submittals at project site, including Contractor's copy of approved samples.

#### 1.9 GOVERNMENT APPROVING AUTHORITY

When approving authority is Contracting Officer, the Government will:

- a. Note date on which submittal was received from QC Manager.
- b. Review submittals for approval within scheduling period specified and only for conformance with project design concepts and compliance with contract documents.
- c. Identify returned submittals with one of the actions defined in paragraph entitled, "Review Notations," of this section and with markings appropriate for action indicated.

Upon completion of review of submittals requiring Government approval, stamp and date approved submittals.

##### 1.9.1 Review Notations

Contracting Officer review will be completed within 20 working days after date of submission. Submittals will be returned to the Contractor with the following notations:

- a. Submittals marked "approved" or "accepted" authorize the Contractor to proceed with the work covered.
- b. Submittals marked "approved as noted" "or approved except as noted, resubmittal not required," authorize the Contractor to proceed with the work covered provided he takes no exception to the corrections.
- c. Submittals marked "not approved" or "disapproved," or "revise and resubmit," indicate noncompliance with the contract requirements or design concept, or that submittal is incomplete. Resubmit with appropriate changes. No work shall proceed for this item until resubmittal is approved.
- d. Submittals marked "not reviewed" will indicate submittal has been previously reviewed and approved, is not required, does not have evidence of being reviewed and approved by Contractor, or is not complete. A submittal marked "not reviewed" will be returned with an explanation of the reason it is not reviewed. Resubmit submittals returned for lack of review by Contractor or for being incomplete, with appropriate action, coordination, or change.

##### 1.10 DISAPPROVED SUBMITTALS

Contractor shall make corrections required by the Contracting Officer. If the Contractor considers any correction or notation on the returned

submittals to constitute a change to the contract drawings or specifications; notice as required under the clause entitled, "Changes," is to be given to the Contracting Officer. Contractor is responsible for the dimensions and design of connection details and construction of work. Failure to point out deviations may result in the Government requiring rejection and removal of such work at the Contractor's expense.

If changes are necessary to submittals, the Contractor shall make such revisions and submission of the submittals in accordance with the procedures above. No item of work requiring a submittal change is to be accomplished until the changed submittals are approved.

#### 1.11 APPROVED SUBMITTALS

The Contracting Officer's approval or acceptance of submittals is not to be construed as a complete check, and indicates only that the general method of construction, materials, detailing and other information are satisfactory.

Approval or acceptance will not relieve the Contractor of the responsibility for any error which may exist, as the Contractor under the Contractor Quality Control (CQC) requirements of this contract is responsible for dimensions, the design of adequate connections and details, and the satisfactory construction of all work.

After submittals have been approved or accepted 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.

#### 1.12 APPROVED SAMPLES

Approval of a sample is only for the characteristics or use named in such approval and is not to be construed to change or modify any contract requirements. Before submitting samples, the Contractor to assure that the materials or equipment will be available in quantities required in the project. No change or substitution will be permitted after a sample has been approved.

Match the approved samples for materials and equipment incorporated in the work. If requested, approved samples, including those which may be damaged in testing, will be returned to the Contractor, at his expense, upon completion of the contract. Samples not approved will also be returned to the Contractor at its expense, if so requested.

Failure of any materials to pass the specified tests will be sufficient cause for refusal to consider, under this contract, any further samples of the same brand or make of that material. Government reserves the right to disapprove any material or equipment which previously has proved unsatisfactory in service.

Samples of various materials or equipment delivered on the site or in place may be taken by the Contracting Officer for testing. Samples failing to meet contract requirements will automatically void previous approvals. Contractor to replace such materials or equipment to meet contract requirements.

Approval of the Contractor's samples by the Contracting Officer does not relieve the Contractor of his responsibilities under the contract.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

-- End of Section --

























## SECTION 01 33 29

## SUSTAINABILITY REQUIREMENTS

## 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 within the text by the basic designation only.

AMERICAN SOCIETY OF HEATING, REFRIGERATING AND AIR-CONDITIONING ENGINEERS (ASHRAE)

ASHRAE 189.1 (2011; Errata 1-2 2012; INT 1 2013; Errata 3-8 2013) Standard for the Design of High-Performance Green Buildings Except Low-Rise Residential Buildings

U.S. DEPARTMENT OF ENERGY (DOE)

ISWG Guiding Principles (2008) High Performance and Sustainable Buildings Guidance

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

40 CFR 247 Comprehensive Procurement Guideline for Products Containing Recovered Materials

## 1.2 SUMMARY

This specification includes general requirements and procedures for this project to be constructed and documented per the federally mandated "Guiding Principles" (GP), Third Party Certification (TPC) requirements (if applicable), UFC 1-200-02, High Performance and Sustainable Building Requirements, and other requirements identified in this specification.

## 1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submittals with an "S" are for Government Approval and for inclusion in the Sustainability Notebook. Submittals with an "S" are for inclusion in the Sustainability Notebook, in conformance to Section 01 33 29 SUSTAINABILITY REQUIREMENTS. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

## SD-01 Preconstruction Submittals

Preliminary Sustainability Notebook; G

Preliminary High Performance and Sustainable Building Checklist

## SD-11 Closeout Submittals

Final Sustainability Notebook; G

## Final High Performance and Sustainable Building Checklist; G

## 1.4 SUSTAINABILITY SUBMITTALS

Provide documentation in the Sustainability Notebook and the HPSB Checklist to indicate compliance with the sustainability requirements of the project.

Submit the and TPC sustainability documentation required in this specification as "S" submittals. Highlight and TPC compliance data in "S" submittal.

## 1.4.1 SUSTAINABILITY NOTEBOOK

Provide and maintain a comprehensive Sustainability Notebook to document compliance with the sustainability requirements identified in the approved and TPC Checklist[s]. Sustainability Notebook must contain all required data to support full compliance with the ISWG Guiding Principles Requirements and TPC requirements. Sustainability Notebook is in the form of an Adobe PDF file; bookmarked at each ISWG Guiding Principles Requirement, TPC requirement, and sub-bookmarked at each document. Match format to ISWG Guiding Principles numbering system indicated herein. Maintain up to date information, spreadsheets, templates, etc. with each current submittals. For TPC projects, provide a second Table of contents using TPC numbering system. Locate documentation unique to TPC here. Where TPC documentation would repeat GP documentation, insert note referring reviewer to GP documentation.

Contracting Officer may deduct from the monthly progress payment accordingly if Sustainability Notebook information is not current, until information is updated and on track per project goals.

## 1.4.1.1 Sustainability Notebook Submittal Schedule

Provide Sustainability Notebook Submittals at the following milestones of the project:

## a. Preliminary Sustainability Notebook

Submit preliminary Sustainability Notebook for approval at the Pre-construction conference. Include Preliminary High Performance and Sustainable Building Checklist.

## b. Construction Progress Meetings. Update and TPC documentation in the Sustainability Notebook[ and TPC Online tool] for each meeting.

## c. Final Sustainability Notebook

Submit updated Sustainability Notebook within 60 days after the Beneficial Occupancy Date (BOD). Final progress payment retainage may be held by Contracting Officer until final sustainability documentation is complete. Include Final High Performance and Sustainable Building Checklist.

## 1.4.2 HIGH PERFORMANCE SUSTAINABLE BUILDING (HPSB) CHECKLIST

Provide construction documentation that provides proof of and supports compliance with the completed HBSP Checklist.

Submit an updated copy of the HPSB Checklist with each Sustainability Notebook submittal. Attach HPSB Checklist to DD1354 Real Property Record Submittal.

Where not included as attachment to this specification section, use the following as HPSB Checklist for respective service branch. Where Internet address appears on two lines, copy full address into Internet browser.

Navy - NAVFAC Sustainability & Energy Data Record Card  
[http://www.wbdg.org/pdfs/navfac\\_sustainable\\_energy\\_data\\_record\\_card.pdf](http://www.wbdg.org/pdfs/navfac_sustainable_energy_data_record_card.pdf)

## 1.5 DOCUMENTATION REQUIREMENTS

Third Party Certification requirements or credits are mandatory when they have requirements that match a Guiding Principle Requirement. Documentation used to demonstrate TPC compliance may be used to demonstrate GP compliance.

Incorporate each of the following ISWG Guiding Principles Requirements into project construction; and provide documentation that proves compliance with each listed requirement. Items below are organized according to the ISWG Guiding Principles. For projects that require TPC, refer to Third Party Certifier's reference manuals for TPC requirements.

### 1.5.1 Energy Efficient Equipment

Provide only energy-using equipment that is Energy Star rated, or has the Federal Energy Management Program (FEMP) recommended efficiency. Where Energy Star or FEMP recommendations have not been established, provide equipment with efficiency in the top 25 percent for the type of equipment procured. Provide only energy using equipment that meets FEMP requirements for low standby power consumption. Energy efficient equipment can be found at: <http://www1.eere.energy.gov/femp/> and <http://www.energystar.gov/>.

Provide the following documentation:

Proof that equipment is energy efficient and complies with the cited requirements.

### 1.5.2 Benchmarking

Provide report of initial actual energy performance with the energy design targets.

Provide the following documentation:

Prefinal Performance Report with data collected from the first 60 days of operation of the facility after Beneficial Occupancy Date (BOD). Submit this information with the Final Sustainability Notebook Submittal.

### 1.5.3 Reduce Volatile Organic Compounds (VOC)

Provide materials and products with low pollutant emissions, including composite wood products, adhesives, sealants, interior paints and finishes, carpet systems, and furnishings. Meeting the requirements of ASHRAE 189.1 Sections 8.4.2 (Prescriptive Option: Materials) or Section 8.5.2 (Performance Option: Materials) demonstrates compliance.

#### 1.5.4 Recycled Content

Provide materials on this project with aggregated total recycled content greater than 10 percent. In addition, comply with 40 CFR 247. Refer to <http://www.epa.gov/cpg/products.htm> for assistance identifying products cited in 40 CFR 247.

#### 1.5.5 Bio-Based Products

Utilize products and material made from biobased materials to the maximum extent possible without jeopardizing the intended end use or detracting from the overall quality delivered to the end user. Use only supplies and materials of a type and quality that conform to applicable specifications and standards.

Biobased products that are designated for preferred procurement under the USDA BioPreferred Program must meet the required minimum biobased content. Refer to <http://www.biopREFERRED.gov> for the product categories and BioPreferred Catalog.

Provide the following documentation:

- a. For biobased products used on this project, provide biobased content and biobased source of material. Indicate name of the manufacturer, cost of each product and the use of each product on this project.

#### 1.5.6 Landfill Disposal

Divert construction debris from landfill disposal in accordance with Construction and Demolition Waste Management of the Federal Green Construction Guide for Specifiers, available at <http://fedgreenspecs.wbdg.org>

Provide the following documentation:

Documentation showing total amount of construction debris diverted from landfill as a percentage of all construction debris on the project.

Include project's Construction Waste Management Plan and all dumpster haul tickets.

#### 1.5.7 Ozone Depleting Substances

Eliminate the use of ozone depleting substances during and after construction where alternative environmentally preferable products are available and in accordance with either the Montreal Protocol and Title VI of the Clean Air Act Amendment of 1990 or equivalent overall air quality benefits that take into account lifecycle impacts. Meet the requirements of ASHRAE 189.1 Section 9.3.3 Refrigerants (except for fire suppression system requirements covered elsewhere in this specification).

Provide the following documentation:

- a. MSDS sheets for all refrigerants provided
- b. Products that meet the criteria of U.S. EPA Significant New Alternatives Policy, available at <http://www.epa.gov/ozone/snap/index.html>.

### 1.5.8 Validation and Certification Restrictions

The purchase of renewable energy credits (RECs) to meet project sustainability goals is prohibited.

## PART 2 PRODUCTS

Not used.

## PART 3 EXECUTION

### 3.1 SUSTAINABILITY COORDINATION

#### 3.1.1 Coordinating Sustainability Documentation Progress

Provide sustainability focus and coordination at the following meetings to achieve sustainability goals. Contractor's designated TPC accredited sustainability professional responsible for TPC documentation must participate in the following meetings to coordinate documentation completion.

- a. Pre-Construction Conference: Discuss the following: TPC and HPSB Checklist[s], Sustainability Action Plan, Construction submittal requirements and schedule, individuals responsible for achieving each Guiding Principle Requirement and TPC prerequisite and credit.
- b. Construction Progress Meetings: Review TPC sustainability requirements with project team including contractor and sub-contractor representatives. Demonstrate TPC documentation is being collected and updated to the Sustainability Notebook and TPC Online tool.
  - (1) Facility Turnover Meetings: Review Sustainability Notebook, and TPC Online submission for completeness and identify any outstanding issues relating to final documentation requirements.
  - (2) Final Sustainability Notebook Review

### 3.2 SUSTAINABILITY AWARD

Finalize the sustainability certification process and obtain the TPC Certification Plaque and Certificates, indicating completion of the projects sustainability goals.

-- End of Section --

## SECTION 01 35 26

## GOVERNMENTAL SAFETY REQUIREMENTS

## 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 within the text by the basic designation only.

## AMERICAN SOCIETY OF SAFETY ENGINEERS (ASSE/SAFE)

ASSE/SAFE A10.34 (2001; R 2012) Protection of the Public on or Adjacent to Construction Sites

## NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 241 (2013) Standard for Safeguarding Construction, Alteration, and Demolition Operations

NFPA 70 (2014; AMD 1 2013; Errata 1 2013; AMD 2 2013; Errata 2 2013; AMD 3 2014; Errata 3 2014) National Electrical Code

NFPA 70E (2012; Errata 2012) Standard for Electrical Safety in the Workplace

## U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1 (2008; Errata 2011) Safety and Health Requirements Manual

## U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

29 CFR 1926 Safety and Health Regulations for Construction

29 CFR 1926.16 Rules of Construction

## U.S. NAVAL FACILITIES ENGINEERING COMMAND (NAVFAC)

NAVFAC P-307 (2009; Change 1 Mar 2011; Change 2 Aug 2011) Management of Weight Handling Equipment

## 1.2 DEFINITIONS

- a. High Visibility Accident. Any mishap which may generate publicity or high visibility.
- b. Medical Treatment. Treatment administered by a physician or by registered professional personnel under the standing orders of a physician. Medical treatment does not include first aid treatment even though provided by a physician or registered personnel.

- c. Recordable Injuries or Illnesses. Any work-related injury or illness that results in:
- (1) Death, regardless of the time between the injury and death, or the length of the illness;
  - (2) Days away from work (any time lost after day of injury/illness onset);
  - (3) Restricted work;
  - (4) Transfer to another job;
  - (5) Medical treatment beyond first aid;
  - (6) Loss of consciousness; or
  - (7) A significant injury or illness diagnosed by a physician or other licensed health care professional, even if it did not result in (1) through (6) above.
- d. "USACE" property and equipment specified in USACE EM 385-1-1 should be interpreted as Government property and equipment.
- e. Weight Handling Equipment (WHE) Accident. A WHE accident occurs when any one or more of the eight elements in the operating envelope fails to perform correctly during operation, including operation during maintenance or testing resulting in personnel injury or death; material or equipment damage; dropped load; derailment; two-blocking; overload; or collision, including unplanned contact between the load, crane, or other objects. A dropped load, derailment, two-blocking, overload and collision are considered accidents even though no material damage or injury occurs. A component failure (e.g., motor burnout, gear tooth failure, bearing failure) is not considered an accident solely due to material or equipment damage unless the component failure results in damage to other components (e.g., dropped boom, dropped load, roll over, etc.) Any mishap meeting the criteria described above shall be documented in both the Contractor Significant Incident Report (CSIR) and using the NAVFAC prescribed Navy Crane Center (NCC) form submitted within five days both as provided by the Contracting Officer. Comply with additional requirements and procedures for accidents in accordance with NAVFAC P-307, Section 12.

### 1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

#### SD-01 Preconstruction Submittals

Accident Prevention Plan (APP); G

Activity Hazard Analysis (AHA); G

#### SD-06 Test Reports

## Notifications and Reports

Submit reports as their incidence occurs, in accordance with the requirements of the paragraph, "Notifications and Reports."

Accident Reports; G

SD-07 Certificates

Contractor Safety Self-Evaluation Checklist; G

### 1.4 CONTRACTOR SAFETY SELF-EVALUATION CHECKLIST

Contracting Officer will provide a "Contractor Safety Self-Evaluation checklist" to the Contractor at the pre-construction conference. Complete the checklist monthly and submit with each request for payment voucher. An acceptable score of 90 or greater is required. Failure to submit the completed safety self-evaluation checklist or achieve a score of at least 90 may result in retention of up to 10 percent of the voucher. Additionally, provide a Monthly Exposure Report and attach to the monthly billing request. This report is a compilation of employee-hours worked each month for all site workers, both prime and subcontractor. Failure to submit the report may result in retention of up to 10 percent of the voucher. The Contracting Officer will submit a copy of the Contractor Safety Self-Evaluation and Monthly Exposure Report to the local safety and occupational health office.

### 1.5 REGULATORY REQUIREMENTS

In addition to the detailed requirements included in the provisions of this contract, comply with the most recent edition of USACE EM 385-1-1, and the applicable Federal and State laws, ordinances, criteria, rules and regulations. Submit matters of interpretation of standards to the appropriate administrative agency for resolution before starting work. Where the requirements of this specification, applicable laws, criteria, ordinances, regulations, and referenced documents vary, the most stringent requirements govern.

### 1.6 SITE QUALIFICATIONS, DUTIES AND MEETINGS

#### 1.6.1 Personnel Qualifications

##### 1.6.1.1 Site Safety and Health Officer (SSHO)

The SSHO must meet the requirements of EM 385-1-1 section 1 and ensure that the requirements of 29 CFR 1926.16 are met for the project. Provide a Safety oversight team that includes one (1) person at the project site to function as the Site Safety and Health Officer (SSHO). The SSHO or an equally-qualified Designated Representative/alternate shall be at the work site at all times to implement and administer the Contractor's safety program and government-accepted Accident Prevention Plan. The SSHO's training, experience, and qualifications shall be as required by EM 385-1-1 paragraph 01.A.17, entitled SITE SAFETY AND HEALTH OFFICER (SSHO), and all associated sub-paragraphs.

A Competent Person shall be provided for all of the hazards identified in the Contractor's Safety and Health Program in accordance with the accepted Accident Prevention Plan, and shall be on-site at all times when the work that presents the hazards associated with their professional expertise is

being performed. Provide the credentials of the Competent Persons(s) to the the Contracting Officer for acceptance in consultation with the Safety Office.

#### 1.6.1.1.1 The Contractor Quality Control (QC) Personnel

The Contractor Quality Control (QC) person cannot be the SSHO on this project, although the QC has safety inspection responsibilities as part of the QC duties.

The Project Superintendent or other Contractor personnel may act on behalf of the SSHO for a period of no more than thirty (30) days annually, provided that the individual meets the same competency level of the SSHOs, demonstrates the proficiency required, and is approved by the Contracting Officer in consultation with the NAVFAC MARIANAS Site Safety and Health Manager.

#### 1.6.1.1.2 Requirements for all Contractor Jobsite Personnel Holding H-1B or H-2B Visas:

All Contractor jobsite workers holding an H-1B or H-2B visa shall complete a minimum 16 hours of classroom training on the requirements of the latest version of the U.S. Army Corps of Engineers Safety & Health Requirements Manual (EM 385-1-1) prior to their first day on the jobsite to include but not limited to the following topics: Sanitation; Medical and First Aid Requirements; Temporary Facilities; Personal Protective Equipment; Electrical; Hand and Power Tools; Material Handling and Storage; Motor Vehicles; Fall Protection; Demolition; Safe Access, Ladders, and Excavations and Trenching,; , prior to reporting to the jobsite.

Submit a list of workers who have completed the training to the Contracting Officer prior to them reporting to the jobsite. Update the list as additional workers are added. Maintain the updated list at the jobsite for review by the government's designated authority. Include the qualifications of qualified trainer(s) that provided the training. Personnel who have taken the 40 Hour Construction Safety Hazard Awareness Training Course for Contractors are not required to take the 16 hours of classroom training on the requirements of the latest version of the EM 385-1-1.

The 16 hours classroom training may be provided by the Guam Contractors Association Trades Academy (GCA Trades Academy) or other qualified trainers as outlined in the subpart titled "Qualified Trainer Requirements".

### 1.6.2 Personnel Duties

#### 1.6.2.1 Site Safety and Health Officer (SSHO)

The SSHO shall:

- a. Conduct daily safety and health inspections and maintain a written log which includes area/operation inspected, date of inspection, identified hazards, recommended corrective actions, estimated and actual dates of corrections. Attach safety inspection logs to the Contractors' daily production/quality control report.
- b. Conduct mishap investigations and complete required reports. Maintain the OSHA Form 300 and Daily Production reports for prime and

sub-contractors.

- c. Maintain applicable safety reference material on the job site.
- d. Attend the pre-construction conference, pre-work meetings including preparatory inspection meeting, and periodic in-progress meetings.
- e. Implement and enforce accepted APPS and AHAs.
- f. Maintain a safety and health deficiency tracking system that monitors outstanding deficiencies until resolution. Post a list of unresolved safety and health deficiencies on the safety bulletin board.
- g. Ensure sub-contractor compliance with safety and health requirements.
- h. Maintain a list of hazardous chemicals on site and their material safety data sheets.

Failure to perform the above duties will result in dismissal of the superintendent, QC Manager, and/or SSHO, and a project work stoppage. The project work stoppage will remain in effect pending approval of a suitable replacement.

### 1.6.3 Meetings

#### 1.6.3.1 Preconstruction Conference

- a. Contractor representatives who have a responsibility or significant role in accident prevention on the project shall attend the preconstruction conference. This includes the project superintendent, site safety and health officer, quality control supervisor, or any other assigned safety and health professionals who participated in the development of the APP (including the Activity Hazard Analyses (AHAs) and special plans, program and procedures associated with it).
- b. Discuss the details of the submitted APP to include incorporated plans, programs, procedures and a listing of anticipated AHAs that will be developed and implemented during the performance of the contract. This list of proposed AHAs will be reviewed at the conference and an agreement will be reached between the Contractor and the Contracting Officer's representative as to which phases will require an analysis. In addition, establish a schedule for the preparation, submittal, review, and acceptance of AHAs to preclude project delays.
- c. Deficiencies in the submitted APP will be brought to the attention of the Contractor at the preconstruction conference, and the Contractor shall revise the plan to correct deficiencies and re-submit it for acceptance. Do not begin work until there is an accepted APP.

#### 1.6.3.2 Safety Meetings

Conduct and document meetings as required by EM 385-1-1. Attach minutes showing contract title, signatures of attendees and a list of topics discussed to the Contractors' daily production/quality control report.

### 1.7 ACCIDENT PREVENTION PLAN (APP)

Use a qualified person to prepare the written site-specific APP. Prepare

the APP in accordance with the format and requirements of USACE EM 385-1-1 and as supplemented herein. Cover all paragraph and subparagraph elements in USACE EM 385-1-1, Appendix A, "Minimum Basic Outline for Accident Prevention Plan". Specific requirements for some of the APP elements are described below. The APP shall be job-specific and address any unusual or unique aspects of the project or activity for which it is written. The APP shall interface with the Contractor's overall safety and health program. Include any portions of the Contractor's overall safety and health program referenced in the APP in the applicable APP element and made site-specific. The Government considers the Prime Contractor to be the "controlling authority" for all work site safety and health of the subcontractors. Contractors are responsible for informing their subcontractors of the safety provisions under the terms of the contract and the penalties for noncompliance, coordinating the work to prevent one craft from interfering with or creating hazardous working conditions for other crafts, and inspecting subcontractor operations to ensure that accident prevention responsibilities are being carried out. The APP shall be signed by the person and firm (senior person) preparing the APP, the Contractor, the on-site superintendent, the designated site safety and health officer, the Contractor Quality control Manager, and any designated CSP or CIH.

Submit the APP to the Contracting Officer 15 calendar days prior to the date of the preconstruction conference for acceptance. Work cannot proceed without an accepted APP.

Once accepted by the Contracting Officer, the APP and attachments will be enforced as part of the contract. Disregarding the provisions of this contract or the accepted APP will be cause for stopping of work, at the discretion of the Contracting Officer, until the matter has been rectified.

Once work begins, changes to the accepted APP shall be made with the knowledge and concurrence of the Contracting Officer, project superintendent, SSSHO and quality control manager. Should any severe hazard exposure, i.e. imminent danger, become evident, stop work in the area, secure the area, and develop a plan to remove the exposure and control the hazard. Notify the Contracting Officer within 24 hours of discovery. Eliminate/remove the hazard. In the interim, take all necessary action to restore and maintain safe working conditions in order to safeguard onsite personnel, visitors, the public (as defined by ASSE/SAFE A10.34,) and the environment.

Copies of the accepted plan will be maintained at the Contracting Officer's office and at the job site.

Continuously review and amend the APP, as necessary, throughout the life of the contract. Incorporate unusual or high-hazard activities not identified in the original APP as they are discovered.

#### 1.7.1 EM 385-1-1 Contents

In addition to the requirements outlined in Appendix A of USACE EM 385-1-1, the following is required:

- a. Names and qualifications (resumes including education, training, experience and certifications) of all site safety and health personnel designated to perform work on this project to include the designated site safety and health officer and other competent and qualified personnel to be used such as CSPs, CIHs, STSs, CHSTs. Specify the duties of each position.

- b. Qualifications of competent and of qualified persons. As a minimum, designate and submit qualifications of competent persons for each of the following major areas: excavation; hazardous energy; health hazard recognition, evaluation and control of chemical, physical and biological agents; personal protective equipment and clothing to include selection, use and maintenance.
- c. Site Safety and Health Plan.
- d. Excavation Plan. The safety and health aspects prepared in accordance with Section 31 00 00 EARTHWORK.]

#### 1.8 ACTIVITY HAZARD ANALYSIS (AHA)

The Activity Hazard Analysis (AHA) format shall be in accordance with USACE EM 385-1-1, Section 1. Submit the AHA for review at least 15 calendar days prior to the start of each phase. Format subsequent AHAs as amendments to the APP. The analysis should be used during daily inspections to ensure the implementation and effectiveness of the activity's safety and health controls.

The AHA list will be reviewed periodically (at least monthly) at the Contractor supervisory safety meeting and updated as necessary when procedures, scheduling, or hazards change.

Develop the activity hazard analyses using the project schedule as the basis for the activities performed. Any activities listed on the project schedule will require an AHA. The AHAs will be developed by the contractor, supplier or subcontractor and provided to the prime contractor for submittal to the Contracting Officer.

#### 1.9 DISPLAY OF SAFETY INFORMATION

Within one calendar day(s) after commencement of work, erect a safety bulletin board at the job site. Where size, duration, or logistics of project do not facilitate a bulletin board, an alternative method, acceptable to the Contracting Officer, that is accessible and includes all mandatory information for employee and visitor review, shall be deemed as meeting the requirement for a bulletin board. Include and maintain information on safety bulletin board as required by EM 385-1-1, section 01.A.06.

#### 1.10 SITE SAFETY REFERENCE MATERIALS

Maintain safety-related references applicable to the project, including those listed in the article "References." Maintain applicable equipment manufacturer's manuals.

#### 1.11 EMERGENCY MEDICAL TREATMENT

Contractors will arrange for their own emergency medical treatment. Government has no responsibility to provide emergency medical treatment.

#### 1.12 NOTIFICATIONS and REPORTS

##### 1.12.1 Accident Notification

Notify the Contracting Officer as soon as practical, but no more than four

hours after any accident meeting the definition of Recordable Injuries or Illnesses or High Visibility Accidents, property damage equal to or greater than \$2,000, or any weight handling equipment accident. Within notification include contractor name; contract title; type of contract; name of activity, installation or location where accident occurred; date and time of accident; names of personnel injured; extent of property damage, if any; extent of injury, if known, and brief description of accident (to include type of construction equipment used, PPE used, etc.). Preserve the conditions and evidence on the accident site until the Government investigation team arrives on-site and Government investigation is conducted.

#### 1.12.2 Accident Reports

- a. Conduct an accident investigation for recordable injuries and illnesses, for Medical Treatment defined in paragraph DEFINITIONS, property damage accidents resulting in at least \$20,000 in damages, and near misses as defined in EM 385-1-1, to establish the root cause(s) of the accident. Complete the applicable NAVFAC Contractor Incident Reporting System (CIRS), and electronically submit via the NAVFAC Enterprise Safety Applications Management System (ESAMS). The Contracting Officer will provide copies of any required or special forms.
- b. Near Misses: Complete the applicable documentation in NAVFAC Contractor Incident Reporting System (CIRS), and electronically submit via the NAVFAC Enterprise Safety Applications Management System (ESAMS).
- c. Conduct an accident investigation for any weight handling equipment accident (including rigging gear accidents) to establish the root cause(s) of the accident, complete the WHE Accident Report form and provide the report to the Contracting Officer within 30 calendar days of the accident. The Contracting Officer will provide a blank copy of the accident report form.

#### 1.13 FACILITY OCCUPANCY CLOSURE

Streets, walks, and other facilities occupied and used by the Government shall not be closed or obstructed without written permission from the Contracting Officer.

#### 1.14 SEVERE STORM PLAN

In the event of a severe storm warning, the Contractor must:

- a. Secure outside equipment and materials and place materials that could be damaged in protected areas.
- b. Check surrounding area, including roof, for loose material, equipment, debris, and other objects that could be blown away or against existing facilities.
- c. Ensure that temporary erosion controls are adequate.

## PART 2 PRODUCTS

## PART 3 EXECUTION

## 3.1 CONSTRUCTION AND OTHER WORK

Comply with USACE EM 385-1-1, NFPA 70, NFPA 70E, NFPA 241, the APP, the AHA, Federal and State OSHA regulations, and other related submittals and activity fire and safety regulations. The most stringent standard prevails.

PPE is governed in all areas by the nature of the work the employee is performing. Use personal hearing protection at all times in designated noise hazardous areas or when performing noise hazardous tasks. Safety glasses must be carried/available on each person.

Mandatory PPE includes:

- a. Hard Hat
- b. Appropriate Safety Shoes
- c. Reflective Vests

## 3.1.1 Hazardous Material Use

Each hazardous material must receive approval from the Contracting Office or their designated representative prior to being brought onto the job site or prior to any other use in connection with this contract. Allow a minimum of 10 working days for processing of the request for use of a hazardous material.

## 3.1.2 Hazardous Material Exclusions

Notwithstanding any other hazardous material used in this contract, radioactive materials or instruments capable of producing ionizing/non-ionizing radiation (with the exception of radioactive material and devices used in accordance with USACE EM 385-1-1 such as nuclear density meters for compaction testing and laboratory equipment with radioactive sources) as well as materials which contain asbestos, mercury or polychlorinated biphenyls, di-isocyanates, lead-based paint are prohibited. The Contracting Officer, upon written request by the Contractor, may consider exceptions to the use of any of the above excluded materials. Low mercury lamps used within fluorescent lighting fixtures are allowed as an exception without further Contracting Officer approval. Notify the Radiation Safety Officer (RSO) prior to excepted items of radioactive material and devices being brought on base.

## 3.1.3 Unforeseen Hazardous Material

The design should have identified materials such as PCB, lead paint, and friable and non-friable asbestos and other OSHA regulated chemicals (i.e. 29 CFR Part 1910.1000). If additional material, not indicated, that may be hazardous to human health upon disturbance during construction operations is encountered, stop that portion of work and notify the Contracting Officer immediately. Within 14 calendar days the Government will determine if the material is hazardous. If material is not hazardous or poses no danger, the Government will direct the Contractor to proceed without change. If material is hazardous and handling of the material is

necessary to accomplish the work, the Government will issue a modification pursuant to "FAR 52.243-4, Changes" and "FAR 52.236-2, Differing Site Conditions."

### 3.2 PRE-OUTAGE COORDINATION MEETING

Apply for utility outages at least 14 days in advance. As a minimum, the request should include the location of the outage, utilities being affected, duration of outage and any necessary sketches. Special requirements for electrical outage requests are contained elsewhere in this specification section. Once approved, and prior to beginning work on the utility system requiring shut down, attend a pre-outage coordination meeting with the Contracting Officer to review the scope of work and the lock-out/tag-out procedures for worker protection. No work will be performed on energized electrical circuits unless proof is provided that no other means exist.

### 3.3 CONTROL OF HAZARDOUS ENERGY (LOCKOUT/TAGOUT)

Ensure that each employee is familiar with and complies with these procedures and USACE EM 385-1-1, Section 12, Control of Hazardous Energy.

### 3.4 EQUIPMENT

#### 3.4.1 USE OF EXPLOSIVES

Explosives shall not be used or brought to the project site without prior written approval from the Contracting Officer. Such approval shall not relieve the Contractor of responsibility for injury to persons or for damage to property due to blasting operations.

Storage of explosives, when permitted on Government property, shall be only where directed and in approved storage facilities. These facilities shall be kept locked at all times except for inspection, delivery, and withdrawal of explosives.

### 3.5 EXCAVATIONS

Soil classification must be performed by a competent person in accordance with 29 CFR 1926 and EM 385-1-1.

#### 3.5.1 Utility Locations

All underground utilities in the work area must be positively identified by a third party, independent, private utility locating company in addition to any station locating service and coordinated with the station utility department.

#### 3.5.2 Utility Location Verification

Physically verify underground utility locations, including utility depth, by hand digging using wood or fiberglass handled tools when any adjacent construction work is expected to come within three feet of the underground system.

#### 3.5.3 Utilities Within and Under Concrete, Bituminous Asphalt, and Other Impervious Surfaces

Utilities located within and under concrete slabs or pier structures,

bridges, parking areas, and the like, are extremely difficult to identify. Whenever contract work involves chipping, saw cutting, or core drilling through concrete, bituminous asphalt or other impervious surfaces, the existing utility location must be coordinated with station utility departments in addition to location and depth verification by a third party, independent, private locating company. The third party, independent, private locating company shall locate utility depth by use of Ground Penetrating Radar (GPR), X-ray, bore scope, or ultrasound prior to the start of demolition and construction. Outages to isolate utility systems must be used in circumstances where utilities are unable to be positively identified. The use of historical drawings does not alleviate the contractor from meeting this requirement.

### 3.6 ELECTRICAL

#### 3.9.1 Portable Extension Cords

Size portable extension cords in accordance with manufacturer ratings for the tool to be powered and protected from damage. Immediately removed from service all damaged extension cords. Portable extension cords shall meet the requirements of EM 385-1-1, NFPA 70E, and OSHA electrical standards.

-- End of Section --

## SECTION 01 42 00

## 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 standards producing organization (e.g. ASTM B564 Standard Specification for Nickel Alloy Forgings). However, when the standards producing organization has not assigned a number to a document, an identifying number has been assigned for reference purposes.

## 1.2 ORDERING INFORMATION

The addresses of the standards publishing organizations whose documents 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.

AACE INTERNATIONAL (AACE)  
1265 Suncrest Towne Centre Drive  
Morgantown, WV 26505-1876 USA  
Ph: 304-296-8444  
Fax: 304-291-5728  
E-mail: [info@aacei.org](mailto:info@aacei.org)  
Internet: <http://www.aacei.org>

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS  
(AASHTO)  
444 North Capital Street, NW, Suite 249  
Washington, DC 20001  
Ph: 202-624-5800  
Fax: 202-624-5806  
E-Mail: [info@ashto.org](mailto:info@ashto.org)  
Internet: <http://www.aashto.org>

AMERICAN CONCRETE INSTITUTE INTERNATIONAL (ACI)  
38800 Country Club Drive  
Farmington Hills, MI 48331-3439  
Ph: 248-848-3700  
Fax: 248-848-3701  
E-mail: [bkstore@concrete.org](mailto:bkstore@concrete.org)  
Internet: <http://www.concrete.org>

AMERICAN SOCIETY OF HEATING, REFRIGERATING AND AIR-CONDITIONING  
ENGINEERS (ASHRAE)  
1791 Tullie Circle, NE  
Atlanta, GA 30329  
Ph: 800-527-4723 or 404-636-8400  
Fax: 404-321-5478  
E-mail: [ashrae@ashrae.org](mailto:ashrae@ashrae.org)

Internet: <http://www.ashrae.org>

AMERICAN SOCIETY OF SAFETY ENGINEERS (ASSE/SAFE)  
1800 East Oakton Street  
Des Plaines, IL 60018  
Ph: 847-699-2929  
Internet: <http://www.asse.org>

AMERICAN WATER WORKS ASSOCIATION (AWWA)  
6666 West Quincy Avenue  
Denver, CO 80235-3098  
Ph: 303-794-7711  
E-mail: [distribution@awwa.org](mailto:distribution@awwa.org)  
Internet: <http://www.awwa.org>

AMERICAN WOOD PROTECTION ASSOCIATION (AWPA)  
P.O. Box 361784  
Birmingham, AL 35236-1784  
Ph: 205-733-4077  
Fax: 205-733-4075  
Internet: <http://www.awpa.com>

ASTM INTERNATIONAL (ASTM)  
100 Barr Harbor Drive, P.O. Box C700  
West Conshohocken, PA 19428-2959  
Ph: 877-909-2786  
Internet: <http://www.astm.org>

GEOSYNTHETIC INSTITUTE (GSI)  
475 Kedron Avenue  
Folsom, PA 19033-1208  
Ph: 610-522-8440  
Fax: 610-522-8441  
Internet: <http://www.geosynthetic-institute.org>

GREEN SEAL (GS)  
1001 Connecticut Avenue, NW  
Suite 827  
Washington, DC 20036-5525  
Ph: 202-872-6400  
Fax: 202-872-4324  
Internet: <http://www.greenseal.org>

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)  
1 Batterymarch Park  
Quincy, MA 02169-7471  
Ph: 617-770-3000  
Fax: 617-770-0700  
Internet: <http://www.nfpa.org>

U.S. ARMY CORPS OF ENGINEERS (USACE)  
CRD-C DOCUMENTS available on Internet:  
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Internet: <http://www.ntis.gov>  
Obtain Military Specifications, Standards and Related Publications  
from:  
Acquisition Streamlining and Standardization Information System  
(ASSIST)  
Department of Defense Single Stock Point (DODSSP)  
Document Automation and Production Service (DAPS)  
Building 4/D  
700 Robbins Avenue  
Philadelphia, PA 19111-5094  
Ph: 215-697-6396 - for account/password issues  
Internet: <http://assist.daps.dla.mil/online/start/>; account  
registration required  
Obtain Unified Facilities Criteria (UFC) from:  
Whole Building Design Guide (WBDG)  
National Institute of Building Sciences (NIBS)  
1090 Vermont Avenue NW, Suite 700  
Washington, DC 20005  
Ph: 202-289-7800  
Fax: 202-289-1092  
Internet: [http://www.wbdg.org/references/docs\\_refs.php](http://www.wbdg.org/references/docs_refs.php)

U.S. DEPARTMENT OF ENERGY (DOE)  
1000 Independence Avenue Southwest  
Washington, D.C. 20585  
Internet: [www.eere.energy.gov](http://www.eere.energy.gov)

U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA)  
Ariel Rios Building  
1200 Pennsylvania Avenue, N.W.  
Washington, DC 20004  
Ph: 202-272-0167  
Internet: <http://www2.epa.gov/libraries>  
--- Some EPA documents are available only from:  
National Technical Information Service (NTIS)  
5301 Shawnee Road  
Alexandria, VA 22312  
Ph: 703-605-6050 or 1-688-584-8332  
Fax: 703-605-6900  
E-mail: [info@ntis.gov](mailto:info@ntis.gov)  
Internet: <http://www.ntis.gov>

U.S. FEDERAL HIGHWAY ADMINISTRATION (FHWA)  
FHWA, Office of Safety  
1200 New Jersey Ave., SE

Washington, DC 20590  
Ph: 202-366-4000  
Internet: <http://www.fhwa.dot.gov>  
Order from:  
Superintendent of Documents  
U. S. Government Printing Office (GPO)  
710 North Capitol Street, NW  
Washington, DC 20401  
Ph: 202-512-1800  
Fax: 202-512-2104  
E-mail: [contactcenter@gpo.gov](mailto:contactcenter@gpo.gov)  
Internet: <http://www.gpoaccess.gov>

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)  
8601 Adelphi Road  
College Park, MD 20740-6001  
Ph: 866-272-6272  
Fax: 301-837-0483  
Internet: <http://www.archives.gov>  
Order documents from:  
Superintendent of Documents  
U.S. Government Printing Office (GPO)  
710 North Capitol Street, NW  
Washington, DC 20401  
Ph: 202-512-1800  
Fax: 202-512-2104  
E-mail: [contactcenter@gpo.gov](mailto:contactcenter@gpo.gov)  
Internet: <http://www.gpoaccess.gov>

U.S. NAVAL FACILITIES ENGINEERING COMMAND (NAVFAC)  
1322 Patterson Ave. SE, Suite 1000  
Washington Navy Yard, DC 20374-5065  
Ph: 202-685-9387  
Internet: <http://www.navfac.navy.mil>

PART 2 PRODUCTS

Not used

PART 3 EXECUTION

Not used

-- End of Section --

## SECTION 01 45 00.00 20

## 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 the basic designation only.

## U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1 (2008; Errata 2011) Safety and Health Requirements Manual

## 1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES

## SD-01 Preconstruction Submittals

Construction Quality Control (QC) Plan; G

Submit a Construction QC Plan prior to start of construction.

Basis of Design and Design Intent

## 1.3 INFORMATION FOR THE CONTRACTING OFFICER

Prior to commencing work on construction, the Contractor can obtain a single copy set of the current report forms from the Contracting Officer. The report forms will consist of the Contractor Production Report, Contractor Production Report (Continuation Sheet), Contractor Quality Control (CQC) Report, (CQC) Report (Continuation Sheet), Preparatory Phase Checklist, Initial Phase Checklist, Rework Items List, and Testing Plan and Log.

Deliver the following to the Contracting Officer during Construction:

- a. CQC Report: Mail or hand-carry the original (wet signatures) and one copy by 10:00 AM the next working day after each day that work is performed and for every seven consecutive calendar days of no-work.
- b. Contractor Production Report: Submit the report electronically by 10:00 AM the next working day after each day that work is performed and for every seven consecutive calendar days of no-work.
- c. Preparatory Phase Checklist: Submit the report electronically in the same manner as the CQC Report for each Preparatory Phase held.
- d. Initial Phase Checklist: Submit the report electronically in the same manner as the CQC Report for each Initial Phase held.

- e. Field Test Reports: Within two working days after the test is performed, submit the report as an electronic attachment to the CQC Report.
- f. Monthly Summary Report of Tests: Submit the report as an electronic attachment to the CQC Report at the end of each month.
- g. Testing Plan and Log: Submit the report as an electronic attachment to the CQC Report, at the end of each month. A copy of the final Testing Plan and Log shall be provided to the OMSI preparer for inclusion into the OMSI documentation.
- h. Rework Items List: Submit lists containing new entries daily, in the same manner as the CQC Report
- i. CQC Meeting Minutes: Within two working days after the meeting is held, submit the report as an electronic attachment to the CQC Report.
- j. QC Certifications: As required by the paragraph entitled "QC Certifications."

#### 1.4 QC PROGRAM REQUIREMENTS

Establish and maintain a QC program as described in this section. This QC program is a key element in meeting the objectives of NAVFAC Commissioning. The QC program consists of a QC Organization, QC Plan, QC Plan Meeting(s), a Coordination and Mutual Understanding Meeting, QC meetings, three phases of control, submittal review and approval, testing, completion inspections, and QC certifications and documentation necessary to provide materials, equipment, workmanship, fabrication, construction and operations which comply with the requirements of this Contract. The QC program must cover on-site and off-site work and be keyed to the work sequence. No construction work or testing may be performed unless the QC Manager is on the work site. The QC Manager must report to an officer of the firm and not be subordinate to the Project Superintendent or the Project Manager. The QC Manager, Project Superintendent and Project Manager must work together effectively. Although the QC Manager is the primary individual responsible for quality control, all individuals will be held responsible for the quality of work on the job.

##### 1.4.1 Acceptance of the Construction Quality Control (QC) Plan

Acceptance of the QC Plan is required prior to the start of construction. The Contracting Officer reserves the right to require changes in the QC Plan and operations as necessary, including removal of personnel, to ensure the specified quality of work. The Contracting Officer reserves the right to interview any member of the QC organization at any time in order to verify the submitted qualifications. All QC organization personnel are subject to acceptance by the Contracting Officer. The Contracting Officer may require the removal of any individual for non-compliance with quality requirements specified in the Contract.

##### 1.4.2 Preliminary Construction Work Authorized Prior to Acceptance

The only construction work that is authorized to proceed prior to the acceptance of the QC Plan is mobilization of storage and office trailers, temporary utilities, and surveying.

#### 1.4.3 Notification of Changes

Notify the Contracting Officer, in writing, of any proposed changes in the QC Plan or changes to the QC organization personnel, a minimum of 10 work days prior to a proposed change. Proposed changes are subject to acceptance by the Contracting Officer.

### 1.5 QC ORGANIZATION

#### 1.5.1 QC Manager

##### 1.5.1.1 Duties

Provide a QC Manager at the work site to implement and manage the QC program. The QC Manager is required to attend the partnering meetings, QC Plan Meetings, Coordination and Mutual Understanding Meeting, conduct the QC meetings, perform the three phases of control, perform submittal review and approval, ensure testing is performed and provide QC certifications and documentation required in this Contract. The QC Manager is responsible for managing and coordinating the three phases of control and documentation performed by testing laboratory personnel and any other inspection and testing personnel required by this Contract. The QC Manager is the manager of all QC activities.

##### 1.5.1.2 Qualifications

A graduate of a four year accredited college or university program in one of the following disciplines: Engineering, Architecture, Construction Management, Engineering Technology, Building Construction, or Building Science, with a minimum of 10 years experience as a Project Superintendent, QC Manager, Project Manager, Project Engineer or Construction Manager on similar size and type construction contracts which included the major trades that are part of this Contract. The individual must have at least two years experience as a QC Manager. The individual must be familiar with the requirements of EM 385-1-1, and have experience in the areas of hazard identification, safety compliance, and sustainability.

#### 1.5.2 Construction Quality Management Training

In addition to the above experience and education requirements, the QC Manager must have completed the course entitled "Construction Quality Management (CQM) for Contractors." If the QC Manager does not have a current certification, they must obtain the CQM for Contractors course certification within 90 days of award. This course is periodically offered by the Naval Facilities Engineering Command and the Army Corps of Engineers. Contact the Contracting Officer for information on the next scheduled class.

#### 1.5.3 Alternate QC Manager Duties and Qualifications

Designate an alternate for the QC Manager at the work site to serve in the event of the designated QC Manager's absence. The period of absence may not exceed two weeks at one time, and not more than 30 workdays during a calendar year. The qualification requirements for the Alternate QC Manager must be the same as for the QC Manager.

#### 1.5.4 Submittal Reviewer[s] Duties and Qualifications

Provide [a] Submittal Reviewer[s], other than the QC Manager or CA, qualified in the discipline[s] being reviewed, to review and certify that the submittals meet the requirements of this Contract prior to certification or approval by the QC Manager.

Each submittal must be reviewed by an individual with 10 years of construction experience.

Each submittal must be reviewed by a registered architect or professional engineer.

#### 1.6 QUALITY CONTROL (QC) PLAN

##### 1.6.1 Construction Quality Control (QC) Plan

###### 1.6.1.1 Requirements

Provide, for acceptance by the Contracting Officer, a Construction QC Plan submitted in a three-ring binder that includes a table of contents, with major sections identified with tabs, with pages numbered sequentially, and that documents the proposed methods and responsibilities for accomplishing commissioning activities during the construction of the project:

- a. QC ORGANIZATION: A chart showing the QC organizational structure.
- b. NAMES AND QUALIFICATIONS: Names and qualifications, in resume format, for each person in the QC organization. Include the CQM for Contractors course certifications for the QC Manager and Alternate QC Manager as required by the paragraphs entitled "Construction Quality Management Training" and "Alternate QC Manager Duties and Qualifications".
- c. DUTIES, RESPONSIBILITY AND AUTHORITY OF QC PERSONNEL: Duties, responsibilities, and authorities of each person in the QC organization.
- d. OUTSIDE ORGANIZATIONS: A listing of outside organizations, such as consulting engineering firms, that will be employed by the Contractor and a description of the services these firms will provide.
- e. APPOINTMENT LETTERS: Letters signed by an officer of the firm appointing the QC Manager and Alternate QC Manager and stating that they are responsible for implementing and managing the QC program as described in this Contract. Include in this letter the responsibility of the QC Manager and Alternate QC Manager to implement and manage the three phases of control, and their authority to stop work which is not in compliance with the Contract. Include copies of the letters in the QC Plan.
- f. SUBMITTAL PROCEDURES AND INITIAL SUBMITTAL REGISTER: Procedures for reviewing, approving, and managing submittals. Provide the name(s) of the person(s) in the QC organization authorized to review and certify submittals prior to approval. Provide the initial submittal of the Submittal Register as specified in Section 01 33 00 SUBMITTAL PROCEDURES.
- g. TESTING LABORATORY INFORMATION: Testing laboratory information

required by the paragraphs entitled "Accreditation Requirements", as applicable.

- h. TESTING PLAN AND LOG: A Testing Plan and Log that includes the tests required, referenced by the specification paragraph number requiring the test, the frequency, and the person responsible for each test. Use Government forms to log and track tests.
- i. PROCEDURES TO COMPLETE REWORK ITEMS: Procedures to identify, record, track, and complete rework items. Use Government forms to record and track rework items.
- j. DOCUMENTATION PROCEDURES: Use Government form.
- k. LIST OF DEFINABLE FEATURES: A Definable Feature of Work (DFOW) is a task that is separate and distinct from other tasks and has control requirements and work crews unique to that task. A DFOW is identified by different trades or disciplines and is an item or activity on the construction schedule. Include in the list of DFOWs, but not be limited to, all critical path activities on the NAS. Provide separate DFOWs in the Network Analysis Schedule for each design development stage and submittal package.
- l. PROCEDURES FOR PERFORMING THE THREE PHASES OF CONTROL: Identify procedures used to ensure the three phases of control to manage the quality on this project. For each DFOW, a Preparatory and Initial phase checklist will be filled out during the Preparatory and Initial phase meetings. Conduct the Preparatory and Initial Phases and meetings with a view towards obtaining quality construction by planning ahead and identifying potential problems for each DFOW.
- m. ORGANIZATION AND PERSONNEL CERTIFICATIONS LOG: Procedures for coordinating, tracking and documenting all certifications on subcontractors, testing laboratories, suppliers, personnel, etc. QC Manager will ensure that certifications are current, appropriate for the work being performed, and will not lapse during any period of the contract that the work is being performed.

#### 1.7 QC PLAN MEETINGS

Prior to submission of the QC Plan, the QC Manager will meet with the Contracting Officer to discuss the QC Plan requirements of this Contract. The purpose of this meeting is to develop a mutual understanding of the QC Plan requirements prior to plan development and submission and to agree on the Contractor's list of DFOWs.

#### 1.8 COORDINATION AND MUTUAL UNDERSTANDING MEETING

After submission of the QC Plan, and prior to the start of construction, the QC Manager will meet with the Contracting Officer to present the QC program required by this Contract. When a new QC Manager is appointed, the coordination and mutual understanding meeting shall be repeated.

##### 1.8.1 Purpose

The purpose of this meeting is to develop a mutual understanding of the QC details, including documentation, administration for on-site and off-site work, design intent, environmental requirements and procedures, coordination of activities to be performed, and the coordination of the

Contractor's management, production, and QC personnel. At the meeting, the Contractor will be required to explain in detail how three phases of control will be implemented for each DFO, as well as how each DFO will be affected by each management plan or requirement as listed below:

- a. Waste Management Plan.
- b. Procedures for noise and acoustics management.
- c. Environmental Protection Plan.
- d. Environmental regulatory requirements.

#### 1.8.2 Coordination of Activities

Coordinate activities included in various sections to assure efficient and orderly installation of each component. Coordinate operations included under different sections that are dependent on each other for proper installation and operation. Coordinate prefunctional tests and startup testing with Cx.

#### 1.8.3 Attendees

As a minimum, the Contractor's personnel required to attend include an officer of the firm, the Project Manager, Project Superintendent, QC Manager, Alternate QC Manager, Environmental Manager, and subcontractor representatives. Each subcontractor who will be assigned QC responsibilities shall have a principal of the firm at the meeting. Minutes of the meeting will be prepared by the QC Manager and signed by the Contractor and the Contracting Officer. Provide a copy of the signed minutes to all attendees and shall be included in the QC Plan.

#### 1.9 QC MEETINGS

After the start of construction, conduct weekly QC meetings by the QC Manager at the work site with the Project Superintendent and the foremen who are performing the work of the DFOs. The QC Manager is to prepare the minutes of the meeting and provide a copy to the Contracting Officer within two working days after the meeting. The Contracting Officer may attend these meetings. As a minimum, accomplish the following at each meeting:

- a. Review the minutes of the previous meeting.
- b. Review the schedule and the status of work and rework.
- c. Review the status of submittals.
- d. Review the work to be accomplished in the next two weeks and documentation required.
- e. Resolve QC and production problems (RFI, etc.).
- f. Address items that may require revising the QC Plan.
- g. Review Accident Prevention Plan (APP).
- h. Review environmental requirements and procedures.

- i. Review Waste Management Plan.
- j. Review Environmental Management Plan.
- k. Review the status of training completion.

#### 1.10 DESIGN REVIEW AND DOCUMENTATION

##### 1.10.1 Basis of Design and Design Intent

Review the basis of design received from the Contracting Officer and the design intent.

##### 1.11 THREE PHASES OF CONTROL

Adequately cover both on-site and off-site work with the Three Phases of Control and include the following for each DFO.

##### 1.11.1 Preparatory Phase

Notify the Contracting Officer at least two work days in advance of each preparatory phase meeting. The meeting will be conducted by the QC Manager and attended by the Project Superintendent, and the foreman responsible for the DFO. When the DFO will be accomplished by a subcontractor, that subcontractor's foreman shall attend the preparatory phase meeting. Document the results of the preparatory phase actions in the [daily Contractor Quality Control Report and in the ]Preparatory Phase Checklist. Perform the following prior to beginning work on each DFO:

- a. Review each paragraph of the applicable specification sections.
- b. Review the Contract drawings.
- c. Verify that field measurements are as indicated on construction and/or shop drawings before confirming product orders, in order to minimize waste due to excessive materials.
- d. Verify that appropriate shop drawings and submittals for materials and equipment have been submitted and approved. Verify receipt of approved factory test results, when required.
- e. Review the testing plan and ensure that provisions have been made to provide the required QC testing.
- f. Examine the work area to ensure that the required preliminary work has been completed.
- g. Coordinate the schedule of product delivery to designated prepared areas in order to minimize site storage time and potential damage to stored materials.
- h. Arrange for the return of shipping/packaging materials, such as wood pallets, where economically feasible.
- i. Examine the required materials, equipment and sample work to ensure that they are on hand and conform to the approved shop drawings and submitted data.
- j. Discuss specific controls used and construction methods, construction

tolerances, workmanship standards, and the approach that will be used to provide quality construction by planning ahead and identifying potential problems for each DFOW.

- k. Review the APP and appropriate Activity Hazard Analysis (AHA) to ensure that applicable safety requirements are met, and that required Material Safety Data Sheets (MSDS) are submitted.

#### 1.11.2 Initial Phase

Notify the Contracting Officer at least two work days in advance of each initial phase. When construction crews are ready to start work on a DFOW, conduct the initial phase with the Project Superintendent, and the foreman responsible for that DFOW. Observe the initial segment of the DFOW to ensure that the work complies with Contract requirements. Document the results of the initial phase in the Initial Phase Checklist. Repeat the initial phase for each new crew to work on-site, or when acceptable levels of specified quality are not being met. Perform the following for each DFOW:

- a. Establish the quality of workmanship required.
- b. Resolve conflicts.
- c. Ensure that testing is performed by the approved laboratory.
- d. Check work procedures for compliance with the APP and the appropriate AHA to ensure that applicable safety requirements are met.

#### 1.11.3 Follow-Up Phase

Perform the following for on-going work daily, or more frequently as necessary, until the completion of each DFOW and document in the daily CQC Report:

- a. Ensure the work is in compliance with Contract requirements.
- b. Maintain the quality of workmanship required.
- c. Ensure that testing is performed by the approved laboratory.
- d. Ensure that rework items are being corrected.
- e. Assure manufacturers representatives have performed necessary inspections if required and perform safety inspections.

#### 1.11.4 Additional Preparatory and Initial Phases

Conduct additional preparatory and initial phases on the same DFOW if the quality of on-going work is unacceptable, if there are changes in the applicable QC organization, if there are changes in the on-site production supervision or work crew, if work on a DFOW is resumed after substantial period of inactivity, or if other problems develop.

#### 1.11.5 Notification of Three Phases of Control for Off-Site Work

Notify the Contracting Officer at least two weeks prior to the start of the preparatory and initial phases.

## 1.12 SUBMITTAL REVIEW AND APPROVAL

Procedures for submission, review and approval of submittals are described in Section 01 33 00 SUBMITTAL PROCEDURES.

## 1.13 TESTING

Except as stated otherwise in the specification sections, perform sampling and testing required under this Contract.

### 1.13.1 Accreditation Requirements

Construction materials testing laboratories must be accredited by a laboratory accreditation authority and will be required to submit a copy of the Certificate of Accreditation and Scope of Accreditation. The laboratory's scope of accreditation must include the appropriate ASTM standards (E 329, C 1077, D 3666, D 3740, A 880, E 543) listed in the technical sections of the specifications. Laboratories engaged in Hazardous Materials Testing shall meet the requirements of OSHA and EPA. The policy applies to the specific laboratory performing the actual testing, not just the Corporate Office.

### 1.13.2 Laboratory Accreditation Authorities

Laboratory Accreditation Authorities include the National Voluntary Laboratory Accreditation Program (NVLAP) administered by the National Institute of Standards and Technology at <http://ts.nist.gov/ts/htdocs/210/214/214.htm>, the American Association of State Highway and Transportation Officials (AASHTO) program at <http://www.transportation.org/aashto/home.nsf/frontpage>, International Accreditation Services, Inc. (IAS) at <http://www.iasonline.org>, U. S. Army Corps of Engineers Materials Testing Center (MTC) at <http://www.wes.army.mil/SL/MTC/>, the American Association for Laboratory Accreditation (A2LA) program at <http://www.a2la.org/>, the Washington Association of Building Officials (WABO) at <http://www.wabo.org/> (Approval authority for WABO is limited to projects within Washington State), and the Washington Area Council of Engineering Laboratories (WACEL) at <http://www.wacel.org/labaccred.html> (Approval authority by WACEL is limited to projects within Facilities Engineering Command (FEC) Washington geographical area).

### 1.13.3 Capability Check

The Contracting Officer retains the right to check laboratory equipment in the proposed laboratory and the laboratory technician's testing procedures, techniques, and other items pertinent to testing, for compliance with the standards set forth in this Contract.

### 1.13.4 Test Results

Cite applicable Contract requirements, tests or analytical procedures used. Provide actual results and include a statement that the item tested or analyzed conforms or fails to conform to specified requirements. If the item fails to conform, notify the Contracting Officer immediately. Conspicuously stamp the cover sheet for each report in large red letters "CONFORMS" or "DOES NOT CONFORM" to the specification requirements, whichever is applicable. Test results must be signed by a testing laboratory representative authorized to sign certified test reports. Furnish the signed reports, certifications, and other documentation to the

Contracting Officer via the QC Manager. Furnish a summary report of field tests at the end of each month, per the paragraph entitled "INFORMATION FOR THE CONTRACTING OFFICER".

#### 1.13.5 Test Reports and Monthly Summary Report of Tests

Furnish the signed reports, certifications, and a summary report of field tests at the end of each month to the Contracting Officer. Attach a copy of the summary report to the last daily Contractor Quality Control Report of each month. Provide a copy of the signed test reports and certifications to the OMSI preparer for inclusion into the OMSI documentation.

#### 1.14 QC CERTIFICATIONS

##### 1.14.1 CQC Report Certification

Contain the following statement within the CQC Report: "On behalf of the Contractor, I certify that this report is complete and correct and equipment and material used and work performed during this reporting period is in compliance with the contract drawings and specifications to the best of my knowledge, except as noted in this report."

##### 1.14.2 Invoice Certification

Furnish a certificate to the Contracting Officer with each payment request, signed by the QC Manager, attesting that as-built drawings are current, coordinated and attesting that the work for which payment is requested, including stored material, is in compliance with Contract requirements.

##### 1.14.3 Completion Certification

Upon completion of work under this Contract, the QC Manager shall furnish a certificate to the Contracting Officer attesting that "the work has been completed, inspected, tested and is in compliance with the Contract." Provide a copy of this final QC Certification for completion to the OMSI preparer for inclusion into the OMSI documentation.

#### 1.15 COMPLETION INSPECTIONS

##### 1.15.1 Punch-Out Inspection

Near the completion of all work or any increment thereof, established by a completion time stated in the Contract Clause entitled "Commencement, Prosecution, and Completion of Work," or stated elsewhere in the specifications, the QC Manager must conduct an inspection of the work and develop a "punch list" of items which do not conform to the approved drawings, specifications and Contract. Include in the punch list any remaining items on the "Rework Items List", which were not corrected prior to the Punch-Out Inspection. Include within the punch list the estimated date by which the deficiencies will be corrected. Provide a copy of the punch list to the Contracting Officer. The QC Manager, or staff, must make follow-on inspections to ascertain that all deficiencies have been corrected. Once this is accomplished, notify the Government that the facility is ready for the Government "Pre-Final Inspection".

### 1.15.2 Pre-Final Inspection

The Government and QCM will perform this inspection to verify that the facility is complete and ready to be occupied. A Government "Pre-Final Punch List" will be documented by the QCM as a result of this inspection. The QC Manager will ensure that all items on this list are corrected prior to notifying the Government that a "Final" inspection with the Client can be scheduled. Any items noted on the "Pre-Final" inspection must be corrected in a timely manner and be accomplished before the contract completion date for the work, or any particular increment thereof, if the project is divided into increments by separate completion dates.

### 1.15.3 Final Acceptance Inspection

Notify the Contracting Officer at least 14 calendar days prior to the date a final acceptance inspection can be held. State within the notice that all items previously identified on the pre-final punch list will be corrected and acceptable, along with any other unfinished Contract work, by the date of the final acceptance inspection. The Contractor must be represented by the QC Manager, the Project Superintendent, and others deemed necessary. Attendees for the Government will include the Contracting Officer, other FEAD/ROICC personnel, and personnel representing the Client. 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."

## 1.16 DOCUMENTATION

Maintain current and complete records of on-site and off-site QC program operations and activities.

### 1.16.1 Construction Documentation

Reports are required for each day that work is performed and must be attached to the Contractor Quality Control Report prepared for the same day. Maintain current and complete records of on-site and off-site QC program operations and activities. The forms identified under the paragraph "INFORMATION FOR THE CONTRACTING OFFICER" will be used. Reports are required for each day work is performed. Account for each calendar day throughout the life of the Contract. Every space on the forms must be filled in. Use N/A if nothing can be reported in one of the spaces. The Project Superintendent and the QC Manager must prepare and sign the Contractor Production and CQC Reports, respectively. The reporting of work must be identified by terminology consistent with the construction schedule. In the "remarks" sections of the reports, enter pertinent information including directions received, problems encountered during construction, work progress and delays, conflicts or errors in the drawings or specifications, field changes, safety hazards encountered, instructions given and corrective actions taken, delays encountered and a record of visitors to the work site, quality control problem areas, deviations from the QC Plan, construction deficiencies encountered, meetings held. For each entry in the report(s), identify the Schedule Activity No. that is associated with the entered remark.

### 1.16.2 Quality Control Validation

Establish and maintain the following in a series of three ring binders.

Binders shall be divided and tabbed as shown below. These binders must be readily available to the Contracting Officer during all business hours.

- a. All completed Preparatory and Initial Phase Checklists, arranged by specification section.
- b. All milestone inspections, arranged by Activity Number.
- c. An up-to-date copy of the Testing Plan and Log with supporting field test reports, arranged by specification section.
- d. Copies of all contract modifications, arranged in numerical order. Also include documentation that modified work was accomplished.
- e. An up-to-date copy of the Rework Items List.
- f. Maintain up-to-date copies of all punch lists issued by the QC staff to the Contractor and Sub-Contractors and all punch lists issued by the Government.

#### 1.16.3 Testing Plan and Log

As tests are performed, the QC Manager will record on the "Testing Plan and Log" the date the test was performed and the date the test results were forwarded to the Contracting Officer. Attach a copy of the updated "Testing Plan and Log" to the last daily CQC Report of each month, per the paragraph "INFORMATION FOR THE CONTRACTING OFFICER". Provide a copy of the final "Testing Plan and Log" to the OMSI preparer for inclusion into the OMSI documentation.

#### 1.16.4 Rework Items List

The QC Manager must maintain a list of work that does not comply with the Contract, identifying what items need to be reworked, the date the item was originally discovered, the date the item will be corrected by, and the date the item was corrected. There is no requirement to report a rework item that is corrected the same day it is discovered. Attach a copy of the "Rework Items List" to the last daily CQC Report of each month. The Contractor is responsible for including those items identified by the Contracting Officer.

#### 1.16.5 As-Built Drawings

The QC Manager is required to ensure the as-built drawings, required by Section 01 78 00 CLOSEOUT SUBMITTALS are kept current on a daily basis and marked to show deviations which have been made from the Contract drawings. Ensure each deviation has been identified with the appropriate modifying documentation (e.g. PC No., Modification No., Request for Information No., etc.). The QC Manager must initial each revision. Upon completion of work, the QC Manager will furnish a certificate attesting to the accuracy of the as-built drawings prior to submission to the Contracting Officer.

#### 1.17 NOTIFICATION ON NON-COMPLIANCE

The Contracting Officer will notify the Contractor of any detected non-compliance with the Contract. 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 will be made the subject of claim for extension of time for excess costs or damages by the Contractor.

## PART 2 PRODUCTS

Not Used

## PART 3 EXECUTION

### 3.1 PREPARATION

Designate receiving/storage areas for incoming material to be delivered according to installation schedule and to be placed convenient to work area in order to minimize waste due to excessive materials handling and misapplication. Store and handle materials in a manner as to prevent loss from weather and other damage. Keep materials, products, and accessories covered and off the ground, and store in a dry, secure area. Prevent contact with material that may cause corrosion, discoloration, or staining. Protect all materials and installations from damage by the activities of other trades.

-- End of Section --

## SECTION 01 50 00

## TEMPORARY CONSTRUCTION FACILITIES AND CONTROLS

## 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 within the text by the basic designation only.

## U.S. FEDERAL HIGHWAY ADMINISTRATION (FHWA)

MUTCD (2009) Manual on Uniform Traffic Control Devices

## 1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

## SD-01 Preconstruction Submittals

Construction site plan; G  
Traffic control plan; G

## 1.3 CONSTRUCTION SITE PLAN

Prior to the start of work, submit a site plan showing the locations and dimensions of temporary facilities (including layouts and details, equipment and material storage area (onsite and offsite), and access and haul routes, avenues of ingress/egress to the fenced area and details of the fence installation. Identify any areas which may have to be graveled to prevent the tracking of mud. Indicate if the use of a supplemental or other staging area is desired. Show locations of safety and construction fences, site trailers, construction entrances, trash dumpsters, temporary sanitary facilities, and worker parking areas.

## PART 2 PRODUCTS

## 2.1 TEMPORARY SIGNAGE

## 2.1.1 Bulletin Board

Immediately upon beginning of work, provide a weatherproof glass-covered bulletin board not less than 36 by 48 inches in size for displaying the Equal Employment Opportunity poster, a copy of the wage decision contained in the contract, Wage Rate Information poster, and other information approved by the Contracting Officer.

## 2.1.2 Project and Safety Signs

The requirements for the signs, their content, and location are as

specified in Section 01 58 00 PROJECT IDENTIFICATION. Erect signs within 15 days after receipt of the notice to proceed. Correct the data required by the safety sign daily, with light colored metallic or non-metallic numerals.

## 2.2 TEMPORARY TRAFFIC CONTROL

### 2.2.1 Haul Roads

Construct access and haul roads necessary for proper prosecution of the work under this contract. Construct with suitable grades and widths; sharp curves, blind corners, and dangerous cross traffic are to be avoided. Provide necessary lighting, signs, barricades, and distinctive markings for the safe movement of traffic. The method of dust control, although optional, must be adequate to ensure safe operation at all times. Location, grade, width, and alignment of construction and hauling roads are subject to approval by the Contracting Officer. Lighting must be adequate to assure full and clear visibility for full width of haul road and work areas during any night work operations.

### 2.2.2 Barricades

Erect and maintain temporary barricades to limit public access to hazardous areas. 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 will be required. Securely place barricades clearly visible with adequate illumination to provide sufficient visual warning of the hazard during both day and night.

### 2.2.3 Fencing

Provide fencing along the construction site at all open excavations and tunnels to control access by unauthorized people.

- a. The safety fencing must 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. Install fencing to be able to restrain a force of at least 250 pounds against it.

## PART 3 EXECUTION

### 3.1 EMPLOYEE PARKING

Contractor employees will 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 must not interfere with existing and established parking requirements of the government installation.

### 3.2 TEMPORARY BULLETIN BOARD

Locate the bulletin board at the project site in a conspicuous place easily accessible to all employees, as approved by the Contracting Officer.

### 3.3 AVAILABILITY AND USE OF UTILITY SERVICES

#### 3.3.1 Temporary Utilities

Provide temporary utilities required for construction. Materials may be new or used, must be adequate for the required usage, not create unsafe conditions, and not violate applicable codes and standards.

#### 3.3.2 Payment for Utility Services

- a. The Government will make all reasonably required utilities available to the Contractor from existing outlets and supplies, as specified in the contract. Unless otherwise provided in the contract, the amount of each utility service consumed will be charged to or paid for by the Contractor at prevailing rates charged to the Government or, where the utility is produced by the Government, at reasonable rates determined by the Contracting Officer. Carefully conserve any utilities furnished without charge.

#### 3.3.3 Sanitation

- a. Provide and maintain within the construction area minimum field-type sanitary facilities approved by the Contracting Officer and periodically empty wastes into a municipal, district, or station sanitary sewage system, or remove waste to a commercial facility. Obtain approval from the system owner prior to discharge into any municipal, district, or commercial sanitary sewer system. Any penalties and / or fines associated with improper discharge will be the responsibility of the Contractor. Coordinate with the Contracting Officer and follow station regulations and procedures when discharging into the station sanitary sewer system. Maintain these conveniences at all times without nuisance. Include provisions for pest control and elimination of odors. Government toilet facilities will not be available to Contractor's personnel.

#### 3.3.4 Telephone

Make arrangements and pay all costs for telephone facilities desired.

#### 3.3.5 Fire Protection

Provide temporary fire protection equipment for the protection of personnel and property during construction. Remove debris and flammable materials daily to minimize potential hazards.

### 3.4 TRAFFIC PROVISIONS

#### 3.4.1 Maintenance of Traffic

- a. Conduct operations in a manner that will not close any thoroughfare or interfere in any way with traffic except with written permission of the Contracting Officer at least 15 calendar days prior to the proposed modification date, and provide a Traffic Control Plan detailing the proposed controls to traffic movement for approval. The plan must be in accordance with State and local regulations and the MUTCD, Part VI.
- b. Conduct work so as to minimize obstruction of traffic, and maintain traffic on at least half of the roadway width at all times. Obtain

approval from the Contracting Officer prior to starting any activity that will obstruct traffic.

- c. Provide, erect, and maintain, at contractors expense, lights, barriers, signals, passageways, detours, and other items, that may be required by the Life Safety Signage, overhead protection authority having jurisdiction.

#### 3.4.2 Protection of Traffic

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 the work, and the erection and maintenance of adequate warning, danger, and direction signs, will be as required by the State and local authorities having jurisdiction. Protect the traveling public from damage to person and property. Minimize the interference with public traffic on roads selected for hauling material to and from the site. Investigate the adequacy of existing roads and their allowable load limit. Contractor is responsible for the repair of any damage to roads caused by construction operations.

#### 3.4.3 Dust Control

Dust control methods and procedures must be approved by the Contracting Officer. Treat dust abatement on access roads with applications of calcium chloride, water sprinklers, or similar methods or treatment.

### 3.5 CONTRACTOR'S TEMPORARY FACILITIES

Contractor-owned or -leased trailers must be identified by Government assigned numbers. Apply the number to the trailer within 14 calendar days of notification, or sooner, if directed by the Government.

#### 3.5.1 Safety

Protect the integrity of any installed safety systems or personnel safety devices. If entrance into systems serving safety devices is required, the Contractor must obtain prior approval from the Contracting Officer. If it is temporarily necessary to remove or disable personnel safety devices in order to accomplish contract requirements, provide alternative means of protection prior to removing or disabling any permanently installed safety devices or equipment and obtain approval from the Contracting Officer.

#### 3.5.2 Administrative Field Offices

Provide and maintain administrative field office facilities within the construction area at the designated site.

#### 3.5.3 Storage Area

Construct a temporary 6 foot high chain link fence around trailers and materials. Include plastic strip inserts, colored green/or brown, so that visibility through the fence is obstructed. Fence posts may be driven, in lieu of concrete bases, where soil conditions permit. Do not place or store Trailers, materials, or equipment outside the fenced area unless such trailers, materials, or equipment are assigned a separate and distinct storage area by the Contracting Officer away from the vicinity of

the construction site but within the installation boundaries. Trailers, equipment, or materials must not be open to public view with the exception of those items which are in support of ongoing work on any given day. Do not stockpile materials outside the fence in preparation for the next day's work. Park mobile equipment, such as tractors, wheeled lifting equipment, trucks, and like equipment within the fenced area at the end of each work day.

#### 3.5.4 Supplemental Storage Area

Upon Contractor's request, the Contracting Officer will designate another or supplemental area for the Contractor's use and storage of trailers, equipment, and materials. This area may not be in close proximity of the construction site but will be within the installation boundaries. Fencing of materials or equipment will not be required at this site; however, the Contractor is responsible for cleanliness and orderliness of the area used and for the security of any material or equipment stored in this area. Utilities will not be provided to this area by the Government.

#### 3.5.5 Appearance of Trailers

- a. Trailers utilized by the Contractor for administrative or material storage purposes must present a clean and neat exterior appearance and 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 installation property.
- b. Paint using suitable paint and maintain the temporary facilities. Failure to do so will be sufficient reason to require their removal.

#### 3.5.6 Security Provisions

Provide adequate outside security lighting at the Contractor's temporary facilities. The Contractor will be responsible for the security of its own equipment; in addition, the Contractor will notify the appropriate law enforcement agency requesting periodic security checks of the temporary project field office.

#### 3.6 TEMPORARY PROJECT SAFETY FENCING

As soon as practicable, but not later than 15 days after the date established for commencement of work, furnish and erect temporary project safety fencing at the work site. Maintain the safety fencing during the life of the contract and, upon completion and acceptance of the work, will become the property of the Contractor and be removed from the work site.

#### 3.7 CLEANUP

Remove construction debris, waste materials, packaging material and the like from the work site daily. Any dirt or mud which is tracked onto paved or surfaced roadways must be cleaned away. Store any salvageable materials resulting from demolition activities within the fenced area described above or at the supplemental storage area. Neatly stack stored materials not in trailers, whether new or salvaged.

#### 3.8 RESTORATION OF STORAGE AREA

Upon completion of the project remove the bulletin board, signs, barricades, haul roads, and any other temporary products from the site.

After removal of trailers, materials, and equipment from within the fenced area, remove the fence that will become the property of the Contractor. Restore areas used by the Contractor for the storage of equipment or material, or other use to the original or better condition. Remove gravel used to traverse grassed areas and restore the area to its original condition, including top soil and seeding as necessary.

-- End of Section --

## SECTION 01 57 19.00 20

## TEMPORARY ENVIRONMENTAL CONTROLS

## 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 within the text by the basic designation only.

## U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA)

EPA 530/F-93/004	(1993; Rev O; Updates I, II, IIA, IIB, and III) Test Methods for Evaluating Solid Waste (Vol IA, IB, IC, and II) (SW-846)
EPA 833-R-060-04	(2007) Developing Your Storm Water Pollution Prevention Plan, a Guide for Construction Sites

## U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

29 CFR 1910.120	Hazardous Waste Operations and Emergency Response
40 CFR 112	Oil Pollution Prevention
40 CFR 112.7	General Requirements for Spill Prevention, Control, and Countermeasure Plans
40 CFR 122.26	Storm Water Discharges (Applicable to State NPDES Programs, see section 123.25)
40 CFR 241	Guidelines for Disposal of Solid Waste
40 CFR 243	Guidelines for the Storage and Collection of Residential, Commercial, and Institutional Solid Waste
40 CFR 258	Subtitle D Landfill Requirements
40 CFR 260	Hazardous Waste Management System: General
40 CFR 261	Identification and Listing of Hazardous Waste
40 CFR 262	Standards Applicable to Generators of Hazardous Waste
40 CFR 263	Standards Applicable to Transporters of Hazardous Waste
40 CFR 264	Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and

## Disposal Facilities

40 CFR 265	Interim Status Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities
40 CFR 266	Standards for the Management of Specific Hazardous Wastes and Specific Types of Hazardous Waste Management Facilities
40 CFR 268	Land Disposal Restrictions
40 CFR 270	EPA Administered Permit Programs: The Hazardous Waste Permit Program
40 CFR 271	Requirements for Authorization of State Hazardous Waste Programs
40 CFR 272	Approved State Hazardous Waste Management Programs
40 CFR 273	Standards For Universal Waste Management
40 CFR 279	Standards for the Management of Used Oil
40 CFR 280	Technical Standards and Corrective Action Requirements for Owners and Operators of Underground Storage Tanks (UST)
40 CFR 300	National Oil and Hazardous Substances Pollution Contingency Plan
40 CFR 355	Emergency Planning and Notification
40 CFR 372-SUBPART D	Specific Toxic Chemical Listings
40 CFR 60	Standards of Performance for New Stationary Sources
40 CFR 63	National Emission Standards for Hazardous Air Pollutants for Source Categories
40 CFR 761	Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions
49 CFR 171	General Information, Regulations, and Definitions
49 CFR 172	Hazardous Materials Table, Special Provisions, Hazardous Materials Communications, Emergency Response Information, and Training Requirements
49 CFR 173	Shippers - General Requirements for Shipments and Packagings
49 CFR 178	Specifications for Packagings

## 1.2 DEFINITIONS

### 1.2.1 Sediment

Soil and other debris that have eroded and have been transported by runoff water or wind.

### 1.2.2 Solid Waste

Garbage, refuse, debris, sludge, or other discharged material, including solid, liquid, semisolid, or contained gaseous materials resulting from domestic, industrial, commercial, mining, or agricultural operations. Types of solid waste typically generated at construction sites may include:

- a. Green waste: The vegetative matter from landscaping, land clearing and grubbing, including, but not limited to, grass, bushes, scrubs, small trees and saplings, tree stumps and plant roots. Marketable trees, grasses and plants that are indicated to remain, be re-located, or be re-used are not included.
- b. Surplus soil: Existing soil that is in excess of what is required for this work, including aggregates intended, but not used, for on-site mixing of concrete, mortars and paving. Contaminated soil meeting the definition of hazardous material or hazardous waste is not included.
- c. Debris: Non-hazardous solid material generated during the construction, demolition, or renovation of a structure which exceeds 2.5 inch particle size that is: a manufactured object; plant or animal matter; or natural geologic material (e.g. cobbles and boulders), broken or removed concrete, masonry, and rock asphalt paving; ceramics; roofing paper and shingles. A mixture of debris and other material such as soil or sludge is also subject to regulation as debris if the mixture is comprised primarily of debris by volume, based on visual inspection.
- d. Wood: Dimension and non-dimension lumber, plywood, chipboard, hardboard. Treated and/or painted wood that meets the definition of lead contaminated or lead based contaminated paint is not included.
- e. Scrap metal: Scrap and excess ferrous and non-ferrous metals such as reinforcing steel, structural shapes, pipe and wire that are recovered or collected and disposed of as scrap. Scrap metal meeting the definition of hazardous material or hazardous waste is not included.
- f. Paint cans: Metal cans that are empty of paints, solvents, thinners and adhesives. If permitted by the paint can label, a thin dry film may remain in the can.
- g. Recyclables: Materials, equipment and assemblies such as doors, windows, door and window frames, plumbing fixtures, glazing and mirrors that are recovered and sold as recyclable.
- h. Hazardous Waste: By definition, to be a hazardous waste a material must first meet the definition of a solid waste. Hazardous waste and hazardous debris are special cases of solid waste. They have additional regulatory controls and must be handled separately. They are thus defined separately in this document.

Material not regulated as solid waste are: nuclear source or byproduct

materials regulated under the Federal Atomic Energy Act of 1954 as amended; suspended or dissolved materials in domestic sewage effluent or irrigation return flows, or other regulated point source discharges; regulated air emissions; and fluids or wastes associated with natural gas or crude oil exploration or production.

#### 1.2.3 Hazardous Debris

As defined in Solid Waste paragraph, debris that contains listed hazardous waste (either on the debris surface, or in its interstices, such as pore structure) per 40 CFR 261; or debris that exhibits a characteristic of hazardous waste per 40 CFR 261.

#### 1.2.4 Chemical Wastes

This includes salts, acids, alkalizes, herbicides, pesticides, and organic chemicals.

#### 1.2.5 Garbage

Refuse and scraps resulting from preparation, cooking, dispensing, and consumption of food.

#### 1.2.6 Hazardous Waste

Any discarded material, liquid, solid, or gas, which meets the definition of hazardous material or is designated hazardous waste by the Environmental Protection Agency or State Hazardous Control Authority as defined in 40 CFR 260, 40 CFR 261, 40 CFR 262, 40 CFR 263, 40 CFR 264, 40 CFR 265, 40 CFR 266, 40 CFR 268, 40 CFR 270, 40 CFR 271, 40 CFR 272, 40 CFR 273, 40 CFR 279, and 40 CFR 280.

#### 1.2.7 Hazardous Materials

Hazardous materials as defined in 49 CFR 171 and listed in 49 CFR 172.

Hazardous material is any material that:

- a. Is regulated as a hazardous material per 49 CFR 173, or
- b. Requires a Material Safety Data Sheet (MSDS) per 29 CFR 1910.120, or
- c. During end use, treatment, handling, packaging, storage, transpiration, or disposal meets or has components that meet or have potential to meet the definition of a hazardous waste as defined by 40 CFR 261 Subparts A, B, C, or D.

Designation of a material by this definition, when separately regulated or controlled by other instructions or directives, does not eliminate the need for adherence to that hazard-specific guidance which takes precedence over this instruction for "control" purposes. Such material include ammunition, weapons, explosive actuated devices, propellants, pyrotechnics, chemical and biological warfare materials, medical and pharmaceutical supplies, medical waste and infectious materials, bulk fuels, radioactive materials, and other materials such as asbestos, mercury, and polychlorinated biphenyls (PCBs). Nonetheless, the exposure may occur incident to manufacture, storage, use and demilitarization of these items.

1.2.8 Waste Hazardous Material (WHM)

Any waste material which because of its quantity, concentration, or physical, chemical, or infectious characteristics may pose a substantial hazard to human health or the environment and which has been so designated. Used oil not containing any hazardous waste, as defined above, falls under this definition.

1.2.9 Oily Waste

Those materials which are, or were, mixed with used oil and have become separated from that used oil. Oily wastes also means materials, including wastewaters, centrifuge solids, filter residues or sludges, bottom sediments, tank bottoms, and sorbents which have come into contact with and have been contaminated by, used oil and may be appropriately tested and discarded in a manner which is in compliance with other State and local requirements.

This definition includes materials such as oily rags, "kitty litter" sorbent clay and organic sorbent material. These materials may be land filled provided that:

- a. It is not prohibited in other State regulations or local ordinances
- b. The amount generated is "de minimus" (a small amount)
- c. It is the result of minor leaks or spills resulting from normal process operations
- d. All free-flowing oil has been removed to the practical extent possible

Large quantities of this material, generated as a result of a major spill or in lieu of proper maintenance of the processing equipment, are a solid waste. As a solid waste, a hazardous waste determination must be performed prior to disposal. As this can be an expensive process, it is recommended that this type of waste be minimized through good housekeeping practices and employee education.

1.2.10 Regulated Waste

Those solid wastes that have specific additional Federal, state, or local controls for handling, storage, or disposal.

1.2.11 Class I and II Ozone Depleting Substance (ODS)

Class I ODS is defined in Section 602(a) of The Clean Air Act and includes the following chemicals:

chlorofluorocarbon-11 (CFC-11)
chlorofluorocarbon-12 (CFC-12)
chlorofluorocarbon-13 (CFC-13)
chlorofluorocarbon-111 (CFC-111)

chlorofluorocarbon-112 (CFC-112)
chlorofluorocarbon-113 (CFC-113)
chlorofluorocarbon-114 (CFC-114)
chlorofluorocarbon-115 (CFC-115)
chlorofluorocarbon-211 (CFC-211)
chlorofluorocarbon-212 (CFC-212)
chlorofluorocarbon-213 (CFC-213)
chlorofluorocarbon-214 (CFC-214)
chlorofluorocarbon-215 (CFC-215)
chlorofluorocarbon-216 (CFC-216)
chlorofluorocarbon-217 (CFC-217)
chlorofluorocarbon-500 (CFC-500)
chlorofluorocarbon-502 (CFC-502)
chlorofluorocarbon-503 (CFC-503)
halon-1211
halon-1301
halon-2402
carbon tetrachloride
methyl bromide
methyl chloroform

Class II ODS is defined in Section 602(s) of The Clean Air Act and includes the following chemicals:

hydrochlorofluorocarbon-21 (HCFC-21)
hydrochlorofluorocarbon-22 (HCFC-22)
hydrochlorofluorocarbon-31 (HCFC-31)
hydrochlorofluorocarbon-121 (HCFC-121)

hydrochlorofluorocarbon-122 (HCFC-122)
hydrochlorofluorocarbon-123 (HCFC-123)
hydrochlorofluorocarbon-124 (HCFC-124)
hydrochlorofluorocarbon-131 (HCFC-131)
hydrochlorofluorocarbon-132 (HCFC-132)
hydrochlorofluorocarbon-133 (HCFC-133)
hydrochlorofluorocarbon-141 (HCFC-141)
hydrochlorofluorocarbon-142 (HCFC-142)
hydrochlorofluorocarbon-221 (HCFC-221)
hydrochlorofluorocarbon-222 (HCFC-222)
hydrochlorofluorocarbon-223 (HCFC-223)
hydrochlorofluorocarbon-224 (HCFC-224)
hydrochlorofluorocarbon-225 (HCFC-225)
hydrochlorofluorocarbon-226 (HCFC-226)
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hydrochlorofluorocarbon-235 (HCFC-235)
hydrochlorofluorocarbon-251 (HCFC-251)
hydrochlorofluorocarbon-252 (HCFC-252)
hydrochlorofluorocarbon-253 (HCFC-253)
hydrochlorofluorocarbon-261 (HCFC-261)
hydrochlorofluorocarbon-262 (HCFC-262)
hydrochlorofluorocarbon-271 (HCFC-271)

#### 1.2.12 Universal Waste

The universal waste regulations streamline collection requirements for certain hazardous wastes in the following categories: batteries,

pesticides, mercury-containing equipment (e.g., thermostats) and lamps (e.g., fluorescent bulbs). The rule is designed to reduce hazardous waste in the municipal solid waste (MSW) stream by making it easier for universal waste handlers to collect these items and send them for recycling or proper disposal. These regulations can be found at 40 CFR 273.

### 1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

#### SD-01 Preconstruction Submittals

Preconstruction Survey; G

Solid Waste Management Plan and Permit; G

Regulatory Notifications; G

Environmental Protection Plan; G

Storm Water Pollution Prevention Plan; G

Storm Water Notice of Intent (for NPDES coverage under the general permit for construction activities); G

Dirt and Dust Control Plan

Contractor Hazardous Material Inventory Log; G

#### SD-06 Test Reports

Laboratory Analysis

Erosion and Sediment Control Inspection Reports

Storm Water Inspection Reports for General Permit

Solid Waste Management Report; G

#### SD-07 Certificates

Contractor 40 CFR employee training records; G

ECATTS certificate of completion

#### SD-11 Closeout Submittals

Some of the records listed below are also required as part of other submittals. For the "Records" submittal, maintain on-site a separate three-ring Environmental Records binder and submit at the completion of the project. Make separate parts to the binder corresponding to each of the applicable sub items listed below.

Storm Water Pollution Prevention Plan compliance notebook; G

Waste Determination Documentation

Disposal Documentation for Hazardous and Regulated Waste

Contractor 40 CFR Employee Training Records

Solid Waste Management Permit

Solid Waste Management Report

Contractor Hazardous Material Inventory Log; G

Hazardous Waste/Debris Management

Regulatory Notifications

#### 1.4 ENVIRONMENTAL PROTECTION REQUIREMENTS

Provide and maintain, during the life of the contract, environmental protection as defined. Plan for and provide environmental protective measures to control pollution that develops during normal construction practice. Plan for and provide environmental protective measures required to correct conditions that develop during the construction of permanent or temporary environmental features associated with the project. Comply with Federal, State, and local regulations pertaining to the environment, including water, air, solid waste, hazardous waste and substances, oily substances, and noise pollution.

The Contractor may be required to promptly conduct tests and procedures for the purpose of assessing whether construction operations are in compliance with Applicable Environmental Laws. Analytical work shall be done by qualified laboratories; and where required by law, the laboratories shall be certified.

##### 1.4.1 Environmental Compliance Assessment Training and Tracking System (ECATTS)

The QC Manager is responsible for environmental compliance on projects unless an Environmental Manager is named. The QC Manager (and alternative QC Manager) or Environmental Manager must complete ECATTS training prior to starting respective portions of on-site work under this contract. If personnel changes occur for any of these positions after starting work, replacement personnel must complete ECATTS training within 14 days of assignment to the project

Submit an ECATTS certificate of completion for personnel who have completed the required "Environmental Compliance Assessment Training and Tracking System (ECATTS)" training. This training is web-based and can be accessed from any computer with Internet access using the following instructions.

Register for NAVFAC Environmental Compliance Training and Tracking System, by logging on to <http://navfac.ecatts.com/>. Obtain the password for registration from the Contracting Officer.

This training has been structured to allow contractor personnel to receive credit under this contract and also to carry forward credit to future contracts. Contractors shall ensure that the QC Manager (and alternate QC Manager) or Environmental Manager review their training plans for new modules or updated training requirements prior to beginning work. Some

training modules are tailored for specific State regulatory requirements; therefore, Contractors working in multiple states will be required to re-take modules tailored to the state where the contract work is being performed.

ECATTS is available for use by all contractor and subcontractor personnel associated with this project. These other personnel are encouraged (but not required) to take the training and may do so at their discretion.

#### 1.4.2 Conformance with the Environmental Management System

Perform work under this contract consistent with the policy and objectives identified in the installation's Environmental Management System (EMS). Perform work in a manner that conforms to objectives and targets, environmental programs and operational controls identified by the EMS. Provide monitoring and measurement information as necessary to address environmental performance relative to environmental, energy, and transportation management goals. In the event an EMS nonconformance or environmental noncompliance associated with the contracted services, tasks, or actions occurs, take corrective and/or preventative actions. In addition, ensure that employees are aware of their roles and responsibilities under the EMS and how these EMS roles and responsibilities affect work performed under the contract.

Ensure that employees receive applicable environmental and occupational health and safety training, and keep up to date on regulatory required specific training for the type of work to be conducted onsite. All on-site Contractor personnel, and their subcontractor personnel, performing tasks that have the potential to cause a significant environmental impact shall be competent on the basis of appropriate education, training or experience. Upon contract award, the Contracting Officer's Representative will notify the installation's EMS coordinator to arrange EMS training. The installation's EMS coordinator will identify training needs associated with environmental aspects and the EMS, and arrange training or take other action to meet these needs. Provide training documentation to the Contracting Officer. The EMS coordinator must retain associated records.

### 1.5 QUALITY ASSURANCE

#### 1.5.1 Preconstruction Survey

Perform a Preconstruction Survey of the project site with the Contracting Officer, and take photographs showing existing environmental conditions in and adjacent to the site. Submit a report for the record.

#### 1.5.2 Regulatory Notifications

The Contractor is responsible for all regulatory notification requirements in accordance with Federal, State and local regulations. In cases where the Navy must also provide public notification (such as stormwater permitting), coordinate with the Contracting Officer. Submit copies of all regulatory notifications to the Contracting Officer prior to commencement of work activities. Typically, regulatory notifications must be provided for the following (this listing is not all inclusive): demolition, renovation, NPDES defined site work, remediation of controlled substances (asbestos, hazardous waste, lead paint).

### 1.5.3 Environmental Brief

Attend an environmental brief to be included in the preconstruction meeting. Provide the following information: types, quantities, and use of hazardous materials that will be brought onto the activity; types and quantities of wastes/wastewater that may be generated during the contract. Discuss the results of the Preconstruction Survey at this time.

Prior to initiating any work on site, meet with the Contracting Officer and activity environmental staff to discuss the proposed Environmental Protection Plan. Develop a mutual understanding relative to the details of environmental protection, including measures for protecting natural resources, required reports, required permits, permit requirements, and other measures to be taken.

### 1.5.4 Contractor 40 CFR Employee Training Records

Prepare and maintain employee training records throughout the term of the contract meeting applicable 40 CFR requirements. Submit these training records to the Contracting Officer at the conclusion of the project, unless otherwise directed.

## 1.6 ENVIRONMENTAL PROTECTION PLAN (EPP)

Prior to initiating any work on site, meet with the Contracting Officer to discuss the proposed Environmental Protection Plan and develop a mutual understanding relative to the details of environmental protection, including measures for protecting natural resources, required reports, and other measures to be taken. The Environmental Protection Plan must incorporate construction related objectives and targets from the installation's Environmental Management System. Submit the Environmental Protection Plan in the following format and include the elements specified below.

### a. Description of the Environmental Protection Plan

#### (1) General overview and purpose

(a) A brief description of each specific plan required by environmental permit or elsewhere in this contract.

(b) The duties and level of authority assigned to the person(s) on the job site that oversee environmental compliance.

(c) A copy of any standard or project specific operating procedures that will be used to effectively manage and protect the environment on the project site.

(d) Communication and training procedures that will be used to convey environmental management requirements to contractor employees and subcontractors.

(e) Emergency contact information contact information (office phone number, cell phone number, and e-mail address).

#### (2) General site information

### b. Management of Natural Resources

- (1) Land resources
  - (2) Tree protection
  - (3) Replacement of damaged landscape features
  - (4) Temporary construction
  - (5) Stream crossings
  - (6) Fish and wildlife resources
  - (7) Wetland areas
- c. Protection of Historical and Archaeological Resources
- (1) Objectives
  - (2) Methods
- d. Storm Water Management and Control
- (1) Ground cover
  - (2) Erodible soils
  - (3) Temporary measures
    - (a) Mechanical retardation and control of runoff
    - (b) Vegetation and mulch
  - (4) Effective selection, implementation and maintenance of Best Management Practices (BMPs).
- e. Protection of the Environment from Waste Derived from Contractor Operations
- (1) Control and disposal of solid and sanitary waste.
  - (2) Control and disposal of hazardous waste (Hazardous Waste Management Section)

This item will consist of the management procedures for all hazardous waste to be generated. The elements of those procedures will coincide with the Activity Hazardous Waste Management Plan. A copy of the Activity Hazardous Waste Management Plan will be provided by the Contracting Officer. As a minimum, include the following:

- (a) Procedures to be employed to ensure a written waste determination is made for appropriate wastes which are to be generated;
- (b) Sampling/analysis plan;
- (c) Methods of hazardous waste accumulation/storage (i.e., in tanks and/or containers);

(d) Management procedures for storage, labeling, transportation, and disposal of waste (treatment of waste is not allowed unless specifically noted);

(e) Management procedures and regulatory documentation ensuring disposal of hazardous waste complies with Land Disposal Restrictions (40 CFR 268);

(f) Management procedures for recyclable hazardous materials such as lead-acid batteries, used oil, and the like;

(g) Used oil management procedures in accordance with 40 CFR 279;

(h) Pollution prevention\hazardous waste minimization procedures;

(i) Plans for the disposal of hazardous waste by permitted facilities;

(j) Procedures to be employed to ensure all required employee training records are maintained.

f. Prevention of Releases to the Environment

(1) Procedures to prevent releases to the environment

(2) Notifications in the event of a release to the environment

g. Regulatory Notification and Permits

List what notifications and permit applications must be made. Some permits require up to 90 days to obtain. Demonstrate that those permits have been obtained or applied for by including copies of all applicable, environmental permits. The Plan will not be approved until all permits have been obtained.

h. Clean Air Act Compliance

(1) Identify air pollution generating equipment or processes that may require federal, state, or local permits under the clean air act.

(2) Identify portable and stationary internal combustion engines (ICE's) that will be supplied, utilized or serviced. Address compliance with 40 CFR 60 Subpart IIII, 40 CFR 63 Subpart ZZZZ, and local regulations as applicable. At minimum, include the make, model, serial number, manufacture date, size (engine bhp), and EPA emission certification status of each engine.

(3) Identify planned air pollution generating processes and management control measures (including but not limited to spray painting, abrasive blasting, demolition, material handling, fugitive dust, and fugitive emissions)

1.6.1 Environmental Protection Plan Review

Within thirty days after the Contract award date, submit the proposed Environmental Protection Plan for review and approval. Commencement of work will not begin until the environmental protection plan has been approved.

### 1.6.2 Licenses and Permits

Obtain licenses and permits pursuant to the "Permits and Responsibilities" FAR Clause 52.236-7.

For permits obtained by the Contracting Officer, whether or not required by the permit, the Contractor is responsible for conforming to all permit requirements and performing all quality control inspections of the work in progress, and to submit notifications and certifications to the applicable regulatory agency via the Contracting Officer.

## PART 2 PRODUCTS

Not Used

## PART 3 EXECUTION

### 3.1 PROTECTION OF NATURAL RESOURCES

Preserve the natural resources within the project boundaries and outside the limits of permanent work. Restore to an equivalent or improved condition upon completion of work. Confine construction activities to within the limits of the work indicated or specified. If the work is near streams, lakes, or other waterways, conform to the national permitting requirements of the Clean Water Act.

Except in areas to be cleared, do not remove, cut, deface, injure, or destroy trees or shrubs without the Contracting Officer's permission. Do not fasten or attach ropes, cables, or guys to existing nearby trees for anchorages unless authorized by the Contracting Officer. Where such use of attached ropes, cables, or guys is authorized, the Contractor will be responsible for any resultant damage.

Protect existing trees which are to remain and which may be injured, bruised, defaced, or otherwise damaged by construction operations. Remove displaced rocks from uncleared areas. By approved excavation, remove trees with 30 percent or more of their root systems destroyed. Remove trees and other landscape features scarred or damaged by equipment operations, and replace with equivalent, undamaged trees and landscape features. Obtain Contracting Officer's approval before replacement.

#### 3.1.1 Erosion and Sediment Control Measures

##### 3.1.1.1 Burnoff

Burnoff of the ground cover is not permitted.

##### 3.1.1.2 Protection of Erodible Soils

Immediately finish the earthwork brought to a final grade, as indicated or specified. Immediately protect the side slopes and back slopes upon completion of rough grading. Plan and conduct earthwork to minimize the duration of exposure of unprotected soils.

##### 3.1.1.3 Temporary Protection of Erodible Soils

Use the following methods to prevent erosion and control sedimentation:

a. Mechanical Retardation and Control of Runoff

Mechanically retard and control the rate of runoff from the construction site. This includes construction of diversion ditches, benches, berms, and use of silt fences and straw bales to retard and divert runoff to protected drainage courses.

b. Vegetation and Mulch

- (1) Provide temporary protection on sides and back slopes as soon as rough grading is completed or sufficient soil is exposed to require erosion protection. Protect slopes by accelerated growth of permanent vegetation, temporary vegetation, mulching, or netting. Stabilize slopes by hydroseeding, anchoring mulch in place, covering with anchored netting, sodding, or such combination of these and other methods necessary for effective erosion control.
- (2) Seeding: Provide new seeding where ground is disturbed. Include topsoil or nutriment during the seeding operation necessary to establish or reestablish a suitable stand of grass.

3.1.2 Erosion and Sediment Control Inspection Reports

Submit "Erosion and Sediment Control Inspection Reports" (E&S) (form provided at the pre-construction conference) and Storm Water Inspection Reports for General Permit for General Permit to the Contracting Officer once every 7 calendar days and within 24 hours of a storm event that produces 0.5 inch or more of rain.

Note erosion control inspection reports may be compiled as part of a stormwater pollution prevention plan inspection reports if applicable.

3.1.2.1 Storm Water Notice of Intent for Construction Activities and Storm Water Pollution Prevention Plan

Submit a Storm Water Notice of Intent (for NPDES coverage under the general permit for construction activities) and a Storm Water Pollution Prevention Plan (SWPPP) for the project to the Contracting Officer prior and gain approval prior to the commencement of work. The SWPPP must meet the requirements of the EPA or State general permit for storm water discharges from construction sites. Submit the SWPPP along with any required Notice of Intents, Notice of Termination, and appropriate permit fees, via the Contracting Officer, to the appropriate Federal or State agency for approval, a minimum of 14 calendar days prior to the start of any land disturbing activities. Maintain an approved copy of the SWPPP at the construction on-site office, and continually update as regulations require, reflecting current site conditions.

Coverage under this permit requires the contractor prepare a Storm Water Pollution Prevention Plan (SWPPP), prepare and submit a Registration Statement as a co-permittee with the Construction Officer, and provide the permit fee to the responsible state agency before any land disturbing activities begin. File for permit coverage on behalf of both the Construction Officer and themselves, and file a Notice of Termination once construction is complete and the site is stabilized with a final sustainable cover.

Under the terms and conditions of the permit, the Contractor may be

required to install, inspect, maintain best management practices (BMPs), and submit stormwater BMP inspection reports and stormwater pollution prevention plan inspection reports. Ensure construction operations and management are constantly in compliance with the terms and conditions of the general permit for storm water discharges from construction activities.

a. The SWPPP shall:

- (1) Identify potential sources of pollution which may be reasonably expected to affect the quality of storm water discharge from the site.
- (2) Describe and ensure implementation of practices which will be used to reduce the pollutants in storm water discharge from the site.
- (3) Ensure compliance with terms of the EPA or State general permit for storm water discharge.
- (4) Select applicable best management practices from EPA 833-R-060-04.
- (5) Include a completed copy of the Registration Statement, BMP Inspection Report Template and Notice of Termination except for the effective date.
- (6) Storm Water Pollution Prevention Measures and Notice of Intent 40 CFR 122.26, EPA 833-R-060-04. Provide a "Storm Water Pollution Prevention Plan" (SWPPP) for the project. The SWPPP will meet the requirements of the EPA or State general permit for storm water discharges from construction sites. Submit the SWPPP along with any required Notice of Intents, Notice of Termination, and appropriate permit fees, via the Contracting Officer, to the appropriate Federal or State agency for approval, a minimum of 14 calendar days prior to the start of construction. A copy of the approved SWPPP will be kept at the construction on-site office, and continually updated as regulations require reflecting current site conditions.

#### 3.1.2.2 Storm Water Pollution Prevention Plan Compliance Notebook

Create and maintain a three ring binder of documents that demonstrate compliance with the Stormwater Construction Activity permit. The binder shall include a copy of the permit Registration Statement, proof of permit fee payment, SWPPP and SWPPP update amendments, inspection reports, copies of correspondence with the Regulatory Agency that issued the permit and a copy of the permit Notice of Termination. At the completion of the project the notebook shall become the property of the Government. Provide the compliance notebook to Contracting Officer. Provide an advance copy of the Registration Statement to the Contracting Officer immediately after the form is presented to the permitting agency.

#### 3.1.3 Stormwater Drainage and Construction Dewatering

There will be no discharge of excavation ground water to the sanitary sewer, or to the storm drains, without prior specific authorization of the Environmental Division in writing. Discharge of hazardous substances will not be permitted under any circumstances.

Construction site runoff will be prevented from entering any storm drain

directly by the use of straw bales or other method suitable to the Environmental Division. Contractor will provide erosion protection of the surrounding soils.

Construction Dewatering shall not be discharged to the sanitary sewer. If the construction dewatering is noted or suspected of being contaminated, it may only be released to the storm drain system if the discharge is specifically permitted. Authorization for any contaminated groundwater release shall be obtained in advance from the base Environmental Officer. Discharge of hazardous substances will not be permitted under any circumstances.

### 3.2 HISTORICAL AND ARCHAEOLOGICAL RESOURCES

Carefully protect in-place and report immediately to the Contracting Officer historical and archaeological items or human skeletal remains discovered in the course of work. Upon discovery, notify the Contracting Officer. Stop work in the immediate area of the discovery until directed by the Contracting Officer to resume work. The Government retains ownership and control over historical and archaeological resources.

### 3.3 SOLID WASTE MANAGEMENT PLAN and PERMIT

Provide to the contracting officer written notification of the quantity of solid waste/debris that is anticipated to be generated by construction. Include in the report the locations where various types of waste will be disposed or recycled. Include letters of acceptance or as applicable, submit one copy of a State and local Solid Waste Management Permit or license showing such agency's approval of the disposal plan before transporting wastes off Government property.

#### 3.3.1 Solid Waste Management Report

Monthly, submit a solid waste disposal report to the Contracting Officer. For each waste, the report will state the classification (using the definitions provided in this section), amount, location, and name of the business receiving the solid waste.

Include copies of the waste handling facilities' weight tickets, receipts, bills of sale, and other sales documentation. In lieu of sales documentation, the Contractor may submit a statement indicating the disposal location for the solid waste which is signed by an officer of the Contractor firm authorized to legally obligate or bind the firm. The sales documentation or Contractor certification will include the receiver's tax identification number and business, EPA or State registration number, along with the receiver's delivery and business addresses and telephone numbers. For each solid waste retained by the Contractor for his own use, the Contractor will submit on the solid waste disposal report the information previously described in this paragraph. Prices paid or received will not be reported to the Contracting Officer unless required by other provisions or specifications of this Contract or public law.

#### 3.3.2 Control and Management of Solid Wastes

Pick up solid wastes, and place in covered containers which are regularly emptied. Do not prepare or cook food on the project site. Prevent contamination of the site or other areas when handling and disposing of wastes. At project completion, leave the areas clean. Recycling is

encouraged and can be coordinated with the Contracting Officer and the activity recycling coordinator. Remove all solid waste (including non-hazardous debris) from Government property and dispose off-site at an approved landfill. Solid waste disposal off-site must comply with most stringent local, State, and Federal requirements including 40 CFR 241, 40 CFR 243, and 40 CFR 258.

Manage spent hazardous material used in construction, including but not limited to, aerosol cans, waste paint, cleaning solvents, contaminated brushes, and used rags, as per environmental law.

#### 3.3.2.1 Disposal Documentation for Hazardous and Regulated Waste

Manifest, pack, ship and dispose of hazardous or toxic waste and universal waste that is generated as a result of construction in accordance with the generating facilities generator status under the Resource Conservation and Recovery Act. Contact the Contracting Officer for the facility RCRA identification number that is to be used on each manifest.

Submit a copy of the applicable EPA and or State permit(s), manifest(s), or license(s) for transportation, treatment, storage, and disposal of hazardous and regulated waste by permitted facilities. Hazardous or toxic waste manifest must be reviewed, signed, and approved by the Navy before the Contractor may ship waste.

#### 3.4 WASTE DETERMINATION DOCUMENTATION

Complete a Waste Determination form (provided at the pre-construction conference) for all contractor derived wastes to be generated. Base the waste determination upon either a constituent listing from the manufacturer used in conjunction with consideration of the process by which the waste was generated, EPA approved analytical data, or laboratory analysis (Material Safety Data Sheets (MSDS) by themselves are not adequate). Attach all support documentation to the Waste Determination form. As a minimum, a Waste Determination form must be provided for the following wastes (this listing is not all inclusive): oil and latex based painting and caulking products, solvents, adhesives, aerosols, petroleum products, and all containers of the original materials.

#### 3.5 POLLUTION PREVENTION/HAZARDOUS WASTE MINIMIZATION

Minimize the use of hazardous materials and the generation of hazardous waste. Include procedures for pollution prevention/ hazardous waste minimization in the Hazardous Waste Management Section of the Environmental Protection Plan. Consult with the activity Environmental Office for suggestions and to obtain a copy of the installation's pollution prevention/hazardous waste minimization plan for reference material when preparing this part of the plan. If no written plan exists, obtain information by contacting the Contracting Officer. Describe the types of the hazardous materials expected to be used in the construction when requesting information.

#### 3.6 WASTE HAZARDOUS MATERIAL (WHM)/HAZARDOUS WASTE (HW) MATERIALS PROHIBITION

No waste hazardous material or hazardous waste shall be disposed of on government property. No hazardous material shall be brought onto government property that does not directly relate to requirements for the performance of this contract. The government is not responsible for

disposal of Contractor's waste material brought on the job site and not required in the performance of this contract. The intent of this provision is to dispose of that waste identified as waste hazardous material/hazardous waste as defined herein that was generated as part of this contract and existed within the boundary of the Contract limits and not brought in from offsite by the Contractor. Incidental materials used to support the contract including, but not limited to aerosol cans, waste paint, cleaning solvents, contaminated brushes, rags, clothing, etc. are the responsibility of the Contractor. The list is illustrative rather than inclusive. The Contractor is not authorized to discharge any materials to sanitary sewer, storm drain, or conduct waste treatment or disposal on government property without written approval of the Contracting Officer.

### 3.7 HAZARDOUS MATERIAL MANAGEMENT

Include hazardous material control procedures in the Safety Plan. Address procedures and proper handling of hazardous materials, including the appropriate transportation requirements. No hazardous material shall be brought onto government property that does not directly relate to requirements for the performance of this contract. Submit a MSDS and estimated quantities to be used for each hazardous material to the Contracting Officer prior to bringing the material on base. Typical materials requiring MSDS and quantity reporting include, but are not limited to, oil and latex based painting and caulking products, solvents, adhesives, aerosol, and petroleum products. Ensure that hazardous materials are utilized in a manner that will minimize the amount of hazardous waste that is generated. Ensure that all containers of hazardous materials have NFPA labels or their equivalent. Certify that all hazardous materials removed from the site are hazardous materials and do not meet the definition of hazardous waste per 40 CFR 261.

#### 3.7.1 Contractor Hazardous Material Inventory Log

Submit the "Contractor Hazardous Material Inventory Log" (found at: <http://www.wbdg.org/ccb/NAVGRAPH/graphtoc.pdf>), which provides information required by (EPCRA Sections 312 and 313) along with corresponding Material Safety Data Sheets (MSDS), to the Contracting Officer at the start and at the end of construction (30 days from final acceptance), and update no later than January 31 of each calendar year during the life of the contract. Keep copies of the MSDS for hazardous materials on site at all times. At the end of the project, provide the Contracting Officer with copies of all of these MSDS, and the maximum quantity of each material that was present at the site at any one time, the dates the material was present, the amount of each material that was used during the project, and how the material was used.

Documentation for any spills/releases, environmental reports or off-site transfers may be requested by the Contracting Officer.

### 3.8 PETROLEUM PRODUCTS AND REFUELING

Conduct the fueling and lubricating of equipment and motor vehicles in a manner that protects against spills and evaporation. Manage all used oil generated on site in accordance with 40 CFR 279. Determine if any used oil generated while on-site exhibits a characteristic of hazardous waste. Used oil containing 1000 parts per million of solvents will be considered a hazardous waste and disposed of at Contractor's expense. Used oil mixed with a hazardous waste will also be considered a hazardous waste.

### 3.8.1 Oily and Hazardous Substances

Prevent oil or hazardous substances from entering the ground, drainage areas, or navigable waters. In accordance with 40 CFR 112, surround all temporary fuel oil or petroleum storage tanks with a temporary berm or containment of sufficient size and strength to contain the contents of the tanks, plus 10 percent freeboard for precipitation. The berm will be impervious to oil for 72 hours and be constructed so that any discharge will not permeate, drain, infiltrate, or otherwise escape before cleanup occurs. Provide general secondary containment for oil transfer operations as required by 40 CFR 112.7.

### 3.8.2 Inadvertent Discovery of Petroleum Contaminated Soil or Hazardous Wastes

If petroleum contaminated soil or suspected hazardous waste is found during construction that was not identified in the contract documents, the contractor shall immediately notify the contracting officer. The contractor shall not disturb this material until authorized by the contracting officer.

### 3.9 FUEL TANKS

Petroleum products and lubricants required to sustain up to 30 days of construction activity may be kept on site. Storage and refilling practices shall comply with 40 CFR Part 112. Secondary containment shall be provided and be no less than 110 percent of the tank volume plus five inches of free-board. If a secondary berm is used for containment then the berm shall be impervious to oil for 72 hours and be constructed so that any discharge will not permeate, drain, infiltrate, or otherwise escape before cleanup occurs. Drips pans are required and the tanks must be covered during inclement weather.

### 3.10 RELEASES/SPILLS OF OIL AND HAZARDOUS SUBSTANCES

Exercise due diligence to prevent, contain, and respond to spills of hazardous material, hazardous substances, hazardous waste, sewage, regulated gas, petroleum, lubrication oil, and other substances regulated by environmental law. Maintain spill cleanup equipment and materials at the work site. In the event of a spill, take prompt, effective action to stop, contain, curtail, or otherwise limit the amount, duration, and severity of the spill/release. In the event of any releases of oil and hazardous substances, chemicals, or gases; immediately (within 15 minutes) notify the Base or Activity Fire Department, the activity's Command Duty Officer, and the Contracting Officer. If the contractor's response is inadequate, the Navy may respond. If this should occur, the contractor will be required to reimburse the government for spill response assistance and analysis.

The Contractor is responsible for verbal and written notifications as required by the federal 40 CFR 355, State, local regulations and Navy Instructions. Spill response will be in accordance with 40 CFR 300 and applicable State and local regulations. Contain and clean up these spills without cost to the Government. If Government assistance is requested or required, the Contractor will reimburse the Government for such assistance. Provide copies of the written notification and documentation that a verbal notification was made within 20 days.

Maintain spill cleanup equipment and materials at the work site. Clean up all hazardous and non-hazardous (WHM) waste spills. The Contractor shall reimburse the government for all material, equipment, and clothing generated during any spill cleanup. The Contractor shall reimburse the government for all costs incurred including sample analysis materials, equipment, and labor if the government must initiate its own spill cleanup procedures, for Contractor responsible spills, when:

- a. The Contractor has not begun spill cleanup procedure within one hour of spill discovery/occurrence, or
- b. If, in the government's judgment, the Contractor's spill cleanup is not adequately abating life threatening situation and/or is a threat to any body of water or environmentally sensitive areas.

### 3.11 CONTROL AND MANAGEMENT OF HAZARDOUS WASTES

#### 3.11.1 Facility Hazardous Waste Generator Status

All work conducted within the boundaries of this activity must meet the regulatory requirements of this generator designation. Comply with all provisions of Federal, State and local regulatory requirements applicable to this generator status regarding training and storage, handling, and disposal of all construction derived wastes.

#### 3.11.2 Hazardous Waste/Debris Management

Identify all construction activities which will generate hazardous waste/debris. Provide a documented waste determination for all resultant waste streams. Hazardous waste/debris will be identified, labeled, handled, stored, and disposed of in accordance with all Federal, State, and local regulations including 40 CFR 261, 40 CFR 262, 40 CFR 263, 40 CFR 264, 40 CFR 265, 40 CFR 266, and 40 CFR 268.

Hazardous waste will also be managed in accordance with the approved Hazardous Waste Management Section of the Environmental Protection Plan. Store hazardous wastes in approved containers in accordance with 49 CFR 173 and 49 CFR 178. Hazardous waste generated within the confines of Government facilities will be identified as being generated by the Government.

Prior to removal of any hazardous waste from Government property, all hazardous waste manifests must be signed by activity personnel from the Station Environmental Office. No hazardous waste must be brought onto Government property. Provide to the Contracting Officer a copy of waste determination documentation for any solid waste streams that have any potential to be hazardous waste or contain any chemical constituents listed in 40 CFR 372-SUBPART D. For hazardous wastes spills, verbally notify the Contracting Officer immediately.

##### 3.11.2.1 Regulated Waste Storage/Satellite Accumulation/90 Day Storage Areas

If the work requires the temporary storage/collection of regulated or hazardous wastes, the Contractor will request the establishment of a Regulated Waste Storage Area, a Satellite Accumulation Area, or a 90 Day Storage Area at the point of generation. The Contractor must submit a request in writing to the Contracting Officer providing the following information:

<u>Contract Number</u>	[_____]
<u>Contractor</u>	[_____]
<u>Haz/Waste or Regulated Waste POC</u>	[_____]
<u>Phone Number</u>	[_____]
<u>Type of Waste</u>	[_____]
<u>Source of Waste</u>	[_____]
<u>Emergency POC</u>	[_____]
<u>Phone Number</u>	[_____]
<u>Location of the Site</u>	[_____]

Attach a waste determination form. Allow ten working days for processing this request. The designated area where waste is being stored shall be barricaded and a sign identifying as follows:

"DANGER - UNAUTHORIZED PERSONNEL KEEP OUT"

[3.11.2.2 Sampling and Analysis of Hazardous Waste (HW)

a. Waste Sampling

Sample waste in accordance with EPA 530/F-93/004. Each sampled drum or container will be clearly marked with the Contractor's identification number and cross referenced to the chemical analysis performed.

b. Laboratory Analysis

Follow the analytical procedure and methods in accordance with the 40 CFR 261. The Contractor will provide all analytical results and reports performed to the Contracting Officer

c. Analysis Type

Identify waste hazardous material/hazardous waste by analyzing for the following properties as a minimum: ignitability, corrosiveness, total chlorides, BTU value, PCBs, TCLP for heavy metals, and cyanide.

][3.11.2.3 Hazardous Waste Disposal

No hazardous, toxic, or universal waste shall be disposed or hazardous material abandoned on government property. And unless otherwise noted in this contract, the government is not responsible for disposal of Contractor generated waste material. The disposal of incidental materials used to accomplish the work including, but not limited to aerosol cans, waste paint, cleaning solvents, contaminated brushes, rags, clothing, etc. are the responsibility of the Contractor. The list is illustrative rather than inclusive.

The Contractor is not authorized to discharge any materials to sanitary sewer, storm drain, or water way or conduct waste treatment or disposal on government property without written approval of the Contracting Officer.

Control of stored waste, packaging, sampling, analysis, and disposal will be determined by the details in the contract. The requirements for jobs in the following paragraphs will be used as the guidelines for disposal of any hazardous waste generated.

a. Responsibilities for Contractor's Disposal

Contractor responsibilities include any generation of WHM/HW requiring Contractor disposal of solid waste or liquid.

(1) Provide all service necessary for the final treatment/disposal of the hazardous material/waste in accordance with all local, State and Federal laws and regulations, and the terms and conditions of the contract within sixty (60) days after the materials have been generated. These services will include all necessary personnel, labor, transportation, packaging, detailed analysis (if required for disposal, and/or transportation, including manifesting or completing waste profile sheets, equipment, and the compilation of all documentation is required).

(2) Contain all waste in accordance with 40 CFR 260, 40 CFR 261, 40 CFR 262, 40 CFR 263, 40 CFR 264, 40 CFR 265, 40 CFR 266, 40 CFR 268, 40 CFR 270, 40 CFR 272, 40 CFR 273, 40 CFR 279, 40 CFR 280, and 40 CFR 761.

(3) Obtain a representative sample of the material generated for each job done to provide waste stream determination.

(4) Analyze each sample taken and providing analytical results to the Contracting Officer. Provide two copies of the results.

(5) Determine the DOT proper shipping names for all waste (each container requiring disposal) and will demonstrate how this determination is developed and supported by the sampling and analysis requirements contained herein to the Contracting Officer.

Contractor Disposal Turn-In Requirements

For any waste hazardous materials or hazardous waste generated which requires the Contractor to dispose of, the following conditions must be complied with in order to be acceptable for disposal:

(1) Drums compatible with waste contents and drums meet DOT requirements for 49 CFR 173 for transportation of materials.

(2) Drums banded to wooden pallets. No more than three (3) 55 gallon drums to a pallet, or two (2) 85 gallon over packs.

(3) Band using 1-1/4 inch minimum band on upper third of drum.

(4) Recovery materials label (provided by Code 106.321) located in middle of drum, filled out to indicate actual volume of material, name of material manufacturer, other vendor information as available.

(5) Always have three (3) to five (5) inches of empty space above volume of material. This space is called 'outage'.

#### 3.11.2.4 Universal Waste/e-Waste Management

Universal waste including but not limited to some mercury containing building products such florescent lamps, mercury vapor lamps, high pressure sodium lamps, CRTs, batteries, aerosol paint containers, electrical equipment containing PCBs, and consumed electronic devices, shall be managed in accordance with applicable environmental law and installation instructions.

#### 3.11.3 Class I [and II ]ODS Prohibition

Class I [and II ODS ]in pure or blended form as defined and identified herein must not be used in the performance of this contract, nor be provided as part of the equipment except for the use of servicing existing government owned equipment. This prohibition will be considered to prevail over any other provision, specification, drawing, or referenced documents.

##### 3.11.3.1 Recycling Requirements

Recycle used refrigerants and ozone depleting substances generated during the performance of this contract to the maximum extent practicable to minimize used refrigerant and ozone depleting substance disposal as HW.

Test, collect, transfer, recycle, and/or arrange for shipping and proper disposal of used refrigerants and ozone depleting substances generated during the performance of work under this contract. The Contractor is responsible for all associated costs.

Any and all Class I ODS and R-22 recovered by the Contractor as part of this contract shall be packaged and turned over to the Government for recycling upon the completion of the work covered by this contract. The Contractor shall arrange for recycling of used refrigerants not turned over to the government, at a licensed refrigerant recycler approved by the Contracting Officer.

##### 3.11.3.2 EPA Certification Requirements

Heating and air conditioning technicians must be certified through an EPA-approved program. Copies of certifications shall be maintained at the employees' place of business and be carried as a wallet card by the technician, as provided by environmental law. .

#### 3.12 DUST CONTROL

Keep dust down at all times, including during nonworking periods. Sprinkle or treat, with dust suppressants, the soil at the site, haul roads, and other areas disturbed by operations. Dry power brooming will not be permitted. Instead, use vacuuming, wet mopping, wet sweeping, or wet power brooming. Air blowing will be permitted only for cleaning nonparticulate debris such as steel reinforcing bars. Only wet cutting will be permitted for cutting concrete blocks, concrete, and bituminous concrete. Do not unnecessarily shake bags of cement, concrete mortar, or plaster.

### 3.12.1 Dirt and Dust Control Plan

Submit truck and material haul routes along with a plan for controlling dirt, debris, and dust on base roadways. As a minimum, identify in the plan the subcontractor and equipment for cleaning along the haul route and measures to reduce dirt, dust, and debris from roadways.

### 3.13 NOISE

Make the maximum use of low-noise emission products, as certified by the EPA. Blasting or use of explosives will not be permitted without written permission from the Contracting Officer, and then only during the designated times. Confine pile-driving operations to the period between 8 a.m. and 4 p.m., Monday through Friday, exclusive of holidays, unless otherwise specified.

### 3.14 MERCURY MATERIALS

Mercury is prohibited in the construction of this facility, unless specified otherwise, and with the exception of mercury vapor lamps and fluorescent lamps. Dumping of mercury-containing materials and devices such as mercury vapor lamps, fluorescent lamps, and mercury switches, in rubbish containers is prohibited. Remove without breaking, pack to prevent breakage, and transport out of the activity in an unbroken condition for disposal as directed. Immediately report to the Environmental Office and the Contracting Officer instances of breakage or mercury spillage. Clean mercury spill area to the satisfaction of the Contracting Officer.

Cleanup of a mercury spill shall not be recycled and shall be managed as a hazardous waste for disposal.

-- End of Section --

## SECTION 01 57 19.01 20

SUPPLEMENTAL TEMPORARY ENVIRONMENTAL CONTROLS  
Joint Region Marianas Explosives Safety Submission (JRM ESS)

## 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 within the text by the basic designation only. If state or local references are not provided here, refer to Section 01 57 19.00 20 TEMPORARY ENVIRONMENTAL CONTROLS for appropriate references.

## JOINT REGION MARIANAS (JRM)

JRM ESS (Amendment Series) Explosives Safety Submission, Munitions Response Sites, GUAM CONSTRUCTION SUPPORT

## DEPARTMENT OF DEFENSE (DOD)

EM-385-1-1 Safety and Health Requirements Manual, US Army Corp of Engineers (USACE)

NOSSAINST 8020.15D Naval Ordnance Safety and Security Activity, Explosives Safety Review, Oversight, and Verification of Munitions Responses (U)

NAVSEA OP 5 (Volume 1) Naval Sea Systems Command, Ammunition and Explosives Safety Ashore

DDESB TP-18 Department of Defense Explosive Safety Board, Technical Paper 18, Qualifications for UXO Technicians

NOSSAINST 8023.11B Standard Operating Procedures, Development, Implementation, and Maintenance for Ammunition and Explosives

- For all above references, the most current version shall apply.

## 1.2 SUBMITTALS

Government acceptance is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. The following shall be submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

## SD-01 Preconstruction Submittals

ESS Work Plans (Anomaly Avoidance, Anomaly Investigation, Digital Geophysical Mapping (DGM), DGM followed by Anomaly Investigation, DGM followed by Advanced Technology /

Munitions Classifier followed by Anomaly Investigation); G

Installation Commanding Officer (ICO) Notification; G

SD-11 Field Reports, After Action Report, and Closeout

QC/QA Report; G

MEC/MPPEH Spot Report; G

Weekly Situational/Status Report (SITREP); G

After Action Report (AAR) (Anomaly Avoidance, Anomaly Investigation, DGM, Advanced Technology / Munitions Classifier); G

1.2.1 Submittal Schedule

Submittal schedule requirements for various ESS Deliverables are detailed below. The period of review for each resubmittal is the same as for initial submittal.

**SCENARIO 1: ANOMALY AVOIDANCE**

Not Used.

**SCENARIO 2: ANOMALY INVESTIGATION**

SUBMITTALS REQUIRED PRIOR TO ANOMALY INVESTIGATION		
Submittals	Copies	Timeframe
Anomaly Investigation Work Plan	Electronic, 6 hard copies, each with CD, bookmarked .pdf and .doc (or .xls) file	14 calendar days after award
Government Review/ Accept Anomaly Investigation Work Plan	Electronic, CD with .pdf and .doc (or .xls) file	14 calendar days
Installation Commanding Officer (ICO) Notification	Electronic, slide presentation	45 calendar days prior to anomaly investigation

\*Anomaly Investigation field work may commence after Government acceptance of Anomaly Investigation Work Plan.

SUBMITTALS REQUIRED DURING ANOMALY INVESTIGATION		
Weekly SITREP	Electronic	Weekly
MEC/MPPEH Spot Report	Electronic	As required, within 1 business day of confirming identification of MEC/MPPEH

QC/QA Report	Electronic	As required; government review and acceptance 14 calendar days
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SUBMITTALS REQUIRED POST-ANOMALY INVESTIGATION		
Anomaly Investigation After Action Report	Electronic, 6 hard copies, each with CD, bookmarked .pdf and .doc	7 calendar days after completion of all Anomaly Investigation work
Government Review/Accept Anomaly Investigation AAR	Electronic, .pdf and .doc (or .xls) file	14 calendar days

**SCENARIO 3: DGM FOLLOWED BY ANOMALY INVESTIGATION**

Not Used.

SUBMITTALS REQUIRED PRIOR TO ANOMALY INVESTIGATION		
Anomaly Investigation Work Plan	Electronic, 6 hard copies, each with CD, bookmarked .pdf and .doc	14 calendar days after award
Government Review/ Accept Anomaly Investigation Work Plan	Electronic, DC with .pdf and .doc (or .xls) file	14 calendar days
Installation Commanding Officer (ICO) Notification	Electronic, slide presentation	45 calendar days prior to anomaly investigation

\*Anomaly Investigation field work may commence after Gov't acceptance of Anomaly Investigation Work Plan.

SUBMITTALS REQUIRED DURING ANOMALY INVESTIGATION		
Weekly SITREP	Electronic	Weekly
MEC/MPPEH Spot Report	Electronic	As required, within 1 business day of confirming identification of MEC/MPPEH
QC/QA Report	Electronic	As required; government review and acceptance 14 calendar days

SUBMITTALS REQUIRED POST-ANOMALY INVESTIGATION		
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Anomaly Investigation After Action Report	Electronic, 6 hard copies, each with CD, bookmarked .pdf and .doc	7 calendar days after completion of all Anomaly Investigation work
Government Review/Accept Anomaly Investigation AAR	Electronic, .pdf and .doc (or .xls) file	14 calendar days

The following requirements apply to the CD ROM.

1. A native file in .doc format will be provided for all reports.
2. A .pdf file(s) of the final documents shall be provided in the following formats: The entire document shall be provided as one pdf file. The pdf file shall have bookmarks for each item identified in the document's table of contents, including tables, figures, captioned photos, and appendices. The bookmark shall use the same description as provided in the table of contents. If the bookmark is lengthy, abbreviate as needed. Bookmark to the second level (i.e. 1.1, 1.2, 1.3, etc.). Do not bookmark signature page of the list of acronyms. Each appendix, regardless of size, shall be provided as an individual pdf file. All maps, figures, and pictures shall be provided at a useable resolution. All color maps, figures, and pictures shall be provided in color.

### 1.3 Personnel Qualifications and Duties

Personnel shall meet the minimum qualification standards set forth in DDESB TP 18 and the JRM ESS, including training and experience requirements. Duties are defined in DDESB TP 18 and the JRM ESS.

For projects requiring on site construction support, a Unexploded Ordnance (UXO) Technician II or above shall be present on site.

For projects requiring munitions response (i.e. anomaly avoidance or anomaly investigation), the contractor shall provide the following personnel:

#### 1.3.1 Unexploded Ordnance Safety Officer (UXOSO)

The UXOSO shall be responsible for implementing the Site Health and Safety Plan (SHSP) and the Accident Prevention Plan (APP). UXOSO must be on site during anomaly investigation. UXOSO may also perform duties of the UXOQCS.

#### 1.3.2 UXO Quality Control Specialist (UXOQCS)

The UXOQCS shall be responsible for implementing the Quality Control Plan. The UXOQCS may also perform duties of the UXOSO. During DGM, either the UXOQCS or Geophysicist must be on site. The UXOQCS shall not report to the SUXOS. The UXOQCS is responsible to ensure that the three phases of quality control (preparatory, initial, and follow-up) are properly implemented and shall inspect each definable feature of work by phase. If anomaly investigation is included, the UXOQCS is responsible for insuring proper implementation of the Geophysical System Verification process, installing an Instrument Verification Strip, and emplacing blind seeds.

#### 1.3.3 The UXO Quality Assurance Manager (UXOQAM)

A qualified government representative shall be assigned to perform the

duties of UXOQAM.

#### 1.3.4 Senior UXO Supervisor (SUXOS)

The SUXOS is responsible to oversee all munitions response work. The SUXOS shall be on site at all times during anomaly investigation. SUXOS shall not perform the role of UXOSO or UXOQCS.

#### 1.3.5 Geophysicist

A geophysicist shall be required for DGM only.  
Not Used.

#### 1.3.6 UXO Technicians

UXO Technicians shall be provided by the contractor as needed based on site and project conditions. Training and experience shall be in accordance with DDESB TP 18 and JRM ESS and be commensurate with their assigned duties.

#### 1.4 General Requirements for all Work Plans (WP)

Specific requirements for WP elements are described below. The WP shall be written, job-specific, and address any unusual or unique aspects of the project or activity for which it is written. The WP shall interface with the Contractor's overall safety, health, and quality control programs. The Government considers the Prime Contractor to be the "controlling authority" for all work site safety, health, and quality control implementation of the subcontractors. Contractors are responsible for informing their subcontractors of the safety and quality provisions under the terms of the contract and the penalties for noncompliance, coordinating the work to prevent one craft from interfering with or creating hazardous working conditions for other crafts, and inspecting subcontractor operations to ensure that accident prevention and quality control responsibilities are being carried out. The contractor shall implement the three phases of quality control. The WP shall be signed by the project superintendent, the project QC Manager, the project SSHO, the UXOSO, UXOQCS, SUXOS, and geophysicist (DGM WP only).

Once accepted by the Contracting Officer, the WP and attachments will be enforced as part of the contract. Only when the WP is accepted shall the contractor be permitted to begin intrusive activity. Disregarding the provisions of this contract or the accepted WP will be cause for stopping of work, at the discretion of the Contracting Officer, until the matter has been rectified.

Once work begins, changes to the accepted WP shall be made with the knowledge and concurrence of the Contracting Officer, project superintendent, QC Manager, SSHO, UXOSO, UXOQCS, SUXOS, and geophysicist (DGM WP only). Should any severe hazard exposure, i.e. imminent danger, become evident, stop work in the area, secure the area, and develop a plan to remove the exposure and control the hazard. Notify the Contracting Officer within 24 hours of discovery. Eliminate/remove the hazard. In the interim, take all necessary action to restore and maintain safe working conditions in order to safeguard onsite personnel, visitors, the public, and the environment.

Copies of the accepted WP will be maintained at the Contracting Officer's office and at the job site.

1.4.1 Anomaly Avoidance Work Plan (WP)  
Not Used.

1.4.2 Digital Geophysical Mapping (DGM) Work Plan (WP)  
Not Used.

1.4.3 Anomaly Investigation Work Plan (WP)

For projects that include DGM, the Anomaly Investigation WP shall be submitted after the acceptance of the DGM After Action Report (AAR). For projects that include extensive footprint or will be executed in zones/phases that result in multiple DGM AARs, a single Anomaly Investigation WP may be submitted and may be supplemented as additional zone DGM AARs are completed and accepted based on the phased schedule.

Only when the Anomaly Investigation WP is accepted by the Government can ground disturbing work begin. Should the accepted Anomaly Investigation WP only include particular zones due to a phased schedule, ground disturbing work may be only in those zones within the accepted Anomaly Investigation WP.

The Anomaly Investigation WP shall include, but not be limited to the following:

1. Project Plan. Describe the overall approach to manage and execute anomaly investigation for surface and subsurface clearance. Identify the objectives and provide details on the equipment, methods, and standard operating procedures to be used. Detail the primary and contingency munitions with the greatest fragmentation distances (MGFD) and the EZs that apply. Detail any reductions in EZs realized through armoring and engineering controls. Address site specific logistical requirements such as water / electrical / other utilities and demolition requirements, site restoration work, etc. Address on-going activities adjacent to the project site that may be impacted by the EZ (e.g. traffic along adjacent roads, housing, offices, etc.). Provide figures that identify exclusion zones for MGFDs and impacted property owners within the EZ. The WP shall comply with NAVSEA OP5 Section 14-10.3.1.5 that requires soil to be removed in layers when the depth of intrusive activities exceeds the detection limits of the geophysical instruments used.

2. Organization and Qualifications. Identify the MEC personnel organization, including organizational chart and the names and qualifications of MEC personnel in resume' format. Include copies of all certifications and qualifications per DDESB TP 18 and the JRM ESS.

3. Site Specific Logistical Requirements. Identify staging and storage areas, lay down areas, designated soil storage and sifting operations, management and disposal of waste generated from field operations, and coordination with ongoing construction activities.

4. Traffic Control. Detail traffic control and mitigation measures to be employed during anomaly investigation. Consideration shall be given to temporary road closures, alternate work schedules, and other methods to

minimize impact to vehicular and pedestrian traffic. The Contractor shall be responsible for signage, devices, flag men, and any other control measures required to safely employ traffic control. The Traffic Control Plan shall be included in the Traffic Control Plan required by Section 01 50 00 TEMPORARY CONSTRUCTION FACILITIES AND CONTROLS.

5. Community Outreach. Describe the communications measures the Contractor will employ to notify the local community of ESS-related work and its anticipated impact. The contractor shall consider the use of DDESB-approved engineered barricades or bunker in place, alternate work schedules (nights or weekends), base activities and school hours (holidays, summer vacation, etc.), reduced work hours, school bus schedules, rush hour traffic, and other items in order to mitigate impact to the local community. Further requirements for Community Outreach are detailed in Section 3.4.

6. Exclusion Zones. Identify the boundary of the EZ for each separate work period. Work periods may vary depending upon site-specific conditions (DGM AAR results, community impacts, etc.). Indicate all points of vehicle access along the EZ perimeter. Contractor shall be responsible to provide reasonable efforts to clear the EZ daily, prior to the start of anomaly investigation.

7. Communications Plan. Identify points of contact within the Prime Contractor and appropriate subcontractor organizations related to MEC/UXO clearance and other on-site activities. The list shall include but may not be limited to appropriate government personnel such as the Construction Management Engineer, Public Affairs Officer, EOD representative, and appropriate first responders. All contractor and government points of contact shall have names, titles, and primary and secondary phone numbers listed as appropriate. Include direction on who will be called for what specific reasons and the priority in which they will be contacted.

8. Schedule. Include specific line items for development, review, and acceptance for all submissions. It is the responsibility of the Prime Contractor to present an overall construction schedule that includes the appropriate JRM ESS clearance operations within the overall construction time line.

9. Accident Prevention Plan (APP) / Site Health and Safety Plan (SHSP). Describe site-specific hazards and the procedures to protect the health and safety of workers and the public during MEC activities. Include worker protective clothing and equipment, staging areas, and waste disposal requirements. The MEC APP shall be a separate submittal from the Construction Accident Prevention Plan required by Section 01 35 26 GOVERNMENTAL SAFETY REQUIREMENTS.

10. Quality Control Plan (QCP). Describe the project-specific quality control and procedures that will be implemented during all aspects of the field work including, but not limited to Data Interpretation, Target Acquisition, Intrusive Operations, Soil Excavation, Anomaly Avoidance, Soil Sifting and Screening, and MEC Identification / Storage / Transportation / Disposal. Include specific details on the instrument validation strip (IVS) and blind seeding procedures. The three phases of control shall be used. The QCP shall be a separate submittal from the Construction Quality Control Plan required by Section 01 45 00.00 20 QUALITY CONTROL.

#### 1.5 Installation Commanding Officer (ICO) Notification

Intent of this submission is for the ICO to get a quick visual understanding of the anomaly investigation impact and use the submission to advertise the format the EZ, Traffic Control Plan, and impacted buildings. Include an aerial picture. Identify the dates, times, and duration of anomaly investigation. Identify the lead government and contractor point of contact for the on-site work. Submission will likely be 1 to 4 slides for each work period depending on the complexity and size of scope.

#### 1.6 QC/QA Report

##### 1.6.1 Anomaly Avoidance QC/QA Report and Anomaly Investigation QC/QA Report

The Anomaly Avoidance QC/QA Report and the Anomaly Investigation QC/QA Report shall include the coordinate system used, description of grids / area included in the report, depth of clearance, number of anomalies investigated, lbs of debris recovered, number of MEC found, number of MPPEH found, number of blind seeds placed, and number of blind seeds recovered. The report must indicate if the QC inspection passed/failed, and must be signed by the UXOQCS, the Prime Contractor QC Officer (if different), and UXOQAM. In map format, identify the area included in the QC/QA Report relative to the entire project footprint, grids, anomalies Left in Place, MEC/MPPEH, and blind seeds. If MEC/MPPEH are found, include a tabular list of the grid, quantity, depth below surface, weight, type (MEC/MPPEH), disposition, mark/model, northing and easting, and any other applicable information. For blind seeds recovered, include a tabular list of the grid, northing and easting, quantity, depth, weight, description, and any other relevant information. For items Left in Place, include a tabular list of the grid, northing and easting, and description. Each complete QC/QA Report shall be submitted to the Government for review and acceptance.

Upon government acceptance of the QC/QA Report, the footprint included within that QC/QA Report may be managed as low likelihood per NAVSEA OP5 and the JRM ESS and construction may proceed in that area. It is anticipated that multiple QC/QA Reports will be required and the number will vary based on project and site conditions. The contractor is responsible for maintaining oversight of intrusive activities to ensure that construction activities that disturb the earth stay within designated areas of low likelihood. Should MEC/MPPEH be uncovered in a site that is managed as low likelihood, the contractor shall immediately stop work and contact the government Construction Management Engineer.

##### 1.6.2 DGM QC/QA Report

Not Used.

#### 1.7 MEC/MPPEH Spot Report

Spot report shall include a brief description of positively identified MEC/MPPEH and its disposition.

#### 1.8 Weekly Situational/Status Report (SITREP)

Indicate percentage of anomaly investigation complete to date and any notable MEC-related issues from the previous week.

#### 1.9 General Requirements for all After Action Reports (AAR)

The After Action Reports shall be signed by the project superintendent, the project QC Manager, the project SSHO, the UXOSO, UXOQCS, SUXOS, and geophysicist (DGM AAR only).

#### 1.9.1 Anomaly Avoidance After Action Report (AAR)

The Anomaly Avoidance AAR shall include, but not be limited to the following:

1. Brief description of the site.
2. Summary of MEC and/or MPPEH found, removed, and left in place.
3. Description of the relative effectiveness and any limitations of the technologies used and the effects on residual risk relative to that originally projected.
4. A summary of the QC/QA Reports.
5. Maps showing:
  - a. Areas from which MEC and/or MPPEH were left in place.
  - b. Areas from which MEC and/or MPPEH were removed.
  - c. Areas within the site where response actions were not performed and the rationale for not addressing those areas.
  - d. The known or reasonably anticipated end use of each area.
6. A summary of the land use controls that were implemented, if any, and the areas to which they apply.
7. A summary of provisions for long-term management.
8. Additional supporting documents as appropriate to include but not limited to field logs, weekly SITREPs, MEC/MPPEH Spot Reports, daily activity reports, QC/QA Reports, NOSSA audits, photographs, QA documentation, Work Plans, etc.

#### 1.9.2 Digital Geophysical Mapping (DGM) After Action Report (AAR) Not Used.

#### 1.9.3 Anomaly Investigation After Action Report (AAR)

The Anomaly Investigation AAR shall include all items identified in Section 1.9.1 Anomaly Avoidance AAR. Additional requirements include maps and summary data of any DGM efforts, maps and summary data of Geophysical System Verification to include Instrument Verification Strip and blind seed data, and a summary of digital data information. Additional supporting documents shall be included as appropriate for the project.

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## PART 2 PRODUCTS

Not Used.

### PART 3 EXECUTION

#### 3.1 Notice to Proceed (NTP) Criteria

Submittals shall not cause delay, limit, or halt the start or any portion of progression of the design work and shall be developed in parallel to the design work. The contractor also shall not use the basis of plans or reports that have not commenced development or uncompleted work to cause delay, limit or halt the start of the design work.

The issuance of each Notice to Proceed shall be authorized only by the Contracting Officer. Each Notice to Proceed shall indicate contractor name/s, start dates, location, and specific work tasks.

#### 3.2. Work Schedule for Subsurface Clearance Activities

The contractor shall schedule work appropriately to mitigate, to the greatest extent practicable, the impacts to base operations and the general public both on and off base. Scheduling shall include phasing as well as night and weekend work as necessary.

#### 3.3 Engineered Barriers / Bunker-in-Place

The contractor shall consider use of approved engineered barriers or other approved techniques to mitigate the impact of exclusion zones on quality of life, base operations, and non-DoD property.

#### 3.4 Community Outreach

Not Used.

#### 3.5 Enforcement of Exclusion Zones

The contractor shall be responsible for providing reasonable levels of verification and enforcement of identified exclusion zones during ESS activities.

Reasonable verification is defined as observations of exclusion zone no more than 6 hours prior to commencing intrusive investigations; should personnel be observed in the exclusion zone, the contractor shall verbally inform them of the scheduled work and request that they leave the EZ. Verbal contact is intended to remind the impacted residents and businesses of the evacuation requirements and the time and duration when intrusive activities will commence.

Reasonable enforcement is defined as verbal notification and request to evacuate to any individual observed inside the EZ limits during anomaly investigation. The contractor shall not be required to stop work, but shall be required to verbally inform anyone observed in the EZ of the work and the request to vacate. The contractor is required to verbally inform people within the EZ once. The contractor has no authority to detain or escort people out of the EZ.

Upon completion of the anomaly investigation activities in the established EZ the contractor shall notify the evacuees as soon as possible that they may return. Notification may be made by phone, text, social media, or other appropriate notification.

#### 3.6 Public Evacuation Process and Exception Requests

Not Used.

### 3.7 Soil Excavation and Removal

Shall be in accordance with JRM ESS and NAVSEA OP 5 (Volume 1). When the depth of intrusive activities exceeds the detection limits of the geophysical instruments used, soil will be removed in layers to allow the detection and removal of MEC and/or MPPEH in the construction footprint.

Anomalies shall be investigated to the depth of construction or when bedrock is reached. Bedrock shall be defined by a licensed professional engineer, geologist or geophysicist. Should the licensed professional engineer, geologist, or geophysicist determine either through site investigation or through the course of anomaly investigation or excavation that the area of excavation is native/virgin soil AND the depth of construction / bedrock is greater than the maximum penetration depth of the munition with the greatest fragmentation distance (MGFD) as described in the JRM ESS, anomalies shall be investigated to the maximum penetration depth of the MGFD only. Should the licensed professional engineer, geologist, or geophysicist determine that anomaly investigation is appropriate to maximum MGFD penetration depth vice depth of construction or bedrock, the contractor shall submit an RFI to the government to accept the reduced scope.

Upon completion and acceptance by the Government of anomaly investigation, earthwork and other ground disturbance activities may commence.

### 3.8 Imported Soils

The Contractor shall ensure that all imported soils are free of MEC/UXO/MPPEH item or materials. All imported soils shall be obtained from Government approved borrow pits or must be screened using a 0.75" screen prior to entering the project site or Government property.

### 3.9 Requirements When MEC/MPPEH is Encountered

Stop all work immediately if any material or object believed to be MEC/MPPEH is encountered and execute first response protocols immediately. Notify the UXO Technician III, UXOSO or SUXOS. Notify the CME as soon as possible. Follow procedures of the Work Plan.

MEC and MPPEH storage, transportation, and disposal will be accomplished by military EOD IAW JRM ESS.

The Contractor shall not blow-in-place or counter-charge any MEC/MPPEH encountered.

If MEC/MPPEH encountered is determined by the SUXOS to be unsafe to move, poses a threat to human health and the environment or represents an imminent and substantial endangerment to human health and the environment, execute first response protocols immediately. The Contractor shall also coordinate as soon as possible with Explosive Ordnance Disposal Mobile Unit Five (EODMU-5) or the appropriate EOD response team for further disposition.

If MEC/MPPEH encountered is determined by the SUXOS to be safe to move and does not pose a threat to human health or the environment, it may be moved and stored for the appropriate EOD response team for further disposition.

-- End of Section --

## SECTION 01 58 00

## PROJECT IDENTIFICATION

## 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 within the text by the basic designation only.

## AMERICAN WOOD PROTECTION ASSOCIATION (AWPA)

AWPA C1	(2003) All Timber Products - Preservative Treatment by Pressure Processes
AWPA C2	(2003) Lumber, Timber, Bridge Ties and Mine Ties - Preservative Treatment by Pressure Processes

## 1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

## SD-02 Shop Drawings

Preliminary one line drawings of project rendering; G

Preliminary drawing indicating layout and text content; G

## SD-04 Samples

Final rendering sample; G

Final framed rendering and copies; G

## 1.3 QUALITY ASSURANCE

## 1.3.1 Rendering

Provide the project rendering in accordance with the following drawing stages as required in paragraph entitled "Submittals". The following submittal data is required to properly identify the appropriate view and approve the final rendering of the facility. The final painted rendering will be used to produce the image for the signboard and framed photographic copies provided to the Contracting Officer.

## 1.3.1.1 Preliminary One Line Drawings

Provide three different views of the facility in a preliminary single line drawing (black and white) format. These three views will represent the best angles at which to view the proposed facility showing the best design features and the three dimensional character of the facility.

#### 1.3.1.2 Final Rendering Sample

Provide a photographic copy (8 by 10 inches minimum size) of final rendering for approval of color, landscaping, and foreground/background development prior to final submittal.

#### 1.3.1.3 Final Framed Rendering and Copies

Provide final full color rendering of the proposed facility as specified.

### 1.4 PROJECT SIGN

Prior to initiating any work on site, provide one project identification sign at the location designated. Construct the sign in accordance with project sign detail, which can be downloaded at: <http://www.wbdg.org/ccb/NAVGRAPH/graphtoc.pdf>. Maintain sign throughout the life of the project. Upon completion of the project, remove the sign from the site. The Government will temporarily supply the Contractor a copy of the rendering to use in the production of the final signboard artwork. Provide color rendering of the project. Reproduce the rendering on the signboard or enclose a copy of the rendering under a water-proof, transparent cover, and caulk for weather protection.

#### 1.4.1 Project Identification Signboard (Navy)

A project identification signboard shall be provided. Provide preliminary drawing indicating layout and text content. The signboard shall be provided at a conspicuous location on the job site where directed by the Contracting Officer.

- a. The field of the sign shall consist of a 4 by 8 foot sheet of grade B-B medium density overlaid exterior plywood.
- b. Lumber shall be B or better Southern pine, pressure-preservative treated in accordance with AWPA C1 and AWPA C2. Nails shall be aluminum or galvanized steel.
- c. The entire signboard and supports shall be given one coat of exterior alkyd primer and two coats of exterior alkyd enamel paint. The lettering and sign work shall be performed by a skilled sign painter using paint known in the trade as bulletin colors. The colors, lettering sizes, and lettering styles shall be as indicated. Where preservative-treated lumber is required, utilize only cured pressure-treated wood which has had the chemicals leached from the surface of the wood prior to painting.
- d. Use spray applied automotive quality high gloss acrylic white enamel paint as background for the NAVFAC logo. NAVFAC logo shall be an applied 2 mil film sticker/decal with either transparent or white background or paint the logo by stencil onto the sign. The weather resistant sticker/decal film shall be rated for a minimum of 2-year exterior vertical exposure. The self-adhering sticker shall be mounted to the sign with pressure sensitive, permanent acrylic adhesive. Shop cut sticker/decal to rectangular shape and provide pull-off backing sheet on adhesive side of design sticker for shipping.
- e. Sign paint colors (manufacturer's numbers/types listed below for color identification only)

- (1) Blue = To match dark blue color in the NAVFAC logo.
  - (2) White = To match Brilliant White color in the NAVFAC logo.
- f. NAVFAC logo must retain proportions and design integrity. NAVFAC logos in electronic format may be obtained from the NAVFAC web portal via the following link:  
[https://portal.navfac.navy.mil/portal/page?\\_pageid=181,3465071&\\_dad=portal&\\_schema](https://portal.navfac.navy.mil/portal/page?_pageid=181,3465071&_dad=portal&_schema)  
Use the following to choose color values for the paint to be used:
- (1) Dark Blue = equivalent to CMYK values 100, 72, 0, 8 .
  - (2) Light Blue = equivalent to CMYK values 69, 34, 0, 0.
  - (3) Cyan = equivalent to CMYK values 100, 9, 0, 6.
  - (4) Yellow = equivalent to CMYK values 0.9,94, 0.
- g. The following is a requirement when rendering is required on the signboard. Final signboard artwork (rendering) may be either mounted under plexiglass as indicated in attached Plates 2 and 5, or at the Contractor's option may be electrostatically printed on 4 mil self-adhering, weather resistant, glossy vinyl film and mounted to signboard. Provide film that is capable of full color reproduction of the building rendering and cover it with an ultra-violet protection film. Laminate the 2 mil satin gloss clear protection film to the white 4 mil vinyl image film. Utilize pressure sensitive "controltac" adhesive to attach rendering to signboard and smooth out surface with hand pressure tools in accordance with manufacturer's recommendations. Shop cut sticker to size required and provide pull-off backing sheet on adhesive side of film for shipping. Provide the rendering on film that is rated for a minimum of 2 years exterior vertical exposure.

#### 1.4.1.1 Project Rendering

The following is a guide for projects that require the Contractor to provide the rendering.

Provide a full color rendering of the proposed facility as specified below:

- a. Provide rendering by a company that regularly does this work as a major component of their normal business.
- b. Colors used on rendering shall match the exterior color scheme indicated in the contract document.
- c. The rendering shall be a full vignette/fully developed, on heavy illustration board. Approximate finished size shall be 24 by 30 inches with minimum inside mat dimension of 16 by 20 inches. Draw the rendering at human eye/roof/bird's eye level view as directed by the Project Manager, painted with Case-in Tempera.
- d. Provide three preliminary single line black and white perspectives prior to proceeding with the color rendering. Provide these preliminary perspectives within 30 days after contract award for evaluation by the Contracting Officer. The view selected by the Contracting Officer shall be developed into the final rendering.

- e. Provide the final rendering sample photograph within 30 days after approval of preliminary single line drawings. Provide this sample photograph for evaluation by the Contracting Officer.
- f. Provide final original color rendering, two (2) full size photographic reproductions of the original rendering, and the photographic negative. Original and reproductions shall be mounted on acid free board, double-matted (acid free matting) with appropriate colored board and framed in contemporary metal frames, using non-glare glass. Project name, location, Architect/Engineer firm's name shall be printed on the matting. On the back of the renderings and reproductions, indicated the project name, the location, the contract number, and the date of reproduction.
- g. The rendering, the photographic copies, and the negative shall be shipped in resilient packaging to ensure damage-free delivery.
- h. Provide copy of rendering to be used for the signboard that has been protected from UV damage as per specifications.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

-- End of Section --

## SECTION 01 74 19

## CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT

## PART 1 GENERAL

## 1.1 GOVERNMENT POLICY

Government policy is to apply sound environmental principles in the design, construction and use of facilities. As part of the implementation of that policy: (1) practice efficient waste management when sizing, cutting, and installing products and materials and (2) use all reasonable means to divert construction and demolition waste from landfills and to facilitate their recycling or reuse. Divert a minimum of 60 percent by weight of total project solid waste from the landfill.

## 1.2 MANAGEMENT

Develop and implement a waste management program. Take a pro-active, responsible role in the management of construction and demolition waste and require all subcontractors, vendors, and suppliers to participate in the effort. The Environmental Manager, as specified in Section 01 57 19 TEMPORARY ENVIRONMENTAL CONTROLS, is responsible for instructing workers and overseeing and documenting results of the Waste Management Plan for the project. Construction and demolition waste includes products of demolition or removal, excess or unusable construction materials, packaging materials for construction products, and other materials generated during the construction process but not incorporated into the work. In the management of waste, consider the availability of viable markets, the condition of the material, the ability to provide the material in suitable condition and in a quantity acceptable to available markets, and time constraints imposed by internal project completion mandates. Implement any special programs involving rebates or similar incentives related to recycling of waste. Revenues or other savings obtained for salvage, or recycling accrue to the Contractor. Appropriately permit firms and facilities used for recycling, reuse, and disposal for the intended use to the extent required by federal, state, and local regulations. Also, provide on-site instruction of appropriate separation, handling, recycling, salvage, reuse, and return methods to be used by all parties at the appropriate stages of the project.

## 1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Waste Management Plan; G

SD-11 Closeout Submittals

Records;

#### 1.4 MEETINGS

Conduct Construction Waste Management meetings. After award of the Contract and prior to commencement of work, schedule and conduct a meeting with the Contracting Officer to discuss the proposed Waste Management Plan and to develop a mutual understanding relative to the details of waste management. The requirements for this meeting may be fulfilled during the coordination and mutual understanding meeting outlined in Section 01 45 00.00 2001 45 00.00 10 QUALITY CONTROL. At a minimum, discuss environmental and waste management goals and issues at the following additional meetings:

- a. Pre-bid meeting.
- b. Preconstruction meeting.
- c. Regular QC meetings.
- d. Work safety meetings.

#### 1.5 WASTE MANAGEMENT PLAN

Submit a waste management plan within 15 days after notice to proceed and not less than 10 days before the preconstruction meeting. The plan demonstrates how to meet the the project waste diversion goal. Also, include the following in the plan:

- a. Name of individuals on the Contractor's staff responsible for waste prevention and management.
- b. Actions that will be taken to reduce solid waste generation, including coordination with subcontractors to ensure awareness and participation.
- c. Description of the regular meetings to be held to address waste management.
- d. Description of the specific approaches to be used in recycling/reuse of the various materials generated, including the areas on site and equipment to be used for processing, sorting, and temporary storage of wastes.
- e. Characterization, including estimated types and quantities, of the waste to be generated.
- f. Name of landfill and/or incinerator to be used and the estimated costs for use, assuming that there would be no salvage or recycling on the project.
- g. Identification of local and regional reuse programs, including non-profit organizations such as schools, local housing agencies, and organizations that accept used materials such as materials exchange networks and Habitat for Humanity. Include the name, location, and phone number for each reuse facility to be used, and provide a copy of the permit or license for each facility.
- h. List of specific waste materials that will be salvaged for resale, salvaged and reused on the current project, salvaged and stored for reuse on a future project, or recycled. Identify the recycling facilities by name, location, and phone number, including a copy of

the permit or license for each facility.

- i. Identification of materials that cannot be recycled/reused with an explanation or justification, to be approved by the Contracting Officer.
- j. Description of the means by which any waste materials identified in item (h) above will be protected from contamination.
- k. Description of the means of transportation of the recyclable materials (whether materials will be site-separated and self-hauled to designated centers, or whether mixed materials will be collected by a waste hauler and removed from the site).
- l. Anticipated net cost savings determined by subtracting Contractor program management costs and the cost of disposal from the revenue generated by sale of the materials and the incineration and/or landfill cost avoidance.

Revise and resubmit Plan as required by the Contracting Officer. Approval of Contractor's Plan will not relieve the Contractor of responsibility for compliance with applicable environmental regulations or meeting project cumulative waste diversion requirement. Distribute copies of the Waste Management Plan to each subcontractor, the Quality Control Manager, and the Contracting Officer.

#### 1.6 RECORDS

Maintain records to document the quantity of waste generated; the quantity of waste diverted through sale, reuse, or recycling; and the quantity of waste disposed by landfill or incineration. Quantities may be measured by weight or by volume, but must be consistent throughout. List each type of waste separately noting the disposal or diversion date. Identify the landfill, recycling center, waste processor, or other organization used to process or receive the solid waste. Provide explanations for any waste not recycled or reused. With each application for payment, submit updated documentation for solid waste disposal and diversion, and submit manifests, weight tickets, receipts, and invoices specifically identifying the project and waste material. Make the records available to the Contracting Officer during construction, and deliver to the Contracting Officer upon completion of the construction a copy of the records.

Information on the quantity and disposition of these materials will be provided by the Contracting Officer. Include this data in records, annotated to indicate that it was accomplished by another party.]

#### 1.7 COLLECTION

Separate, store, protect, and handle at the site identified recyclable and salvageable waste products in a manner that maximizes recyclability and salvagability of identified materials. Provide the necessary containers, bins and storage areas to facilitate effective waste management and clearly and appropriately identify them. Provide materials for barriers and enclosures around recyclable material storage areas which are nonhazardous and recyclable or reusable. Locate out of the way of construction traffic. Provide adequate space for pick-up and delivery and convenience to subcontractors. Recycling and waste bin areas are to be kept neat and clean, and handle recyclable materials to prevent contamination of materials from incompatible products and materials.

Clean contaminated materials prior to placing in collection containers. Use cleaning materials that are nonhazardous and biodegradable. Handle hazardous waste and hazardous materials in accordance with applicable regulations and coordinate with Section 01 57 19 TEMPORARY ENVIRONMENTAL CONTROLS. Separate materials by one of the following methods:

1.7.1 Source Separated Method.

Separate waste products and materials that are recyclable from trash and sorted as described below into appropriately marked separate containers and then transported to the respective recycling facility for further processing. Deliver materials in accordance with recycling or reuse facility requirements (e.g., free of dirt, adhesives, solvents, petroleum contamination, and other substances deleterious to the recycling process). Separate materials into the following category types as appropriate to the project waste and to the available recycling and reuse programs in the project area:

- a. Land clearing debris.
- b. Asphalt.
- c. Concrete and masonry.
- d. Metal (e.g. banding, stud trim, ductwork, piping, rebar, roofing, other trim, steel, iron, galvanized, stainless steel, aluminum, copper, zinc, lead brass, bronze).
  - (1) Ferrous.
  - (2) Non-ferrous.
- e. Wood (nails and staples allowed).
- f. Debris.
- g. Glass (colored glass allowed).
- h. Paper.
  - (1) Bond.
  - (2) Newsprint.
  - (3) Cardboard and paper packaging materials.
- i. Plastic.

Type	
1	Polyethylene Terephthalate (PET, PETE)
2	High Density Polyethylene (HDPE)
3	Vinyl (Polyvinyl Chloride or PVC)

Type	
4	Low Density Polyethylene (LDPE)
5	Polypropylene (PP)
6	Polystyrene (PS)
7	Other. Use of this code indicates that the package in question is made with a resin other than the six listed above, or is made of more than one resin listed above, and used in a multi-layer combination.

- j. Gypsum.
- k. Non-hazardous paint and paint cans.
- l. Carpet.
- m. Ceiling tiles.
- n. Insulation.
- o. Beverage containers.

1.7.2 Other Methods.

Other proposed methods may be used when approved by the Contracting Officer.

1.8 DISPOSAL

Control accumulation of waste materials and trash. Recycle or dispose of collected materials off-site at intervals approved by the Contracting Officer and in compliance with waste management procedures. Except as otherwise specified in other sections of the specifications, dispose of in accordance with the following:

1.8.1 Reuse.

Give first consideration to salvage for reuse since little or no re-processing is necessary for this method, and less pollution is created when items are reused in their original form. [Consider sale or donation of waste suitable for reuse.

1.8.2 Recycle.

Recycle waste materials not suitable for reuse, but having value as being recyclable. Recycle all fluorescent lamps, HID lamps, and mercury-containing thermostats removed from the site. Arrange for timely pickups from the site or deliveries to recycling facilities in order to prevent contamination of recyclable materials.

[1.8.3 Compost

Consider composting on site if a reasonable amount of compostable material

will be available. Compostable materials include plant material, sawdust, and certain food scraps.

]1.8.4 Waste.

Dispose of materials with no practical use or economic benefit to waste-to-energy plants where available. As the last choice, dispose of materials at a landfill or incinerator.

1.8.5 Return

Set aside and protect misdelivered and substandard products and materials and return to supplier for credit.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used. -- End of Section --

SECTION 01 75 00.00 40

STARTING AND ADJUSTING

PART 1 GENERAL

1.1 SUMMARY

Requirements of this Section apply to, and are a component part of, each section of the specifications.

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Verification of Prior Experience; G

Documentation of Manufacturer's Prior Experience; G

Quality Control Plan; G

SD-02 Shop Drawings

Drawings, Diagrams and Schedules; G

Diagrams and Instructions; G

Coordination Drawings; G

SD-03 Product Data

Catalog Cuts; G

Manufacturer's Sample Warranty; G

Samples of Warranty Language; G

SD-05 Design Data

Design Calculations; G

SD-06 Test Reports

Factory Tests; G

Functional Field Test; G

Final Acceptance Test; G

Test Procedures; G

SD-07 Certificates

Qualification of Manufacturer; G

Qualification of Applicator/Installer; G

United States Manufacture; G

SD-08 Manufacturer's Instructions

Manufacturer's Administrative Requirements; G

Demonstration and Training Information; G

Manufacturer's Procedural Requirements; G

SD-09 Manufacturer's Field Reports

Documentation of the Testing and Verification Actions; G

SD-10 Operation and Maintenance Data

Operation and Maintenance Data; G

Safety and Security Data or Posters; G

1.2.1 Preconstruction and Pre-Testing Requirements

Deliver equipment and services required by the specifications. Ensure all equipment is free of latent manufacturing and installation defects. The Government reserves the option to elect performance of acceptance testing by internal personnel, or a designated third party. Regardless of who performs the acceptance testing, ensure the requirements of acceptance are met.

Submit the following for review and approval prior to the commencement of work and any testing, whether such testing is on site or elsewhere:

- a. Verification of prior experience and expertise with similar project scope
- b. Documentation of manufacturer's prior experience and expertise with similar project materials and systems
- c. Quality Control Plan
- d. Manufacturer's sample warranty and operation and maintenance data, with details regarding start-up procedures
- e. Manufacturer's administrative requirements
- f. Manufacturer's procedural requirements
- g. Demonstration and training information

Submit the following certifications:

- a. Provide evidence that products used within this specification are United States manufacture.

- b. Qualification of manufacturer, including current licenses and insurance.
- c. Qualification of applicator/installer, including licenses and insurance.

#### 1.2.2 Shop Drawings and Diagrams

Submit the following shop drawings, record drawings, and diagrams as required to correctly execute the installation of the work:

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

#### 1.2.3 Product and Design Data

Submit all product data and any design calculations, mix designs, analyses or other data pertaining to ensure a complete functional installation; including, but not limited to:

- a. Catalog cuts, illustrations, schedules, diagrams, performance charts, instructions and brochures illustrating size, physical appearance and other characteristics of materials, systems or equipment for some portion of the work
- b. Samples of warranty language when the contract requires extended/no dollar limit product warranties
- c. Operation and maintenance data provided by the manufacturer to ensure the safe and efficient operation, maintenance and repair of the system or equipment provided
- d. Safety and security data or posters provided by the manufacturer to be posted in a conspicuous visible location for operational and maintenance personnel

#### 1.2.4 Tests Required

Perform tests to verify proper functioning of fire protection, fire suppression, electrical switchgear, protective relaying, fluid and gas systems, pump/motor combinations, boiler systems, hydraulic and pneumatic control, condition/performance monitoring systems, energy control and monitoring systems, and other assemblies and components that need to be tested as an interrelated whole.

##### 1.2.4.1 Factory Tests

Submit certified copies of required tests performed at the factory to verify proper build. These test results will be used in the "Final Acceptance Test" section to verify no shipping damage and proper installation.

#### 1.2.4.2 Test Procedures

Submit test procedure and recording forms that document the test steps for approval to the Contracting Officer 21 calendar days prior to the proposed test date. Ensure procedures clearly state step by step instruction to verify system parameters, components, and functions.

#### 1.2.4.3 Functional Field Test

Perform functional field tests test to verify that the system and components have been properly installed and are functioning properly. Perform test(s) in the presence of the Contracting Officer. Acceptance will be issued when system has performed per other sections and referenced industry standards.

Coordinate and submit documentation of the testing and verification actions taken by manufacturer's representative [at the job site][, in the vicinity of the job site][, or on a sample taken from the job site], on a portion of the work, [during][after] installation, to confirm compliance with manufacturer's standards or instructions.

#### 1.2.4.4 Final Acceptance Test

Perform a formal test with full documentation using the approved recording form. Contracting Officer will witness this test and issue a written final acceptance. Provide final test data to the Contracting Officer with a cover letter clearly marked with the system name, date, and the words " Final Test Data - Forward to the Systems Engineer/Condition Monitoring Office/Predictive Testing Group for inclusion in the Maintenance Database."

### PART 2 PRODUCTS

Not Used

### PART 3 EXECUTION

Not Used

-- End of Section --

## SECTION 01 78 00

## CLOSEOUT SUBMITTALS

## 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 within the text by the basic designation only.

## ASTM INTERNATIONAL (ASTM)

ASTM E1971 (2005; R 2011) Stewardship for the Cleaning of Commercial and Institutional Buildings

## GREEN SEAL (GS)

GS-37 (2012) Cleaning Products for Industrial and Institutional Use

## U.S. ARMY CORPS OF ENGINEERS (USACE)

TR-06-X (2006; Supplement 2009) A/E/C (Architectural, Engineering, and Construction) CADD Standard - Release 3.0

## U.S. DEPARTMENT OF DEFENSE (DOD)

UFC 1-300-08 (2009, with Change 2) Criteria for Transfer and Acceptance of DoD Real Property

## 1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

## SD-03 Product Data

As-Built Record of Equipment and Materials  
Warranty Management Plan  
Warranty Tags  
Final Cleaning  
Spare Parts Data

## SD-08 Manufacturer's Instructions

Posted Instructions

## SD-10 Operation and Maintenance Data

## Operation and Maintenance Manuals

## SD-11 Closeout Submittals

Record Drawings  
Certification of EPA Designated Items; G  
Interim Form DD1354; G  
Checklist for Form DD1354; G  
NAVFAC Sustainable & Energy Data Record Card; G

## 1.3 PROJECT RECORD DOCUMENTS

## 1.3.1 Record Drawings

Drawings showing final as-built conditions of the project. This paragraph covers record drawings complete, as a requirement of the contract. The terms "drawings," "contract drawings," "drawing files," "working record drawings" and "final record drawings" refer to contract drawings which are revised to be used for final record drawings showing as-built conditions. The final CAD record drawings must consist of one set of electronic CAD drawing files in the specified format, 2 sets of prints, and one set of the approved working Record drawings.

## 1.3.1.1 Government Furnished Materials

One set of electronic CADD files in the specified software and format revised to reflect all bid amendments will be provided by the Government at the preconstruction conference for projects requiring CADD file record drawings.

## 1.3.1.2 Working Record and Final Record Drawings

Revise 2 sets of paper drawings by red-line process to show the as-built conditions during the prosecution of the project. Keep these working as-built marked drawings current on a weekly basis and at least one set available on the jobsite at all times. Changes from the contract plans which are made in the work or additional information which might be uncovered in the course of construction must be accurately and neatly recorded as they occur by means of details and notes. Prepare final record (as-built) drawings after the completion of each definable feature of work as listed in the Contractor Quality Control Plan (as appropriate for the project). The working as-built marked prints and final record (as-built) drawings will be jointly reviewed for accuracy and completeness by the Contracting Officer and the Contractor prior to submission of each monthly pay estimate. If the Contractor fails to maintain the working and final record drawings as specified herein, the Contracting Officer will deduct from the monthly progress payment an amount representing the estimated cost of maintaining the record drawings. This monthly deduction will continue until an agreement can be reached between the Contracting Officer and the Contractor regarding the accuracy and completeness of updated drawings. Show on the working and final record drawings, but not limited to, the following information:

- a. The actual location, kinds and sizes of all sub-surface utility lines. In order that the location of these lines and appurtenances may be determined in the event the surface openings or indicators become covered over or obscured, show by offset dimensions to two permanently fixed surface features the end of each run including each change in direction on the record drawings. Locate valves, splice

boxes and similar appurtenances by dimensioning along the utility run from a reference point. Also record the average depth below the surface of each run.

- b. The location and dimensions of any changes.
- c. Correct grade, elevations, cross section, or alignment of roads, earthwork, structures or utilities if any changes were made from contract plans.
- d. 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.
- e. The topography, invert elevations and grades of drainage installed or affected as part of the project construction.
- f. Changes or modifications which result from the final inspection.
- g. Where contract drawings or specifications present options, show only the option selected for construction on the final as-built prints.
- h. If borrow material for this project is from sources on Government property, or if Government property is used as a spoil area, furnish a contour map of the final borrow pit/spoil area elevations.
- i. Systems designed or enhanced by the Contractor.
- j. Modifications (include within change order price the cost to change working and final record drawings to reflect modifications) and compliance with the following procedures.
  - (1) Follow directions in the modification for posting descriptive changes.
  - (2) Place a Modification Circle at the location of each deletion.
  - (3) For new details or sections which are added to a drawing, place a Modification Circle by the detail or section title.
  - (4) For minor changes, place a Modification Circle by the area changed on the drawing (each location).
  - (5) For major changes to a drawing, place a Modification Circle by the title of the affected plan, section, or detail at each location.
  - (6) For changes to schedules or drawings, place a Modification Circle either by the schedule heading or by the change in the schedule.
  - (7) The Modification Circle size shall be 1/2 inch diameter unless the area where the circle is to be placed is crowded. Smaller size circle shall be used for crowded areas.

#### 1.3.1.3 Drawing Preparation

Modify the record drawings as may be necessary to correctly show the

features of the project as it has been constructed by bringing the contract set into agreement with approved working as-built prints, and adding such additional drawings as may be necessary. These working as-built marked prints must be neat, legible and accurate. These drawings are part of the permanent records of this project and must be returned to the Contracting Officer after approval by the Government. Any drawings damaged or lost by the Contractor must be satisfactorily replaced by the Contractor at no expense to the Government.

#### 1.3.1.4 Computer Aided Design and Drafting (CADD) Drawings

Only employ personnel proficient in the preparation of CADD drawings to modify the contract drawings or prepare additional new drawings. Additions and corrections to the contract drawings must be equal in quality and detail to that of the originals. Line colors, line weights, lettering, layering conventions, and symbols must be the same as the original line colors, line weights, lettering, layering conventions, and symbols. If additional drawings are required, prepare them using the specified electronic file format applying [the same graphic standards specified for original drawings TR-06-X. The title block and drawing border to be used for any new final record drawings must be identical to that used on the contract drawings. Accomplish additions and corrections to the contract drawings using CADD files. The Contractor will be furnished "as-designed" drawings in format compatible with a Windows XP/Windows NT operating system. The electronic files will be supplied on optical disk. Provide all program files and hardware necessary to prepare final record drawings. The Contracting Officer will review final record drawings for accuracy and return them to the Contractor for required corrections, changes, additions, and deletions.

- a. Provide CADD "base" colors of red, green, and blue. Color code for changes as follows:
  - (1) Deletions (Red) - Over-strike deleted graphic items (lines), lettering in notes and leaders.
  - (2) Additions (Green) - Added items, lettering in notes and leaders.
  - (3) Special (Blue) - Items requiring special information, coordination, or special detailing or detailing notes.
- b. Rename the Contract Drawing files in a manner related to the contract number (i.e., 98-C-10.DGN) as instructed in the Pre-Construction conference. Use only those renamed files for the Marked-up changes. All changes shall be made on the layer/level as the original item.
- c. When final revisions have been completed, show the wording "RECORD DRAWINGS / AS-BUILT CONDITIONS" followed by the name of the Contractor in letters at least 3/16 inch high on the cover sheet drawing. Mark all other contract drawings either "Record" drawing denoting no revisions on the sheet or "Revised Record" denoting one or more revisions. Date original contract drawings in the revision block.
- d. Within 20 days after Government approval of all of the working record drawings for a phase of work, prepare the final CADD record drawings for that phase of work and submit two sets of blue-lined prints of these drawings for Government review and approval. The Government will promptly return one set of prints annotated with any necessary corrections. Within 10 days revise the CADD files accordingly at no

additional cost and submit one set of final prints for the completed phase of work to the Government. Within 20 days of substantial completion of all phases of work, submit the final record drawing package for the entire project. Submit one set of electronic files on optical disk, one set of mylars, two sets of blue-line prints and one set of the approved working record drawings. They must be complete in all details and identical in form and function to the contract drawing files supplied by the Government. Any transactions or adjustments necessary to accomplish this is the responsibility of the Contractor. The Government reserves the right to reject any drawing files it deems incompatible with the customer's CADD system. Paper prints, drawing files and storage media submitted will become the property of the Government upon final approval. Failure to submit final record drawing files and marked prints as specified will be cause for withholding any payment due the Contractor under this contract. Approval and acceptance of final record drawings must be accomplished before final payment is made to the Contractor.

1.3.1.5 Payment

No separate payment will be made for record drawings required under this contract, and all costs accrued in connection with such drawings are considered a subsidiary obligation of the Contractor.

1.3.2 As-Built Record of Equipment and Materials

Furnish one copy of preliminary record of equipment and materials used on the project 15 days prior to final inspection. This preliminary submittal will be reviewed and returned 2 days after final inspection with Government comments. Submit two sets of final record of equipment and materials 10 days after final inspection. Key the designations to the related area depicted on the contract drawings. List the following data:

RECORD OF DESIGNATED EQUIPMENT AND MATERIALS DATA				
Description	Specification Section	Manufacturer and Catalog, Model, and Serial Number	Composition and Size	Where Used

1.3.3 Final Approved Shop Drawings

Furnish final approved project shop drawings 30 days after transfer of the completed facility.

1.3.4 Construction Contract Specifications

Furnish final record (as-built) construction contract specifications, including modifications thereto, 30 days after transfer of the completed facility.

1.3.5 Real Property Equipment

Furnish a list of installed equipment furnished under this contract. Include all information usually listed on manufacturer's name plate. In the "EQUIPMENT-IN-PLACE LIST" include, as applicable, the following for each piece of equipment installed: description of item, location (by room

number), model number, serial number, capacity, name and address of manufacturer, name and address of equipment supplier, condition, spare parts list, manufacturer's catalog, and warranty. Furnish a draft list at time of transfer. Furnish the final list 30 days after transfer of the completed facility.

#### 1.4 SPARE PARTS DATA

Submit two copies of the Spare Parts Data list.

- a. Indicate manufacturer's name, part number, nomenclature, and stock level required for maintenance and repair. List those items that may be standard to the normal maintenance of the system.
- b. Supply items of each part for spare parts inventory. Provision of spare parts does not relieve the Contractor of responsibilities listed under the contract guarantee provisions.

#### 1.5 CERTIFICATION OF EPA DESIGNATED ITEMS

Submit the Certification of EPA Designated Items as required by FAR 52.223-9, "Certification and Estimate of Percentage of Recovered Material Content for EPA Designated Items". Include on the certification form the following information: project name, project number, Contractor name, license number, Contractor address, and certification. The certification will read as follows and be signed and dated by the Contractor. "I hereby certify the information provided herein is accurate and that the requisition/procurement of all materials listed on this form comply with current EPA standards for recycled/recovered materials content. The following exemptions may apply to the non-procurement of recycled/recovered content materials: 1) The product does not meet appropriate performance standards; 2) The product is not available within a reasonable time frame; 3) The product is not available competitively (from two or more sources); 4) The product is only available at an unreasonable price (compared with a comparable non-recycled content product)." Record each product used in the project that has a requirement or option of containing recycled [or biobased] content in accordance with Section 01 62 35 RECYCLED/RECOVERED/BIOBASED MATERIALS, noting total price, total value of post-industrial recycled content, total value of post-consumer recycled content, and comments. Recycled [and biobased] content values may be determined by weight or volume percent, but must be consistent throughout.

#### 1.6 WARRANTY MANAGEMENT

##### 1.6.1 Warranty Management Plan

Develop a warranty management plan which contains information relevant to the clause Warranty of Construction. At least 30 days before the planned pre-warranty conference, submit one set of the warranty management plan. Include within the warranty management plan all required actions and documents to assure that the Government receives all warranties to which it is entitled. The plan must be in narrative form and contain sufficient detail to render it suitable for use by future maintenance and repair personnel, whether tradesmen, or of engineering background, not necessarily familiar with this contract. The term "status" as indicated below must include due date and whether item has been submitted or was accomplished. Warranty information made available during the construction phase must be submitted to the Contracting Officer for approval prior to

each monthly pay estimate. Assemble approved information in a binder and turn over to the Government upon acceptance of the work. The construction warranty period will begin on the date of project acceptance and continue for the full product warranty period. A joint 4 month and 9 month warranty inspection will be conducted, measured from time of acceptance, by the Contractor, Contracting Officer and the Customer Representative. Include within the warranty management plan , but not limited to, the following:

- a. Roles and responsibilities of all personnel associated with the warranty process, including points of contact and telephone numbers within the organizations of the Contractors, subContractors, manufacturers or suppliers involved.
- b. Furnish with each warranty the name, address, and telephone number of each of the guarantor's representatives nearest to the project location.
- c. Listing and status of delivery of all Certificates of Warranty for extended warranty items .
- d. A list for each warranted equipment, item, feature of construction or system indicating:
  - (1) Name of item.
  - (2) Model and serial numbers.
  - (3) Location where installed.
  - (4) Name and phone numbers of manufacturers or suppliers.
  - (5) Names, addresses and telephone numbers of sources of spare parts.
  - (6) Warranties and terms of warranty. Include one-year overall warranty of construction, including the starting date of warranty of construction. Items which have extended warranties must be indicated with separate warranty expiration dates.
  - (7) Cross-reference to warranty certificates as applicable.
  - (8) Starting point and duration of warranty period.
  - (9) Summary of maintenance procedures required to continue the warranty in force.
  - (10) Cross-reference to specific pertinent Operation and Maintenance manuals.
  - (11) Organization, names and phone numbers of persons to call for warranty service.
  - (12) Typical response time and repair time expected for various warranted equipment.
- e. The Contractor's plans for attendance at the 4 and 9 month post-construction warranty inspections conducted by the Government.
- f. Procedure and status of tagging of all equipment covered by extended warranties.
- g. Copies of instructions to be posted near selected pieces of equipment where operation is critical for warranty and/or safety reasons.

#### 1.6.2 Performance Bond

The Contractor's Performance Bond must remain effective throughout the construction period.

- a. In the event the Contractor fails to commence and diligently pursue

any construction warranty work required, the Contracting Officer will have the work performed by others, and after completion of the work, will charge the remaining construction warranty funds of expenses incurred by the Government while performing the work, including, but not limited to administrative expenses.

- b. In the event sufficient funds are not available to cover the construction warranty work performed by the Government at the Contractor's expense, the Contracting Officer will have the right to recoup expenses from the bonding company.
- c. Following oral or written notification of required construction warranty repair work, respond in a timely manner. Written verification will follow oral instructions. Failure of the Contractor to respond will be cause for the Contracting Officer to proceed against the Contractor.

1.6.3 Pre-Warranty Conference

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

1.6.4 Warranty Tags

At the time of installation, tag each warranted item with a durable, oil and water resistant tag approved by the Contracting Officer. Attach each tag with a copper wire and spray with a silicone waterproof coating. Also, submit two record copies of the warranty tags showing the layout and design. The date of acceptance and the QC signature must remain blank until the project is accepted for beneficial occupancy. Show the following information on the tag.

Type of product/material	
Model number	
Serial number	
Contract number	
Warranty period from/to	

Inspector's signature	
Construction Contractor	
Address	
Telephone number	
Warranty contact	
Address	
Telephone number	
Warranty response time priority code	
WARNING - PROJECT PERSONNEL TO PERFORM ONLY OPERATIONAL MAINTENANCE DURING THE WARRANTY PERIOD.	

1.7 OPERATION AND MAINTENANCE MANUALS

Submit 6 copies of the project operation and maintenance manuals 30 calendar days prior to testing the system involved. Update and resubmit data for final approval no later than 30 calendar days prior to contract completion.

1.7.1 Configuration

Operation and Maintenance Manuals must be consistent with the manufacturer's standard brochures, schematics, printed instructions, general operating procedures, and safety precautions. Bind information in manual format and grouped by technical sections. Test data must be legible and of good quality. Light-sensitive reproduction techniques are acceptable provided finished pages are clear, legible, and not subject to fading. Pages for vendor data and manuals must have 0.3937-inch holes and be bound in 3-ring, loose-leaf binders. Organize data by separate index and tabbed sheets, in a loose-leaf binder. Binder must lie flat with printed sheets that are easy to read. Caution and warning indications must be clearly labeled.

1.7.2 Training and Instruction

Submit classroom and field instructions in the operation and maintenance of systems equipment where required by the technical provisions. These services must be directed by the Contractor, using the manufacturer's factory-trained personnel or qualified representatives. Contracting Officer will be given 7 calendar days written notice of scheduled instructional services. Instructional materials belonging to the manufacturer or vendor, such as lists, static exhibits, and visual aids, must be made available to the Contracting Officer.

1.8 CLEANUP

Provide final cleaning in accordance with ASTM E1971 and submit two copies of the listing of completed final clean-up items. Leave premises "broom clean." Comply with GS-37 for general purpose cleaning and

bathroom cleaning. Use only nonhazardous cleaning materials, including natural cleaning materials, in the final cleanup. Remove waste and surplus materials, rubbish and construction facilities from the site. Recycle, salvage, and return construction and demolition waste from project in accordance with the Waste Management Plan. Promptly and legally transport and dispose of any trash. Do not burn, bury, or otherwise dispose of trash on the project site.

#### 1.9 REAL PROPERTY RECORD

Near the completion of Project, but a minimum of 60 days prior to final acceptance of the work, complete and submit an accounting of all installed property with Interim Form DD1354 "Transfer and Acceptance of Military Real Property." Include any additional assets/improvements/alterations from the Draft DD Form 1354. Contact the Contracting Officer for any project specific information necessary to complete the DD Form 1354. Refer to UFC 1-300-08 for instruction on completing the DD Form 1354. For information purposes, a blank DD Form 1354 (fill-able) in ADOBE (PDF) may be obtained at the following web site:

<http://www.dtic.mil/whs/directives/infomgt/forms/eforms/dd1354.pdf>

Submit the completed Checklist for Form DD1354 of Installed Building Equipment items. Attach this list to the updated DD Form 1354.

#### 1.10 NAVFAC SUSTAINABLE & ENERGY DATA RECORD CARD

Within 60 days of the completion of Project, complete an electronic copy of the NAVFAC Sustainable & Energy Data Record Card, and submit to the Contracting Officer. Draft Record card for this project should be available from Designer of Record (DOR) or Contracting Officer. Instructions and a blank DD Form (fill-able) in ADOBE (PDF) may be obtained at the Whole Building Design Guide web site by navigating: Home > Participating Agencies > Department of Defense (DoD) > NAVFAC Sustainable Development Program > Contract Documents > NAVFAC Sustainable & Energy Data Record Card; or directly at [http://www.wbdg.org/pdfs/navfac\\_sustainable\\_energy\\_data\\_record\\_card.pdf](http://www.wbdg.org/pdfs/navfac_sustainable_energy_data_record_card.pdf).

#### PART 2 PRODUCTS

Not Used

#### PART 3 EXECUTION

Not Used

-- End of Section --

## SECTION 01 78 23

## OPERATION AND MAINTENANCE DATA

## 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 within the text by the basic designation only.

## ASTM INTERNATIONAL (ASTM)

ASTM E1971 (2005; R 2011) Stewardship for the Cleaning of Commercial and Institutional Buildings

## 1.2 SUBMISSION OF OPERATION AND MAINTENANCE DATA

Submit Operation and Maintenance (O&M) Data specifically applicable to this contract and a complete and concise depiction of the provided equipment, product, or system, stressing and enhancing the importance of system interactions, troubleshooting, and long-term preventative maintenance and operation. The subcontractors must compile and prepare data and deliver to the Contractor prior to the training of Government personnel. The Contractor must compile and prepare aggregate O&M data including clarifying and updating the original sequences of operation to as-built conditions. Organize and present information in sufficient detail to clearly explain O&M requirements at the system, equipment, component, and subassembly level. Include an index preceding each submittal. Submit in accordance with this section and Section 01 33 00 SUBMITTAL PROCEDURES.

## 1.2.1 Package Quality

Documents must be fully legible. Poor quality copies and material with hole punches obliterating the text or drawings will not be accepted.

## 1.2.2 Package Content

Comply with the data package requirements specified in the individual technical sections, including the content of the packages and addressing each product, component, and system designated for data package submission, except as follows.

## 1.2.3 Changes to Submittals

Manufacturer-originated changes or revisions to submitted data must be furnished by the Contractor if a component of an item is so affected subsequent to acceptance of the O&M Data. Submit changes, additions, or revisions required by the Contracting Officer for final acceptance of submitted data within 30 calendar days of the notification of this change requirement.

#### 1.2.4 O&M Database

Develop a database from the O&M manuals that contains the information required to start a preventative maintenance program.

### 1.3 TYPES OF INFORMATION REQUIRED IN O&M DATA PACKAGES

#### 1.3.1 Operating Instructions

Include specific instructions, procedures, and illustrations for the following phases of operation for the installed model and features of each system:

##### 1.3.1.1 Safety Precautions

List personnel hazards and equipment or product safety precautions for all operating conditions.

##### 1.3.1.2 Operator Prestart

Include procedures required to install, set up, and prepare each system for use.

##### 1.3.1.3 Startup, Shutdown, and Post-Shutdown Procedures

Provide narrative description for Startup, Shutdown and Post-shutdown operating procedures including the control sequence for each procedure.

##### 1.3.1.4 Normal Operations

Provide narrative description of Normal Operating Procedures. Include Control Diagrams with data to explain operation and control of systems and specific equipment.

##### 1.3.1.5 Emergency Operations

Include Emergency Procedures for equipment malfunctions to permit a short period of continued operation or to shut down the equipment to prevent further damage to systems and equipment. Include Emergency Shutdown Instructions for fire, explosion, spills, or other foreseeable contingencies. Provide guidance and procedures for emergency operation of all utility systems including required valve positions, valve locations and zones or portions of systems controlled.

##### 1.3.1.6 Operator Service Requirements

Include instructions for services to be performed by the operator such as lubrication, adjustment, inspection, and recording gage readings.

##### 1.3.1.7 Environmental Conditions

Include a list of Environmental Conditions (temperature, humidity, and other relevant data) that are best suited for the operation of each product, component or system. Describe conditions under which the item equipment should not be allowed to run.

#### 1.3.2 Preventive Maintenance

Include the following information for preventive and scheduled maintenance

to minimize corrective maintenance and repair for the installed model and features of each system. Include potential environmental and indoor air quality impacts of recommended maintenance procedures and materials.

#### 1.3.2.1 Lubrication Data

Include preventative maintenance lubrication data, in addition to instructions for lubrication provided under paragraph titled "Operator Service Requirements":

- a. A table showing recommended lubricants for specific temperature ranges and applications.
- b. Charts with a schematic diagram of the equipment showing lubrication points, recommended types and grades of lubricants, and capacities.
- c. A Lubrication Schedule showing service interval frequency.

#### 1.3.2.2 Preventive Maintenance Plan and Schedule

Include manufacturer's schedule for routine preventive maintenance, inspections, tests and adjustments required to ensure proper and economical operation and to minimize corrective maintenance. Provide manufacturer's projection of preventive maintenance work-hours on a daily, weekly, monthly, and annual basis including craft requirements by type of craft. For periodic calibrations, provide manufacturer's specified frequency and procedures for each separate operation.

#### 1.3.2.3 Cleaning Recommendations

Provide environmentally preferable cleaning recommendations in accordance with ASTM E1971.

#### 1.3.3 Corrective Maintenance (Repair)

Include manufacturer's recommended procedures and instructions for correcting problems and making repairs for the installed model and features of each system. Include potential environmental and indoor air quality impacts of recommended maintenance procedures and materials.

##### 1.3.3.1 Troubleshooting Guides and Diagnostic Techniques

Include step-by-step procedures to promptly isolate the cause of typical malfunctions. Describe clearly why the checkout is performed and what conditions are to be sought. Identify tests or inspections and test equipment required to determine whether parts and equipment may be reused or require replacement.

##### 1.3.3.2 Wiring Diagrams and Control Diagrams

Wiring diagrams and control diagrams shall be point-to-point drawings of wiring and control circuits including factory-field interfaces. Provide a complete and accurate depiction of the actual job specific wiring and control work. On diagrams, number electrical and electronic wiring and pneumatic control tubing and the terminals for each type, identically to actual installation configuration and numbering.

#### 1.3.3.3 Maintenance and Repair Procedures

Include instructions and a list of tools required to repair or restore the product or equipment to proper condition or operating standards.

#### 1.3.3.4 Removal and Replacement Instructions

Include step-by-step procedures and a list required tools and supplies for removal, replacement, disassembly, and assembly of components, assemblies, subassemblies, accessories, and attachments. Provide tolerances, dimensions, settings and adjustments required. Instructions shall include a combination of text and illustrations.

#### 1.3.3.5 Spare Parts and Supply Lists

Include lists of spare parts and supplies required for maintenance and repair to ensure continued service or operation without unreasonable delays. Special consideration is required for facilities at remote locations. List spare parts and supplies that have a long lead-time to obtain.

#### 1.3.4 Corrective Maintenance Work-Hours

Include manufacturer's projection of corrective maintenance work-hours including requirements by type of craft. Corrective maintenance that requires completion or participation of the equipment manufacturer shall be identified and tabulated separately.

#### 1.3.5 Appendices

Provide information required below and information not specified in the preceding paragraphs but pertinent to the maintenance or operation of the product or equipment. Include the following:

##### 1.3.5.1 Product Submittal Data

Provide a copy of all SD-03 Product Data submittals required in the applicable technical sections.

##### 1.3.5.2 Manufacturer's Instructions

Provide a copy of all SD-08 Manufacturer's Instructions submittals required in the applicable technical sections.

##### 1.3.5.3 O&M Submittal Data

Provide a copy of all SD-10 Operation and Maintenance Data submittals required in the applicable technical sections.

##### 1.3.5.4 Parts Identification

Provide identification and coverage for all parts of each component, assembly, subassembly, and accessory of the end items subject to replacement. Include special hardware requirements, such as requirement to use high-strength bolts and nuts. Identify parts by make, model, serial number, and source of supply to allow reordering without further identification. Provide clear and legible illustrations, drawings, and exploded views to enable easy identification of the items. When illustrations omit the part numbers and description, both the

illustrations and separate listing shall show the index, reference, or key number that will cross-reference the illustrated part to the listed part. Parts shown in the listings shall be grouped by components, assemblies, and subassemblies in accordance with the manufacturer's standard practice. Parts data may cover more than one model or series of equipment, components, assemblies, subassemblies, attachments, or accessories, such as typically shown in a master parts catalog

#### 1.3.5.5 Warranty Information

List and explain the various warranties and clearly identify the servicing and technical precautions prescribed by the manufacturers or contract documents in order to keep warranties in force. Include warranty information for primary components such as the compressor of air conditioning system.

#### 1.3.5.6 Personnel Training Requirements

Provide information available from the manufacturers that is needed for use in training designated personnel to properly operate and maintain the equipment and systems.

#### 1.3.5.7 Testing Equipment and Special Tool Information

Include information on test equipment required to perform specified tests and on special tools needed for the operation, maintenance, and repair of components.

#### 1.3.5.8 Testing and Performance Data

Include completed prefunctional checklists, functional performance test forms, and monitoring reports. Include recommended schedule for retesting and blank test forms.

#### 1.3.5.9 Contractor Information

Provide a list that includes the name, address, and telephone number of the General Contractor and each Subcontractor who installed the product or equipment, or system. For each item, also provide the name address and telephone number of the manufacturer's representative and service organization that can provide replacements most convenient to the project site. Provide the name, address, and telephone number of the product, equipment, and system manufacturers.

### 1.4 TYPES OF INFORMATION REQUIRED IN CONTROLS O&M DATA PACKAGES

Include Data Package 5 and the following for control systems:

- a. Narrative description on how to perform and apply all functions, features, modes, and other operations, including unoccupied operation, seasonal changeover, manual operation, and alarms. Include detailed technical manual for programming and customizing control loops and algorithms.
- b. Full as-built sequence of operations.
- c. Copies of all checkout tests and calibrations performed by the Contractor (not Cx tests).

- d. Full print out of all schedules and set points after testing and acceptance of the system.]
- e. Full as-built print out of software program.]
- f. Electronic File:
  - (1) Assemble each manual into a composite electronically indexed file in PDF format. Provide HDD's, DVD's or CD's as appropriate, so that each one contains all maintenance and record files, and also the Project Record Documents and Training Videos, of the entire program for this facility.
  - (2) Name each indexed document file in composite electronic index with applicable item name. Include a complete electronically linked operation and maintenance directory.
  - (3) Link the index to separate files within the composite of files. Book mark maintenance and record files, that have a Table of Contents, according to the Table of Contents]
- h. Marking of all system sensors and thermostats on the as-built floor plan and mechanical drawings with their control system designations.]

#### 1.5 SCHEDULE OF OPERATION AND MAINTENANCE DATA PACKAGES

Furnish the O&M data packages specified in individual technical sections. The required information for each O&M data package is as follows:

##### 1.5.1 Data Package 1

- a. Safety precautions
- b. Cleaning recommendations
- c. Maintenance and repair procedures
- d. Warranty information
- e. Contractor information
- f. Spare parts and supply list

##### 1.5.2 Data Package 2

- a. Safety precautions
- b. Normal operations
- c. Environmental conditions
- d. Lubrication data
- e. Preventive maintenance plan and schedule
- f. Cleaning recommendations
- g. Maintenance and repair procedures

- h. Removal and replacement instructions
- i. Spare parts and supply list
- j. Parts identification
- k. Warranty information
- l. Contractor information

#### 1.5.3 Data Package 3

- a. Safety precautions
- b. Operator prestart
- c. Startup, shutdown, and post-shutdown procedures
- d. Normal operations
- e. Emergency operations
- f. Environmental conditions
- g. Lubrication data
- h. Preventive maintenance plan and schedule
- i. Cleaning recommendations
- j. Troubleshooting guides and diagnostic techniques
- k. Wiring diagrams and control diagrams
- l. Maintenance and repair procedures
- m. Removal and replacement instructions
- n. Spare parts and supply list
- o. Product submittal data
- p. O&M submittal data
- q. Parts identification
- r. Warranty information
- s. Testing equipment and special tool information
- t. Testing and performance data
- u. Contractor information

#### 1.5.4 Data Package 4

- a. Safety precautions
- b. Operator prestart

- c. Startup, shutdown, and post-shutdown procedures
  - d. Normal operations
  - e. Emergency operations
  - f. Operator service requirements
  - g. Environmental conditions
  - h. Lubrication data
  - i. Preventive maintenance plan and schedule
  - j. Cleaning recommendations
  - k. Troubleshooting guides and diagnostic techniques
  - l. Wiring diagrams and control diagrams
  - m. Maintenance and repair procedures
  - n. Removal and replacement instructions
  - o. Spare parts and supply list
  - p. Corrective maintenance man-hours
  - q. Product submittal data
  - r. O&M submittal data
  - s. Parts identification
  - t. Warranty information
  - u. Personnel training requirements
  - v. Testing equipment and special tool information
  - w. Testing and performance data
  - x. Contractor information
- 1.5.5 Data Package 5
- a. Safety precautions
  - b. Operator prestart
  - c. Start-up, shutdown, and post-shutdown procedures
  - d. Normal operations
  - e. Environmental conditions
  - f. Preventive maintenance plan and schedule

- g. Troubleshooting guides and diagnostic techniques
- h. Wiring and control diagrams
- i. Maintenance and repair procedures
- j. Removal and replacement instructions
- k. Spare parts and supply list
- l. Product submittal data
- m. Manufacturer's instructions
- n. O&M submittal data
- o. Parts identification
- p. Testing equipment and special tool information
- q. Warranty information
- r. Testing and performance data
- s. Contractor information

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

-- End of Section --

## SECTION 01 78 24.00 20

## FACILITY ELECTRONIC OPERATION AND MAINTENANCE SUPPORT INFORMATION (eOMSIS)

## PART 1 GENERAL

## 1.1 DEFINITIONS AND ABBREVIATIONS

## 1.1.1 eOMSIS Manual

Manual (PDF file) provided by the Contractor that includes, but is not limited to, product information, a facility description with photos, and a list of primary facility systems.

## 1.1.2 Systems

The words "system", "systems", and "equipment", when used in this document refer to as-built systems and equipment.

## 1.1.3 Computer Assisted Design and Drafting (CADD)

Electronic Computer Assisted Design and Drafting graphic software program that is used to create facility design contract documents and Record Drawings.

## 1.1.4 KTR

An abbreviation for "Contractor."

## 1.2 EOMSIS MEETINGS

## 1.2.1 Pre-Construction Meeting

Be prepared to discuss the following during this meeting:

- a. eOMSIS Manual Development Meetings
- b. Processes and methods of gathering eOMSIS Manual information during construction.
- c. The eOMSIS Submittals schedule. Include the eOMSIS submittal schedule on the Baseline Construction Schedule in accordance with Section 01 32 17.00 20 NETWORK ANALYSIS SCHEDULE (NAS).

## 1.2.2 eOMSIS Manual Coordination and Mutual Understanding Meeting

Facilitate a meeting after the Pre-Construction Meeting prior to the submission of the eOMSIS Progress Submittal. Meeting attendance must include the Contractor's eOMSIS Manual Preparer, and Quality Control Manager, and the Government's Design Manager (DM), Contracting Officer's Representative, and NAVFAC Public Works (PW) Facilities Management Specialist (FMS). Also include the Mechanical, Electrical, and Fire Protection Sub-Contractors as required.

The purpose of this meeting is to reach a mutual understanding of the scope of work concerning the contract requirements for eOMSIS and coordinate the efforts necessary by both the Government and Contractor to

ensure an accurate collection, preparation and timely Government review of eOMSI.

### 1.3 SUBMITTAL SCHEDULING

#### 1.3.1 eOMSI, Progress Submittal

Submit the Progress submittal when construction is approximately 50 percent complete, to the Contracting Officer for approval. Provide eOMSI Manual Files (Bookmarked PDF). Include all elements and portions of system construction completed up to this point.

The purpose of this submittal is to verify progress is in accordance with contract requirements as discussed during the eOMSI Coordination and Mutual Understanding Meeting. Field verify a portion of the eOMSI information.

#### 1.3.2 eOMSI, Prefinal Submittal

Submit the 100 percent submittal of the eOMSI Prefinal Submittal to the Contracting Officer for approval within 90 calendar days of the Beneficial Occupancy Date (BOD). This submittal must provide a complete, working document that can be used to operate and maintain the facility. Any portion of the submittal that is incomplete or inaccurate requires the entire submittal to be returned for correction. Any discrepancies discovered during the Government's review of eOMSI Progress submittal must be corrected prior to the Prefinal submission.

The eOMSI Prefinal Submittal must include eOMSI Manual Files (Bookmarked PDF).

#### 1.3.3 eOMSI, Final Submittal

Submit completed eOMSI Manual Files (Bookmarked PDF). The Final submittal is due at BOD. Any discrepancies discovered during the Government's review of the Prefinal eOMSI submittal, including the Field Verification, must be corrected prior to the Final eOMSI submission.

### 1.4 UNITS OF MEASURE

Provide eOMSI utilizing the units of measure used in the Government created contract documents.

### 1.5 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

#### SD-11 Closeout Submittals

eOMSI, Progress Submittal; G

eOMSI, Prefinal Submittal; G

eOMSI, Final Submittal; G

## PART 2 PRODUCTS

### 2.1 eOMSI FILES FORMAT

Scan eOMSI Manual Files for malicious viruses using a commercially available scanning program that is routinely updated to identify and remove current virus threats.

Provide four electronic copies to the Contracting Officer for approval, for each submittal required. Provide eOMSI Manual files on CD or data DVD disks using the most current version of Adobe Acrobat or similar software capable of producing PDF files.

#### 2.1.1 eOMSI Manual Organization

Organize the eOMSI Manuals into three parts: 1) Product and Drawing Information, 2) Facility Information, and 3) Primary Systems. Bookmark the PDF files for easy access to the information.

- a. Bookmark Facility Information and Primary Systems to at least one level lower than the major system.
- b. Bookmark Product and Drawing Information documents using the current version of CSI Masterformat numbering system, and arrange submittals using the specification sections as a structure. Use CSI Masterformat and UFGS numbers along with descriptive bookmarked titles that explain the content of the information that is being bookmarked.

#### 2.1.2 eOMSI Manual Compact Disk Label and Disk Holder or Case

Provide the following information on the compact disk label and disk holder or case:

- a. Project Title
- b. Activity and Location
- c. Construction Contract Number
- d. Prepared For: (Contracting Agency)
- e. Prepared By: (Name, title, phone number and email address)
- f. Include the compact disk content on the disk label
- g. Date
- h. Virus scanning program used

### 2.2 EOMSI MANUAL

#### 2.2.1 Product and Drawing Information

Provide an organized record of the facility products, materials, equipment, and minimum information necessary to operate the facility. Provide Product and Drawing Information for all systems in the final constructed facility, including the anticipated critical systems identified in this specification section. Organize and bookmark the information for easy access and quick retrieval.

#### 2.2.1.1 O&M Data

As a minimum, include the O&M Data, submitted in the technical specification sections, and in accordance with Section 01 78 23 OPERATION AND MAINTENANCE DATA. Provide the following for each product, material, and system on the project:

- a. Materials
- b. Equipment
- c. Data Sheets
- d. Test Reports
- e. Warranties
- f. Certificates
- g. Shop Drawings

#### 2.2.1.2 Utility Record Drawings

Edit original CADD drawings to eliminate unneeded information, to show and document details of the actual installation of the utility systems; annotate and highlight the eOMSI information. Provide in PDF format. Provide the following drawings at a large enough scale to be clear, legible, and able to differentiate designated isolation units from surrounding valves and switches.

#### 2.2.1.3 Record Drawings

Provide an electronic copy of the Record Drawings, as specified in Section 01 78 23 CLOSEOUT SUBMITTALS, for the project in PDF format. Bookmark all drawings using the sheet title and sheet number.

### PART 3 EXECUTION

-- End of Section --

## SECTION 02 56 13

## GEOMEMBRANE

## 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 within the text by the basic designation only.

## ASTM INTERNATIONAL (ASTM)

ASTM D 1004	(2009) Initial Tear Resistance of Plastic Film and Sheeting
ASTM D 1505	(2010) Density of Plastics by the Density-Gradient Technique
ASTM D 1603	(2006) Carbon Black Content in Olefin Plastics
ASTM D 3895	(2007) Oxidative-Induction Time of Polyolefins by Differential Scanning Calorimetry
ASTM D 4833	(2007) Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products
ASTM D 5596	(2003; R 2009) Microscopic Evaluation of the Dispersion of Carbon Black in Polyolefin Geosynthetics
ASTM D 5994	(2010) Measuring Core Thickness of Textured Geomembrane
ASTM D 6392	(2008) Determining the Integrity of Nonreinforced Geomembrane Seams Produced Using Thermo-Fusion Methods
ASTM D 6497	(2002; R 2010) Mechanical Attachment of Geomembrane to Penetrations or Structures
ASTM D 6693	(2010) Standard Test Method for Determining Tensile Properties of Nonreinforced Polyethylene and Nonreinforced Flexible Propylene Geomembranes
ASTM D 7466	(2010) Standard Test Method for Measuring the Asperity Height of Textured Geomembrane

## GEOSYNTHETIC INSTITUTE (GSI)

GSI GRI GM7

(1995) Accelerated Curing of Geomembrane  
Test Strip Seams Made by Chemical Fusion  
Methods

## 1.2 SUBMITTAL REQUIREMENTS

Submit manufacturer's, and fabricator's qualification statements, including resumes of key personnel involved in the project, a minimum of 7 days prior to geomembrane shipment. Also submit installer's, QC inspector's, and QC laboratory's qualification statements including resumes of key personnel involved in the project a minimum of 7 days prior to geomembrane placement. The submittal from the QC laboratory shall include verification that the laboratory is accredited via the Geosynthetic Accreditation Institute's Laboratory Accreditation Program (GAI-LAP) for the tests the QC laboratory will be required to perform. The following shall also be submitted:

- a. Final as-built drawings of the geomembrane installation shall be prepared. These drawings shall include panel numbers, seam numbers, location of repairs, destructive seam samples, and penetrations. Furnish geomembrane panel layout and penetration detail drawings, a minimum of 7 days prior to geomembrane placement.
- b. Manufacturer's and fabricator's QC manuals, a minimum of 7 days prior to geomembrane shipment. Installer's QC manual, a minimum of 7 days prior to geomembrane placement.
- c. Geomembrane QA and QC samples. The Contractor shall also collect samples from Government provided geomembrane for laboratory QA/QC testing and reporting.
- d. Manufacturer's certified raw and sheet material test reports and a copy of the QC certificates, a minimum of 7 days prior to shipment of geomembrane to the site.
- e. Certification from the QC inspector and installer of the acceptability of the surface on which the geomembrane is to be placed, immediately prior to geomembrane placement.
- f. QC inspector certified test results on all field seams. Installer and certified QC laboratory test results on all destructively tested field seams. QC inspector certified test results on all repaired seams. Certified QC test results.
- g. Manufacturer's interface friction test results with different types of sand should be provided a minimum of 7 days prior to geomembrane shipment.

## 1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. The following shall be submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings  
 Penetrations; G  
 Panel Layout; G  
 As-Built Drawings; G

## SD-03 Product Data

Tests, Inspections, and Verifications; G  
Field Seaming; G  
Qualifications; G

## SD-04 Samples

Samples

## SD-06 Test Reports

Materials; G  
Surface Preparation; G  
Non-Destructive Field Seam Continuity Testing; G  
Destructive Field Seam Testing; G  
Destructive Seam Test Repairs; G  
Interface Friction Testing; G

## SD-07 Certificates

Samples  
Materials; G  
Surface Preparation; G  
Destructive Field Seam Testing; G  
Destructive Seam Test Repairs; G  
Interface Friction Testing; G

## 1.4 QUALIFICATIONS

## 1.4.1 Manufacturer

Manufacturer shall have produced the proposed geomembrane sheets for at least 5 completed projects having a total minimum area of 929,000 square meter (10 million square feet).

## 1.4.2 Fabricator

The fabricator is responsible for seaming geomembrane sheets into panels. Fabricator shall have fabricated the proposed geomembrane panels for at least 5 completed projects having a total minimum area of 186,000 square meter (2 million square feet).

## 1.4.3 Installer

The installer is responsible for field handling, deploying, seaming, anchoring (if required), and field Quality Control (QC) testing of the geomembrane. The installer shall have installed the proposed geomembrane material for at least 5 completed projects having a total minimum area of 186,000 square meter (2 million square feet). At least one seamer shall have experience seaming a minimum of 46,500 square meter (500,000 square feet) of the proposed geomembrane using the same type of seaming equipment and geomembrane thickness specified for this project.

## 1.4.4 QC Inspector

The QC inspector is the person or corporation hired by the Contractor, who is responsible for monitoring and documenting activities related to the QC of the geomembrane from manufacturing through installation. The QC inspector shall have provided QC inspection during installation of the proposed geomembrane material for at least 5 completed projects having a total minimum area of 186,000 square meter (2 million square feet).

#### 1.4.5 QC Laboratory

The QC laboratory shall have provided QC and/or Quality Assurance (QA) testing of the proposed geomembrane and geomembrane seams for at least five completed projects having a total minimum area of 186,000 square meter (2 million square feet). The QC laboratory shall be accredited via the Geosynthetic Accreditation Institute's Laboratory Accreditation Program (GAI-LAP) for the tests the QC laboratory will be required to perform.

### 1.5 DELIVERY, STORAGE AND HANDLING

#### 1.5.1 Delivery

The QC inspector shall be present during delivery and unloading of the geomembrane. Each geomembrane roll/panel shall be labeled with the manufacturer's name, product identification number, roll/panel number, and roll dimensions.

#### 1.5.2 Storage

Temporary storage at the project site shall be on a level surface, free of sharp objects where water cannot accumulate. The geomembrane shall be protected from puncture, abrasion, excessive heat or cold, material degradation, or other damaging circumstances. Storage shall not result in crushing the core of roll goods or flattening of the rolls. Rolls shall not be stored more than two high. Palleted materials shall be stored on level surfaces and shall not be stacked on top of one another. Damaged geomembrane shall be removed from the site and replaced with geomembrane that meets the specified requirements.

#### 1.5.3 Handling

Rolls/panels shall not be dragged, lifted by one end, or dropped. A pipe or solid bar, of sufficient strength to support the full weight of a roll without significant bending, shall be used for all handling activities. The diameter of the pipe or solid bar shall be small enough to be easily inserted through the core of the roll. Chains shall be used to link the ends of the pipe or bar to the ends of a spreader bar. The spreader bar shall be wide enough to prevent the chains from rubbing against the ends of the roll. Alternatively, a stinger bar protruding from the end of a forklift or other equipment may be used. The stinger bar shall be at least three-fourths the length of the core and also must be capable of supporting the full weight of the roll without significant bending. If recommended by the manufacturer, a sling handling method utilizing appropriate loading straps may be used.

### 1.6 AMBIENT CONDITIONS

Geomembrane shall not be deployed or field-seamed in the presence of excess moisture (i.e., rain, fog, dew), in areas of ponded water, or in the presence of excess wind. Unless authorized by the Contracting Officer, no placement or seaming shall be attempted at ambient temperatures above 40 degree centigrade (104 degrees F). Ambient temperature shall be measured at a height no greater than 0.15 meters (6 inches) above the ground or geomembrane surface. In marginal conditions, seaming shall cease unless destructive field seam tests, conducted by the QC laboratory, confirm that seam properties meet the requirements. Tests shall be conducted in accordance with paragraph Destructive Field Seam Testing.

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 Raw Materials

Resin used in manufacturing geomembrane sheets shall be made of virgin uncontaminated ingredients. No more than 10 percent regrind, reworked, or trim material in the form of chips or edge strips shall be used to manufacture the geomembrane sheets. All regrind, reworked, or trim materials shall be from the same manufacturer and exactly the same formulation as the geomembrane sheet being produced. No post consumer materials or water-soluble ingredients shall be used to produce the geomembrane. For geomembranes with plasticizers, only primary plasticizers that are resistant to migration shall be used. Submit a copy of the test reports and QC certificates for materials used in the manufacturing of the geomembrane shipped to the site.

2.1.2 Sheet Materials

Geomembrane sheets shall be manufactured as wide as possible to minimize factory and field seams. Geomembrane sheets shall be uniform in color, thickness, and surface texture. The textured surface features shall consist of raw materials identical to that of the parent sheet material and shall be uniform over the entire face of the geomembrane. The sheets shall be free of and resistant to fungal or bacterial attack and free of cuts, abrasions, holes, blisters, contaminants and other imperfections. Geomembrane sheets and factory seams shall conform to the requirements listed in Tables below for Manufacturing Quality Control (MQC).

TABLE 1. DOUBLE TEXTURED HDPE GEOMEMBRANE PROPERTIES

PROPERTY	TEST VALUE	MQC TESTING FREQUENCY (MIN.)	TEST METHOD
Nominal Thickness	1.5 mm (60 mils)		
Thickness (min ave)	-10 percent of nominal	per roll	ASTM D 5994
Asperity Height (min ave)	0.40 mm (16 mils)	every other roll	ASTM D 7466
Density (min)	0.94 g/cc (58.7 lb/ft <sup>3</sup> )	per 890,000 N (200,000 lb)	ASTM D 1505
Tensile Properties (min ave)		per 89,000 N (20,000 lb)	ASTM D 6693
-Strength at Break	N/mm (lb/inch-width)	16 (90)	
-Strength at Yield	N/mm (lb/inch-width)	22 (126)	
-Elongation at Break, %		100 percent	
-Elongation at Yield, %		12 percent	

TABLE 1. DOUBLE TEXTURED HDPE GEOMEMBRANE PROPERTIES

PROPERTY	TEST VALUE	MQC TESTING FREQUENCY MIN.)	TEST METHOD
Tear Resistance	187 N(42 lb)	per 200,000 N (45,000 lb)	ASTM D 1004
Puncture Resistance	400 N (90 lb)	per 200,000 N (45,000 lb)	ASTM D 4833
Carbon Black Content	2.0-3.0 percent	per 89,000 N (20,000 lb)	ASTM D 1603
Carbon Black Dispersion	Note (1)	per 200,000 N (45,000 lb)	ASTM D 5596
Oxidative Induction Time (OIT) (min ave) -Std OIT	>100 min	per 890,000 N (200,000 lb)	ASTM D 3895

MQC = Manufacturing Quality Control

Note (1): Carbon black dispersion (only near spherical agglomerates) for 10 different views: 9 in Categories 1 or 2 and 1 in Category 3.

TABLE 2. HDPE SEAM PROPERTIES

PROPERTY	TEST VALUE	TEST METHOD
Seam Shear Strength (min) (1)	21 N/mm (120 lb/in)	ASTM D 6392
Seam Peel Strength (min) (1) (2)	15.94 N/mm (91 lb/in)	ASTM D 6392

Note (1): Seam tests for peel and shear must fail in the Film Tear Bond mode. This is a failure in the ductile mode of one of the bonded sheets by tearing or breaking prior to complete separation of the bonded area.

Note (2): Where applicable, both tracks of a double hot wedge seam shall be tested for peel adhesion.

TABLE 3. DOUBLE TEXTURED LLDPE GEOMEMBRANE PROPERTIES

PROPERTY	TEST VALUE	MQC TESTING FREQUENCY MIN.)	TEST METHOD
Nominal Thickness	1 mm (40 mils)		
Thickness	-10 percent	per roll	ASTM D 5994

TABLE 3. DOUBLE TEXTURED LLDPE GEOMEMBRANE PROPERTIES

PROPERTY	TEST VALUE	TEST METHOD
(min ave)	of nominal	
Asperity Height (min ave)	0.40 mm (16 mils)	every other roll
Density (min)	0.939 g/cc (58.6 lb/ft <sup>3</sup> )	per 890,000 N (200,000 lb)
Tensile Properties (min ave)		per 89,000 N (20,000 lb)
-Strength at Break	N/mm (lb/inch-width)	11 (60)
-Elongation at Break, %		250 percent
Tear Resistance (min ave)	100 N(22 lb)	per 200,000 N (45,000 lb)
Puncture Resistance (min ave)	200 N (44 lb)	per 200,000 N (45,000 lb)
Carbon Black Content	2.0-3.0 percent	per 89,000 N (20,000 lb)
Carbon Black Dispersion	Note (1)	per 200,000 N (45,000 lb)
Oxidative Induction Time (OIT) (min ave) (5) -Std OIT	>100 min	per 890,000 N (200,000 lb)

MQC = Manufacturing Quality Control

Note (1): Carbon black dispersion (only near spherical agglomerates) for 10 different views: 9 in Categories 1 or 2 and 1 in Category 3.

TABLE 4. LLDPE SEAM PROPERTIES

PROPERTY	TEST VALUE	TEST METHOD
Seam Shear Strength (min) (1)	10.5 N/mm (60 lb/in)	ASTM D 6392
Seam Peel Strength (min) (1) (2)	8.75 N/mm (50 lb/in)	ASTM D 6392

Note (1): Seam tests for peel and shear must fail in the Film Tear Bond mode. This is a failure in the ductile mode of one of the bonded sheets by tearing or breaking prior to complete separation of the bonded area.

Note (2): Where applicable, both tracks of a double hot wedge seam shall be tested for peel adhesion.

### 2.1.3 Factory Seams

Geomembrane sheets shall be factory seamed into maximum sized panels to minimize field seaming. Factory seaming shall be by methods approved by the geomembrane manufacturer. Seams shall meet the minimum shear and peel strength requirements shown in Tables 2 and 4. Factory seams shall extend to the end of the sheet so that no unbonded edges greater than 0.003 m (1/8 inch) wide are present.

## 2.2 TESTS, INSPECTIONS, AND VERIFICATIONS

### 2.2.1 Interface Friction Testing

Manufacturer would provide interface friction test results with different types of sand.

### 2.2.2 Manufacturing, Sampling, and Testing

#### 2.2.2.1 Raw Materials

Raw materials shall be tested in accordance with the approved MQC manual. Any raw material which fails to meet the geomembrane manufacturer's specified physical properties shall not be used in manufacturing the sheet. Seaming rods and pellets shall be manufactured of materials which are essentially identical to that used in the geomembrane sheet. Seaming rods and pellets shall be tested for density, melt index and carbon black content in accordance with the approved MQC manual. Seaming rods and pellets which fail to meet the corresponding property values required for the sheet material, shall not be used for seaming.

#### 2.2.2.2 Sheet Material

Geomembrane sheets shall be tested in accordance with the approved MQC manual. As a minimum, MQC testing shall be conducted at the frequencies shown in Tables 1 and 3. Sheets not meeting the minimum requirements specified in Tables 1 and 3 shall not be sent to the site.

## 2.3 EQUIPMENT

Equipment used in performance of the work shall be in accordance with the geomembrane manufacturer's recommendations and shall be maintained in satisfactory working condition.

## PART 3 EXECUTION

### 3.1 PREPARATION

#### 3.1.1 Surface Preparation

Surface preparation shall be performed in accordance with Section 31 00 00 EARTHWORK. Rocks larger than 0.01 m (1/2 inch) in diameter and any other material which could damage the geomembrane shall be removed from the surface to be covered with the geomembrane. Construction equipment tire or track deformations beneath the geomembrane shall not be greater than 0.025 m (1.0 inch) in depth. Each day during placement of geomembrane,

the QC Inspector and installer shall inspect the surface on which geomembrane is to be placed and certify in writing that the surface is acceptable. Repairs to the subgrade shall be performed at no additional cost to the Government.

### 3.2 GEOMEMBRANE DEPLOYMENT

The procedures and equipment used shall not elongate, wrinkle, scratch, or otherwise damage the geomembrane, other geosynthetic layers, or the underlying subgrade. Geomembrane damaged during installation shall be replaced or repaired, at the QC inspector's discretion. Only geomembrane panels that can be anchored (if required) and seamed together the same day shall be deployed. Adequate ballast (i.e., sand bags) shall be placed on the geomembrane, without damaging the geomembrane, to prevent uplift by wind. No equipment shall be operated on the top surface of the geomembrane without permission from the Contracting Officer. Seams shall be oriented parallel to the line of maximum slope. Where seams can only be oriented across the slope, the upper panel shall be lapped over the lower panel. The methods used to deploy and backfill over the geomembrane shall minimize wrinkles and tensile stresses in the geomembrane. The geomembrane shall have adequate slack to prevent the creation of tensile stress. The wrinkle height to width ratio for installed geomembrane shall not exceed 0.5. In addition, geomembrane wrinkles shall not exceed 0.15 m (6 inches) in height. Wrinkles that do not meet the above criteria shall be cut out and repaired in accordance with the installer's approved QC manual.

### 3.3 FIELD SEAMING

#### 3.3.1 Trial Seams

Trial seams shall be made under field conditions on strips of excess geomembrane. Trial seams shall be made each day prior to production seaming, whenever there is a change in seaming personnel or seaming equipment and at least once every four hours, by each seamer and each piece of seaming equipment used that day. Trial seam samples shall be collected and tested in accordance with ASTM D 6392. One sample shall be obtained from each trial seam. This sample shall be at least 0.9 m long by 0.3 m wide (36 inches long by 12 inches wide) with the seam centered lengthwise. Ten random specimens 0.025 m (1 inch) wide shall be cut from the sample. Five seam specimens shall be field tested for shear strength and 5 seam specimens shall be field tested for peel adhesion using an approved quantitative tensiometer. Where necessary, accelerated curing of trial seams made by chemical methods shall be conducted in accordance with GSI GRI GM7. To be acceptable, 4 out of 5 replicate test specimens shall meet seam strength requirements specified in Table 2. If the field tests fail to meet these requirements, the entire operation shall be repeated. If the additional trial seam fails, the seaming apparatus or seamer shall not be used until the deficiencies are corrected by the installer and 2 consecutive successful trial seams are achieved.

#### 3.3.2 Field Seams

Panels shall be seamed in accordance with the geomembrane manufacturer's recommendations. In sumps, corners and odd-shaped geometric locations, the number of field seams shall be minimized. Seaming shall extend to the outside edge of panels. Soft subgrades shall be compacted and approved prior to seaming. The seam area shall be free of moisture, dust, dirt, and foreign material at the time of seaming. Fish mouths in seams shall

be repaired.

#### 3.3.2.1 Polyethylene Seams

Polyethylene geomembranes shall be seamed by thermal fusion methods. Extrusion welding shall only be used for patching and seaming in locations where thermal fusion methods are not feasible. Seam overlaps that are to be attached using extrusion welds shall be ground prior to welding. Grinding marks shall be oriented perpendicular to the seam direction and no marks shall extend beyond the extrudate after placement. Extrusion welding shall begin within 10 minutes after grinding. Where extrusion welds are temporarily terminated long enough to cool, they shall be ground prior to applying new extrudate over the existing seam. The total depth of the grinding marks shall be no greater than 10 percent of the sheet thickness.

#### 3.4 SAMPLES

One QC sample, 0.46 m (18 inches) in length, for the entire width of a roll, shall be obtained for every 9,290 square square m (100,000 square feet) of material delivered to the site. Samples shall not be obtained from the first three feet of the roll. For accordion folded geomembranes, samples of equivalent size shall be collected from approved locations. The samples shall be identified by manufacturer's name, product identification, lot and roll/panel number. The date, a unique sample number, and the machine direction shall also be noted. In addition, a 0.3 m by 0.3 m (12 inch by 12 inch) QA sample shall be collected, labeled, and submitted to the Contracting Officer each time QC samples are collected.

#### 3.5 TESTS

Provide all QC samples to the QC laboratory to determine density, thickness, tensile strength at break, and elongation at break in accordance with the methods specified in Tables 1 and 3. Samples not meeting the specified requirements shall result in the rejection of applicable rolls/panels. As a minimum, rolls/panels produced immediately prior to and immediately after the failed roll/panel shall be tested for the same failed parameter. Testing shall continue until a minimum of three successive rolls/panels on both sides of the original failing roll/panel pass the failed parameter.

##### 3.5.1 Non-Destructive Field Seam Continuity Testing

Field seams shall be non-destructively tested for continuity over their full length in accordance with the installer's approved QC manual. Seam testing shall be performed as the seaming work progresses, not at the completion of field seaming. Any seams which fail shall be documented and repaired in accordance with the installer's approved QC manual.

##### 3.5.2 Destructive Field Seam Testing

A minimum of one destructive test sample per 229 m(750 feet) of field seam shall be obtained if requested by the Contracting Officer . Sample locations shall not be identified prior to seaming. Samples shall be a minimum of 0.3 m wide by 1.07 m long (12 inches wide by 42 inches long) with the seam centered lengthwise. Each sample shall be cut into 3 equal pieces, with one piece retained by the installer, one piece given to the QC laboratory, and the remaining piece given to the Contracting Officer for QA testing and/or permanent record. Each sample shall be numbered and

cross referenced to a field log which identifies: (1) panel number; (2) seam number; (3) date and time cut; (4) ambient temperature within 0.15 m (6 inches) above the geomembrane; (5) seaming unit designation; (6) name of seamer; and (7) seaming apparatus temperature and pressures (where applicable). Ten 0.025 m wide (1 inch wide) replicate specimens shall be cut from the installer's sample. Five specimens shall be tested for shear strength and 5 for peel adhesion using an approved field quantitative tensiometer. Jaw separation speed shall be in accordance with the approved QC manual. To be acceptable, 4 out of 5 replicate test specimens shall meet the seam strength requirements specified in Table 2. If the field tests pass, 5 specimens shall be tested at the QC laboratory for shear strength and 5 for peel adhesion in accordance with the QC laboratory's approved procedures. To be acceptable, 4 out of 5 replicate test specimens shall meet the seam strength requirements specified in Table 2. If the field or laboratory tests fail, the seam shall be repaired in accordance with paragraph Destructive Seam Test Repairs. Holes for destructive seam samples shall be repaired the same day they are cut.

The strength of the seam that joins the 40 mils LLDPE and the 60 mils HDPE shall be no less than that joins two pieces of 40 mils LLDPE geomembrane.

### 3.6 DEFECTS AND REPAIRS

#### 3.6.1 Destructive Seam Test Repairs

Seams that fail destructive seam testing may be overlaid with a strip of new material and seamed (cap stripped). Alternatively, the seaming path shall be retraced to an intermediate location a minimum of 3 m (10 feet) on each side of the failed seam location. At each location a 0.3 by 0.46 m (12 by 18 inch) minimum size seam sample shall be taken for 2 additional shear strength and 2 additional peel adhesion tests using an approved quantitative field tensiometer. If these tests pass, then the remaining seam sample portion shall be sent to the QC laboratory for 5 shear strength and 5 peel adhesion tests in accordance with the QC laboratory's approved procedures. To be acceptable, 4 out of 5 replicate test specimens must meet specified seam strength requirements. If these laboratory tests pass, then the seam shall be cap stripped or repaired using other approved methods between that location and the original failed location. If field or laboratory tests fail, the process shall be repeated. After repairs are completed, the repaired seam shall be non-destructively tested in accordance with paragraph Non-Destructive Field Seam Continuity Testing.

#### 3.6.2 Patches

Tears, holes, blisters and other defects shall be repaired with patches. Patches shall have rounded corners, be made of the same geomembrane, and extend a minimum of 0.15 m (6 inches) beyond the edge of defects. Minor localized flaws shall be repaired by spot welding or seaming as determined by the QC inspector. Repairs shall be non-destructively tested. The Contracting Officer or the QC inspector may also elect to perform destructive seam tests on suspect areas.

### 3.7 VISUAL INSPECTION AND EVALUATION

Immediately prior to covering, the geomembrane, seams, and non-seam areas shall be visually inspected by the QC inspector and Contracting Officer for defects, holes, or damage due to weather conditions or construction activities. At the Contracting Officer's or the QC inspector's discretion, the surface of the geomembrane shall be brushed, blown, or washed by the installer if the amount of dust, mud, or foreign material

inhibits inspection or functioning of the overlying material. Each suspect location shall be non-destructively tested in accordance with paragraph Non-Destructive Field Seam Continuity Testing. Each location that fails non-destructive testing shall be repaired in accordance with paragraph Patches and non-destructively retested.

### 3.8 PENETRATIONS

Geomembrane penetration details shall be in accordance with ASTM D 6497 or as recommended by the geomembrane manufacturer. Factory fabricated boots shall be used wherever possible. Field seams for penetrations shall be non-destructively tested in accordance with the installer's approved QC manual. Seams that fail non-destructive testing shall be repaired in accordance with the installer's approved QC manual and non-destructively tested prior to acceptance.

### 3.9 PROTECTION AND BACKFILLING

The deployed and seamed geomembrane shall be covered with the specified material within 14 calendar days of acceptance. Wrinkles in the geomembrane shall be prevented from folding over during placement of cover materials. Cover soil shall not be dropped onto the geomembrane or overlying geosynthetics from a height greater than 0.9 m (3 feet). The soil shall be pushed out over the geomembrane or overlying geosynthetics in an upward tumbling motion. Soil shall be placed from the bottom of the slope upward. The initial loose soil lift thickness shall be 0.3 m (12 inches). Equipment with ground pressures less than 48,263 N per square meter (7 psi) shall be used to place the first lift over the geomembrane. A minimum of 0.46 m (18 inches) of soil shall be maintained between construction equipment with ground pressures greater than 48,263 N per square meter (7 psi) and the geomembrane. Cover soil compaction and testing requirements are described in Section 31 00 00 EARTHWORK. Equipment placing cover soil shall not stop abruptly, make sharp turns, spin their wheels, or travel at speeds exceeding 2.2 m/s(5 mph).

-- End of Section --

## SECTION 02 56 15

## GEOSYNTHETIC CLAY LINER (GCL)

## 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 within the text by the basic designation only.

## ASTM INTERNATIONAL (ASTM)

ASTM D5261	(2010) Measuring Mass Per Unit Area of Geotextiles
ASTM D5887	(2009) Measurement of Index Flux Through Saturated Geosynthetic Clay Liner Specimens Using a Flexible Wall Permeameter
ASTM D5888	(2006; R 2011) Storage and Handling of Geosynthetic Clay Liners
ASTM D5889	(2011) Quality Control of Geosynthetic Clay Liners
ASTM D5890	(2011) Swell Index of Clay Mineral Component of Geosynthetic Clay Liners
ASTM D5891	(2002; R 2009) Fluid Loss of Clay Component of Geosynthetic Clay Liners
ASTM D5993	(1999; R 2009) Measuring Mass Per Unit of Geosynthetic Clay Liners
ASTM D6072/D6072M	(2009) Obtaining Samples of Geosynthetic Clay Liners
ASTM D6243	(2009) Determining the Internal and Interface Shear Resistance of Geosynthetic Clay Liner by the Direct Shear Method
ASTM D6496	(2004a; R 2009) Determining Average Bonding Peel Strength Between the Top and Bottom Layers of Needle-Punched Geosynthetic Clay Liners
ASTM D6768	(2004; R 2009) Tensile Strength of Geosynthetic Clay Liners

## 1.2 SUBMITTAL REQUIREMENTS

Submit manufacturer's certified raw and roll material data sheets. If needle punching or stitch bonding is used in construction of GCL, the certification shall indicate that the GCL has been continuously inspected

for broken needles using an in-line metal detector and all broken needles have been removed. The certified data sheets shall be attested to by a person having legal authority to bind the GCL manufacturing company. Certified test results shall be submitted at least 14 working days prior to delivery of the GCL. Submit GCL panel layout and detail drawings, for approval, a minimum of 14 days prior to deployment. The following shall also be submitted as specified:

- a. GCL panel layout and penetration detail drawings.
- b. Manufacturer's warranty statement.
- c. Manufacturer's quality control (QC) manual which describes testing procedures, frequency of testing and acceptance/rejection criteria for QC testing at least 14 days prior to delivery of the GCL. QC samples shall be delivered at the specified frequencies.
- d. The Contractor shall also collect samples from Government provided GCL for laboratory QA/QC testing and reporting.
- e. Manufacturer's, installer's, QC inspector's, and QC laboratory's qualification statements including resumes of key personnel involved in this project.
- f. Mid-plane and interface shear strength test results at least 14 days prior to deployment.
- g. Independent QC laboratory test results including description of equipment and test methods.
- h. Certificate of subgrade inspection.

### 1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

#### SD-02 Shop Drawings

Layout and Detail Drawings;G

#### SD-03 Product Data

GCL Properties;G  
Warranty;G  
Tests, Inspections, and Verifications;G  
Qualifications;G

#### SD-04 Samples

Samples

#### SD-06 Test Reports

Tests, Inspections, and Verifications;G  
Conformance Tests;G  
Subgrade Preparation;G

#### 1.4 QUALIFICATIONS

##### 1.4.1 Manufacturer

Geosynthetic clay liner shall be the product of a GCL Manufacturer who has produced the proposed GCL using the same bentonite, polyethylene geomembrane, geotextiles, sewing thread, and adhesive for at least 5 completed projects and shall have produced a minimum of 186,000 square meter (2,000,000square feet) of the proposed GCL.

##### 1.4.2 Installer

The installer shall have installed GCL at a minimum of 5 projects of comparable scope and complexity and shall have installed a minimum of 186,000 square meter (2,000,000 square feet) of the proposed GCL.

##### 1.4.3 QC Inspector

The independent QC inspector is responsible for monitoring and documenting activities related to the QC of the GCL from manufacturing through installation. The QC inspector shall have provided QC and/or QA inspection during installation of GCL material for at least 5 projects and shall have performed QC and/or QA inspection on a minimum of 186,000 square meter(2 million square feet) of GCL.

##### 1.4.4 QC Laboratory

An independent QC laboratory is responsible for QC GCL testing. The QC laboratory shall have provided QC and/or QA testing of GCL for at least 5 completed projects and shall have performed QC and or QA testing for a minimum of 186,000 square meter(2 million square feet) of GCL. The QC laboratory shall be accredited via the Geosynthetic Accreditation Institute's Laboratory Accreditation Program (GAI-LAP).

#### 1.5 DELIVERY, STORAGE, AND HANDLING

Delivery, storage, and handling of GCL shall be in accordance with ASTM D5888.

##### 1.5.1 Delivery

The Contracting Officer shall be present during unloading of the GCL. Rolls shall be packaged in an opaque, waterproof, protective covering and wrapped around a central core. Tears in the packaging shall be repaired to restore a waterproof protective barrier around the GCL. Unloading of rolls from the delivery vehicles shall be done in a manner that prevents damage to the GCL and its packaging.

##### 1.5.2 Storage

Field storage shall be in flat dry areas where water cannot accumulate and the GCL rolls can be protected from damage. Storage of the rolls on blocks or pallets will not be allowed unless the GCL rolls are fully supported as approved by the Contracting Officer. Stacks of GCL rolls shall be no greater than three high. Rolls shall be covered with a water proof tarpaulin or plastic sheet if stored outdoors.

1.5.3 Handling

During handling, rolls shall not be dragged, lifted by one end, dropped to the ground, or otherwise damaged. A pipe or solid bar of sufficient strength to support the full weight of the roll without significant bending shall be used for all unloading and handling activities. If recommended by the manufacturer, a sling handling method utilizing appropriate loading straps may be used.

1.6 WARRANTY

The manufacturer's warranty shall state that the GCL materials meet all requirements of the contract documents and that for the intended use, specify the years the GCL is warranted against deterioration. The installer's warranty shall specify the number of years the GCL shall not fail due to improper installation.

PART 2 PRODUCTS

2.1 GCL PROPERTIES

GCL shall be a manufactured product consisting of a sodium montmorillonite clay (bentonite) layer evenly distributed between two geotextiles. GCL shall conform to the property requirements listed in Table 1 and shall be free of tears, holes, or other defects that may affect its serviceability. Encapsulating geotextiles shall be mechanically bonded together using a needle punch or stitch bonding process. Needle punched and stitch bonded GCLs shall be continuously inspected for broken needles using an in-line metal detector and broken needles shall be removed. The minimum manufactured GCL sheet width shall be 4.1 meter (13.5 feet) and the minimum manufactured GCL sheet length shall be 30 meter (98 feet).

TABLE 1 - GCL PROPERTIES		
	TEST METHOD	TEST VALUE
BENTONITE		
Swell Index Test, minimum	ASTM D5890	24 mL
Fluid Loss, maximum	ASTM D5891	18 mL
UPPER GEOTEXTILE PROPERTIES		
Material Type		Nonwoven
Mass per Unit Area, min.	ASTM D5261	204 g/sq m (6 ounces/sq yard)
LOWER GEOTEXTILE PROPERTIES		
Material Type		Nonwoven
Mass per Unit Area, min.	ASTM D5261	204 g/sq m (6 ounces/sq yard)

TABLE 1 - GCL PROPERTIES		
	TEST METHOD	TEST VALUE
COMPOSITE		
Bentonite Mass/Unit Area, minimum, Note 1	ASTM D5993	3700 g/ sq m (0.75 lbs/sq foot)
Moisture Content, maximum	ASTM D5993	40 percent
Tensile Strength, minimum, (MD and CD) Peak Mid-Plane Shear Strength (hydrated), minimum at a normal stress of 200 psf Peak Interface Friction Angle (hydrated), minimum	ASTM D6768  ASTM D6243/D6243M  ASTM D6243/D6243M	23 lbs/in  500 psf  11.3 degrees
Index Flux, maximum	ASTM D5887	0.00000001 cubic m/sq m-sec
Peel Strength, min. MD (Peel Strength, MARV MD), Note 2	ASTM D6496	400 N/m (2.3 lbs/inch)
Note 1: Bentonite mass/unit area shall be computed at 0 percent moisture content. Bentonite mass/unit area is exclusive of glues added to the bentonite. Note 2: The peel test applies to geotextile backed GCL products only.		

## 2.2 TESTS, INSPECTIONS, AND VERIFICATIONS

### 2.2.1 Manufacturing Sampling and Testing

GCL and its components shall be sampled and tested in accordance with the manufacturer's approved QC manual. The manufacturer's QC procedures shall be in accordance with ASTM D5889. Test results not meeting the requirements specified in Table 1 shall result in the rejection of applicable rolls. The manufacturer's QC manual shall describe procedures used to determine rejection of applicable rolls. As a minimum, rolls produced immediately prior to and immediately after the failed roll shall be tested for the same failed parameter. Testing shall continue until a minimum of three successive rolls on both sides of the original failing roll pass the failed parameter.

### 2.2.2 Shear Strength Testing

Mid-plane and interface shear strength testing shall be performed in accordance with ASTM D6243. The hydration fluid to be used for both mid-plane and interface shear strength testing shall be tap water. The final moisture content of the GCL at the center of each specimen shall be included with the test results. GCL and adjacent geosynthetics shall be oriented such that the shear force is parallel to the down slope orientation of the geosynthetics in the field. Modifications to the test procedures described in this section shall be submitted and approved prior

to use.

#### 2.2.2.1 Mid-Plane Shear Strength Testing

One set of mid-plane direct shear tests shall be performed. Specimens shall be allowed to hydrate prior to shearing for a minimum of 24 hours. Free drainage shall be provided along both sides of the GCL to aid in hydration. Normal stresses of 200, 400, and 600 psf shall be used during hydration, consolidation, and shearing. The normal stresses shall not be relieved prior to or during shearing of the specimens.

#### 2.2.2.2 Interface Shear Strength Testing

One set of interface direct shear tests shall be performed on both interfaces of the GCL. Free drainage shall be provided along the outside of the GCL to aid in hydration. The other side of the GCL shall be placed against the interface material on which the test will be run. This interface material shall remain in place during hydration, consolidation, and shearing. The normal stresses shall not be relieved prior to or during shearing of the specimens. Tests shall be run until a minimum total displacement of 50 mm (2 inches) is reached.

### PART 3 EXECUTION

#### 3.1 SAMPLES AND TESTS

##### 3.1.1 Samples

Collect QC samples at approved locations upon delivery to the site at the request of the Contracting Officer. Samples shall be collected, packaged, and transported in accordance with ASTM D6072/D6072M. Samples shall be identified with a waterproof marker by manufacturer's name, product identification, lot and roll number. The date, a unique sample number, the machine direction, and the top surface of the GCL shall also be noted on the sample. The outer layer of the GCL roll shall be discarded prior to sampling a roll. Samples shall then be collected by cutting the full-width of the GCL sheet a minimum of 1 meter (3 feet) wide in the machine direction. An additional 610 x 610 mm (24 by 24 inch) QA sample shall be collected, labeled, and submitted to the Contracting Officer each time QC samples are collected.

##### 3.1.2 Conformance Tests

Provide QC samples to the QC laboratory to determine bentonite mass per unit area (ASTM D5993) peel strength (ASTM D6496), flux (ASTM D5887) and tensile strength (ASTM D6768) at the request of the Contracting Officer. Tests not meeting the requirements specified in Table 1 shall result in the rejection of applicable rolls. Determination of applicable rolls shall be as described in paragraph Tests, Inspections and Verifications.

#### 3.2 INSTALLATION

##### 3.2.1 Subgrade Preparation

The subgrade shall be compacted in accordance with Section 31 00 00 EARTHWORK. The subgrade surface shall be smooth and free of vegetation, standing water, and angular stones or other foreign matter that could damage the GCL. At a minimum, the subgrade surface shall be rolled with a smooth-drum compactor of sufficient weight to remove any wheel ruts,

footprints, or other abrupt grade changes. All protrusions extending more than 13mm (0.5 inches) from the subgrade surface (or less if recommended by the manufacturer) shall either be removed, crushed, or pushed into the surface with the smooth-drum compactor. Each day during placement, the Contracting Officer and installer shall inspect the surface on which GCL is to be placed and certify in writing that the surface is acceptable.

### 3.2.2 Placement

GCL shall be installed as soon as practical after completion and approval of the subgrade. Rolls shall be delivered to the work area in their original packaging. Immediately prior to deployment, the packaging shall be carefully removed without damaging the GCL. GCL which has been hydrated prior to being covered by an overlying geomembrane or a minimum of 305 mm (12 inches) of cover soil shall be removed and replaced. Hydrated GCL is defined as having become soft as determined by squeezing the material with finger pressure or material which has exhibited swelling. If the subgrade is soil, construction equipment may be used to deploy GCL. If the subgrade is a geosynthetic, GCL shall be deployed by hand or by use of approved light weight equipment with pneumatic tires which will not damage the underlying geosynthetic. On side slopes (if required), GCL shall be anchored at the top and deployed down the slope to minimize wrinkles. Dragging of GCL panels over the ground surface shall be minimized. The Contracting Officer has the option of requiring the use of a slip sheet. Deployed GCL panels shall lie flat on the subgrade surface, with no wrinkles or folds.

### 3.2.3 Seams

On side slopes, GCL shall be placed with seams oriented parallel to the line of maximum slope and shall be free of tension or stress upon completion of installation. Panels shall be positioned with the overlap recommended by the manufacturer, but not less than 150 mm (6 inches) for panel sides or 450 mm (18 inches) for panel ends. Soil or other foreign matter shall be removed from the overlap area immediately prior to seaming. If recommended by the manufacturer, granular bentonite of the same type as the bentonite used for the GCL shall be placed along the entire overlap width at a minimum rate of 0.37 kg/linear meter (0.25 lbs/linear foot) or as recommended by the manufacturer. Construction adhesive or other approved seaming methods recommended by the manufacturer shall be used for horizontal seams on slopes. Overlaps which occur on slopes shall be constructed with the up slope GCL shingled over the down slope GCL. Alternate seaming methods may be approved if recommended by the manufacturer.

### 3.2.4 Protection

Only those GCL panels which can be anchored (if required) and covered in the same day shall be unpackaged and installed. If exposed GCL cannot be permanently covered before the end of a working day, it shall be temporarily covered with plastic or other waterproof material to prevent hydration. Plastic sheeting will be available during the work day to cover the GCL in anticipation of rain events. Hydrated GCL shall be removed and replaced.

### 3.3 REPAIRS

Holes or tears in GCL shall be repaired by placing a patch of GCL extending a minimum of 305 mm(12 inches) beyond the edges of the hole or

tear on all sides. If recommended by the manufacturer, granular bentonite or bentonite mastic shall be applied in the overlap area. Patches shall be secured with a construction adhesive or other approved methods as recommended by the manufacturer.

#### 3.4 PENETRATIONS

Penetration details shall be as recommended by the GCL manufacturer. As a minimum, pipe penetrations shall incorporate a collar of GCL wrapped around the pipe and securely fastened. Dry bentonite or bentonite paste shall be placed around the penetration as recommended by the GCL manufacturer.

#### 3.5 COVERING

GCL shall not be covered prior to inspection and approval by the Contracting Officer. Cover soil shall be free of angular stones or other foreign matter which could damage the GCL. The maximum particle size of the cover soil shall be 25 mm (1 inch). Cover soil shall not be dropped directly onto the GCL from a height greater than 1 meter (3 feet). The soil shall be pushed out over the GCL in an upward tumbling motion. The direction of backfilling shall proceed in the direction of down gradient shingling of GCL overlaps; except that on side slopes, soil backfill shall be placed from the bottom of the slope upward. Cover soil shall be placed such that soil does not enter the GCL overlap zone and tensile stress are not mobilized in the GCL. No equipment shall be operated on the top surface of the GCL without permission from the Contracting Officer.

-- End of Section --

## SECTION 03 30 53

## MISCELLANEOUS CAST-IN-PLACE CONCRETE

## PART 1 GENERAL

## 1.1 SUMMARY

Perform all work in accordance with ACI 318.

## 1.2 UNIT PRICES

## 1.2.1 Concrete Payment

Payment will cover all costs associated with furnishing, delivering, placing, finishing, and curing of concrete for the various items of the schedule, including the cost of all formwork. Payment for concrete, for which payment is made as a lump sum, is not to be included in this unit price payment item. Payment for grout, preformed expansion joints, field-molded sealants, waterstops, reinforcing steel bars or wire reinforcement is to be included in this unit price payment item.

## 1.2.2 Measurement

Concrete will be measured for payment on the basis of the actual volume of concrete within the pay lines of the structures as indicated. Measurement of concrete placed against the sides of any excavation without the use of intervening forms will be made only within the pay lines of the structure. No deductions will be made for rounded or beveled edge, for space occupied by metal work, for electrical conduits or timber, or for voids or embedded items that are either less than 5 cubic feet in volume or 1 square foot in cross section.

## 1.2.3 Unit of Measure

Unit of measure: cubic yard.

## 1.3 REFERENCES

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

## AMERICAN CONCRETE INSTITUTE INTERNATIONAL (ACI)

ACI 117	(2010; Errata 2011) Specifications for Tolerances for Concrete Construction and Materials and Commentary
ACI 301	(2010; Errata 2011) Specifications for Structural Concrete
ACI 304R	(2000; R 2009) Guide for Measuring, Mixing, Transporting, and Placing Concrete
ACI 305R	(2010) Guide to Hot Weather Concreting

ACI 318	(2011; Errata 1 2011; Errata 2 2012; Errata 3-4 2013) Building Code Requirements for Structural Concrete and Commentary
ACI 347	(2004; Errata 2008; Errata 2012) Guide to Formwork for Concrete
ACI SP-66	(2004) ACI Detailing Manual
ASTM INTERNATIONAL (ASTM)	
ASTM A1064/A1064M	(2013) Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete
ASTM A615/A615M	(2013) Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement
ASTM C1064/C1064M	(2011) Standard Test Method for Temperature of Freshly Mixed Hydraulic-Cement Concrete
ASTM C1260	(2007) Standard Test Method for Potential Alkali Reactivity of Aggregates (Mortar-Bar Method)
ASTM C143/C143M	(2012) Standard Test Method for Slump of Hydraulic-Cement Concrete
ASTM C150/C150M	(2012) Standard Specification for Portland Cement
ASTM C1567	(2013) Standard Test Method for Potential Alkali-Silica Reactivity of Combinations of Cementitious Materials and Aggregate (Accelerated Mortar-Bar Method)
ASTM C1602/C1602M	(2012) Standard Specification for Mixing Water Used in Production of Hydraulic Cement Concrete
ASTM C172/C172M	(2010) Standard Practice for Sampling Freshly Mixed Concrete
ASTM C173/C173M	(2012) Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method
ASTM C231/C231M	(2010) Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method
ASTM C260/C260M	(2010a) Standard Specification for Air-Entraining Admixtures for Concrete

ASTM C309	(2011) Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete
ASTM C31/C31M	(2012) Standard Practice for Making and Curing Concrete Test Specimens in the Field
ASTM C33/C33M	(2013) Standard Specification for Concrete Aggregates
ASTM C39/C39M	(2014) Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens
ASTM C494/C494M	(2013) Standard Specification for Chemical Admixtures for Concrete
ASTM C685/C685M	(2011) Concrete Made by Volumetric Batching and Continuous Mixing
ASTM C94/C94M	(2014) Standard Specification for Ready-Mixed Concrete
ASTM D75/D75M	(2013) Standard Practice for Sampling Aggregates
ASTM D98	(2005; R 2013) Calcium Chloride

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

40 CFR 247	Comprehensive Procurement Guideline for Products Containing Recovered Materials
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#### 1.4 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for [Contractor Quality Control approval.] [information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government.] Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Installation Drawings; G

SD-03 Product Data

Air-Entraining Admixture  
Accelerating Admixture  
Water-Reducing or Retarding Admixture  
Curing Materials

Conveying and Placing Concrete

Mix Design Data[; G]  
Ready-Mix Concrete

Mechanical Reinforcing Bar Connectors

## SD-06 Test Reports

Aggregates  
Concrete Mixture Proportions; G

Compressive Strength Testing; G  
Slump; G  
Air Content  
Water

## SD-07 Certificates

Cementitious Materials  
Pozzolan  
CPG for recycled materials or appropriate Waiver Form  
Aggregates

## 1.5 QUALITY ASSURANCE

Indicate specific locations of Concrete Placement on installation drawings and include, but not be limited to, square feet of concrete placements, thicknesses and widths, plan dimensions, and arrangement of cast-in-place concrete section.

## 1.5.1 Regulatory Requirements

The state statutory and regulatory requirements: Guam form a part of this specification to the extent referenced. Submit CPG for recycled materials or appropriate Waiver Form.

## PART 2 PRODUCTS

## 2.1 SYSTEM DESCRIPTION

The Government retains the option to sample and test aggregates and concrete to determine compliance with the specifications. Provide facilities and labor as may be necessary to assist the Government in procurement of representative test samples. Obtain samples of aggregates at the point of batching in accordance with ASTM D75/D75M. Sample concrete in accordance with ASTM C172/C172M. Determine slump and air content in accordance with ASTM C143/C143M and ASTM C231/C231M, respectively, when cylinders are molded. Prepare, cure, and transport compression test specimens in accordance with ASTM C31/C31M. Test compression test specimens in accordance with ASTM C39/C39M. Take samples for strength tests not less than once each shift in which concrete is produced [from each strength of concrete required]. Provide a minimum of five specimens from each sample; two to be tested at 28 days (90 days if pozzolan is used) for acceptance, two will be tested at 7 days for information and one held in reserve.

## 2.1.1 Strength

Acceptance test results are the average strengths of two specimens tested at 28 days (90 days if pozzolan is used). The strength of the concrete is considered satisfactory so long as the average of three consecutive acceptance test results equal or exceed the specified compressive strength,  $f'c$ , but not more than 20 percent, and no individual acceptance test result falls below  $f'c$  by more than 500 psi.

### 2.1.2 Construction Tolerances

Apply a Class "C" finish to all surfaces except those specified to receive a Class "D" finish. Apply a Class "D" finish to all post-construction surfaces which will be permanently concealed. Surface requirements for the classes of finish required are as specified in ACI 117.

### 2.1.3 Concrete Mixture Proportions

Concrete mixture proportions are the responsibility of the Contractor. Mixture proportions must 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 yard of concrete. Provide materials included in the mixture proportions of the same type and from the same source as will be used on the project. The specified compressive strength  $f'_c$  is 3,000 psi at 28 days (90 days if pozzolan is used). The maximum nominal size coarse aggregate is 1 inch, in accordance with ACI 304R. The air content must be between 4.5 and 7.5 percent with a slump between 2 and 5 inches. The maximum water-cementitious material ratio is 0.50. Submit the applicable test reports and mixture proportions that will produce concrete of the quality required, ten days prior to placement of concrete.

## 2.2 MATERIALS

Submit manufacturer's literature from suppliers which demonstrates compliance with applicable specifications for the specified materials.

### 2.2.1 Cementitious Materials

Submit Manufacturer's certificates of compliance, accompanied by mill test reports, attesting that the concrete materials meet the requirements of the specifications in accordance with the Special Clause "CERTIFICATES OF COMPLIANCE". Also, certificates for all material conforming to EPA's Comprehensive Procurement Guidelines (CPG), in accordance with 40 CFR 247. Provide cementitious materials that conform to the appropriate specifications listed:

#### 2.2.1.1 Portland Cement

ASTM C150/C150M, Type II, with tri-calcium aluminates (C3A) content less than 10 percent and a maximum cement-alkali content of 0.80 percent Na<sub>2</sub>O<sub>e</sub> (sodium oxide) equivalent.

#### 2.2.2 Aggregates

For fine and coarse aggregates meet the quality and grading requirements of ASTM C33/C33M and test and evaluate for alkali-aggregate reactivity in accordance with ASTM C1260. Perform evaluation of fine and coarse aggregates separately and in combination, matching the proposed mix design proportioning. All results of the separate and combination testing must have a measured expansion less than 0.08 percent at 28 days after casting. If the test data indicates an expansion of 0.08 percent or greater, reject the aggregate(s) or perform additional testing using ASTM C1260 and ASTM C1567. Perform the additional testing using ASTM C1260 and ASTM C1567 using the low alkali portland cement in combination with ground granulated blast furnace (GGBF) slag, or Class F fly ash. Use GGBF

slag in the range of 40 to 50 percent of the total cementitious material by mass. Use Class F fly ash in the range of 25 to 40 percent of the total cementitious material by mass]. Submit certificates of compliance and test reports for aggregates showing the material(s) meets the quality and grading requirements of the specifications under which it is furnished.

### 2.2.3 Admixtures

Provide admixtures, when required or approved, in compliance with the appropriate specification listed. Retest chemical admixtures that have been in storage at the project site, for longer than 6 months or that have been subjected to freezing, at the expense of the Contractor at the request of the Contracting Officer and will be rejected if test results are not satisfactory.

#### 2.2.3.1 Air-Entraining Admixture

Provide air-entraining admixture that meets the requirements of ASTM C260/C260M.

#### 2.2.3.2 Accelerating Admixture

Provide calcium chloride meeting the requirements of ASTM D98. Other accelerators must meet the requirements of ASTM C494/C494M, Type C or E.

#### 2.2.3.3 Water-Reducing or Retarding Admixture

Provide water-reducing or retarding admixture meeting the requirements of ASTM C494/C494M, Type A, B, or D. High-range water reducing admixture Type F [or G] may be used only when approved, approval being contingent upon particular placement requirements as described in the Contractor's Quality Control Plan.

### 2.2.4 Water

Mixing and curing water in compliance with the requirements of ASTM C1602/C1602M; [potable, and] free of injurious amounts of oil, acid, salt, or alkali. Submit test report showing water complies with ASTM C1602/C1602M.

### 2.2.5 Reinforcing Steel

Provide reinforcing bars conforming to the requirements of ASTM A615/A615M, Grade 60, deformed. Provide welded steel wire reinforcement conforming to the requirements of ASTM A1064/A1064M. Detail reinforcement not indicated in accordance with ACI 301 and ACI SP-66. Provide mechanical reinforcing bar connectors in accordance with ACI 301 and provide 125 percent minimum yield strength of the reinforcement bar.

### 2.2.6 Formwork

Design and engineer the formwork as well as its construction in accordance with ACI 301 Section 2 and 5 and ACI 347. Fabricate of wood, steel, or other approved material. Submit formwork design prior to the first concrete placement.

### 2.2.7 Form Coatings

Provide form coating in accordance with ACI 301.

### 2.2.8 Curing Materials

Provide curing materials in accordance with ACI 301, Section 5.

### 2.3 READY-MIX CONCRETE

Provide ready-mix concrete with mix design data conforming to ACI 301 Part 2. Submit delivery tickets in accordance with ASTM C94/C94M for each ready-mix concrete delivery, include the following additional information: .

- a. Type and brand cement
- b. Cement content in 94-pound bags per cubic yard of concrete
- c. Maximum size of aggregate
- d. Amount and brand name of admixture
- e. Total water content expressed by water cementitious material ratio

### 2.4 ACCESSORIES

#### 2.4.1 Curing Compound

Provide curing compound conforming to ASTM C309. Submit manufactures instructions for placing curing compound.

## PART 3 EXECUTION

### 3.1 PREPARATION

Prepare construction joints to expose coarse aggregate. The surface must be clean, damp, and free of laitance. Construct ramps and walkways, as necessary, to allow safe and expeditious access for concrete and workmen. Remove standing or flowing water, loose particles, debris, and foreign matter. Satisfactorily compact earth foundations. Make spare vibrators available. Placement cannot begin until the entire preparation has been accepted by the Government.

#### 3.1.1 Embedded Items

Secure reinforcement in place after joints, anchors, and other embedded items have been positioned. Arrange internal ties so that when the forms are removed the metal part of the tie is not less than 2 inches from concrete surfaces permanently exposed to view or exposed to water on the finished structures. Prepare embedded items so they are be free of oil and other foreign matters such as loose coatings or rust, paint, and scale. The embedding of wood in concrete is permitted only when specifically authorized or directed. Provide all equipment needed to place, consolidate, protect, and cure the concrete at the placement site and in good operating condition.

#### 3.1.2 Formwork Installation

Forms must be properly aligned, adequately supported, and mortar-tight. Provide smooth form surfaces, free from irregularities, dents, sags, or holes when used for permanently exposed faces. Chamfer all exposed joints and edges , unless otherwise indicated.

### 3.1.3 Production of Concrete

#### 3.1.3.1 Ready-Mixed Concrete

Provide ready-mixed concrete conforming to ASTM C94/C94M except as otherwise specified.

#### 3.1.3.2 Concrete Made by Volumetric Batching and Continuous Mixing

Conform to ASTM C685/C685M.

### 3.2 CONVEYING AND PLACING CONCRETE

Convey and place concrete in accordance with ACI 301, Section 5.

#### 3.2.1 Hot-Weather Requirements

Place concrete in hot weather in accordance with ACI 305R

### 3.3 FINISHING

#### 3.3.1 Temperature Requirement

Do not finish or repair concrete when either the concrete or the ambient temperature is below 50 degrees F.

#### 3.3.2 Finishing Formed Surfaces

Remove all fins and loose materials , and surface defects including filling of tie holes. Repair all honeycomb areas and other defects. Remove all unsound concrete from areas to be repaired. Ream or chip 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 and fill with dry-pack mortar. Brush-coat the prepared area with an approved epoxy resin or latex bonding compound or with a neat cement grout after dampening and filling with mortar or concrete. Use a blend of portland cement and white cement in mortar or concrete for repairs to all surfaces permanently exposed to view shall be so that the final color when cured is the same as adjacent concrete.

#### 3.3.3 Finishing Unformed Surfaces

Finish unformed surfaces in accordance with ACI 301, Section 5.

### 3.4 CURING AND PROTECTION

Cure and protect in accordance with ACI 301, Section 5.

### 3.5 FORM WORK

Provide form work in accordance with ACI 301, Section 2 and Section 5.

#### 3.5.1 Removal of Forms

Remove forms in accordance with ACI 301, Section 2.

### 3.6 STEEL REINFORCING

Reinforcement must be free from loose, flaky rust and scale, and free from oil, grease, or other coating which might destroy or reduce the reinforcement's bond with the concrete.

#### 3.6.1 Fabrication

Shop fabricate steel reinforcement in accordance with ACI 318 and ACI SP-66. Provide shop details and bending in accordance with ACI 318 and ACI SP-66.

#### 3.6.2 Splicing

Perform splices in accordance with ACI 318 and ACI SP-66.

#### 3.6.3 Supports

Secure reinforcement in place by the use of metal or concrete supports, spacers, or ties.

### 3.7 EMBEDDED ITEMS

Before placing concrete, take care to determine that all embedded items are firmly and securely fastened in place. Provide embedded items free of oil and other foreign matter, such as loose coatings of rust, paint and scale. Embedding of wood in concrete is permitted only when specifically authorized or directed.

### 3.8 TESTING AND INSPECTING

Report the results of all tests and inspections conducted at the project site informally at the end of each shift. Submit written reports weekly. Deliver within three days after the end of each weekly reporting period. See Section 01 45 00.00 10 QUALITY CONTROL.

#### 3.8.1 Field Testing Technicians

The individuals who sample and test concrete must 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.

#### 3.8.2 Preparations for Placing

Inspect foundation or construction joints, forms, and embedded items in sufficient time prior to each concrete placement to certify that it is ready to receive concrete.

#### 3.8.3 Sampling and Testing

- a. Obtain samples and test concrete for quality control during placement. Sample fresh concrete for testing in accordance with ASTM C172/C172M. Make six test cylinders.
- b. Test concrete for compressive strength at 7 and 28 days for each design mix and for every 100 cubic yards of concrete. Test two cylinders at 7 days; two cylinders at 28 days; and hold two cylinders in reserve. Conform test specimens to ASTM C31/C31M. Perform compressive strength testing conforming to ASTM C39/C39M.

- c. Test slump at the site of discharge for each design mix in accordance with ASTM C143/C143M. Check slump once during each shift that concrete is produced for each strength of concrete required.
- d. Test air content for air-entrained concrete in accordance with ASTM C231/C231M. Test concrete using lightweight or extremely porous aggregates in accordance with ASTM C173/C173M. Check air content at least once during each shift that concrete is placed [for each strength of concrete required].
- e. Determine temperature of concrete at time of placement in accordance with ASTM C1064/C1064M. Check concrete temperature at least once during each shift that concrete is placed [for each strength of concrete required].

#### 3.8.4 Action Required

##### 3.8.4.1 Placing

Do not begin placement until the availability of an adequate number of acceptable vibrators, which are in working order and have competent operators, has been verified. Discontinue placing if any lift is inadequately consolidated.

##### 3.8.4.2 Air Content

Whenever an air content test result is outside the specification limits, adjust the dosage of the air-entrainment admixture prior to delivery of concrete to forms.

##### 3.8.4.3 Slump

Whenever a slump test result is outside the specification limits, adjust the batch weights of water and fine aggregate prior to delivery of concrete to the forms. Make the adjustments so that the water-cementitious material ratio does not exceed that specified in the submitted concrete mixture proportion and the required concrete strength is still met.

-- End of Section --

SECTION 09 96 72

RECOATING EXISTING STEEL WATER TANK

PART 1 - GENERAL

1.01 DESCRIPTION

This section describes the application and inspection of the protective coatings to be utilized on the interior and exterior surfaces of the Owner's existing 250,000-gallon steel water tank. Clean and coat steel water tank in accordance with Section 099674.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Coating for Steel Water Tank (Epoxy): 099674.

1.03 SUBMITTALS

- A. Provide submittals in accordance with Section 013300 and Section 1.05 of this specification for the following:
  - 1. Written respirator program.
  - 2. Confined space certifications.
  - 3. GISO 5158 and 5159 training records.

1.04 REFERENCE DOCUMENTS

The following guidelines, documents, and references are to assist the Contractor in performing its duties for cleaning, surface preparation, and application of the coating systems. The documents listed form a part of this specification to the extent referenced.

- A. Quality Control: The following references provide the means of maintaining quality control of the blasting and coating systems:
  - 1. Steel Structures Painting Council (SSPC), Surface Preparation Specifications, Publication No. 98-01.
  - 2. SSPC-PA Series (Paint Application Guides).
  - 3. NACE, RPO287-02, Field Measurement of Surface Abrasive Blast Cleaned Surfaces Using a Replica Tape.
  - 4. ASTM D4138, Standard Method of Measurement of Dry Film Thickness of Protective Coating Systems by Destructive Means.
  - 5. ASTM D4285, Standard Test Method for Indicating Oil or Water in Compressed Air.

6. ASTM D4414, Standard Practice for Measurement of Wet Film Thickness by Notch Gages.
7. U.S. Weather Bureau psychometric tables.

1.05 WORKER PROTECTION

- A. Conform to federal, state, county, city, and Owner safety and environmental protection codes and regulations. Do not create conditions for which the Owner is subject to citations by any regulatory agency. Should the Owner be cited for a condition under the control of the Contractor, the Contractor will be responsible for payment and settlement of said citation. Provide safety equipment, including that for confined space entry and safety equipment necessary for use by the Owner's Representative.
- B. Comply with applicable regulations for properly storing, handling, transporting, and disposing of any hazardous waste.
- C. Provide at least one working telephone on the jobsite at all times.
- D. Maintain a full-time standby hole watch in case of an emergency. This employee shall be certified in CPR, have confined space certification, and be able to comply with GISO 5157 (Operating Procedures and Employee Training) and GISO 5158 (Pre-Entry). This employee shall also be fully equipped to operate within the directives of GISO 5159 (Confined Space Operations). This person shall have his own personal safety equipment and operating telephone (not the jobsite telephone).
- E. During the interior abrasive blasting operations, blast operators shall wear National Institute of Occupational Safety and Health (NIOSH) approved air-supplied helmets. The air compressor used to supply breathing air shall conform to OSHA regulations on carbon monoxide and high-temperature protection and meet Grade D breathing air as described in Compressed Gas Association Commodity Specification G-7.1 (ANSI S86.1). Breathing air shall also be free of dust, fumes, vapors, or gases that may result in harmful exposure. Other persons who are exposed to blasting dust shall wear approved filter-type respirators and safety goggles. When coatings are applied in confined areas, persons exposed to toxic vapors and dust shall wear NIOSH-approved air-supplied masks.
- F. Prepare a written respirator program per OSHA regulations. The elements of a respirator protection program are summarized, but not limited to, the following:
  1. Written standard operating procedures for selection and use;
  2. Employee instructions and training in the use and limitations of respirators;
  3. Regular cleaning and disinfection;
  4. Sanitary storage of respirators; and

- 5. Regular inspection of respirators to assure that they are in good repair.
  - G. Blasting and spraying hoses shall be grounded to prevent accumulation of charges of static electricity.
  - H. Provide explosionproof artificial lighting for all work-confined spaces. Light bulbs shall be guarded to prevent breakage. Lighting fixtures and flexible cords shall comply with the requirements of NEPA 70 NEC for the atmosphere in which they will be used.
  - I. Coating materials may be irritating to the skin and eyes. When handling and mixing coatings, workers shall wear gloves and eye shields.
- 1.06 PRECONSTRUCTION CONFERENCE
- See Section 099674.
- 1.07 QUALIFICATIONS
- A. See Section 099674.
  - B. Require the coating applicator to provide a supervisor at the worksite during cleaning and coating operations. The supervisor shall have the authority to sign change orders, coordinate work, and make decisions. Provide skilled craftsmen qualified to perform the required work.
- 1.08 INSPECTION
- A. The Owner's Representative will provide coating inspection. The Owner's Representative will provide test equipment, except for the low-voltage holiday detector. The Contractor shall conduct the low-voltage holiday test in the presence of the Owner's Representative.
  - B. The Owner's Representative will perform inspection on all phases of the surface preparation, abrasive blast cleaning, and application of the coating systems. See Section 099674 for additional requirements.
- 1.09 EXISTING RESERVOIR COATING SYSTEMS
- A. The existing reservoir has the following coatings:
  - B. Work will consist of surface cleaning and overcoating with a coating as specified in Section 099674. The exterior is coated with an alkyd epoxy. Remove and replace the existing coating with a coating as specified in Section 099674.
- 1.10 FINAL SELECTION OF EXTERIOR COLORS
- Color of finish coat shall match the existing color as closely as possible.

PART 2 - MATERIALS

2.01 COATING SYSTEMS

See Section 099674.

2.02 INTERIOR COATING SYSTEM

See Section 099674.

2.03 EXTERIOR OVERCOATING SYSTEM

See Section 099674.

PART 3 - EXECUTION

3.01 DELIVERY AND STORAGE OF COATING MATERIALS

See Section 099674.

3.02 PROTECTION OF THE WORK

See Section 099674.

3.03 CONDITION OF EQUIPMENT

See Section 099674.

3.04 VENTILATION OF TANK INTERIOR

See Section 099674.

3.05 HUMIDITY AND TEMPERATURE CONTROL

See Section 099674.

3.06 INTERIOR SURFACE PREPARATION

- A. Remove accumulated sand and silt from the bottom of the tank.
- B. Abrasion blast clean interior surfaces per SSPC SP-10. The surface profile shall be 1.5 to 2.5 mils.

3.07 EXTERIOR SURFACE PREPARATION

- A. Clean the exterior of the tank roof and shell using stiff brushes with clean potable water that has been mixed with ICI Devoe Devprep 88 Biodegradable Water Based Cleaner, or equal. After the surfaces have been cleaned, rinse with clean potable water and allow to dry thoroughly prior to painting.
- B. Prepare damaged exterior painted surfaces on the roof and shell according to SSPC SP-2 or SSPC SP-3, either by hand sanding or power tool cleaning.

3.08 LIMITATIONS ON ABRASIVE BLAST CLEANING

See Section 099674. Changed humidity or a delay, such as equipment failure, may cause a cleaned surface to color or slightly oxidize from condensation before the coating can be applied. In the event that a surface colors or becomes moist, blast clean it again before applying the coating.

3.09 ABRASIVE BLAST CLEANING

See Section 099674.

3.10 LIMITATIONS ON THE APPLICATION OF COATINGS

- A. See Section 099674.
- B. If a change in climatic conditions damages a coating application, repair the damaged coatings to its specified condition. The Contractor is responsible for damaged coatings.

3.11 PROCEDURES FOR THE APPLICATION OF COATINGS

See Section 099674.

3.12 APPLICATION OF EXTERIOR OVERCOATING SYSTEM

- A. Spot prime by brush the cleaned damaged areas of the tank roof and shell and stripe all of the seams. Thickness shall be in accordance with Section 099674.
- B. Apply a full coat of primer to the entire tank roof and shell surfaces. Dry-film thickness shall be in accordance with Section 099674.
- C. Apply a finish coat to the entire roof and shell to a thickness in accordance with Section 099674. Questionable areas will be measured by the Owner's Representative using a Tooke Gauge. Contractor is responsible for sanding and repair of coating damaged by the Tooke Gauge.
- D. Allow 24 hours' drying time between coats or until each coat has dried.
- E. Use a wet-film gauge to monitor the application of each coat of paint, according to ASTM D4414.

3.13 INSPECTION FACILITIES

See Section 099674.

3.14 INSPECTION AND TESTING

- A. See Section 099674.
- B. The Owner's Representative will provide all test equipment as specified in Section 099674, except for the nondestructive low-voltage holiday detector.

SECTION 09 96 74

COATINGS FOR STEEL WATER TANK

PART 1 - GENERAL

1.01 DESCRIPTION

This section describes the materials, applications, and inspection of the protective coatings to be utilized on exterior surfaces of the steel water tank. Clean and coat steel water tank in accordance with AWWA D102 and the following. Use an inorganic zinc primer/epoxy intermediate/polyurethane finish. Apply protective coatings in the field as indicated.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Recoating Existing Steel Water Tank: 099672

1.03 SUBMITTALS

- A. Submit coating manufacturer's catalog data on formulation and recommended use in accordance with Section 013300.
- B. Submit coating manufacturer's surface preparation recommendations including maximum height of surface profile on abrasive blast cleaned steel.
- C. Submit coating manufacturer's application instructions, equipment, temperature and humidity limitations, drying time, and recoat cycle time.
- D. Submit coating manufacturer's recommended minimum and maximum time intervals between the application of field-applied primers and the field-applied touch-up or intermediate coats.
- E. Submit two color chip samples illustrating available colors for the finish coats of the exterior coating system.
- F. Submit manufacturer's safety data sheets on painting and coating products.
- G. Submit the name of the company and abrasive to be used, the generic type of abrasive, and product data sheets.

1.04 PRECONSTRUCTION CONFERENCE

At least 14 days prior to field application of the coating systems to the steel tank, schedule and arrange a conference with the Owner's Representative, tank manufacturer, coating applicator, and the coating manufacturer to coordinate the following:

- A. Tank manufacturer's work schedule for inspection coordination.

- B. Surface preparation methods.
- C. Specification compliance of blast abrasives and surface profile.
- D. Schedule of blast cleaning and coating application.
- E. List of equipment for cleaning and coating applications.
- F. Weather limitations for acceptable work.
- G. Inspection facilities.

1.05 QUALIFICATIONS

The Contractor shall require the coating applicator to hold a valid license recognized in Guam for performing abrasive blast cleaning and coating/painting work. The Contractor's coating applicator shall have a minimum of five years' experience and successful history in the application of the specified products to surfaces of steel tanks.

1.06 INSPECTION

- A. The Owner's Representative will provide a coating inspector. Test equipment will be provided by the Owner and will be operated by the Owner's Representative assigned to the project.
- B. The Owner's Representative will perform inspection on all off-site phases of the surface preparation, abrasive blast cleaning, and application of the coating systems.

PART 2 - MATERIALS

2.01 COATING SYSTEMS

- A. All materials of a specified system including primer, touch-up, intermediate, and finish coats shall be provided by the same manufacturer. Thinners, cleaners, driers, and other additives shall be as recommended by the coating manufacturer for the specified system.
- B. No request for product substitution will be considered which decreases the dry-film thickness designated, the number of coats to be applied, or which changes the generic type of coating specified.
- C. Requests for substitution shall contain the full name of each product, descriptive literature, complete data on past performance, manufacturer's instruction for use, generic type, its nonvolatile content by volume, and complete product information as outlined in AWWA D102. This information shall demonstrate equivalence of product and performance to the specified materials. No coating materials shall be procured or delivered to the project site prior to the review of the proposed material by the Owner's Representative.

2.02 EXTERIOR COATING SYSTEM ON ROOF AND KNUCKLE PLATES AND SHELL PLATES

- A. Primer (Roof and Knuckle Plates Only): Field-applied, self-curing, solvent-based two-component inorganic zinc coating with minimum zinc content of 12 pounds per gallon. Products: PPG Dimetcote 9 HS, Carboline 11 or 11HS, Tnemec 90-96, Devoe Catha-Coat 304 or 304V, or Sherwin-Williams Zinc-Clad II Plus.
- B. Shell plates: Field prime with epoxy.
- C. Touch-Up of Roof and Knuckle Plates and Field Primer for Shell Plates: Field-applied epoxy with minimum volume solids of 58%. Products: PPG Amercoat 385 or 395, Carboline Carboguard 891 or 893SG, Tnemec 104, Devoe Devran 224 HS, or Sherwin-Williams Macropoxy 646 B58-600.
- D. Intermediate: Field-applied epoxy with minimum volume solids of 58%. Products: PPG Amercoat 385 or 395, Carboline Carboguard 891 or 893SG, Tnemec 104, Devoe Devran 224 HS, or Sherwin-Williams Macropoxy 646 B58-600.
- E. Finish: Field-applied polyurethane having a minimum volume solids of 52%. Product: PPG Amercoat 450 HS, Carboline 133HB or 134HG, Tnemec Series 1075, Devoe Devthane 379, or Sherwin-Williams Hi-Solids Polyurethane B65-300.

2.03 ORGANIC ZINC PRIMER FOR FIELD TOUCH-UP AND SHOP COATING

- A. The organic zinc primer described below may be substituted for the specified inorganic zinc primers.
- B. Type: Organic zinc primer having a minimum zinc content of 14 pounds per gallon.
- C. Service Conditions: For use as a shop-applied primer or field touch-up primer over inorganic zinc prime coatings on exposed metal.
- D. Surface Preparation: SSPC SP-10.
- E. Coating: Coating shall be of the two- or three-component converted epoxy, epoxy phenolic, or urethane type. Products: Tnemec 90-97, International Interzinc 308, PPG Amercoat 68 HS, Devoe 313, Carboline 859, Sherwin-Williams Zinc-Clad III HS, or equal; applied to a minimum dry-film thickness of 3 mils.

PART 3 - EXECUTION

3.01 DELIVERY AND STORAGE OF COATING MATERIALS

- A. Deliver coating materials to the job in original sealed containers identified with labels indicating manufacturer; product name and number; color, batch, or lot number; and date of manufacture. Note the date of manufacture and apply coatings prior to the expiration of the guaranteed storage life. Coating materials exceeding storage life will be rejected.

- B. Store coating materials in enclosed structures to protect from weather and excessive heat or cold. Conform to state and local requirements for flammable materials.

3.02 PROTECTION OF THE WORK

- A. Protect adjacent work and surfaces not to be coated from blast cleaning, overspray, spattering, and spillage. Use protective coverings or drop cloths. Where protection is required or provided for coated surface, maintain until the coating has properly cured. Do not handle, work on, or disturb these areas until the coating is completely dry and hard.
- B. Protect surfaces coated with coal-tar base paint systems from exposure to direct sunlight at all times.

3.03 CONDITION OF EQUIPMENT

Use coating equipment designed for the application of the specified materials. Use compressors with traps and filters to remove water and oils from the air.

3.04 SURFACE PREPARATION PRIOR TO ABRASIVE BLAST CLEANING

- A. Remove oil, grease, dust, dirt, rust, moisture, mill scale, and all other foreign or interference substances that would adversely affect the adhesion or durability of the coating system.
- B. Remove oil and grease in accordance with SSPC SP-1. Use clean cloths and cleaning solvents and wipe dry with clean cloths. Do not leave a film or greasy residue on the cleaned surfaces.
- C. Remove weld spatter and weld slag, and grind smooth rough welds, beads, peaked corners, and sharp edges, including erection lugs, in accordance with SSPC SP-2 and SSPC SP-3.

3.05 LIMITATIONS ON ABRASIVE BLAST CLEANING

The specified limitations on the application of coatings also applies to blast cleaning. Do not blast clean when conditions would not permit the subsequent application of coating. Blast clean only the area that can be coated with primer or touch-up coating during the same day. In the event that a cleaned surface colors, oxidizes, or becomes moist, blast clean it again before applying the coating.

3.06 STANDARD BLAST-CLEANED PANELS

On the first day of abrasive blast cleaning, both on-site and off-site, prepare sample panels with a minimum size of 8 1/2 inches by 11 inches of the same steel plate as the tank for use in maintaining a standard during the work on the project. Achieve the specified surface profile and select with the Owner's Representative a panel illustrating the degree of cleaning specified. Both parties then initial the selected panel and coat it with a clear finish that will not fade or yellow. Submit panel to the Owner's Representative.

3.07 ABRASIVE BLAST CLEANING

- A. Use dry abrasive blast cleaning for metal surfaces. Use a maximum particle size to produce a 1.5- to 2.0-mil surface profile or as recommended by the manufacturer of the specified coating system. Measurement of surface profile will be in accordance with NACE RP0287-02. Sand used for cleaning shall be washed, uniformly graded, dry, and free of contaminants. Do not use abrasives that have become contaminated in automatic equipment. When field blast cleaning with hand-held nozzles, do not recycle or reuse blast particles.
- B. After blast cleaning and prior to application of coating, dry clean surfaces to be coated by dusting, sweeping, and vacuuming to remove residue from blasting. Apply the specified primer or touch-up coating within the period of an eight-hour working day. Do not apply coating over damp or moist surfaces. Reclean prior to application of primer or touch-up coating any blast-cleaned surface not coated within said eight-hour period.
- C. Keep the area of the work in a clean condition and do not permit blasting particles to accumulate and constitute a nuisance or hazard. Cover the reservoir inlet, outlet, drain, hydrants, and overflow piping, and prevent blasting particles from being blown into the piping.
- D. During blast cleaning, exercise caution to prevent damage to adjacent preapplied coatings. Schedule blast cleaning and coating such that dust, dirt, blast particles, old coatings, rust, mill scale, etc., will not damage or fall upon wet or newly coated surfaces. Restore any damaged coatings to their specified condition.

3.08 LIMITATIONS ON THE APPLICATION OF COATINGS

- A. Do not apply coatings under the following conditions:
  - 1. When the surrounding ambient air temperature or the temperature of the surface to be coated is below 50°F or as recommended by the manufacturer of the specified coating system.
  - 2. When the temperature of the surface to be coated is more than 5°F below the air temperature or when the surface temperature is over 120°F.
  - 3. When the surface to be coated is wet, moist, or contaminated with any foreign matter.
  - 4. During rain, snow, fog, or mist or when the relative humidity exceeds 85%.
  - 5. When the surface temperature is less than 5°F above the dew point within eight hours after application of coating.
- B. If above conditions are prevalent, the application of coating shall be delayed or postponed until conditions are favorable. Dew or moisture condensation should be anticipated, and if such conditions are prevalent, coating work shall be delayed until midmorning to be certain

that the surfaces are dry. The day's coating shall be completed in time to permit the film sufficient drying time prior to damage by climatic conditions.

- C. Climatic conditions will be monitored by the Owner's Representative utilizing psychrometers and other measuring gauges at the worksite to aid in inspection.
- D. If a change in climatic conditions damages a coating application, repair the damaged coatings to their specified condition.

### 3.09 PROCEDURES FOR THE APPLICATION OF COATINGS

- A. Conform to the requirements of SSPC PA-1. Follow the recommendations of the coating manufacturer including the selection of spray equipment, brushes, rollers, cleaners, thinners, mixing, drying time, temperature and humidity of application, and safety precautions.
- B. Stir, strain, and keep coating materials at a uniform consistency during application. Apply each coating evenly, free of brush marks, sags, runs, and other evidence of poor workmanship. Finished surfaces shall be free from holidays, defects, or blemishes.
- C. Use a different shade or tint on succeeding coating applications to indicate coverage.
- D. Prior to each coating application, brush coat with the coating material all welds, sharp edges, nuts, bolts, and irregular surfaces difficult to coat to provide complete coverage of all surfaces.
- E. Do not use thinners unless recommended by the coating manufacturer. If thinning is allowed, do not exceed the maximum allowable amount of thinner per gallon of coating material. Stir coating materials at all times when adding thinner. Do not flood the coating material surface with thinner prior to mixing. Do not reduce coating materials more than is absolutely necessary to obtain the proper application characteristics and to obtain the specified dry-film thicknesses.
- F. Remove dust, blast particles, and other debris from blast-cleaned surfaces by dusting, sweeping, and vacuuming. Allow ventilator fans to clean airborne dust to provide good visibility of working area prior to coating applications. Remove dust from coated surfaces by dusting, sweeping, and vacuuming prior to applying succeeding coats.
- G. Observe minimum and maximum recoat times between primer and succeeding coating applications to achieve maximum crosslinking of coatings. If the recommended minimum or maximum recoat time is exceeded, prepare the surface as directed by the coating manufacturer. Apply a second application of the primer or coating if the maximum recoat time has been exceeded.
- H. Apply coating systems to the specified minimum dry-film thicknesses as measured from above the peaks of the surface profile. Measurement shall be in accordance with SSPC PA-2 and shall be corrected for the magnetic effect of the surface profile.

- I. Apply primer or touch-up coating immediately after blast cleaning and before any surface rusting occurs or any dust, dirt, or any foreign matter has accumulated. Reclean steel surfaces by blast cleaning that have surface colored or become moist prior to coating application.

3.10 TANK SURFACES TO RECEIVE COATINGS: NONSUBMERGED, INTERMITTENTLY SUBMERGED, AND SUBMERGED CONDITIONS

Apply primers and coatings to the exterior surfaces of the steel water tank as follows:

- A. Field apply primer to exterior surfaces of roof plates and knuckle plates.
- B. Field apply primer to exterior surfaces of shell plates, access manholes, and other areas not specifically mentioned.

3.11 APPLICATION OF EXTERIOR COATING SYSTEM ON ROOF AND KNUCKLE PLATES AND SHELL PLATES

- A. Surface Preparation: Clean exterior surfaces, including ferrous metal accessories and piping, prior to primer application in accordance with SSPC SP-10.
- B. Primer: After surface preparation field apply one primer coat of inorganic zinc on the exterior surfaces of the roof and knuckle plates to a dry-film thickness of 3 mils.
- C. Treatment: Specified accessories are either hot-dipped galvanized or of aluminum construction. Field apply one coat of passivator or metal conditioner to treat the galvanized and aluminum surfaces prior to the application of the primer, touch-up, intermediate, and finish coats. Use the products as recommended by the coating manufacturer.
- D. Primer: After surface preparation and treatment, field apply one prime coat of epoxy on the exterior shell surfaces to a dry-film thickness of 3 mils.
- E. Intermediate: After observing specified recoat time and surface condition, field apply one intermediate coat of epoxy paint on the exterior surfaces to a dry-film thickness of 5 mils.
- F. Finish: After observing specified recoat time and surface condition, field apply one finish coat of polyurethane enamel on the exterior surfaces to a dry-film thickness of 2 mils. Use the color selected by the Owner.
- G. Total System: The total exterior coating system on shell plates shall have a minimum dry-film thickness of 10 mils. The total exterior coating system on roof and knuckle plates shall have a minimum dry-film thickness of 13 mils.

3.12 FIELD INSPECTION FACILITIES

Provide the Owner's Representative with facilities for inspection including:

- A. Illumination and labor to move the lights, whenever required by the Owner's Representative. Provide additional lights and supports sufficient to illuminate areas to be inspected. The Owner's Representative will determine the level of illumination required for inspection purposes.
- B. Temporary ladders and scaffolding. Erect and move to the locations requested by the Owner's Representative.

3.13 INSPECTION AND TESTING

- A. The Owner's Representative will perform such tests as are required to demonstrate substantial compliance with all phases of the surface preparation, abrasive blast cleaning, and application of the coating systems. Test equipment shall include but not be limited to the following: SSPC surface preparation standards, surface profile comparator, test tape, micrometer, abrasive sieve test, ultraviolet lamp, mirror, certified thickness calibration plates, magnetic-type dry-film thickness gauge, nondestructive holiday detector, and nonsudsing-type wetting agent. Equipment will be calibrated by the Owner's Representative in the presence of the Contractor to verify its accuracy prior to use. The Contractor shall provide the test equipment.
- B. Notify the Owner's Representative three working days in advance of field operations involving abrasive blast cleaning and coating applications.
- C. The Owner's Representative will verify the degree of surface cleanliness profile of the field blast cleaned surface. Perform additional blast cleaning over areas not conforming to the specified surface preparation.
- D. The Contractor shall inspect each coat of primer, touch-up, intermediate, and finish coating to determine thickness and integrity. Each coating application will be checked and deficiencies marked. After observing specified recoat time, apply additional coating materials over areas not having the specified minimum dry-film thickness and areas having any holidays or pinholes. After correction of deficiencies, the Contractor shall reinspect those areas to determine the acceptability of the additional coating. Each coating application must be 100% to the satisfaction of the Owner's Representative prior to succeeding coating applications.
- E. After completion of the epoxy coating curing cycle, conduct an MEK wipe test with a clean rag, using 25 rubs per each immersion test area on the floor and shell. Test areas will be selected at random by the Owner's Representative. The coating shall be considered cured if it retains its gloss and hardness after the MEK wipe test.

END OF SECTION

## SECTION 10 14 53

## TRAFFIC SIGNAGE

## 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 within the text by the basic designation only.

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS  
(AASHTO)

- AASHTO M 133 (2012) Standard Specification for Preservatives and Pressure Treatment Processes for Timber
- AASHTO M 168 (2007; R 2012) Standard Specification for Wood Products
- AASHTO M 268 (2014) Standard Specification for Retroreflective Sheeting for Flat and Vertical Traffic Control Applications

AMERICAN WOOD PROTECTION ASSOCIATION (AWPA)

- AWPA T1 (2015) Use Category System: Processing and Treatment Standard
- AWPA U1 (2015) Use Category System: User Specification for Treated Wood

ASTM INTERNATIONAL (ASTM)

- ASTM A1011/A1011M (2014) Standard Specification for Steel, Sheet, and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability and Ultra-High Strength
- ASTM A123/A123M (2013) Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
- ASTM A320/A320M (2015) Standard Specification for Alloy/Steel and Stainless Steel Bolting Materials for Low-Temperature Service
- ASTM A325 (2014) Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength
- ASTM A36/A36M (2014) Standard Specification for Carbon Structural Steel

ASTM A499	(2015) Standard Specification for Steel Bars and Shapes, Carbon Rolled from "T" Rails
ASTM A500/A500M	(2013) Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes
ASTM A563	(2015) Standard Specification for Carbon and Alloy Steel Nuts
ASTM A653/A653M	(2015) Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
ASTM A709/A709M	(2013a) Standard Specification for Structural Steel for Bridges
ASTM B209	(2014) Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate
ASTM B221	(2014) Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes
ASTM C94/C94M	(2015) Standard Specification for Ready-Mixed Concrete
ASTM D4956	(2013) Standard Specification for Retroreflective Sheeting for Traffic Control
ASTM F436	(2011) Hardened Steel Washers
U.S. FEDERAL HIGHWAY ADMINISTRATION (FHWA)	
FHWA SHS	(2004; Supplement 2012) Standard Highway Signs
MUTCD	(2009) Manual on Uniform Traffic Control Devices

## 1.2 GENERAL

All signs must be in accordance with the MUTCD. Any signs not detailed on the drawings must be in accordance with the FHWA SHS.

## 1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

Traffic Sign Posts

FHWA Acceptance Letter

Traffic Sign Retroreflective Sheeting

SD-04 Samples

Flexible Posts

## PART 2 PRODUCTS

### 2.1 TRAFFIC SIGN POSTS

#### 2.1.1 Steel Flanged Channel Section (U-Shape)

Fabricate steel posts from steel conforming to ASTM A36/A36M or ASTM A499 and with a minimum yield strength of 30 ksi and a minimum tensile strength of 50 ksi. Punch or drill 5/16 to 3/8 inch diameter holes spaced at 1 or 2 inch centers along the centerline of the web prior to galvanizing for the entire length of the post. Galvanize posts after punching in accordance with ASTM A123/A123M.

#### 2.1.2 Perforated Steel Tube

Fabricate steel posts from steel conforming to either ASTM A653/A653M, structural steel, Grade 50, Class 1, coating designation G90 or ASTM A1011/A1011M, structural steel, Grade 50, hot-dip galvanized after punching in accordance with ASTM A123/A123M. Prepunch holes approximately 7/16 inch in diameter spaced at approximately 1 inch centers along each side of the tube for the entire length of the post.

#### 2.1.3 Steel Tube

Steel tubing must conform to ASTM A500/A500M, Grade B or C, and must be hot-dip galvanized in accordance with ASTM A123/A123M.

#### 2.1.4 Structural Steel H Section

Structural steel posts must conform to ASTM A709/A709M, Grade 50 or 50W. Galvanize posts, fuse plate and splice plate after fabrication in accordance with ASTM A123/A123M.

##### 2.1.4.1 Slip Base, Fuse Plate and Splice Plate

Structural steel base plates and stiffener plates must conform to ASTM A36/A36M, minimum yield strength 50,000 psi.

##### 2.1.4.2 High-Strength Bolts, Nuts and Washers

High strength bolts must conform to ASTM A325. Nuts must conform to ASTM A563. Washers must conform to ASTM F436. High strength bolts, nuts and washers must be zinc coated.

#### 2.1.5 Wood

Wood posts must be dry no. 1 grade Douglas fir, southern or Ponderosa pine, hemlock, spruce, or western larch conforming to AASHTO M 168. Treat the posts with water-borne preservative according to AASHTO M 133, AWPA T1 and AWPA U1.

## 2.2 FLAT ALUMINUM SIGN PANELS

Aluminum sign panels must conform to ASTM B209, alloy-temper 6061-T6 or 5052-H38. The blanks must be free from laminations, blisters, open seams, pits, holes, other defects that may affect their appearance or use. The thickness must be uniform and the blank commercially flat.

## 2.3 EXTRUDED ALUMINUM SIGN PANELS

Extruded aluminum panels must conform to ASTM B221, alloy 6063-T6. The maximum allowable deviation from flat on the face is 0.05 inches per foot. Aluminum edge molding must be in accordance with ASTM A320/A320M or SAE J405d austenitic steel, minimum yield strength of 30,000 psi.

## 2.4 TRAFFIC SIGN RETROREFLECTIVE SHEETING

All background sheeting applied to flat sheet and extruded panel signs must be in accordance with ASTM D4956, Type III, IV, VII, VIII, IX or XI retroreflective sheeting and must have Class 1, 3, or 4 adhesive backing. Retroreflective sheeting must be high intensity that is an unmetallized micro prismatic reflective material.

Retroreflective sheeting must have sufficient adhesion, strength and flexibility such that the sheeting can be handled, processed and applied according to the manufacturer's recommendations without appreciable stretching, tearing, cracking or other damage.

### 2.4.1 Legend and Border

Apply retroreflective sheeting as legend and border in accordance with ASTM D4956, Type IX, XI, or AASHTO M 268 Type C or D, Class 1. Retroreflective sheeting must be an unmetallized cube corner microprismatic reflective material. Retroreflective sheeting applied as legend and border for specific signing applications, without a datum mark on the surface of the sheeting, must be evaluated for rotational sensitivity in accordance with AASHTO M 268, Section 3.3.1 and fabricated in accordance with AASHTO M 268, Section 3.3.2.

### 2.4.2 Screen Printed Transparent Colored Areas

For screen printed transparent colored areas or transparent colored overlay films on white sheeting, the coefficient of retroreflection (RA) must be no less than 70 percent of the original values for the corresponding color.

### 2.4.3 Adhesive Performance

Adhesive performance for retroreflective sheeting must be in accordance with ASTM D4956. The sheeting surface must be in condition to be readily screen processed and compatible with transparent overlay films, plus recommended transparent and opaque screen process colors. Furnish manufacturer's information as to the type of solvent or solvents that may be used to clean the surface of the sheeting without detrimental loss of performance and durability.

## 2.5 LETTERS, NUMERALS, ARROWS, SYMBOLS, AND BORDERS

Apply letters, numerals, arrows, symbols, and borders on the

retroreflective sheeting or opaque background of the sign using the direct or reverse screen process. Apply messages and borders of a color darker than the background to the paint or the retroreflective sheeting using the direct process. Messages and borders must be of a color lighter than the sign background and applied using the reverse screen process. Use opaque or transparent colors, inks, and paints of the type and quality recommended by the retroreflective sheeting manufacturer in the screen process. Perform the screening in a manner that results in a uniform color and tone, with sharply defined edges of legends and borders and without blemishes on the sign background that will affect intended use. Air dry or bake the signs after screening according to the manufacturer's recommendations to provide a smooth hard finish. Reject any signs with blister's or other blemishes.

## 2.6 DELINEATOR POSTS

### 2.6.1 Steel Posts

Steel posts must be fabricated from steel conforming to ASTM A36/A36M or ASTM A499 and must have a minimum yield strength of 30 ksi and a minimum tensile strength of 50 ksi. Posts must be galvanized after punching in accordance with ASTM A123/A123M.

### 2.6.2 Flexible Posts

Provide one-piece driveable or two-piece with driveable steel anchor flexible posts. Posts must be impact-resistant, integrally colored UV stabilized polymer or polycarbonate extrusion or fiberglass reinforced composite material. Other materials are subject to approval by the Contracting Officer's Representative. Include a retroreflective sheeting plate with each post as indicated.

## 2.7 DELINEATOR RETROREFLECTORS

### 2.7.1 Circular Prismatic Reflectors

Retroreflectors attached to steel posts must be a 3-inch minimum diameter acrylic plastic lens with prismatic optical elements and a smooth, clear, transparent face. Fabricate the back from similar material and fuse to the lens around the entire perimeter to form a homogeneous unit. Permanently seal the units against the intrusion of dust, water, or air. Mount the retroreflector unit in a housing fabricated from 0.063-inch aluminum alloy or similar, or from cold-rolled, hot dip, galvanized steel, having a thickness of 0.064 inches. Provide the indicated color.

### 2.7.2 Retroreflective Sheeting

A retroreflective sheeting plate must be applied to each flexible post by the post manufacturer and must be in accordance with ASTM D4956, Type III, IV, V, VII, VIII, IX or XI retroreflective sheeting. Retroreflective sheeting must be high intensity that is an unmetallized cube corner micro prismatic reflective material. Provide the size and color of the retroreflective sheeting plate as indicated.

## 2.8 HARDWARE

Bolts, nuts, post clips, lock and flat washers must be either aluminum alloy or commercial quality stainless steel, hot-dip galvanized or cadmium plated after fabrication. Bolts/nuts must be an approved tamper resistant

design. Provide fiber washers of commercial quality.

## 2.9 CONCRETE

ASTM C94/C94M, using 3/4 inch maximum aggregate, and having minimum compressive strength of 3000 psi at 28 days.

## PART 3 EXECUTION

### 3.1 SIGN POSTS

#### 3.1.1 Steel Flanged Channel Section/Perforated Square Steel Tube/ Round Steel Tube

Sign posts consist of a base post and sign post. Drive steel sign base posts with a suitable driving head. Attach sign posts to base posts. Replace any base posts damaged during driving or otherwise at no additional cost to the Government.

#### 3.1.2 Structural Steel H Section Posts

Tighten all breakaway assembly bolts in a systematic manner to the prescribed torque indicated. Loosen each breakaway assembly bolt and re-tighten to the required torque in the same order as the initial tightening. Burr the threads at the nut using a center punch to prevent the nut from loosening. Tighten nuts on hinge plate bolts to the required minimum bolt tension values indicated.

#### 3.1.3 Wood

Drill holes in the post as indicated.

### 3.2 SIGN PANELS

Clean, degrease and etch the face of metal panels using methods recommended by the retroreflective sheeting manufacturer. After cleaning and degreasing, apply retroreflective sheeting material to the sign panels as recommended by the manufacturer. Perform shearing, cutting and punching prior to preparing the blanks for application of reflective material. Holes must not be field drilled in any part of the panel. Use nylon washers recommended by the sign sheeting manufacturer between the bolt heads and sign faces on flat sheet aluminum signs. Replace any damaged sign panels at no additional cost to the Government.

### 3.3 DELINEATORS

Drive steel delineator posts into the ground in a manner that will not damage the post. Flexible delineator posts may be driven into the soil in accordance with the manufacturer's instructions or must be attached to a steel anchor. Demonstrate the method of installation for the Contracting Officer's Representative to verify that posts will be installed without being damaged.

### 3.4 LOCATION AND POSITION OF SIGNS

Locate and erect all signs in accordance with the drawings and MUTCD. Signs should be vertically mounted at right angles to the direction of, and facing, the traffic that they are intended to serve. Where mirror reflection from the sign face is encountered to such a degree as to reduce

legibility, turn the sign slightly away from the road. Turn signs that are placed 30 feet or more from the pavement edge toward the road. On curved alignments, determine the angle of placement by the direction of approaching traffic rather than by the roadway edge at the point where the sign is located. Mounted signs must present a smooth flat surface varying no more than 3/8 inch from a 4-foot straightedge placed in any position on the face of the sign after erection. Mount signs on traffic signal posts with strap or clamp type sign supports. Each installed sign will be inspected by the Contracting Officer's representative prior to acceptance by the Government.

-- End of Section --

## SECTION 26 00 00.00 20

## BASIC ELECTRICAL MATERIALS AND METHODS

## 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 the basic designation only.

## ASTM INTERNATIONAL (ASTM)

ASTM D709 (2013) Laminated Thermosetting Materials

## INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)

IEEE 100 (2000; Archived) The Authoritative Dictionary of IEEE Standards Terms

IEEE C2 (2012; Errata 2012; INT 1-4 2012; INT 5-7 2013; INT 8-10 2014; INT 11 2015) National Electrical Safety Code

IEEE C57.12.28 (2014) Standard for Pad-Mounted Equipment - Enclosure Integrity

IEEE C57.12.29 (2014) Standard for Pad-Mounted Equipment - Enclosure Integrity for Coastal Environments

## NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

NEMA 250 (2014) Enclosures for Electrical Equipment (1000 Volts Maximum)

## NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 70 (2014; AMD 1 2013; Errata 1 2013; AMD 2 2013; Errata 2 2013; AMD 3 2014; Errata 3-4 2014; AMD 4-6 2014) National Electrical Code

## 1.2 RELATED REQUIREMENTS

This section applies to all sections of Division 26, ELECTRICAL, of this project specification unless specified otherwise in the individual sections.

Section 26 12 21 SINGLE-PHASE PAD-MOUNTED TRANSFORMERS

## 1.3 DEFINITIONS

- a. Unless otherwise specified or indicated, electrical and electronics terms used in these specifications, and on the drawings, shall be as defined in IEEE 100.

- b. The technical sections referred to herein are those specification sections that describe products, installation procedures, and equipment operations and that refer to this section for detailed description of submittal types.
- c. The technical paragraphs referred to herein are those paragraphs in PART 2 - PRODUCTS and PART 3 - EXECUTION of the technical sections that describe products, systems, installation procedures, equipment, and test methods.

#### 1.4 ELECTRICAL CHARACTERISTICS

Electrical characteristics for this project shall be 120/240 volts single phase.

#### 1.5 ADDITIONAL SUBMITTALS INFORMATION

Submittals required in other sections that refer to this section must conform to the following additional requirements as applicable.

##### 1.5.1 Shop Drawings (SD-02)

Include wiring diagrams and installation details of equipment indicating proposed location, layout and arrangement, control panels, accessories, piping, ductwork, and other items that must be shown to ensure a coordinated installation. Wiring diagrams shall identify circuit terminals and indicate the internal wiring for each item of equipment and the interconnection between each item of equipment. Drawings shall indicate adequate clearance for operation, maintenance, and replacement of operating equipment devices.

##### 1.5.2 Product Data (SD-03)

Submittal shall include performance and characteristic curves.

#### 1.6 QUALITY ASSURANCE

##### 1.6.1 Regulatory Requirements

In each of the publications referred to herein, consider the advisory provisions to be mandatory, as though the word, "shall" had been substituted for "should" wherever it appears. Interpret references in these publications to the "authority having jurisdiction," or words of similar meaning, to mean the Contracting Officer. Equipment, materials, installation, and workmanship shall be in accordance with the mandatory and advisory provisions of NFPA 70 unless more stringent requirements are specified or indicated.

##### 1.6.2 Standard Products

Provide materials and equipment that are products of manufacturers regularly engaged in the production of such products which are of equal material, design and workmanship. Products shall have been in satisfactory commercial or industrial use for 2 years prior to bid opening. The 2-year period shall include applications of equipment and materials under similar circumstances and of similar size. The product shall have been on sale on the commercial market through advertisements, manufacturers' catalogs, or brochures during the 2-year period. Where two or more items of the same class of equipment

are required, these items shall be products of a single manufacturer; however, the component parts of the item need not be the products of the same manufacturer unless stated in the technical section.

#### 1.6.2.1 Alternative Qualifications

Products having less than a 2-year field service record will be acceptable if a certified record of satisfactory field operation for not less than 6000 hours, exclusive of the manufacturers' factory or laboratory tests, is furnished.

#### 1.6.2.2 Material and Equipment Manufacturing Date

Products manufactured more than 3 years prior to date of delivery to site shall not be used, unless specified otherwise.

### 1.7 WARRANTY

The equipment items shall be supported by service organizations which are reasonably convenient to the equipment installation in order to render satisfactory service to the equipment on a regular and emergency basis during the warranty period of the contract.

### 1.8 POSTED OPERATING INSTRUCTIONS

Provide for each system and principal item of equipment as specified in the technical sections for use by operation and maintenance personnel. The operating instructions shall include the following:

- a. Wiring diagrams, control diagrams, and control sequence for each principal system and item of equipment.
- b. Start up, proper adjustment, operating, lubrication, and shutdown procedures.
- c. Safety precautions.
- d. The procedure in the event of equipment failure.
- e. Other items of instruction as recommended by the manufacturer of each system or item of equipment.

Print or engrave operating instructions and frame under glass or in approved laminated plastic. Post instructions where directed. For operating instructions exposed to the weather, provide weather-resistant materials or weatherproof enclosures. Operating instructions shall not fade when exposed to sunlight and shall be secured to prevent easy removal or peeling.

### 1.9 MANUFACTURER'S NAMEPLATE

Each item of equipment shall have a nameplate bearing the manufacturer's name, address, model number, and serial number securely affixed in a conspicuous place; the nameplate of the distributing agent will not be acceptable.

### 1.10 FIELD FABRICATED NAMEPLATES

ASTM D709. Provide laminated plastic nameplates for each equipment enclosure, relay, switch, and device; as specified in the technical sections or as indicated on the drawings. Each nameplate inscription shall identify the function and, when applicable, the position. Nameplates shall be melamine plastic, 0.125 inch thick, white with black center core. Surface shall be matte finish. Corners shall be square. Accurately align lettering and engrave into the core. Minimum size of nameplates shall be one by 2.5 inches. Lettering shall be a minimum of 0.25 inch high normal block style.

### 1.11 ELECTRICAL REQUIREMENTS

Electrical installations shall conform to IEEE C2, NFPA 70, and requirements specified herein.

### 1.12 INSTRUCTION TO GOVERNMENT PERSONNEL

Where specified in the technical sections, furnish the services of competent instructors to give full instruction to designated Government personnel in the adjustment, operation, and maintenance of the specified systems and equipment, including pertinent safety requirements as required. Instructors shall be thoroughly familiar with all parts of the installation and shall be trained in operating theory as well as practical operation and maintenance work. Instruction shall be given during the first regular work week after the equipment or system has been accepted and turned over to the Government for regular operation. The number of man-days (8 hours per day) of instruction furnished shall be as specified in the individual section.

## PART 2 PRODUCTS

### 2.1 FACTORY APPLIED FINISH

Electrical equipment shall have factory-applied painting systems which shall, as a minimum, meet the requirements of NEMA 250 corrosion-resistance test.

## PART 3 EXECUTION

### 3.1 FIELD APPLIED PAINTING

Paint electrical equipment as required to match finish of adjacent surfaces or to meet the indicated or specified safety criteria.

### 3.2 FIELD FABRICATED NAMEPLATE MOUNTING

Provide number, location, and letter designation of nameplates as indicated. Fasten nameplates to the device with a minimum of two sheet-metal screws or two rivets.

### 3.3 WARNING SIGN MOUNTING

Provide the number of signs required to be readable from each accessible side, but space the signs a maximum of 30 feet apart.

-- End of Section --

## SECTION 26 05 00.00 40

## COMMON WORK RESULTS FOR ELECTRICAL

## 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 within the text by the basic designation only.

## ASTM INTERNATIONAL (ASTM)

ASTM D709 (2013) Laminated Thermosetting Materials

## ELECTRONIC INDUSTRIES ALLIANCE (EIA)

EIA 480 (1981) Toggle Switches

## INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)

IEEE C57.12.28 (2014) Standard for Pad-Mounted Equipment - Enclosure Integrity

IEEE C57.12.29 (2014) Standard for Pad-Mounted Equipment - Enclosure Integrity for Coastal Environments

IEEE Stds Dictionary (2009) IEEE Standards Dictionary: Glossary of Terms & Definitions

## INTERNATIONAL CODE COUNCIL (ICC)

ICC/ANSI A117.1 (2009) Accessible and Usable Buildings and Facilities

## NATIONAL AERONAUTICS AND SPACE ADMINISTRATION (NASA)

RCBEA GUIDE (2004) NASA Reliability Centered Building and Equipment Acceptance Guide

## NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

ANSI Z535.1 (2006; R 2011) American National Standard for Safety--Color Code

ANSI/NEMA OS 1 (2013) Sheet-Steel Outlet Boxes, Device Boxes, Covers, and Box Supports

ANSI/NEMA OS 2 (2013) Nonmetallic Outlet Boxes, Device Boxes, Covers, and Box Supports

NEMA 250 (2014) Enclosures for Electrical Equipment (1000 Volts Maximum)

NEMA FB 1	(2014) Standard for Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable
NEMA KS 1	(2013) Enclosed and Miscellaneous Distribution Equipment Switches (600 V Maximum)
NEMA PB 1	(2011) Panelboards
NEMA RN 1	(2005; R 2013) Polyvinyl-Chloride (PVC) Externally Coated Galvanized Rigid Steel Conduit and Intermediate Metal Conduit
NEMA TC 2	(2013) Standard for Electrical Polyvinyl Chloride (PVC) Conduit
NEMA TC 3	(2015) Standard for Polyvinyl Chloride (PVC) Fittings for Use With Rigid PVC Conduit and Tubing
NEMA VE 1	(2009) Standard for Metal Cable Tray Systems
NEMA WD 1	(1999; R 2005; R 2010) Standard for General Color Requirements for Wiring Devices
NEMA WD 6	(2012) Wiring Devices Dimensions Specifications

## NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 70	(2014; AMD 1 2013; Errata 1 2013; AMD 2 2013; Errata 2 2013; AMD 3 2014; Errata 3-4 2014; AMD 4-6 2014) National Electrical Code
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## UNDERWRITERS LABORATORIES (UL)

UL 1	(2005; Reprint Jul 2012) Standard for Flexible Metal Conduit
UL 1242	(2006; Reprint Mar 2014) Standard for Electrical Intermediate Metal Conduit -- Steel
UL 489	(2013; Reprint Mar 2014) Molded-Case Circuit Breakers, Molded-Case Switches, and Circuit-Breaker Enclosures
UL 506	(2008; Reprint Oct 2013) Specialty Transformers
UL 6	(2007; Reprint Nov 2014) Electrical Rigid Metal Conduit-Steel
UL 797	(2007; Reprint Dec 2012) Electrical Metallic Tubing -- Steel

UL 870 (2008; Reprint Feb 2013) Standard for Wireways, Auxiliary Gutters, and Associated Fittings

1.2 DEFINITIONS

- a. Unless otherwise specified or indicated, electrical and electronics terms used in these specifications, and on the drawings, are as defined in IEEE Stds Dictionary.
- b. The technical sections referred to herein are those specification sections that describe products, installation procedures, and equipment operations and that refer to this section for detailed description of submittal types.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submit the following in accordance with Section 01 33 00

SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Material, Equipment, and Fixture Lists; G

SD-03 Product Data

Conduits and Raceways; G

Wire and Cable; G

Splices and Connectors

Circuit Breakers; G

Dry-Type Distribution Transformers; G

SD-07 Certificates

Certification

SD-08 Manufacturer's Instructions

Manufacturer's Instructions; G

1.4 QUALITY ASSURANCE

Submit certification required to install equipment components and system packages.

## PART 2 PRODUCTS

Submit manufacturer's instructions including special provisions required to install equipment components and system packages. Special provisions detail impedances, hazards and safety precautions.

### 2.1 EQUIPMENT

Provide the standard cataloged materials and equipment of manufacturers regularly engaged in the manufacture of the products. For material, equipment, and fixture lists submittals, show manufacturer's style or catalog numbers, specification and drawing reference numbers, warranty information, and fabrication site.

#### 2.1.1 Conduits And Raceways

##### 2.1.1.1 Rigid Steel Conduit

Ensure rigid steel conduit complies with UL 6 and is galvanized by the hot-dip process. Use polyvinylchloride (PVC) coated rigid steel conduit in accordance with NEMA RN 1, where underground and in corrosive areas, or painted with bitumastic.

Use threaded fittings for rigid steel conduit.

Use solid gaskets. Ensure conduit fittings with blank covers have gaskets, except in clean, dry areas or at the lowest point of a conduit run where drainage is required.

Ensure covers have captive screws and are accessible after the work has been completed.

##### 2.1.1.2 Rigid Nonmetallic Conduit

Ensure rigid nonmetallic conduit complies with NEMA TC 2 and NEMA TC 3 with wall thickness not less than Schedule 40.

#### 2.1.3 Wire and Cable

Use copper 600-volt type THHN for conductors installed in conduit. Ensure all conductors AWG No. 8 and larger, are stranded. All conductors smaller than AWG No. 8 are solid.

Ensure flexible cable is Type SO and contain a grounding conductor with green insulation.

Ensure conductors installed in plenums are marked plenum rated.

#### 2.1.4 Circuit Breakers

Ensure circuit-breaker interrupting rating is not less than those indicated and in no event less than 10,000 amperes root-mean-square (rms) symmetrical at 240 volts, respectively. Multipole circuit breakers are the common-trip type with a single handle. Molded case circuit breakers are bolt-on type conforming to UL 489.

### 2.1.5 Manufacturer's Nameplate

Ensure each item of equipment has a nameplate bearing the manufacturer's name, address, model number, and serial number securely affixed in a conspicuous place; the nameplate of the distributing agent is not acceptable.

### 2.1.6 Dry-Type Distribution Transformers

General purpose dry-type transformers with windings 600 volts or less are two-winding, 60 hertz, self-cooled in accordance with UL 506. Ensure windings have a minimum of two 2-1/2-percent taps above and below nominal voltage.

## PART 3 EXECUTION

### 3.1 PREPARATION

Clean and paint conduit, supports, fittings, cabinets, pull boxes, and racks.

Protect metallic materials against corrosion. Provide equipment enclosures with the standard finish by the manufacturer when used for most indoor installations. Do not use aluminum when in contact with earth or concrete and, where connected to dissimilar metal, protect by approved fittings and treatment. Provide hot-dip galvanized ferrous metals such as, but not limited to, anchors, bolts, braces, boxes, bodies, clamps, fittings, guards, nuts, pins, rods, shims, thimbles, washers, and miscellaneous not of corrosion-resistant steel except where other equivalent protective treatment is specifically approved in writing.

### 3.2 INSTALLATION

#### 3.2.1 Conduits, Raceways And Fittings

Conduit runs between outlet and outlet, between fitting and fitting, or between outlet and fitting cannot contain more than the equivalent of three 90-degree bends, including those bends located immediately at the outlet or fitting.

Do not install crushed or deformed conduit. Avoid trapped conduit runs where possible. Take care to prevent the lodgment of foreign material in the conduit, boxes, fittings, and equipment during the course of construction. Clear any clogged conduit of obstructions or be replaced.

Conduit and raceway runs concealed in or behind walls, above ceilings, or exposed on walls and ceilings 5 feet or more above finished floors and not subject to mechanical damage may be electrical metallic tubing (EMT).

##### 3.2.1.1 Rigid Steel Conduit

Make field-made bends and offsets with approved hickey or conduit bending machine. Use long radius conduit for elbows larger than 2-1/2 inches.

Provide all conduit stubbed-up through concrete floors for connections to free-standing equipment with the exception of motor-control centers, cubicles, and other such items of equipment, with a flush coupling when the

floor slab is of sufficient thickness. Otherwise, provide a floor box set flush with the finished floor. For conduits installed for future use, terminate with a coupling and plug set flush with the floor.

### 3.2.1.2 Rigid Nonmetallic Conduit

Ensure rigid PVC conduit is direct buried.

Install a green insulated copper grounding conductor in conduit with conductors and solidly connect to ground at each end. Size grounding wires in accordance with NFPA 70.

### 3.2.1.3 Splices and Connectors

Make all splices in AWG No. 8 and smaller with approved indentor crimp-type connectors and compression tools.

Make all splices in AWG No. 6 and larger with bolted clamp-type connectors. Wrap joints with an insulating tape that has an insulation and temperature rating equivalent to that of the conductor.

### 3.2.2 Wiring

Color code feeder and branch circuit conductors as follows:

CONDUCTOR	COLOR AC
Phase A	Black
Phase B	Red
Phase C	Blue
Neutral	White
Equipment Grounds	Green

Use conductors up to and including AWG No. 2 that are manufactured with colored insulating materials. For conductors larger than AWG No. 2, have ends identified with color plastic tape in outlet, pull, or junction boxes.

Splice in accordance with the NFPA 70. Provide conductor identification within each enclosure where a tap, splice, or termination is made and at the equipment terminal of each conductor. Match terminal and conductor identification as indicated.

Where several feeders pass through a common pullbox, tag the feeders to clearly indicate the electrical characteristics, circuit number, and panel designation.

### 3.2.3 Boxes and Fittings

Furnish and install pullboxes where necessary in the conduit system to facilitate conductor installation. For conduit runs longer than 100 feet or

with more than three right-angle bends, install a pullbox at a convenient intermediate location.

Securely mount boxes and enclosures to the building structure with supporting facilities independent of the conduit entering or leaving the boxes.

#### 3.2.4 Dry-Type Distribution Transformers

Connect dry-type transformers with flexible metallic conduit.

#### 3.2.5 Field Fabricated Nameplates

Ensure nameplates conform to ASTM D709. Provide laminated plastic nameplates for each equipment enclosure, relay, switch, and device, as specified in the technical sections or as indicated on the drawings. Each nameplate inscription identifies the function and, when applicable, the position. Provide nameplates that are melamine plastic, 0.125 inch thick, white with black center core and a matte finish surface. Accurately align lettering and engrave into the core. Minimum size of nameplates is 1 by 2.5 inches. Lettering is a minimum of 0.25 inch high normal block style.

#### 3.2.6 Identification Plates And Warnings

Furnish and install identification plates for lighting and power panelboards, motor control centers, all line voltage heating and ventilating control panels, fire detector and sprinkler alarms, door bells, pilot lights, disconnect switches, manual starting switches, and magnetic starters. Attach identification plates to process control devices and pilot lights.

Furnish identification plates for all line voltage enclosed circuit breakers, identifying the equipment served, voltage, phase(s) and power source. For circuits 480 volts and above, install conspicuously located warning signs in accordance with OSHA requirements.

-- End of Section --

## SECTION 26 05 19.00 10

## INSULATED WIRE AND CABLE

## 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 within the text by the basic designation only.

## ASSOCIATION OF EDISON ILLUMINATING COMPANIES (AEIC)

AEIC CS8 (2013) Specification for Extruded Dielectric Shielded Power Cables Rated 5 Through 46 kV

## INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)

IEEE 383 (2003; R 2008) Standard for Qualifying Class 1E Electric Cables and, Field Splices for Nuclear Power Generating Stations 2004

## NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

NEMA WC 70 (2009) Power Cable Rated 2000 V or Less for the Distribution of Electrical Energy--S95-658

## 1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

Installation Instructions

SD-06 Test Reports

Tests, Inspections, and Verifications

## 1.3 DELIVERY, STORAGE, AND HANDLING

Furnish cables on reels or coils. Each cable and the outside of each reel or coil, shall be plainly marked or tagged to indicate the cable length, voltage rating, conductor size, and manufacturer's lot number and reel number. Each coil or reel of cable shall contain only one continuous cable without splices. Cables for exclusively dc applications, as specified in paragraph HIGH VOLTAGE TEST SOURCE, shall be identified as such

## PART 2 PRODUCTS

### 2.1 MATERIALS

#### 2.1.1 Wire Table

Furnish wire and cable in accordance with the requirements conforming to the detailed requirements specified herein.

#### 2.1.2 Rated Circuit Voltages

All wire and cable shall have minimum rated circuit voltages in accordance with NEMA WC 70.

#### 2.1.3 Conductors

##### 2.1.3.1 Material for Conductors

Conductors shall conform to all the applicable requirements of NEMA WC 70, as applicable, and shall be annealed copper. Copper conductors may be bare, or tin- or lead-alloy-coated, if required by the type of insulation used.

##### 2.1.3.2 Size

Minimum wire size shall be No. 12 AWG for power and lighting circuits; No. 10 AWG for current transformer secondary circuits; No. 14 AWG for potential transformer, relaying, and control circuits; No. 16 AWG for annunciator circuits; and No. 19 AWG for alarm circuits.

##### 2.1.3.3 Stranding

Conductor stranding classes cited herein shall be as defined in NEMA WC 70, as applicable. Lighting conductors No. 10 AWG and smaller shall be solid or have Class B stranding. Any conductors used between stationary and moving devices, such as hinged doors or panels, shall have Class H or K stranding. All other conductors shall have Class B or C stranding, except that conductors shown on the drawings, or in the schedule, as No. 12 AWG may be 19 strands of No. 25 AWG, and conductors shown as No. 10 AWG may be 19 strands of No. 22 AWG.

##### 2.1.3.4 Separator Tape

Where conductor shielding, strand filling, or other special conductor treatment is not required, a separator tape between conductor and insulation is permitted.

#### 2.1.4 Insulation

##### 2.1.4.1 Insulation Material

Provide insulation which is a cross-linked thermosetting polyethylene (XLPE) type, meeting the requirements of NEMA WC 70, as applicable, or an ethylene-propylene rubber (EPR) type meeting the requirements of NEMA WC 70.

#### 2.1.4.2 Insulation Thickness

The insulation thickness for each conductor shall be based on its rated circuit voltage.

- a. Power Cables/Single-Conductor Control Cables, 2,000 Volts and Below - The insulation thickness for single-conductor cables rated 2,000 volts and below shall be as required by NEMA WC 70, as applicable. Some thicknesses of NEMA WC 70 will be permitted only for single-conductor cross-linked thermosetting polyethylene insulated cables without a jacket. NEMA WC 70 ethylene-propylene rubber-insulated conductors shall have a jacket.
- c. Multiple-Conductor Control Cables - The insulation thickness of multiple-conductor cables used for control and related purposes shall be as required by NEMA WC 70, as applicable.

#### 2.1.5 Jackets

All cables shall have jackets meeting the requirements of NEMA WC 70, as applicable, and as specified herein. Individual conductors of multiple-conductor cables shall be required to have jackets only if they are necessary for the conductor to meet other specifications herein. Jackets of single-conductor cables and of individual conductors of multiple-conductor cables, except for shielded cables, shall be in direct contact and adhere or be vulcanized to the conductor insulation. Multiple-conductor cables and shielded single-conductor cables shall be provided with a common overall jacket, which shall be tightly and concentrically formed around the core. Repaired jacket defects found and corrected during manufacturing are permitted if the cable, including jacket, afterward fully meets these specifications and the requirements of the applicable standards.

##### 2.1.5.1 Jacket Material

The jacket shall be one of the materials listed below.

- a. General Use
  - (1) Heavy-duty black neoprene (NEMA WC 70).
  - (2) Heavy-duty chlorosulfonated polyethylene (NEMA WC 70).
  - (3) Heavy-duty cross-linked (thermoset) chlorinated polyethylene (NEMA WC 70).
- b. Accessible Use Only, 2,000 Volts or Less - Cables installed where they are entirely accessible, such as cable trays and raceways with removable covers, or where they pass through less than 10 feet of exposed conduit only, shall have jackets of one of the materials specified in above paragraph GENERAL USE, or the jackets may be of one of the following:
  - (1) General-purpose neoprene (NEMA WC 70).
  - (2) Black polyethylene (NEMA WC 70).
  - (3) Thermoplastic chlorinated polyethylene (NEMA WC 70).

#### 2.1.5.2 Jacket Thickness

The minimum thickness of the jackets at any point shall be not less than 80 percent of the respective nominal thicknesses specified below.

- a. Multiple-Conductor Cables - Thickness of the jackets of the individual conductors of multiple-conductor cables shall be as required by NEMA WC 70, and shall be in addition to the conductor insulation thickness required by Column B of Table 3-1 of the applicable NEMA publication for the insulation used. Thickness of the outer jackets or sheaths of the assembled multiple-conductor cables shall be as required by NEMA WC 70.
- b. Single-Conductor Cables - Single-conductor cables, if nonshielded, shall have a jacket thickness as specified in NEMA WC 70. If shielded, the jacket thickness shall be in accordance with the requirements of NEMA WC 70.

### 2.2 CABLE IDENTIFICATION

#### 2.2.1 Color-Coding

Insulation of individual conductors of multiple-conductor cables shall be color-coded in accordance with NEMA WC 70, except that colored braids will not be permitted. Only one color-code method shall be used for each cable construction type. Control cable color-coding shall be in accordance with NEMA WC 70. Power cable color-coding shall be black for Phase A, red for Phase B, blue for Phase C, white for grounded neutral, and green for an insulated grounding conductor, if included.

#### 2.2.2 Cabling

Individual conductors of multiple-conductor cables shall be assembled with flame-and moisture-resistant fillers, binders, and a lay conforming to NEMA WC 70, except that flat twin cables will not be permitted. Fillers shall be used in the interstices of multiple-conductor round cables with a common covering where necessary to give the completed cable a substantially circular cross section. Fillers shall be non-hygroscopic material, compatible with the cable insulation, jacket, and other components of the cable. The rubber-filled or other approved type of binding tape shall consist of a material that is compatible with the other components of the cable and shall be lapped at least 10 percent of its width.

#### 2.2.3 Dimensional Tolerance

The outside diameters of single-conductor cables and of multiple-conductor cables shall not vary more than 5 percent and 10 percent, respectively, from the manufacturer's published catalog data.

## PART 3 EXECUTION

### 3.1 INSTALLATION INSTRUCTIONS

Submit cable manufacturing data as requested. The following information shall be provided by the cable manufacturer for each size, conductor quantity, and type of cable furnished:

- a. Minimum bending radius, in inches - For multiple-conductor cables, this information shall be provided for both the individual conductors and the multiple-conductor cable.
- b. Pulling tension and sidewall pressure limits, in pounds.
- c. Instructions for stripping semiconducting insulation shields, if furnished, with minimum effort without damaging the insulation.
- d. Upon request, compatibility of cable materials and construction with specific materials and hardware manufactured by others shall be stated. Also, if requested, recommendations shall be provided for various cable operations, including installing, splicing, terminating, etc.

### 3.2 TESTS, INSPECTIONS, AND VERIFICATIONS

#### 3.2.1 Cable Data

Manufacture of the wire and cable shall not be started until all materials to be used in the fabrication of the finished wire or cable have been approved by the Contracting Officer. Cable data shall be submitted for approval including dimensioned sketches showing cable construction, and sufficient additional data to show that these specifications will be satisfied.

#### 3.2.2 Inspection and Tests

Inspection and tests of wire and cable furnished under these specifications shall be made by and at the plant of the manufacturer, and shall be witnessed by the Contracting Officer or his authorized representative, unless waived in writing. The Government may perform further tests before or after installation. Testing in general shall comply with NEMA WC 70. Specific tests required for particular materials, components, and completed cables shall be as specified in the sections of the above standards applicable to those materials, components, and cable types. Tests shall also be performed in accordance with the additional requirements specified below.

##### 3.2.2.1 High-Voltage Test Source

Where the applicable standards allow a choice, high-voltage tests for cables to be used exclusively on dc circuits shall be made with dc test voltages. Cables to be used exclusively on ac circuits shall be tested with ac test voltages. If both ac and dc will be present, on either the same or separate conductors of the cable, ac test voltages shall be used.

##### 3.2.2.2 Flame Tests

All multiple-conductor and single-conductor cable assemblies shall pass IEEE 383 flame tests, paragraph 2.5, using the ribbon gas burner. Single-conductor cables and individual conductors of multiple-conductor cables shall pass the flame test of NEMA WC 70. If such tests, however, have previously been made on identical cables, these tests need not be repeated. Instead, certified reports of the original qualifying tests shall be submitted. In this case the reports furnished under paragraph REPORTS,

shall verify that all of each cable's materials, construction, and dimensions are the same as those in the qualifying tests.

#### 3.2.2.3 Independent Tests

The Government may at any time make visual inspections, continuity or resistance checks, insulation resistance readings, power factor tests, or dc high-potential tests at field test values. A cable's failure to pass these tests and inspections, or failure to produce readings consistent with acceptable values for the application, will be grounds for rejection of the cable.

#### 3.2.2.4 Reports

Furnish results of tests made. No wire or cable shall be shipped until authorized. Lot number and reel or coil number of wire and cable tested shall be indicated on the test reports.

-- End of Section --

## SECTION 26 05 71.00 40

## LOW VOLTAGE OVERCURRENT PROTECTIVE DEVICES

## PART 1 GENERAL

Section 26 00 00.00 20 BASIC ELECTRICAL MATERIALS AND METHODS applies to work specified in this section.

## 1.1 REFERENCES

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

## AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI C39.1 (1981; R 1992) Requirements for Electrical Analog Indicating Instruments

## ASTM INTERNATIONAL (ASTM)

ASTM A167 (2011) Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip

ASTM A48/A48M (2003; R 2012) Standard Specification for Gray Iron Castings

ASTM D877 (2002; R 2007) Standard Test Method for Dielectric Breakdown Voltage of Insulating Liquids Using Disk Electrodes

## ELECTRONIC INDUSTRIES ALLIANCE (EIA)

EIA 443 (1979) NARM Standard for Solid State Relays Service

## INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)

IEEE C37.17 (2012) Standard for Trip Devices for AC and General-Purpose DC Low-Voltage Power Circuit Breakers

IEEE C37.90 (2005; R 2011) Standard for Relays and Relay Systems Associated With Electric Power Apparatus

IEEE C57.13 (2008; INT 2009) Standard Requirements for Instrument Transformers

IEEE C63.2 (2009) Standard for Electromagnetic Noise and Field Strength Instrumentation, 10 Hz to 40 GHz - Specifications

IEEE C63.4 (2014) American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz

IPC - ASSOCIATION CONNECTING ELECTRONICS INDUSTRIES (IPC)

IPC D330 (1992) Design Guide Manual

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

ANSI C12.1 (2008) Electric Meters Code for Electricity Metering

ANSI C78.23 (1995; R 2003) American National Standard for Incandescent Lamps - Miscellaneous Types

NEMA 107 (1987; R 1993) Methods of Measurement of Radio Influence Voltage (RIV) of High-Voltage Apparatus (inactive)

NEMA 250 (2014) Enclosures for Electrical Equipment (1000 Volts Maximum)

NEMA AB 3 (2013) Molded Case Circuit Breakers and Their Application

NEMA FU 1 (2012) Low Voltage Cartridge Fuses

NEMA ICS 1 (2000; R 2015) Standard for Industrial Control and Systems: General Requirements

NEMA ICS 2 (2000; R 2005; Errata 2008) Standard for Controllers, Contactors, and Overload Relays Rated 600 V

NEMA ICS 6 (1993; R 2011) Enclosures

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 70 (2014; AMD 1 2013; Errata 1 2013; AMD 2 2013; Errata 2 2013; AMD 3 2014; Errata 3-4 2014; AMD 4-6 2014) National Electrical Code

UNDERWRITERS LABORATORIES (UL)

UL 20 (2010; Reprint Feb 2012) General-Use Snap Switches

UL 489 (2013; Reprint Mar 2014) Molded-Case Circuit Breakers, Molded-Case Switches, and Circuit-Breaker Enclosures

UL 50 (2007; Reprint Apr 2012) Enclosures for Electrical Equipment, Non-environmental Considerations

UL 508 (1999; Reprint Oct 2013) Industrial Control Equipment

## 1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Protective Devices; G

SD-03 Product Data

Circuit Breakers; G

SD-08 Manufacturer's Instructions

Protective Devices; G

SD-10 Operation and Maintenance Data

Circuit Breakers; G

## PART 2 PRODUCTS

### 2.1 SYSTEM DESIGN

Submit Connection Diagrams showing the relations and connections of control devices and protective devices by showing the general physical layout of all controls, the interconnection of one system (or portion of system) with another, and internal tubing, wiring, and other devices.

Submit Fabrication Drawings for control devices and protective devices consisting of fabrication and assembly details performed in the factory.

### 2.2 CIRCUIT BREAKERS

Provide circuit breakers that conform to UL 489, and NEMA AB 3.

#### 2.2.1 Molded-Case Circuit Breakers

Provide molded case, manually operated, trip-free, circuit breakers, with inverse-time thermal-overload protection and instantaneous magnetic short-circuit protection as required. Completely enclose circuit breakers in a molded case, with the calibrated sensing element factory-sealed to prevent tampering.

Locate thermal-magnetic tripping elements in each pole of the circuit breaker, and provide inverse-time-delay thermal overload protection and instantaneous magnetic short-circuit protection. Provide instantaneous magnetic tripping element, that is adjustable and accessible from the front of the breaker on frame sizes larger than 100 amperes.

Size breaker as required for the continuous current rating of the circuit. Provide breaker class as required.

Provide sufficient interrupting capacity of the panel and lighting branch circuit breakers, to successfully interrupt the maximum short-circuit current imposed on the circuit at the breaker terminals. Provide circuit breaker interrupting capacities with a minimum of 10,000 amperes and that conform to NEMA AB 3.

Provide the common-trip type multipole circuit breakers having a single operating handle and a two-position on/off indication. Provide circuit breakers with temperature compensation for operation in an ambient temperature of 104 degrees F. Provide circuit breakers that have root mean square (rms) symmetrical interrupting ratings sufficient to protect the circuit being supplied. Interrupting ratings may have selective type tripping (time delay, magnetic, thermal, or ground fault).

Provide phenolic composition breaker body capable of having such accessories as handle-extension, handle-locking, and padlocking devices attached where required.

For circuit breakers used for meter circuit disconnects, meet the applicable requirements of NFPA 70 and are the motor-circuit protector type.

For circuit breakers used for service disconnection, provide an enclosed circuit-breaker type with external handle for manual operation. Provide sheet metal enclosures with a hinged cover suitable for surface mounting.

### PART 3 EXECUTION

#### 3.1 INSTALLATION

Install Control devices and protective devices that are not factory installed in equipment, in accordance with the manufacturer's recommendations. Field adjust and operations test the control and protective devices. Conform to NFPA 70, NEMA ICS 1 and NEMA ICS 2 requirements for installation of control and protective devices.

#### 3.2 FIELD TESTING

Demonstrate the operation and controls of protective devices of non-factory installed equipment.

Do not energize control and protective devices until recorded test data has been approved by the Contracting Officer. Provide final test reports with a cover letter/sheet clearly marked with the System name, Date, and the words Final Test Reports to the Contracting Officer for approval.

-- End of Section --

## SECTION 31 00 00

## EARTHWORK

## PART 1 GENERAL

## 1.1 MEASUREMENT PROCEDURES

## 1.1.1 Excavation

The unit of measurement for excavation and borrow will be the cubic yard, computed by the average end area method from cross sections taken before and after the excavation and borrow operations, including the excavation for ditches, gutters, and channel changes, when the material is acceptably utilized or disposed of as herein specified. The measurements will include authorized excavation of rock (except for piping trenches that is covered below), authorized excavation of unsatisfactory subgrade soil, and the volume of loose, scattered rocks and boulders collected within the limits of the work; allowance will be made on the same basis for selected backfill ordered as replacement. The measurement will not include the volume of subgrade material or other material that is scarified or plowed and reused in-place, and will not include the volume excavated without authorization or the volume of any material used for purposes other than directed. The volume of overburden stripped from borrow pits and the volume of excavation for ditches to drain borrow pits, unless used as borrow material, will not be measured for payment. The measurement will not include the volume of any excavation performed prior to the taking of elevations and measurements of the undisturbed grade.

## 1.1.2 Piping Trench Excavation

Measure trench excavation by the number of linear feet along the centerline of the trench and excavate to the depths and widths specified for the particular size of pipe. Replace unstable trench bottoms with a selected granular material. Include the additional width at manholes and similar structures, the furnishing, placing and removal of sheeting and bracing, pumping and bailing, and all incidentals necessary to complete the work required by this section.

## 1.1.3 Rock Excavation for Trenches

Measure and pay for rock excavation by the number of cubic yards of acceptably excavated rock material. Measure the material in place, but base volume on a maximum 30 inches width for pipes 12 inches in diameter or less, and a maximum width of 16 inches greater than the outside diameter of the pipe for pipes over 12 inches in diameter. Provide the measurement to include all authorized overdepth rock excavation as determined by the Contracting Officer. For manholes and other appurtenances, compute volumes of rock excavation on the basis of 1 foot outside of the wall lines of the structures.

## 1.1.4 Topsoil Requirements

Separate excavation, hauling, and spreading or piling of topsoil and related miscellaneous operations will be considered subsidiary obligations of the Contractor, covered under the contract unit price for excavation.

#### 1.1.5 Overhaul Requirements

Allow the unit of measurement for overhaul to be the station-yard. The overhaul distance will be the distance in stations between the center of volume of the overhaul material in its original position and the center of volume after placing, minus the free-haul distance in stations. The haul distance will be measured along the shortest route determined by the Contracting Officer as feasible and satisfactory. Do not measure or waste unsatisfactory materials for overhaul where the length of haul for borrow is within the free-haul limits.

#### 1.1.6 Select Granular Material

Measure select granular material in place as the actual cubic yards replacing wet or unstable material in trench bottoms in authorized overdepth areas. Provide unit prices which include furnishing and placing the granular material, excavation and disposal of unsatisfactory material, and additional requirements for sheeting and bracing, pumping, bailing, cleaning, and other incidentals necessary to complete the work.

### 1.2 PAYMENT PROCEDURES

Payment will constitute full compensation for all labor, equipment, tools, supplies, and incidentals necessary to complete the work.

#### 1.2.1 Classified Excavation

Classified excavation will be paid for at the contract unit prices per cubic yard for common or rock excavation.

#### 1.2.2 Piping Trench Excavation

Payment for trench excavation will constitute full payment for excavation and backfilling, including specified overdepth except in rock or unstable trench bottoms.

#### 1.2.3 Rock Excavation for Trenches

Payment for rock excavation will be made in addition to the price bid for the trench excavation, and will include all necessary drilling and all incidentals necessary to excavate and dispose of the rock. Select granular material, used as backfill replacing rock excavation, will not be paid for separately, but will be included in the unit price for rock excavation.

#### 1.2.4 Unclassified Excavation

Unclassified excavation will be paid for at the contract unit price per cubic yard for unclassified excavation.

#### 1.2.5 Classified Borrow

Classified borrow will be paid for at the contract unit prices per cubic yard for common or rock borrow.

#### 1.2.6 Unclassified Borrow

Unclassified borrow will be paid for at the contract unit price per cubic

yard for unclassified borrow.

#### 1.2.7 Authorized Overhaul

The number of station-yards of overhaul to be paid for will be the product of number of cubic yards of overhaul material measured in the original position, multiplied by the overhaul distance measured in stations of 100 feet and will be paid for at the contract unit price per station-yard for overhaul in excess of the free-haul limit as designated in paragraph DEFINITIONS.

#### 1.3 CRITERIA FOR BIDDING

Base bids on the following criteria:

- a. Surface elevations are as indicated.
- b. Pipes or other artificial obstructions, except those indicated, may be encountered.
- c. Ground water elevations indicated by the boring log were those existing at the time subsurface investigations were made and do not necessarily represent ground water elevation at the time of construction.
- d. Borrow material character is indicated by the boring logs.
- e. Hard materials and rock may be encountered in the excavation area.

#### 1.4 REFERENCES

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

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS  
(AASHTO)

AASHTO T 180 (2010) Standard Method of Test for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop

AASHTO T 224 (2010) Standard Method of Test for Correction for Coarse Particles in the Soil Compaction Test

ASTM INTERNATIONAL (ASTM)

ASTM C 136 (2006) Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates

ASTM D 1140 (2000; R 2006) Amount of Material in Soils Finer than the No. 200 (75-micrometer) Sieve

ASTM D 1556 (2007) Density and Unit Weight of Soil in Place by the Sand-Cone Method

ASTM D 1557	(2009) Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft <sup>3</sup> ) (2700 kN-m/m <sup>3</sup> )
ASTM D 2487	(2010) Soils for Engineering Purposes (Unified Soil Classification System)
ASTM D 422	(1963; R 2007) Particle-Size Analysis of Soils
ASTM D 4318	(2010) Liquid Limit, Plastic Limit, and Plasticity Index of Soils
ASTM D 6938	(2010) Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)

## 1.5 DEFINITIONS

### 1.5.1 Satisfactory Materials

Satisfactory materials comprise any materials classified by ASTM D 2487 as GW, GP, GM, GP-GM, GW-GM, GC, GP-GC, GM-GC, SW, SP, SM, SW-SM, SC, SW-SC, SP-SM, SP-SC, CL,. Satisfactory materials for grading comprise stones less than 6 inches.

### 1.5.2 Unsatisfactory Materials

Materials which do not comply with the requirements for satisfactory materials are unsatisfactory. Unsatisfactory materials also include man-made fills; trash; refuse; backfills from previous construction; and material classified as satisfactory which contains root and other organic matter. Notify the Contracting Officer when encountering any contaminated materials.

### 1.5.3 Cohesionless and Cohesive Materials

Cohesionless materials include materials classified in ASTM D 2487 as GW, GP, SW, and SP. Cohesive materials include materials classified as GC, SC, ML, CL, MH, and CH. Materials classified as GM and SM will be identified as cohesionless only when the fines are nonplastic. Perform testing, required for classifying materials, in accordance with ASTM D 4318, ASTM C 136, ASTM D 422, and ASTM D 1140.

### 1.5.4 Degree of Compaction

Degree of compaction required, except as noted in the second sentence, is expressed as a percentage of the maximum density obtained by the test procedure presented in ASTM D 1557 abbreviated as a percent of laboratory maximum density. Since ASTM D 1557 applies only to soils that have 30 percent or less by weight of their particles retained on the 3/4 inch sieve, express the degree of compaction for material having more than 30 percent by weight of their particles retained on the 3/4 inch sieve as a percentage of the maximum density in accordance with AASHTO T 180 and corrected with AASHTO T 224. To maintain the same percentage of coarse material, use the "remove and replace" procedure as described in NOTE 8 of Paragraph 7.2 in AASHTO T 180.

#### 1.5.5 Overhaul

Overhaul is the authorized transportation of satisfactory excavation or borrow materials in excess of the free-haul limit of [\_\_\_\_\_] stations. Overhaul is the product of the quantity of materials hauled beyond the free-haul limit, and the distance such materials are hauled beyond the free-haul limit, expressed in station yards.

#### 1.5.6 Topsoil

Provide as specified in Section 32 92 19, Hydro Seed.

#### 1.5.7 Hard/Unyielding Materials

Hard/Unyielding materials comprise weathered rock, dense consolidated deposits, or conglomerate materials which are not included in the definition of "rock" with stones greater than 18 inch in any dimension or as defined by the pipe manufacturer, whichever is smaller. These materials usually require the use of heavy excavation equipment, ripper teeth, or jack hammers for removal.

#### 1.5.8 Rock

Solid homogeneous interlocking crystalline material with firmly cemented, laminated, or foliated masses or conglomerate deposits, neither of which can be removed without systematic drilling and blasting, drilling and the use of expansion jacks or feather wedges, or the use of backhoe-mounted pneumatic hole punchers or rock breakers; also large boulders, buried masonry, or concrete other than pavement. Removal of hard material will not be considered rock excavation because of intermittent drilling and blasting that is performed merely to increase production.

#### 1.5.9 Unstable Material

Unstable materials are too wet to properly support the utility pipe, conduit, or appurtenant structure.

#### 1.5.10 Initial Backfill Material

Initial backfill consists of satisfactory materials free from rocks 6 inches or larger in any dimension or free from rocks of such size as recommended by the pipe manufacturer, whichever is smaller.

#### 1.5.11 Expansive Soils

Expansive soils are defined as soils that have a plasticity index equal to or greater than 15 when tested in accordance with ASTM D 4318.

### 1.6 SYSTEM DESCRIPTION

Subsurface soil boring logs are provided in the project basis of design report. These data represent the best subsurface information available at the borrow site; however, variations may exist in the subsurface between boring locations.

#### 1.6.1 Classification of Excavation

No consideration will be given to the nature of the materials, and all

excavation will be designated as unclassified excavation. [

#### 1.6.1.1 Common Excavation

Include common excavation with the satisfactory removal and disposal of all materials not classified as rock excavation.

#### 1.6.1.2 Rock Excavation

Submit notification of encountering rock in the project. Include rock excavation with blasting, excavating, grading, disposing of material classified as rock, and the satisfactory removal and disposal of boulders 1/2 cubic yard or more in volume. Include the removal of any concrete or masonry structures, except pavements, exceeding 1/2 cubic yard in volume that may be encountered in the work in this classification. If at any time during excavation, including excavation from borrow areas, the Contractor encounters material that may be classified as rock excavation, uncover such material and notify the Contracting Officer. Do not proceed with the excavation of this material until the Contracting Officer has classified the materials as common excavation or rock excavation and has taken cross sections as required. Failure on the part of the Contractor to uncover such material, notify the Contracting Officer, and allow ample time for classification and cross sectioning of the undisturbed surface of such material will cause the forfeiture of the Contractor's right of claim to any classification or volume of material to be paid for other than that allowed by the Contracting Officer for the areas of work in which such deposits occur.

### 1.7 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for [Contractor Quality Control approval.] [information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government.] Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

Utilization of Excavated Materials

SD-06 Test Reports

Testing

SD-07 Certificates

Testing

## PART 2 PRODUCTS

### 2.1 REQUIREMENTS FOR OFFSITE SOILS

Provide as specified in Section 31 23 00.00 20, Excavation and Fill.

### 2.2 MATERIAL FOR RIP-RAP

Provide as specified in Section 31 23 00.00 20 EXCAVATION AND FILL.

### 2.2.1 Bedding Material

Provide bedding material consisting of sand, gravel, or crushed rock, well graded, with a maximum particle size of 2 inches. Compose material of tough, durable particles. Allow fines passing the No. 200 standard sieve with a plasticity index less than six.

## PART 3 EXECUTION

### 3.1 STRIPPING OF TOPSOIL

Where indicated or directed, strip existing soils to a minimum depth of 6 inches. Transport and deposit in stockpiles convenient to areas that are to receive application of the topsoil later, or at locations indicated or specified by the Contracting Officer. Keep topsoil separate from other excavated materials, brush, litter, objectionable weeds, roots, stones larger than 2 inches in diameter, and other materials that would interfere with planting and maintenance operations. See Section 31 23 00.00 20 EXCAVATION AND FILL for further instructions.

### 3.2 GENERAL EXCAVATION

Perform excavation of every type of material encountered within the limits of the project to the lines, grades, and elevations indicated and as specified. Perform the grading in accordance with the typical sections shown and the tolerances specified in paragraph FINISHING. Transport satisfactory excavated materials and place in fill or embankment within the limits of the work. Excavate unsatisfactory materials encountered within the limits of the work below grade and replace with satisfactory materials as directed. Include such excavated material and the satisfactory material ordered as replacement in excavation. Dispose surplus satisfactory excavated material not required for fill or embankment in areas approved for surplus material storage or designated waste areas. Dispose unsatisfactory excavated material in designated waste or spoil areas. During construction, perform excavation and fill in a manner and sequence that will provide proper drainage at all times.

#### 3.2.1 Ditches, Gutters, and Channel Changes

Finish excavation of ditches, and channel changes by cutting accurately to the cross sections, grades, and elevations shown on the contract drawings. Do not excavate ditches below grades shown. Backfill the excessive open ditch excavation with satisfactory, thoroughly compacted, material or with suitable stone or cobble to grades shown. Dispose excavated material as shown or as directed, except in no case allow material be deposited a maximum 4 feet from edge of a ditch. Maintain excavations free from detrimental quantities of leaves, brush, sticks, trash, and other debris until final acceptance of the work.

#### 3.2.2 Drainage Structures

Make excavations to the lines, grades, and elevations shown, or as directed. Provide trenches and foundation pits of sufficient size to permit the placement and removal of forms for the full length and width of structure footings and foundations as shown. Clean rock or other hard foundation material of loose debris and cut to a firm, level, stepped, or serrated surface. Remove loose disintegrated rock and thin strata. Do not disturb the bottom of the excavation when concrete is to be placed in an excavated area. Do not excavate to the final grade level until just

before the concrete is to be placed.

### 3.2.3 Drainage

Provide for the collection and disposal of surface and subsurface water encountered during construction. Completely drain construction site during periods of construction to keep soil materials sufficiently dry. Construct storm drainage features (ponds/basins) at the earliest stages of site development, and throughout construction grade the construction area to provide positive surface water runoff away from the construction activity or provide temporary ditches, swales, and other drainage features and equipment as required to maintain dry soils. When unsuitable working platforms for equipment operation and unsuitable soil support for subsequent construction features develop, remove unsuitable material and provide new soil material as specified herein. It is the responsibility of the Contractor to assess the soil and ground water conditions presented by the plans and specifications and to employ necessary measures to permit construction to proceed.

### 3.2.4 Trench Excavation Requirements

Excavate the trench as recommended by the manufacturer of the pipe to be installed. Slope trench walls below the top of the pipe, or make vertical, and of such width as recommended in the manufacturer's printed installation manual. Provide vertical trench walls where no manufacturer's printed installation manual is available. Shore trench walls more than 4 feet high, cut back to a stable slope, or provide with equivalent means of protection for employees who may be exposed to moving ground or cave in. Excavate trench walls which are cut back to at least the angle of repose of the soil. Give special attention to slopes which may be adversely affected by weather or moisture content. Do not exceed the trench width below the pipe top of 24 inches plus pipe outside diameter (O.D.) for pipes of less than 24 inches inside diameter, and do not exceed 36 inches plus pipe outside diameter for sizes larger than 24 inches inside diameter. Where recommended trench widths are exceeded, provide redesign, stronger pipe, or special installation procedures by the Contractor. The Contractor is responsible for the cost of redesign, stronger pipe, or special installation procedures without any additional cost to the Government.

#### 3.2.4.1 Bottom Preparation

Grade the bottoms of trenches accurately to provide uniform bearing and support for the bottom quadrant of each section of the pipe. Excavate bell holes to the necessary size at each joint or coupling to eliminate point bearing. Remove stones of 3 inch or greater in any dimension, or as recommended by the pipe manufacturer, whichever is smaller, to avoid point bearing.

#### 3.2.4.2 Removal of Unyielding Material

Where unyielding material is encountered in the bottom of the trench, remove such material 4 inch below the required grade and replaced with suitable materials as provided in paragraph BACKFILLING AND COMPACTION.

#### 3.2.4.3 Removal of Unstable Material

Where unstable material is encountered in the bottom of the trench, remove such material to the depth directed and replace it to the proper grade

with select granular material as provided in paragraph BACKFILLING AND COMPACTION. When removal of unstable material is required due to the Contractor's fault or neglect in performing the work, the Contractor is responsible for excavating the resulting material and replacing it without additional cost to the Government.

#### 3.2.4.4 Excavation for Appurtenances

Provide excavation for manholes, catch-basins, inlets, or similar structures of sufficient size to permit the placement and removal of forms for the full length and width of structure footings and foundations as shown. Clean rock or loose debris and cut to a firm surface either level, stepped, or serrated, as shown or as directed. Remove loose disintegrated rock and thin strata. When concrete or masonry is to be placed in an excavated area, take special care not to disturb the bottom of the excavation. Do not excavate to the final grade level until just before the concrete or masonry is to be placed.

#### 3.2.5 Underground Utilities

The Contractor is responsible for movement of construction machinery and equipment over pipes and utilities during construction. Excavation made with power-driven equipment is not permitted within three feet of known Government-owned utility or subsurface construction. For work immediately adjacent to or for excavations exposing a utility or other buried obstruction, excavate by hand. Start hand excavation on each side of the indicated obstruction and continue until the obstruction is uncovered or until clearance for the new grade is assured. Support uncovered lines or other existing work affected by the contract excavation until approval for backfill is granted by the Contracting Officer. Report damage to utility lines or subsurface construction immediately to the Contracting Officer.

### 3.3 SELECTION OF BORROW MATERIAL

Select borrow material to meet the requirements and conditions of the particular fill or embankment for which it is to be used. Obtain borrow material from the borrow areas shown on Drawing Sheet No. C-110 or from approved private sources. Unless otherwise provided in the contract, the Contractor is responsible for obtaining the right to procure material, pay royalties and other charges involved, and bear the expense of developing the sources, including rights-of-way for hauling from the owners. Borrow material from approved sources on Government-controlled land may be obtained without payment of royalties. Unless specifically provided, do not obtain borrow within the limits of the project site without prior written approval. Consider necessary clearing, grubbing, and satisfactory drainage of borrow pits and the disposal of debris thereon related operations to the borrow excavation.

### 3.4 OPENING AND DRAINAGE OF EXCAVATION AND BORROW PITS

Notify the Contracting Officer sufficiently in advance of the opening of any excavation or borrow pit or borrow areas to permit elevations and measurements of the undisturbed ground surface to be taken. Except as otherwise permitted, excavate borrow pits and other excavation areas providing adequate drainage. Transport overburden and other spoil material to designated spoil areas or otherwise dispose of as directed. Provide neatly trimmed and drained borrow pits after the excavation is completed. Ensure that excavation of any area, operation of borrow pits, or dumping of spoil material results in minimum detrimental effects on

natural environmental conditions.

### 3.5 GRADING AREAS

Where indicated, divide work into grading areas within which satisfactory excavated material will be placed in embankments, fills, and required backfills. Do not haul satisfactory material excavated in one grading area to another grading area except when so directed in writing. Place and grade stockpiles of satisfactory, unsatisfactory, and wasted materials as specified. Keep stockpiles in a neat and well drained condition, giving due consideration to drainage at all times. Clear, grub, and seal by rubber-tired equipment, the ground surface at stockpile locations; separately stockpile excavated satisfactory and unsatisfactory materials. Protect stockpiles of satisfactory materials from contamination which may destroy the quality and fitness of the stockpiled material. If the Contractor fails to protect the stockpiles, and any material becomes unsatisfactory, remove and replace such material with satisfactory material from approved sources.

### 3.6 FINAL GRADE OF SURFACES TO SUPPORT CONCRETE

Do not excavate to final grade until just before concrete is to be placed. Only use excavation methods that will leave the foundation rock in a solid and unshattered condition. Roughen the level surfaces, and cut the sloped surfaces, as indicated, into rough steps or benches to provide a satisfactory bond. Protect all surfaces from erosion resulting from ponding or water flow.

### 3.7 GROUND SURFACE PREPARATION

#### 3.7.1 General Requirements

Remove and replace unsatisfactory material with satisfactory materials, as directed by the Contracting Officer, in surfaces to receive fill or in excavated areas. Scarify the surface to a depth of 6 inches before the fill is started. Plow, step, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so that the fill material will bond with the existing material. When subgrades are less than the specified density, break up the ground surface to a minimum depth of 6 inches, pulverizing, and compacting to the specified density.

### 3.8 UTILIZATION OF EXCAVATED MATERIALS

Dispose unsatisfactory materials removing from excavations into designated waste disposal or spoil areas. Use satisfactory material removed from excavations, insofar as practicable, in the construction of fills, embankments, subgrades, bedding (as backfill), and for similar purposes. Submit procedure and location for disposal of unused satisfactory material. Do not waste any satisfactory excavated material without specific written authorization. Dispose of satisfactory material, authorized to be wasted, in designated areas approved for surplus material storage or designated waste areas as directed. Clear and grub newly designated waste areas on Government-controlled land before disposal of waste material thereon.

### 3.9 BACKFILLING AND COMPACTION

Place satisfactory materials as specified in Section 31 23 00.00.20, Excavation and fill.

### 3.9.1 Trench Backfill

Backfill trenches as specified in Section 31 23 00.00 20, Excavation and fill.

### 3.9.2 Backfill for Appurtenances

After the inlet or similar structure has been constructed, place backfill in such a manner that the structure is not damaged by the shock of falling earth. Deposit the backfill material, compact it as specified for final backfill, and bring up the backfill evenly on all sides of the structure to prevent eccentric loading and excessive stress.

## 3.10 SPECIAL REQUIREMENTS

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

### 3.10.1 Rip-Rap Construction

Construct rip-rap as specified in Section 32 23 00.00 20, Excavation and fill.

#### 3.10.1.1 Bedding Placement

Spread bedding material uniformly to a thickness of at least 3 inches on prepared subgrade. Compaction of bedding is not required. Finish bedding to present even surface free from mounds and windrows.

## 3.11 EMBANKMENTS

### 3.11.1 Earth Embankments

Construct earth embankments from satisfactory materials free of organic material and rocks with any dimension greater than 3 inches. Place the material in successive horizontal layers of loose material not more than 8 inches in depth. Spread each layer uniformly on a soil surface that has been moistened or aerated as necessary, and scarified or otherwise broken up so that the fill will bond with the surface on which it is placed. After spreading, plow, disk, or otherwise break up each layer; moisten or aerate as necessary; thoroughly mix; and compact to at least 90 percent laboratory maximum density for cohesive materials or 95 percent laboratory maximum density for cohesionless materials. Finish compaction by sheepsfoot rollers, pneumatic-tired rollers, steel-wheeled rollers, vibratory compactors, or other approved equipment.

## 3.12 SUBGRADE PREPARATION

3.12.1 Prepare surfaces to receive satisfactory fill materials as specified in Section 32 23 00.00 20, Excavation and Fill.

## 3.13 FINISHING

Finish the surface of excavations, embankments, and subgrades to a smooth and compact surface in accordance with the lines, grades, and cross sections or elevations shown. Provide the degree of finish for graded areas within 0.1 foot of the grades and elevations indicated. Finish ditches in a manner that will result in effective drainage. Repair

graded, topsoiled, or backfilled areas prior to acceptance of the work, and re-established grades to the required elevations and slopes.

### 3.13.1 Subgrade and Embankments

During construction, keep embankments and excavations shaped and drained. Maintain ditches and drains along subgrade to drain effectively at all times. Do not disturb the finished subgrade by traffic or other operation.

### 3.14 PLACING TOPSOIL

Place Topsoil as specified in Section 32 92 19, Hydro Seed.

### 3.15 TESTING

Perform testing by a Department of the Navy (DON) validated commercial testing laboratory or the Contractor's validated testing facility. Submit qualifications of the DON validated commercial testing laboratory or the Contractor's validated testing facilities. If the Contractor elects to establish testing facilities, do not permit work requiring testing until the Contractor's facilities have been inspected, DON validated and approved by the Contracting Officer.

a. Determine field in-place density in accordance with ASTM D 6938. When ASTM D 6938 is used, check the calibration curves and adjust using only the sand cone method as described in ASTM D 1556. ASTM D 6938 results in a wet unit weight of soil in determining the moisture content of the soil when using this method.

b. Check the calibration curves furnished with the moisture gauges along with density calibration checks as described in ASTM D 6938; check the calibration of both the density and moisture gauges at the beginning of a job on each different type of material encountered and at intervals as directed by the Contracting Officer. When test results indicate, as determined by the Contracting Officer, that compaction is not as specified, remove the material, replace and recompact to meet specification requirements.

c. Perform tests on recompacted areas to determine conformance with specification requirements. Appoint a registered professional civil engineer to certify inspections and test results. These certifications shall state that the tests and observations were performed by or under the direct supervision of the engineer and that the results are representative of the materials or conditions being certified by the tests. The following number of tests, if performed at the appropriate time, will be the minimum acceptable for each type operation.

#### 3.15.1 Fill and Backfill Material Gradation

One test per 1,000 cubic yards stockpiled or in-place source material. Determine gradation of fill and backfill material in accordance with [ASTM C 136] [ASTM D 422] [ASTM D 1140].

#### 3.15.2 In-Place Densities

a. One test per 5,000 square feet, or fraction thereof, of each lift of fill or backfill areas compacted by other than hand-operated

machines.

b. One test per 5,000 square feet, or fraction thereof, of each lift of fill or backfill areas compacted by hand-operated machines.

### 3.15.3 Check Tests on In-Place Densities

If ASTM D 6938 is used, check in-place densities by ASTM D 1556 as follows:

a. One check test per lift for each 10,000 square feet, or fraction thereof, of each lift of fill or backfill compacted by other than hand-operated machines.

b. One check test per lift for each 10,000 square feet, of fill or backfill areas compacted by hand-operated machines.

c. One check test per day, minimum, in addition to requirements above.

### 3.15.4 Moisture Contents

In the stockpile, excavation, or borrow areas, perform a minimum of two tests per day per type of material or source of material being placed during stable weather conditions. During unstable weather, perform tests as dictated by local conditions and approved by the Contracting Officer.

### 3.15.5 Optimum Moisture and Laboratory Maximum Density

Perform tests for each type material or source of material including borrow material to determine the optimum moisture and laboratory maximum density values. One representative test per 1,500 cubic yards of fill and backfill, or when any change in material occurs which may affect the optimum moisture content or laboratory maximum density.

### 3.16 DISPOSITION OF SURPLUS MATERIAL

Provide surplus material or other soil material not required or suitable for filling or backfilling, and brush, refuse, stumps, roots, and timber as wasted in Government disposal area as directed by the contracting officer. Materials deemed acceptable to stockpile on Government property will be placed in a location to be determined by the contracting officer.

-- End of Section --

## SECTION 31 05 20

## GEOSYNTHETIC DRAINAGE LAYER

## 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 within the text by the basic designation only.

## ASTM INTERNATIONAL (ASTM)

ASTM D1505	(2010) Density of Plastics by the Density-Gradient Technique
ASTM D1603	(2011) Carbon Black Content in Olefin Plastics
ASTM D4218	(1996; R 2008) Determination of Carbon Black Content in Polyethylene Compounds by the Muffle-Furnace Technique
ASTM D4355	(2007) Deterioration of Geotextiles from Exposure to Light, Moisture and Heat in a Xenon-Arc Type Apparatus
ASTM D4491	(1999a; R 2009) Water Permeability of Geotextiles by Permittivity
ASTM D4533	(2011) Trapezoid Tearing Strength of Geotextiles
ASTM D4632	(2008) Grab Breaking Load and Elongation of Geotextiles
ASTM D4716	(2008) Determining the (In-Plane) Flow Rate Per Unit Width and Hydraulic Transmissivity of a Geosynthetic Using a Constant Head
ASTM D4751	(2004) Determining Apparent Opening Size of a Geotextile
ASTM D4833	(2007) Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products
ASTM D5035	(2011) Breaking Force and Elongation of Textile Fabrics (Strip Method)
ASTM D5199	(2011) Measuring Nominal Thickness of Geosynthetics
ASTM D5261	(2010) Measuring Mass Per Unit Area of

## Geotextiles

ASTM D7005

(2003; R 2008) Standard Test Method for Determining the Bond Strength (Ply Adhesion) of Geocomposites

## 1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

## SD-03 Product Data

Sampling and Testing;G  
Penetrations;G  
Construction Quality Control (QC) Laboratory;G

## SD-04 Samples

Geosynthetic Drainage Layer  
Seams and Overlaps

The Contractor shall also collect samples from Government provided geosynthetic drainage layer (geocomposite) for laboratory QA/QC testing and reporting.

## SD-06 Test Reports

Sampling and Testing;G  
Geosynthetic Drainage Layer;G

## 1.3 QUALITY ASSURANCE

Provide a construction quality control (QC) laboratory that has also performed quality assurance (QA) testing, if required, of geosynthetic drainage layers for at least five completed projects, having a total minimum area of 186,000 square meters (2 million square feet). Submit qualifications of laboratory which shall carry current accreditation via the Geosynthetic Accreditation Institute's Laboratory Accreditation Program (GAI-LAP) for the tests it will be required to perform.

## 1.4 DELIVERY, STORAGE, AND HANDLING

The QC inspector shall be present during delivery and unloading of the geosynthetic drainage layer. Ensure the drainage layer material has not been damaged during shipping, storage, or handling. Any drainage layer material found to be damaged shall be repaired or replaced. Accept delivery of material only after the required submittals have been approved. Each roll shall be labeled with the manufacturer's name, product identification, lot number, roll number, and roll dimensions. Rolls that have attached geotextiles shall be individually wrapped in plastic. Store the rolls in a level and dry area.

## PART 2 PRODUCTS

## 2.1 GEOSYNTHETIC DRAINAGE LAYER

The polymer used to manufacture the geonet component of the geosynthetic drainage layer shall be polyethylene which is clean and free of any foreign contaminants. Submit one properly identified 610 by 610 mm (24 by 24 inch) minimum size geosynthetic drainage layer sample; fasteners

proposed for use; and the method of seaming and overlapping. Submit manufacturer's quality control test results. Regrind material which consists of edge trimmings and other scraps may be used to manufacture the geonet; however, post-consumer recycled materials shall not be used. Conform the geosynthetic drainage layer to the property requirements listed in Table 1. Component criteria for the geonet alone and geotextile alone are also listed in Table 1. The geonet shall be covered on both sides with nonwoven geotextile. Create geocomposite by heat bonding geotextile to the geonet. The geotextile shall not be bonded to the drainage net within 150 mm (6 inches) of the edges of the rolls. Where applicable, Table 1 property values represent minimum average roll values (MARV). The value for AOS represents the maximum average roll value (MaxARV).

TABLE 1 - GEOSYNTHETIC DRAINAGE LAYER PROPERTIES

PROPERTY	TEST METHOD	TEST VALUE	MINIMUM MQC TESTING FREQUENCY
<b>GEONET</b>			
Thickness, minimum avg, Note 1	ASTM D5199	200 mil	100,000 SF
Polymer Density, minimum avg	ASTM D1505	0.940 g/cc	100,000 SF
Carbon Black Content	ASTM D1603 ASTM D4218	1-3 percent	100,000 SF
Tensile Strength, minimum avg, Note 2	ASTM D5035	45 lbs/in	100,000 SF
<b>GEOTEXTILE</b>			
Mass/Unit Area, MARV	ASTM D5261	6.0 oz/SY	100,000 SF
Grab Strength, MARV	ASTM D4632	157 lbs	100,000 SF
Grab Elongation, MARV	ASTM D4632	50 percent	100,000 SF
Tear Strength, MARV	ASTM D4533	55 lbs	100,000 SF
Puncture Strength, MARV	ASTM D4833	55 lbs	100,000 SF
Permittivity, MARV	ASTM D4491	.2/sec	500,000 SF
AOS(O95), MaxARV	ASTM D4751	.25 mm	500,000 SF
UV Stability, percent retained (500 hrs)	ASTM D4355	50 percent	Note 3
<b>GEOCOMPOSITE</b>			
Transmissivity, min, including attached geotextiles Note 4	ASTM D4716	0.5 gal/ min-foot	200,000 SF
Geonet/Geotextile Adhesion,	ASTM D7005	0.5 lbs/inch	100,000 SF

TABLE 1 - GEOSYNTHETIC DRAINAGE LAYER PROPERTIES

PROPERTY	TEST METHOD	TEST VALUE	MINIMUM MQC TESTING FREQUENCY
minimum avg, Note 5			

Note 1: The diameter of the presser foot shall be 2.22 inches and the pressure shall be 2.9 psi. For other thickness options, see manufacturer's literature.

Note 2: This is the average peak value for five equally spaced machine direction tests across the roll width.

Note 3: Manufacturer's historical data.

Note 4: Measure manufacturing quality control transmissivity tests using a gradient of 0.1 under a normal pressure. Use a minimum seating period of 15 minutes. Perform the test between rigid end platens.

Note 5: Average of five tests across the roll width. Discounting the outer 305 mm of each side of the roll, collect samples at the 10, 30, 50, 70, and 90 percent positions across the roll width. Test both sides for double sided geocomposites.

## 2.2 SAMPLING AND TESTING

### 2.2.1 Manufacturing Quality Control Testing

Manufacturing quality control test methods and frequencies shall be in accordance with Table 1 unless otherwise approved. Submit manufacturer's quality control manual and construction quality control test results.

### 2.2.2 Construction Quality Control Testing

Perform a minimum of one construction quality control transmissivity test.

## PART 3 EXECUTION

### 3.1 INSTALLATION

#### 3.1.1 Surface Preparation

Prior to placement of the geosynthetic drainage layer, the subgrade shall be smooth and free of all materials which could damage the drainage layer.

#### 3.1.2 Placement

The geosynthetic drainage layer shall not be damaged during placement. Unroll the drainage layer in the direction of maximum slope, keeping the net flat against the subgrade to minimize wrinkles and folds. The drainage layer shall not be dragged across textured geomembrane if a geotextile is attached to the surface facing the geomembrane. Place adequate ballast (e.g. sandbags) to prevent uplift by wind prior to covering.

### 3.1.3 Seams and Overlaps

#### 3.1.3.1 Geonet Side Seams

Overlap geonet side seams a minimum of 100 mm ( 4 inches). Side seam fastener spacing shall be a maximum of 1.5 m ( 5 feet). In anchor trenches (if required), fastener spacing shall be a maximum of 305 mm (1 foot).

#### 3.1.3.2 Geonet End Seams

Overlap geonet end seams a minimum of 305 mm (1 foot). End seam fastener spacing shall be a maximum of 305 mm (1 foot). The overlaps shall be in the direction of flow.

#### 3.1.3.3 Geonet Fasteners

Tie geonet rolls together with plastic fasteners. The fasteners shall be a contrasting color from the geonet and attached geotextiles. Metallic fasteners will not be allowed.

#### 3.1.3.4 Geotextile Seams

The geotextile component of the geocomposite shall be overlapped in the direction of flow.

#### 3.1.3.5 Geotextile Cap Strips

Place geotextile cap strips over any exposed edges of geocomposite. Cap strips shall be a minimum of 610 mm (2 feet) in width and shall be thermally bonded to the geotextile component of the geocomposite.

### 3.1.4 Stacked Geosynthetic Drainage Layers

When geosynthetic drainage layers are to be stacked, stagger roll ends and edges so that joints do not lie above one another.

### 3.1.5 Corners

In the corners of landfill liner side slopes, install an extra layer of drainage layer material from the top to the bottom of the slope.

### 3.1.6 Penetrations

Submit penetration details. Mechanically attach a geotextile apron to pipes and other appurtenances penetrating through the drainage layer so that soil is prevented from getting into the drainage layer. The apron of the attached geotextile shall extend out from the pipe or appurtenance a minimum of 610 mm (2 feet). The apron geotextile shall be thermally bonded to the geotextile component of the geocomposite.

## 3.2 REPAIRS

### 3.2.1 Geonet Damage

Make repairs by placing a patch of the geosynthetic drainage layer over the damaged area. Extend the patch a minimum of 610 mm (2 feet) beyond the edge of the damage. Use approved fasteners, spaced every 150 mm (6 inches) around the patch, to hold the patch in place. If more than 25 percent of the roll width is damaged, approval must be obtained to repair

or replace the damaged roll.

### 3.2.2 Geotextile Damage

Repair damaged geotextile by placing a patch of geotextile over the damaged area with a minimum of 305 mm ( 12 inches) of overlap in all directions. The geotextile patch shall be thermally bonded in place.

### 3.3 PROTECTION AND BACKFILLING

Cover the geosynthetic drainage layer with the specified materials within 14 days of acceptance. Place cover soil from the bottom of the slope upward and shall not be dropped directly onto the drainage layer from a height greater than 915 mm (3 feet). The cover soil shall be pushed out over the geosynthetic drainage layer in an upward tumbling motion so that wrinkles in the drainage layer do not fold over. No equipment shall be operated on the top surface of the geosynthetic drainage layer without permission from the Contracting Officer. The initial loose soil lift thickness shall be 305 mm (12 inches). Use equipment with ground pressures no greater than 50 kPa (7 psi) to place the first lift of soil. A minimum of 460 mm (18 inches) of soil shall be maintained between construction equipment with a ground pressure greater than 50 kPa (7 psi) and the drainage layer. Cover soil compaction and testing requirements are described in Section 31 00 00 EARTHWORK.

-- End of Section --

## SECTION 31 11 00

## CLEARING AND GRUBBING

## PART 1 GENERAL

## 1.1 DELIVERY, STORAGE, AND HANDLING

Deliver materials to store at the site, and handle in a manner which will maintain the materials in their original manufactured or fabricated condition until ready for use.

## PART 2 PRODUCTS

NOT USED

## PART 3 EXECUTION

## 3.1 PROTECTION

## 3.1.1 Trees, Shrubs, and Existing Facilities

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.

## 3.1.2 Utility Lines

Protect existing utility lines that are indicated to remain from damage. Notify the Contracting Officer immediately of damage to or an encounter with an unknown existing utility line. The Contractor is responsible for the repairs of damage to existing utility lines that are indicated or made known to the Contractor prior to start of clearing and grubbing operations. When utility lines which are to be removed are encountered within the area of operations, notify the Contracting Officer in ample time to minimize interruption of the service. Refer to Section 01 30 00, ADMINISTRATIVE REQUIREMENTS and Section 01 57 19.00 20, TEMPORARY ENVIRONMENTAL CONTROLS for additional utility protection.

## 3.2 CLEARING

Clearing shall consist of the felling, trimming, and cutting of trees into sections and the satisfactory disposal of the trees and other vegetation designated for removal, including downed timber, snags, brush, and rubbish occurring within the areas to be cleared. 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. 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.

## 3.3 GRUBBING

Grubbing shall consist of the removal and disposal of stumps, roots larger than 3 inches in diameter, and matted roots from the designated grubbing

areas. 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 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.

### 3.4 DISPOSAL OF MATERIALS

#### 3.4.1 Nonsaleable Materials

Written permission to dispose of such products on private property shall be filed with the Contracting Officer. Logs, stumps, roots, brush, rotten wood, and other refuse from the clearing and grubbing operations, except for salable timber, shall be disposed of outside the limits of Government-controlled land at the Contractor's responsibility, except when otherwise directed in writing. Such directive will state the conditions covering the disposal of such products and will also state the areas in which they may be placed. Disposal of refuse and debris and any accidental loss or damage attendant thereto shall be the Contractor's responsibility.]

-- End of Section --

## SECTION 31 23 00.00 20

## EXCAVATION AND FILL

## 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 the basic designation only.

## AMERICAN WATER WORKS ASSOCIATION (AWWA)

AWWA C600 (2010) Installation of Ductile-Iron Water Mains and Their Appurtenances

## ASTM INTERNATIONAL (ASTM)

ASTM C 136 (2006) Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates

ASTM C 33/C 33M (2011) Standard Specification for Concrete Aggregates

ASTM D 1140 (2000; R 2006) Amount of Material in Soils Finer than the No. 200 (75-micrometer) Sieve

ASTM D 1556 (2007) Density and Unit Weight of Soil in Place by the Sand-Cone Method

ASTM D 1557 (2009) Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft<sup>3</sup>) (2700 kN-m/m<sup>3</sup>)

ASTM D 2216 (2010) Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass

ASTM D 2321 (2011) Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications

ASTM D 2487 (2010) Soils for Engineering Purposes (Unified Soil Classification System)

ASTM D 3786/D 3786M (2009) Hydraulic Bursting Strength of Textile Fabrics-Diaphragm Bursting Strength Tester Method

ASTM D 422 (1963; R 2007) Particle-Size Analysis of Soils

ASTM D 4318 (2010) Liquid Limit, Plastic Limit, and Plasticity Index of Soils

ASTM D 4355	(2007) Deterioration of Geotextiles from Exposure to Light, Moisture and Heat in a Xenon-Arc Type Apparatus
ASTM D 4533	(2004; R 2009) Trapezoid Tearing Strength of Geotextiles
ASTM D 4632	(2008) Grab Breaking Load and Elongation of Geotextiles
ASTM D 4751	(2004) Determining Apparent Opening Size of a Geotextile
ASTM D 4759	(2002; R 2007) Determining the Specification Conformance of Geosynthetics
ASTM D 4833	(2007) Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products
ASTM D 6938	(2010) Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)
ASTM D 698	(2007e1) Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/cu. ft. (600 kN-m/cu. m.))

## 1.2 DEFINITIONS

### 1.2.1 Degree of Compaction

Degree of compaction is expressed as a percentage of the maximum density obtained by the test procedure presented in ASTM D 1557, for general soil types, abbreviated as percent laboratory maximum density.

### 1.2.2 Hard Materials

Weathered rock, dense consolidated deposits, or conglomerate materials which are not included in the definition of "rock" but which usually require the use of heavy excavation equipment, ripper teeth, or jack hammers for removal.

### 1.2.3 Rock

Solid homogeneous interlocking crystalline material with firmly cemented, laminated, or foliated masses or conglomerate deposits, neither of which can be removed without systematic drilling and blasting, drilling and the use of expansion jacks or feather wedges, or the use of backhoe-mounted pneumatic hole punchers or rock breakers; also large boulders, buried masonry, or concrete other than pavement exceeding 1 cubic yard in volume. Removal of hard material will not be considered rock excavation because of intermittent drilling and blasting that is performed merely to increase production.

### 1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

#### SD-06 Test Reports

Select material test

Density tests

Moisture Content Tests

Copies of all laboratory and field test reports within 24 hours of the completion of the test.

### 1.4 DELIVERY, STORAGE, AND HANDLING

Perform in a manner to prevent contamination or segregation of materials.

### 1.5 CRITERIA FOR BIDDING

Base bids on the following criteria:

- a. Surface elevations are as indicated.
- b. Pipes or other artificial obstructions, except those indicated, may be encountered.
- c. Material character at the borrow site is indicated by the boring logs.
- d. Hard materials and rock may be encountered in areas to be excavated.
- e. Borrow material in the quantities required may be available at the project site. If the quantity of satisfactory materials required to complete the work cannot be excavated at the borrow site, then additional material will be required to be imported from an alternate source. The alternate source shall be located and associated work directed by the Contracting officer.
- f. Blasting will not be permitted. Remove material in an approved manner.
- g. The borrow site is situated in a previously excavated area that has been backfilled with various waste materials. Removal and disposing of unsatisfactory or otherwise deleterious materials may be required as part of the excavation work at the borrow site.

### 1.6 REQUIREMENTS FOR OFF SITE SOIL

Soils brought in from off site for use as topsoil shall be tested for VOCs (EPA Method 8260B), SVOCs (EPA Method 8270C, Pesticides (EPA Method 8082) PCBs (EPA Method 8080) and metals(EPA Method 6010) in accordance with EPA SW-846. Provide Borrow Site Testing for TPH and TCLP from a composite sample of material from the borrow site, with at least one test for every 3,800 cubic meters (4,970 cubic yards) from each borrow site. Material

shall not be brought on site until tests have been approved by the Contracting Officer.

## 1.7 QUALITY ASSURANCE

### 1.7.1 Utilities

Movement of construction machinery and equipment over pipes and utilities during construction shall be at the Contractor's risk. Excavation made with power-driven equipment is not permitted within three feet of known Government-owned utility or subsurface construction. For work immediately adjacent to or for excavations exposing a utility or other buried obstruction, excavate by hand. Start hand excavation on each side of the indicated obstruction and continue until the obstruction is uncovered or until clearance for the new grade is assured. Support uncovered lines or other existing work affected by the contract excavation until approval for backfill is granted by the Contracting Officer. Report damage to utility lines or subsurface construction immediately to the Contracting Officer.

## PART 2 PRODUCTS

### 2.1 SOIL MATERIALS

#### 2.1.1 Satisfactory Materials

Any materials classified by ASTM D 2487 as GW, GP, GM, GP-GM, GW-GM, GC, GP-GC, GM-GC, SW, SP, SM, SW-SM, SC, SW-SC, SP-SM, SP-SC, CL, free of debris, roots, wood, scrap material, vegetation, refuse, soft unsound particles, and deleterious, or objectionable materials. Unless specified otherwise, the maximum particle diameter shall be one-half the lift thickness at the intended location.

#### 2.1.2 Unsatisfactory Materials

Materials which do not comply with the requirements for satisfactory materials. Unsatisfactory materials also include man-made fills, trash, refuse, or backfills from previous construction. Unsatisfactory material also includes material classified as satisfactory which contains root and other organic matter, and stones larger than 3 inches. The Contracting Officer shall be notified of any contaminated materials.

#### 2.1.3 Cohesionless and Cohesive Materials

Cohesionless materials include materials classified in ASTM D 2487 as GW, GP, SW, and SP. Cohesive materials include materials classified as GC, SC, ML, CL, MH, and CH. Materials classified as GM, GP-GM, GW-GM, SW-SM, SP-SM, and SM shall be identified as cohesionless only when the fines are nonplastic (plasticity index equals zero). Materials classified as GM and SM will be identified as cohesive only when the fines have a plasticity index greater than zero.

#### 2.1.4 Expansive Soils

Soils that have a plasticity index equal to or greater than 15 when tested in accordance with ASTM D 4318.

#### 2.1.5 Common Fill

Satisfactory, soil material with the characteristics required to compact

to the soil density specified for the intended location.

#### 2.1.6 Topsoil

Provide as specified in Section 32 92 19 HYDRO SEED.

### 2.2 UTILITY BEDDING MATERIAL

Except as specified otherwise in the individual piping section, provide bedding for buried piping in accordance with AWWA C600, Type 4, except as specified herein. Backfill to top of pipe shall be compacted to 95 percent of ASTM D 1557 maximum density. Plastic piping shall have bedding to spring line of pipe. Provide ASTM D 2321 materials as follows:

- a. Class I: Angular, 0.25 to 1.5 inches, graded stone, including a number of fill materials that have regional significance such as coral, crushed stone, and crushed shells.
- b. Class II: Coarse sands and gravels with maximum particle size of 1.5 inches, including various graded sands and gravels containing small percentages of fines, generally granular and noncohesive, either wet or dry. Soil Types GW, GP, SW, and SP are included in this class as specified in ASTM D 2487.

#### 2.2.1 Sand

Clean, coarse-grained sand classified as SW or SP by ASTM D 2487 for bedding as indicated.

#### 2.2.2 Gravel

Clean, coarsely graded natural gravel, crushed stone or a combination thereof having a classification of GW GP in accordance with ASTM D 2487 for bedding as indicated. Maximum particle size shall not exceed 1 inch.

### 2.3 BORROW

Obtain borrow materials required in excess of those furnished from excavations from sources outside of Government property, except that borrow materials conforming to common fill may be obtained from the Government borrow pit. The Government borrow pit is located as indicated on the construction drawings. If the Government borrow pit is used, the Contractor shall perform clearing, grubbing, and stripping required for providing access to suitable borrow material. Dispose of materials from clearing and grubbing operations at the Government landfill as directed and approved by the contracting officer. After removal of borrow material, regrade borrow pit to contours shown which will blend in with adjacent topography. Maximum side slopes shall be three horizontal to one vertical. Excavation and backfilling of borrow pit shall ensure proper drainage.

### 2.4 BACKFILL FOR UNDERDRAINAGE SYSTEMS

Clean sand, crushed rock, or gravel meeting the following requirements:

- a. Perforated Pipe: Backfill meeting requirements of [Type II] material as specified in Table

1. TABLE 1

Type II

	Gradation 57 ASTM C 33/C 33M
ASTM D 422	
<u>Sieve Size</u>	<u>Percent Passing</u>
1.5 inches	100
1 inch	90 - 100
3/8 inch	25 - 60
No. 4	5 - 40
No. 8	0 - 20
No. 16	--
No. 50	--
No. 100	--

2.5 FILTER FABRIC

Provide a pervious sheet of polyester, nylon, or polypropylene, ultraviolet resistant filaments woven, spun bonded, fused, or otherwise manufactured into a nonraveling fabric with uniform thickness and strength. Fabric shall be Mirafi 140 N or approved equal. Fabric shall have the following manufacturer certified minimum average roll properties as determined by ASTM D 4759:

	<u>Class A</u>	<u>Class B</u>
a. Grab tensile strength (ASTM D 4632) machine and transversed direction	min. 180	120 lbs.
b. Grab elongation (ASTM D 4632) machine and transverse direction	min. 15	50%
c. Puncture resistance (ASTM D 4833)	min. 80	25 lbs.
d. Mullen burst strength (ASTM D 3786/D 3786M)	min. 290	130 psi.
e. Trapezoidal Tear (ASTM D 4533)	min. 50	50 lbs.
f. Apparent Opening Size (ASTM D 4751)	70	
h. Ultraviolet Degradation (ASTM D 4355)	70 percent Strength retained at 150 hours	

2.6 MATERIAL FOR RIP-RAP

Bedding material, Filter fabric and rock conforming to these requirements for construction indicated.

2.6.1 Bedding Material

Consisting of sand, gravel, or crushed rock, well graded, with a maximum particle size of 2 inches. Material shall be composed of tough, durable particles. Fines passing the No. 200 standard sieve shall have a plasticity index less than six.

### 2.6.2 Rock

Rock fragments sufficiently durable to ensure permanence in the structure and the environment in which it is to be used. Rock fragments shall be free from cracks, seams, and other defects that would increase the risk of deterioration from natural causes. The size of the fragments shall be such that no individual fragment exceeds a weight of 50 pounds and that no more than 10 percent of the mixture, by weight, consists of fragments weighing 2 pounds or less each. Specific gravity of the rock shall be a minimum of 2.50. The inclusion of more than trace 1 percent quantities of dirt, sand, clay, and rock fines will not be permitted.

## PART 3 EXECUTION

### 3.1 PROTECTION

#### 3.1.1 General

- a. Prevent undermining of pavements, foundations and slabs.
- b. Prevent slippage or movement in banks or slopes adjacent to the excavation.

#### 3.1.2 Drainage and Dewatering

Provide for the collection and disposal of surface and subsurface water encountered during construction.

##### 3.1.2.1 Drainage

So that construction operations progress successfully, completely drain construction site during periods of construction to keep soil materials sufficiently dry. The Contractor shall establish/construct storm drainage features (ponds/basins) at the earliest stages of site development, and throughout construction grade the construction area to provide positive surface water runoff away from the construction activity and/or provide temporary ditches, dikes, swales, and other drainage features and equipment as required to maintain dry soils and prevent erosion. When unsuitable working platforms for equipment operation and unsuitable soil support for subsequent construction features develop, remove unsuitable material and provide new soil material as specified herein. It is the responsibility of the Contractor to assess the soil and ground water conditions presented by the plans and specifications and to employ necessary measures to permit construction to proceed. Excavated slopes and backfill surfaces shall be protected to prevent erosion and sloughing. Excavation shall be performed so that the site, the area immediately surrounding the site, and the area affecting operations at the site shall be continually and effectively drained.

#### 3.1.3 Underground Utilities

Location of the existing utilities indicated is approximate. The Contractor shall physically verify the location and elevation of the existing utilities indicated prior to starting construction. The Contractor shall contact the DON for assistance in locating existing utilities.

### 3.1.4 Machinery and Equipment

Movement of construction machinery and equipment over pipes during construction shall be at the Contractor's risk. Repair, or remove and provide new pipe for existing or newly installed pipe that has been displaced or damaged.

## 3.2 SURFACE PREPARATION

### 3.2.1 Clearing and Grubbing

Unless indicated otherwise, remove trees, stumps, logs, shrubs, brush and vegetation and other items that would interfere with construction operations within the grading limits. Remove stumps entirely. Grub out matted roots and roots over 2 inches in diameter to at least 12 inches below existing surface. Trees, stumps, logs, shrubs, brush and other vegetation materials shall be processed in accordance with the requirements of Section 32 92 19, Part 2.4.

### 3.2.2 Stripping

Strip existing soils from the waste landfill site a minimum 6 inches where excavation or grading is indicated and stockpile separately from other excavated material. Material unsuitable for use as topsoil shall be stockpiled and used for backfilling provided it meets the requirements of these specifications. Locate topsoil so that the material can be used readily for the finished grading. Screen or otherwise process the topsoil that is removed from the waste landfill to bring it into conformance with the requirements of Section 32 92 19 Hydro Seed. Unsatisfactory or otherwise deleterious materials that remain after processing shall be placed in areas of the waste landfill that are to receive fill material below the final landfill cover. Where sufficient existing topsoil conforming to the material requirements is not available on site, provide borrow materials suitable for use as topsoil. Protect topsoil and keep in segregated piles until needed.

## 3.3 EXCAVATION

Excavate to contours, elevation, and dimensions indicated. Reuse excavated materials that meet the specified requirements for the material type required at the intended location. Keep excavations free from water. Excavate soil disturbed or weakened by Contractor's operations, soils softened or made unsuitable for subsequent construction due to exposure to weather. Excavations below indicated depths will not be permitted except to remove unsatisfactory material. Unsatisfactory material encountered below the grades shown shall be removed as directed. Refill with satisfactory material and compact to 90 percent of maximum density. Unless specified otherwise, refill excavations cut below indicated depth with satisfactory material and compact to 90 percent of ASTM D 1557 maximum density. Satisfactory material removed below the depths indicated, without specific direction of the Contracting Officer, shall be replaced with satisfactory materials to the indicated excavation grade. Determination of elevations and measurements of approved overdepth excavation of unsatisfactory material below grades indicated shall be done under the direction of the Contracting Officer.

### 3.3.1 Pipe Trenches

Excavate to the dimension indicated. Grade bottom of trenches to provide

uniform support for each section of pipe after pipe bedding placement. Tamp if necessary to provide a firm pipe bed. Recesses shall be excavated to accommodate bells and joints so that pipe will be uniformly supported for the entire length. Rock, where encountered, shall be excavated to a depth of at least 6 inches below the bottom of the pipe.

### 3.3.2 Excavated Materials

Satisfactory excavated material required for common fill or trench backfill shall be placed in the proper section of the permanent work required or shall be separately stockpiled if it cannot be readily placed. Satisfactory material in excess of that required for the permanent work and all unsatisfactory material shall be disposed of as specified in Paragraph "DISPOSITION OF SURPLUS MATERIAL."

### 3.3.3 Final Grade of Surfaces to Support Concrete

Excavation to final grade shall not be made until just before concrete is to be placed. Only excavation methods that will leave the foundation materials in a solid and undisturbed condition shall be used. Approximately level surfaces shall be roughened, and sloped surfaces shall be cut as indicated into rough steps or benches to provide a satisfactory bond. All surfaces shall be protected from erosion resulting from ponding or flow of water.

## 3.4 SUBGRADE PREPARATION

Unsatisfactory material in surfaces to receive fill or in excavated areas shall be removed and replaced with satisfactory materials as directed by the Contracting Officer or the project Geotechnical Engineer. The surface shall be scarified to a depth of 6 inches before the fill is started. Sloped surfaces steeper than 1 vertical to 3 horizontal shall be plowed, stepped, benched, or broken up so that the fill material will bond with the existing material. When subgrades are less than the specified density, the ground surface shall be broken up to a minimum depth of 6 inches, pulverized, and compacted to the specified density. Material shall not be placed on surfaces that are muddy. Compaction shall be accomplished by sheepsfoot rollers, pneumatic-tired rollers, steel-wheeled rollers, or other approved equipment well suited to the soil being compacted. Material shall be moistened or aerated as necessary to provide the moisture content that will readily facilitate obtaining the specified compaction with the equipment used. Minimum subgrade density shall be as specified herein.

### 3.4.1 Proof Rolling

Proof rolling shall be done on an exposed subgrade free of surface water (wet conditions resulting from rainfall) which would promote degradation of an otherwise acceptable subgrade. After stripping, proof roll the existing subgrade of the landfill. Operate the equipment in a systematic manner to ensure the number of passes over all areas, and at speeds between 2 1/2 to 3 1/2 miles per hour, or at a rate determined to be safe based on the field conditions. Notify the Contracting Officer a minimum of 3 days prior to proof rolling. Proof rolling shall be performed in the presence of the Contracting Officer. Rutting or pumping of material shall be undercut as directed by the Contracting Officer and replaced with common fill material.

### 3.5 FILLING AND BACKFILLING

Fill and backfill to contours, elevations, and dimensions indicated. Compact each lift before placing overlaying lift.

#### 3.5.1 Common Fill Placement

Provide for general site. Use satisfactory materials. Place in 8 inch lifts. Compact areas not accessible to rollers or compactors with mechanical hand tampers. Aerate material excessively moistened by rain to a satisfactory moisture content. Finish to a smooth surface by blading, rolling with a smooth roller, or both.

#### 3.5.2 Trench Backfilling

Backfill as rapidly as construction, testing, and acceptance of work permits. Place and compact backfill under roadway areas in 6 inch lifts to top of trench

### 3.6 BORROW

Where satisfactory materials are not available in sufficient quantity from required excavations, approved borrow materials shall be obtained as specified herein.

### 3.7 COMPACTION

Determine in-place density of existing subgrade; if required density exists, no compaction of existing subgrade will be required.

#### 3.7.1 General Site

Compact underneath areas designated for vegetation and areas outside the 5 foot line of the roadway area or structure to 90 percent of ASTM D 1557.

#### 3.7.2 Adjacent Area

Compact areas within 5 feet of roadway areas to 90 percent of ASTM D 1557.

### 3.8 SPECIAL EARTHWORK REQUIREMENTS FOR SUBSURFACE DRAINS

Excavate to dimensions indicated. Provide a bedding surface of no less than three inch of clean gravel and place on geotextile fabric as indicated. Backfill around and over the pipes after pipe installation has been approved. Compact common fill overlying the under drain system as specified for adjacent or overlying work.

#### 3.8.1 Granular Backfill Using Filter Fabric

##### 3.8.1.1 Perforated Pipes

Place granular material and extend it for one pipe diameter, minimum of 6 inches on each side of and 3 inches above top of pipe. Wrap geotextile fabric around the granular material before continuing with the backfill. Minimum overlap of the geotextile fabric shall be 12 inches.

### 3.9 RIP-RAP CONSTRUCTION

Construct rip-rap on bedding material and filter fabric in the areas

indicated.

### 3.9.1 Preparation

Trim and dress indicated areas to conform to cross sections, lines and grades shown within a tolerance of 0.1 foot.

### 3.9.2 Bedding Placement

Prior to placement of bedding materials, install filter fabric in accordance with the manufacturer's instructions. Spread bedding material uniformly to a thickness of at least 3 inches on prepared subgrade as indicated. Compaction of bedding is not required. Finish bedding to present even surface free from mounds and windrows.

### 3.9.3 Stone Placement

Place rock for rip-rap on prepared bedding material to produce a well graded mass with the minimum practicable percentage of voids in conformance with lines and grades indicated. Distribute larger rock fragments, with dimensions extending the full depth of the rip-rap throughout the entire mass and eliminate "pockets" of small rock fragments. Rearrange individual pieces by mechanical equipment or by hand as necessary to obtain the distribution of fragment sizes specified above.

## 3.10 FINISH OPERATIONS

### 3.10.1 Grading

Finish grades as indicated within one-tenth of one foot. Grade areas to drain water away from structures. Maintain areas free of trash and debris. For existing grades that will remain but which were disturbed by Contractor's operations, grade as directed.

### 3.10.2 Topsoil and Seed

Provide as specified in Section 32 92 19 HYDRO SEED.

### 3.10.3 Protection of Surfaces

Protect newly backfilled, graded, and topsoiled areas from traffic, erosion, and settlements that may occur. Repair or reestablish damaged grades, elevations, or slopes.

## 3.11 DISPOSITION OF SURPLUS MATERIAL

The surplus green/wood pellet waste will be placed in a location to be determined by the Navy Project Manager.

## 3.12 FIELD QUALITY CONTROL

### 3.12.1 Sampling

Take the number and size of samples required to perform the following tests.

### 3.12.2 Testing

Perform one of each of the following tests for each material used. Provide additional tests for each source change.

#### 3.12.2.1 Common Fill and Trench Backfill Material Testing

Test Common fill and Trench backfill material in accordance with ASTM C 136 for conformance to ASTM D 2487 gradation limits; ASTM D 1140 for material finer than the No. 200 sieve; ASTM D 4318 for liquid limit and for plastic limit; ASTM D 698 or ASTM D 1557 for moisture density relations, as applicable.

#### 3.12.2.2 Select Material Testing

Test select material in accordance with ASTM C 136 for conformance to ASTM D 2487 gradation limits; ASTM D 1140 for material finer than the No. 200 sieve; ASTM D 698 or ASTM D 1557 for moisture density relations, as applicable.

#### 3.12.2.3 Density Tests

Test density in accordance with ASTM D 6938. When ASTM D 6938 density tests are used, verify density test results by performing an ASTM D 1556 density test at a location already ASTM D 6938 tested as specified herein. Perform an ASTM D 1556 density test at the start of the job, and for every 10 ASTM D 6938 density tests thereafter. Test each lift at randomly selected locations every 5,000 square feet for fill areas and every 5,000 square feet of subgrade in cut. Include density test results in daily report.

Bedding and backfill in trenches: One test per 50 linear feet in each lift.

#### 3.12.2.4 Moisture Content Tests

In the stockpile, excavation or borrow areas, a minimum of two tests per day per type of material or source of materials being placed is required during stable weather conditions. During unstable weather, tests shall be made as dictated by local conditions and approved moisture content shall be tested in accordance with ASTM D 2216. Include moisture content test results in daily report.

-- End of Section --

## SECTION 32 11 23

## GRADED-CRUSHED AGGREGATE BASE 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 ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS  
(AASHTO)

- AASHTO T 180 (2009) Standard Method of Test for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and an 457-mm (18-in) Drop
- AASHTO T 224 (2001; R 2004) Correction for Coarse Particles in the Soil Compaction Test

ASTM INTERNATIONAL (ASTM)

- ASTM C 117 (2004) Standard Test Method for Materials Finer than 75-um (No. 200) Sieve in Mineral Aggregates by Washing
- ASTM C 127 (2007) Standard Test Method for Density, Relative Density (Specific Gravity), and Absorption of Coarse Aggregate
- ASTM C 128 (2007a) Standard Test Method for Density, Relative Density (Specific Gravity), and Absorption of Fine Aggregate
- ASTM C 131 (2006) Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
- ASTM C 136 (2006) Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates
- ASTM C 88 (2005) Standard Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate
- ASTM D 1556 (2007) Density and Unit Weight of Soil in Place by the Sand-Cone Method
- ASTM D 1557 (2009) Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft<sup>3</sup>) (2700 kN-m/m<sup>3</sup>)

ASTM D 2167	(2008) Density and Unit Weight of Soil in Place by the Rubber Balloon Method
ASTM D 2487	(2006e1) Soils for Engineering Purposes (Unified Soil Classification System)
ASTM D 4318	(2005) Liquid Limit, Plastic Limit, and Plasticity Index of Soils
ASTM D 5821	(2001: R 2006) Standard Test Method for Determining the Percentage of Fractured Particles in Coarse Aggregate
ASTM D 6938	(2008a) Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)
ASTM D 75/D 75M	(2009) Standard Practice for Sampling Aggregates
ASTM E 11	(2009) Wire Cloth and Sieves for Testing Purposes

## 1.2 DEFINITIONS

For the purposes of this specification, the following definitions apply.

### 1.2.1 Graded-Crushed Aggregate Base Course

Graded-crushed aggregate (GCA) base course is well graded, crushed, durable aggregate uniformly moistened and mechanically stabilized by compaction. GCA is similar to ABC, but it has more stringent requirements and it produces a base course with higher strength and stability.

### 1.2.2 Degree of Compaction

Degree of compaction required, except as noted in the second sentence, is expressed as a percentage of the maximum laboratory dry density obtained by the test procedure presented in ASTM D 1557 abbreviated as a percent of laboratory maximum dry density. Since ASTM D 1557 applies only to soils that have 30 percent or less by weight of their particles retained on the 3/4 inch sieve, the degree of compaction for material having more than 30 percent by weight of their particles retained on the 3/4 inch sieve are expressed as a percentage of the laboratory maximum dry density in accordance with AASHTO T 180 Method D and corrected with AASHTO T 224.

## 1.3 SYSTEM DESCRIPTION

All plant, equipment, and tools used in the performance of the work will be subject to approval before the work is started and shall be maintained in satisfactory working condition at all times. Submit a list of proposed equipment, including descriptive data. Provide adequate equipment having the capability of producing the required compaction, meeting grade controls, thickness control, and smoothness requirements as set forth herein.

#### 1.4 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

##### SD-06 Test Reports

Sampling and Testing  
Field Density Tests

#### 1.5 QUALITY ASSURANCE

Sampling and testing are the responsibility of the Contractor. Test the materials to establish compliance with the specified requirements; perform testing at the specified frequency. The Contracting Officer may specify the time and location of the tests. Furnish copies of test results to the Contracting Officer within 24 hours of completion of the tests.

##### 1.5.1 Sampling

Take samples for laboratory testing in conformance with ASTM D 75/D 75M. When deemed necessary, the sampling will be observed by the Contracting Officer.

##### 1.5.2 Tests

Perform the following tests in conformance with the applicable standards listed.

###### 1.5.2.1 Sieve Analysis

Make sieve analysis in conformance with ASTM C 117 and ASTM C 136. Sieves shall conform to ASTM E 11.

###### 1.5.2.2 Liquid Limit and Plasticity Index

Determine liquid limit and plasticity index in accordance with ASTM D 4318.

###### 1.5.2.3 Moisture-Density Determinations

Determine the laboratory maximum dry density and optimum moisture content in accordance with ASTM D 1557 or AASHTO T 180, Method D and corrected with AASHTO T 224.

###### 1.5.2.4 Field Density Tests

Measure field density in accordance with ASTM D 1556, ASTM D 2167 or ASTM D 6938. For the method presented in ASTM D 1556 use the base plate as shown in the drawing. For the method presented in ASTM D 6938 check the calibration curves and adjust them, if necessary, using only the sand cone method as described in paragraph Calibration, of the ASTM publication. Tests performed in accordance with ASTM D 6938 result in a wet unit weight of soil, and ASTM D 6938 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 6938. 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 6938, on each different type of material being tested at the beginning of a job and at intervals as directed.

#### 1.5.2.5 Wear Test

Perform wear tests on GCA course material in conformance with ASTM C 131.

#### 1.5.2.6 Soundness

Perform soundness tests on GCA in accordance with ASTM C 88.

### 1.5.3 Testing Frequency

#### 1.5.3.1 Initial Tests

Perform one of each of the following tests, on the proposed material prior to commencing construction, to demonstrate that the proposed material meets all specified requirements when furnished. If materials from more than one source are going to be utilized, this testing shall be completed for each source.

- a. Sieve Analysis.
- b. Liquid limit and plasticity index.
- c. Moisture-density relationship.
- d. Wear.
- e. Soundness.

#### 1.5.3.2 In Place Tests

Perform each of the following tests on samples taken from the placed and compacted GCA. Samples shall be taken and tested at the rates indicated.

- a. Perform density tests on every lift of material placed and at a frequency of one set of tests for every 250 square yards, or portion thereof, of completed area.
- b. Perform sieve analysis on every lift of material placed and at a frequency of one sieve analysis for every 500 square yards, or portion thereof, of material placed.
- c. Perform liquid limit and plasticity index tests at the same frequency as the sieve analysis.
- d. Measure the total thickness of the base course at intervals, in such a manner as to ensure one measurement for each 500 square yards of base course. Measurements shall be made in 3 inch diameter test holes penetrating the base course.

#### 1.5.4 Approval of Material

Select the source of the material 30 days prior to the time the material will be required in the work. Tentative approval of material will be based on initial test results. Final approval of the materials will be

based on sieve analysis, liquid limit, and plasticity index tests performed on samples taken from the completed and fully compacted course(s).

## PART 2 PRODUCTS

### 2.1 AGGREGATES

Provide GCA consisting of clean, sound, durable particles of crushed stone, crushed gravel, angular sand, or other approved material. GCA shall be free of silt and clay as defined by ASTM D 2487, organic matter, and other objectionable materials or coatings. The portion retained on the No. 4 sieve is known as coarse aggregate; that portion passing the No. 4 sieve is known as fine aggregate.

#### 2.1.1 Coarse Aggregate

Provide coarse aggregates with angular particles of uniform density. When the coarse aggregate is supplied from more than one source, aggregate from each source shall meet the specified requirements and shall be stockpiled separately.

- a. Crushed Gravel: Crushed gravel shall be manufactured by crushing gravels, and shall meet all the requirements specified below.
- b. Crushed Stone: Provide crushed stone consisting of freshly mined quarry rock, meeting all the requirements specified below.

##### 2.1.1.1 Graded-Crushed Aggregate Base Course

GCA coarse aggregate shall not show more than 40 percent loss when subjected to the Los Angeles abrasion test in accordance with ASTM C 131. GCA coarse aggregate shall not exhibit a loss greater than 18 percent weighted average, at five cycles, when tested for soundness in magnesium sulfate, or 12 percent weighted average, at five cycles, when tested in sodium sulfate in accordance with ASTM C 88. The amount of flat and elongated particles shall not exceed 20 percent for the fraction retained on the 1/2 inch sieve nor 20 percent for the fraction passing the 1/2 inch sieve. A flat particle is one having a ratio of width to thickness greater than 3; an elongated particle is one having a ratio of length to width greater than 3. In the portion retained on each sieve specified, the crushed aggregate shall contain at least 90 percent by weight of crushed pieces having two or more freshly fractured faces determined in accordance with ASTM D 5821. When two fractures are contiguous, the angle between planes of the fractures must be at least 30 degrees in order to count as two fractured faces. Crushed gravel shall be manufactured from gravel particles 90 percent of which by weight are retained on the maximum size sieve listed in TABLE 1.

#### 2.1.2 Fine Aggregate

Fine aggregates shall be angular particles of uniform density. When the fine aggregate is supplied from more than one source, aggregate from each source shall meet the specified requirements.

##### 2.1.2.1 Graded-Crushed Aggregate Base Course

Provide GCA fine aggregate consisting of angular particles produced by crushing stone, or gravel that meets the requirements for wear and

soundness specified for GCA coarse aggregate. Fine aggregate shall be produced by crushing only particles larger than No. 4 sieve in size. The fine aggregate shall contain at least 90 percent by weight of particles having two or more freshly fractured faces in the portion passing the No. 4 sieve and retained on the No. 10 sieve, and in the portion passing the No. 10 sieve and retained on the No. 40 sieve.

2.1.3 Gradation Requirements

Apply the specified gradation requirements to the completed base course. The aggregates shall be continuously well graded within the limits specified in TABLE 1. Sieves shall conform to ASTM E 11.

TABLE 1. GRADATION OF AGGREGATES

Percentage by Weight Passing Square-Mesh Sieve

Sieve Designation	No. 2
2 inch	----
1-1/2 inch	100
1 inch	60-100
1/2 inch	30-65
No. 4	20-50
No. 10	15-40
No. 40	5-25
No. 200	0-8

NOTE 1: The values are based on aggregates of uniform specific gravity. If materials from different sources are used for the coarse and fine aggregates, they shall be tested in accordance with ASTM C 127 and ASTM C 128 to determine their specific gravities. If the specific gravities vary by more than 10 percent, the percentages passing the various sieves shall be corrected as directed by the Contracting Officer.

2.2 LIQUID LIMIT AND PLASTICITY INDEX

Apply liquid limit and plasticity index requirements to the completed course and to any component that is blended to meet the required gradation. The portion of any component or of the completed course passing the No. 40 sieve shall be either nonplastic or have a liquid limit not greater than 25 and a plasticity index not greater than 5.

PART 3 EXECUTION

3.1 GENERAL REQUIREMENTS

When the GCA is constructed in more than one layer, clean the previously constructed layer of loose and foreign matter by sweeping with power sweepers or power brooms, except that hand brooms may be used in areas where power cleaning is not practicable. Provide adequate drainage during the entire period of construction to prevent water from collecting or standing on the working area. Provide line and grade stakes as necessary for control. Grade stakes shall be in lines parallel to the centerline of the area under construction and suitably spaced for string lining.

### 3.2 OPERATION OF AGGREGATE SOURCES

Clearing, stripping, and excavating are the responsibility of the Contractor. Operate the aggregate sources to produce the quantity and quality of materials meeting the specified requirements in the specified time limit.

### 3.3 STOCKPILING MATERIAL

Clear and level storage sites prior to stockpiling of material. Stockpile all materials, including approved material available from excavation and grading, in the manner and at the locations designated. Aggregates shall be stockpiled on the cleared and leveled areas designated by the Contracting Officer to prevent segregation. Materials obtained from different sources shall be stockpiled separately.

### 3.4 PREPARATION OF UNDERLYING COURSE

Prior to constructing the base course(s), the underlying course or subgrade shall be cleaned of all foreign substances. The surface of the underlying course or subgrade shall meet specified compaction and surface tolerances. Ruts or soft yielding spots in the underlying courses, 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 recompacting to specified density requirements. For cohesionless underlying courses containing sands or gravels, as defined in ASTM D 2487, the surface shall be stabilized prior to placement of the base course(s). Stabilization shall be accomplished by mixing GCA into the underlying course and compacting by approved methods. The stabilized material shall be considered as part of the underlying course and shall meet all requirements of the underlying course. The finished underlying course shall not be disturbed by traffic or other operations and shall be maintained in a satisfactory condition until the base course is placed.

### 3.5 INSTALLATION

#### 3.5.1 Mixing the Materials

Mix the coarse and fine aggregates in a stationary plant, or in a traveling plant or bucket loader on an approved paved working area. Make adjustments in mixing procedures or in equipment, as directed, to obtain true grades, to minimize segregation or degradation, to obtain the required water content, and to insure a satisfactory base course meeting all requirements of this specification.

#### 3.5.2 Placing

Place the mixed material on the prepared subgrade in layers of uniform thickness with an approved spreader. When a compacted layer 6 inches or less in thickness is required, place the material in a single layer. When a compacted layer in excess of 6 inches is required, place the material in layers of equal thickness. No layer shall be thicker than 6 inches or thinner than 3 inches when compacted. The layers shall be so placed that when compacted they will be true to the grades or levels required with the least possible surface disturbance. Where the base course is placed in more than one layer, the previously constructed layers shall be cleaned of loose and foreign matter by sweeping with power sweepers, power brooms, or

hand brooms, as directed. Such adjustments in placing procedures or equipment shall be made as may be directed to obtain true grades, to minimize segregation and degradation, to adjust the water content, and to insure an acceptable base course.

### 3.5.3 Grade Control

The finished and completed base course shall conform to the lines, grades, and cross sections shown. Underlying material(s) shall be excavated and prepared at sufficient depth for the required base course thickness so that the finished base course and the subsequent surface course will meet the designated grades.

### 3.5.4 Compaction

Compact each layer of the base course, as specified, with approved compaction equipment. Maintain water content during the compaction procedure to within plus or minus 2 percent of the optimum water content determined from laboratory tests as specified in this Section. Begin rolling at the outside edge of the surface and proceed to the center, overlapping on successive trips at least one-half the width of the roller. Alternate trips of the roller shall be slightly different lengths. Speed of the roller shall be such that displacement of the aggregate does not occur. In all places not accessible to the rollers, the mixture shall be compacted with hand-operated power tampers. Continue compaction until each layer has a degree of compaction that is at least 95 percent of laboratory maximum density through the full depth of the layer. Make such adjustments in compacting or finishing procedures as may be directed to obtain true grades, to minimize segregation and degradation, to reduce or increase water content, and to ensure a satisfactory base course. Any materials that are found to be unsatisfactory shall be removed and replaced with satisfactory material or reworked, as directed, to meet the requirements of this specification.

### 3.5.5 Thickness

Construct the compacted thickness of the base course as indicated. No individual layer shall be thicker than 6 inches nor be thinner than 3 inches in compacted thickness. The total compacted thickness of the base course(s) shall be within 1/2 inch of the thickness indicated. Where the measured thickness is more than 1/2 inch deficient, correct such areas by scarifying, adding new material of proper gradation, reblading, and recompacting as directed. Where the measured thickness is more than 1/2 inch thicker than indicated, the course shall be considered as conforming to the specified thickness requirements. Average job thickness shall be the average of all thickness measurements taken for the job, but shall be within 1/4 inch of the thickness indicated. The total thickness of the base course shall be measured at intervals in such a manner as to ensure one measurement for each 500 square yards of base course. Measurements shall be made in 3 inch diameter test holes penetrating the base course.

### 3.5.6 Finishing

The surface of the top layer of base course shall be finished after final compaction by cutting any overbuild to grade and rolling with a steel-wheeled roller. Thin layers of material shall not be added to the top layer of base course to meet grade. If the elevation of the top layer of base course is 1/2 inch or more below grade, then the top layer should be scarified to a depth of at least 3 inches and new material shall be

blended in and compacted to bring to grade. Adjustments to rolling and finishing procedures shall be made as directed to minimize segregation and degradation, obtain grades, maintain moisture content, and insure an acceptable base course. Should the surface become rough, corrugated, uneven in texture, or traffic marked prior to completion, the unsatisfactory portion shall be scarified, reworked and recompacted or it shall be replaced as directed.

### 3.5.7 Smoothness

The surface of the top layer shall show no deviations in excess of 3/8 inch when tested with a 12 foot straightedge. Take measurements in successive positions parallel to the centerline of the area to be paved. Measurements shall also be taken perpendicular to the centerline at 50 foot intervals. Deviations exceeding this amount shall be corrected by removing material and replacing with new material, or by reworking existing material and compacting it to meet these specifications.

### 3.6 MAINTENANCE

Maintain the base course in a satisfactory condition until the full pavement section is completed and accepted. Maintenance shall include immediate repairs to any defects and shall be repeated as often as necessary to keep the area intact. Any area of base course that is damaged shall be reworked or replaced as necessary to comply with this specification.

### 3.7 DISPOSAL OF UNSATISFACTORY MATERIALS

Any unsuitable materials that must be removed shall be disposed of as directed. No additional payments will be made for materials that must be replaced.

-- End of Section --

SECTION 32 92 19

HYDROSEEDING

PART 1 GENERAL

1.1 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. The following shall be submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Drawings

Record Drawings; G

SD-03 Product Data

Source, Supplier's, and Manufacturer's Literature

SD-06 Test Reports

Revegetation Work Schedule; G

Seed Collection Report

SD-07 Certificates

Seed Bag Certification Tags and Signed Certificates

Seed Samples containing mixture of Centipede Grass (*Eremochloa Ophiuroides*), Carpetgrass (*Axonopus affinis*), and Annual Ryegrass (*Lolium Muliflorm*)

Erosion Control Materials

Mycorrhizal Inoculum

Notice of Completion

SD-08 Manufacturer's Instructions

Erosion Control Materials

1.2 SUMMARY OF WORK ITEMS

- a. Prepare final cover area for seeding.
- b. Seed final cover area.

1.3 DELIVERY, STORAGE, AND HANDLING

1.3.1 Delivery

Seed protection shall be conducted.

### 1.3.2 Storage

#### 1.3.2.1 Seed Storage

Store in cool, dry and dark locations away from contaminants, and rodent infestation.

#### 1.3.2.2 Handling

Do not drop or dump materials from vehicles.

### 1.3.3 Restrictions

Seeding restrictions shall be in accordance with the applicable Guam standards. Additionally, planting shall not occur when the area to be planted is muddy.

## PART 2 PRODUCTS

### 2.1 REVEGETATION WORK SCHEDULE

Prior to beginning any restoration work, the contractor shall provide a Revegetation Work Schedule for the approval of the Navy Project Manager /ROICC.

Contractor shall prepare a Seed Collection Report providing a list of seeds to be provided. Additionally, the contractor shall provide seed bag certification tags and signed certificates.

### 2.2 SEED

#### 2.2.1 Classification

Provide territory-approved seed of the latest season's crop delivered in original sealed packages, bearing producer's guaranteed analysis for percentages of mixtures, purity, germination, weedseed content, and inert material. Label in conformance with Agricultural Marketing Service (AMS) Seed Act and applicable territory seed laws. Wet, moldy, or otherwise damaged seed will be rejected.

#### 2.2.2 Composition

Seed will be a mix of 33 percent each of Centipede Grass (*Eremochloa Ophiuroides*), Carpetgrass (*Axonopus affinis*), and Annual Ryegrass (*Lolium Muliflorm*) or approved equal.

### 2.3 SEED SAMPLES

The contractor shall draw a 2-ounce sample of each individual species of seed delivered to the project site. Each seed sample shall be approved by the Contractor's QC Manager, prior to beginning any restoration work.

### 2.4 MULCH AND TOPSOIL

The Contractor shall process all the scrap wood and green waste, even if the quantity exceeds the quantity required for the landfill cover construction. The surplus green/wood pellet waste will be placed in a location to be determined by the Navy Project Manager. Prior to processing the green/wood pellet waste, the contractor shall weigh the material.

Payment will be made based on the cost per ton of the material processed. Process on site green waste and wood pellet waste to 3/4" size, the contractor shall provide a listing of the source, supplier's, and manufacturer's literature for bulk material samples. Specifically, the contractor shall provide 0.23 kg (half-pound) samples of the mulch and soil stabilizer being proposed for use on the project.

## 2.5 SCRAP WOOD AND GREEN WASTE PROCESSING

Scrap wood and green waste processing shall include the labor, equipment, transportation, handling and materials necessary to shred/grind materials to an average 3/4 inch diameter size. Materials shall be initially processed and staged separately. Non-organic debris shall be removed prior to processing and staged separately for contractor to transport to the nearby transfer station (<1 mile) for cost free disposal. Metals shall be removed and returned to the Landfill Operator at the site in suitable containers for scrap metal recycling. Processed scrap wood shall be staged in approximate 5000 cubic yard piles to permit testing prior to use. A representative composite sample of processed scrap wood shall be collected for every 5000 cubic yards processed and analyzed for TCLP metals. Processed green waste shall be securely covered with netting of suitable mesh size to contain Rhino Beetle and their larvae. Contractor shall eradicate any observed invasive species such as Fire Ants and Rhinoceros Beetles and their larvae prior to netting removal and mixing of materials.

Upon obtaining scrap wood pile testing results verifying material is non-hazardous, contractor shall mix processed scrap wood and green waste with borrow material at a suitable ratio to produce material that meets the final cover material specifications for the landfill.

## 2.6 EROSION CONTROL MATERIALS

Jute mat will be placed under the 1-inch thick mulch on slopes 20% (5H to 1V) and steeper. Woven jute fiber erosion control blanket with a minimum weight of 0.5 kg (1.1 pounds) per square meter. Blanket shall be certified inert, weed-free material. The erosion control blanket shall have a maximum permissible shear stress of 12.6 kg per square meter or greater. The contractor shall furnish delivery certificates for all Erosion Control Materials delivered to the project.

## 2.7 MYCORRHIZAL INOCULUM

Mycorrhizal Inoculum shall be vigorous and certified.

## PART 3 EXECUTION

### 3.1 PREPARATION

#### 3.1.1 EXTENT OF WORK

Provide soil preparation, fertilizing, seeding, and surface top dressing of all newly graded finished earth surfaces of the landfill final cover, unless indicated otherwise, and at all areas inside or outside the limits of construction that are disturbed by the Contractor's operations.

In areas that the imprinting effort does not sufficiently penetrate the upper 200 mm (8 inches) of the soil cover, scarification will be performed. The upper 100 mm (4 inches) of the soil cover will be scarified

on side slopes of 3:1 or greater. Spread soil evenly to provide positive drainage. Protect finished soil surface from damage by vehicular traffic.

### 3.2 SEEDING

#### 3.2.1 Seed Application Conditions

Immediately before seeding, restore soil to proper grade and thoroughly moisten soil to a depth of 150 mm (6 inches). Do not seed when ground is muddy or in an unsatisfactory condition for seeding. If special conditions exist that may warrant a variance in the above seeding dates or conditions, submit a written request to the Contractor's QC Manager stating the special conditions and proposed variance.

#### 3.2.2 Seed Application

Seeding shall take place on all newly graded finished earth surfaces as indicated in the project drawings. Seed shall be applied at a rate of 45 pounds (20.5 kg) per acre, unless otherwise directed by the Navy Project Manager/ROICC.

##### 3.2.2.1 Hydroseeding

Mix seed, fertilizer, and wood cellulose fiber in required amount of water to produce a homogeneous slurry. Fertilizer shall be applied at a minimum rate equal to 91 kg (200 pounds) per acre. Wood cellulose fiber mulch shall be applied at a rate of 454 kg (1,000 pounds), dry weight, per acre. When hydraulically sprayed on the ground, material shall form a blotterlike cover impregnated uniformly with grass seed. Cover shall allow rainfall or applied water to percolate to underlying soil.

### 3.3 PROTECTION OF SEEDED AREAS

Immediately after seeding and installation of erosion control matting (slopes greater than 3:1) (prior to hydroseeding), protect area against traffic and other use. The location of the matting will be determined by the contractor based on the BMPs to be implemented during construction.

### 3.4 ESTABLISHMENT REQUIREMENTS

Establish seeded areas, including watering, spot weeding, and re-seeding until a full, uniform stand of vegetation free of weeds and undesirable grass species covering a minimum of 90 percent of the landfill cover area is achieved and accepted by the Government. The Contractor shall combine available on-site processed and borrowed materials to establish a one foot uniform final erosion protection layer capable of producing and sustaining grass growth.

#### 3.4.1 Establishment

- a. The establishment period shall begin on the first day following completion and acceptance of the revegetation work.
- b. Perform weed control as per applicable Guam standards, or as directed by the Navy Project Manager/ROICC.
- c. Make frequent inspections to ensure seeded areas are healthy and free of insect infestations and diseases. Report any findings to the Navy Project Manager/ROICC. Remove diseased seeds and replace them to prevent

the spread of diseases and insects.

d. Remove and dispose of, all trash and litter accumulated during the establishment period.

e. Fertilizers, pesticides, or herbicides other than those specified to any of the hydroseeded areas shall not be applied without the written acceptance of the Navy Project Manager/ROICC. Biological control agents, such as insect predators, may be used with the acceptance of the Navy Project Manager/ROICC.

f. During the establishment period, replace in like kind and size to the same specifications required for original seeding all seeds which die, are unhealthy, or diseased. All replacement seeding shall be performed within 30 days receipt of written notice provided by the Navy Project Manager /ROICC.

g. At the end of the establishment period, the contractor shall present written notice of completion to the Navy Project Manager/ROICC that the required work has been completed. The contractor shall also submit the Record Drawings for approval.

-- End of Section --

## SECTION 33 40 00

## STORM DRAINAGE UTILITIES

## PART 1 GENERAL

## 1.1 MEASUREMENT AND PAYMENT

## 1.1.1 Pipe Culverts, Storm Drains and Underdrains

The length of pipe installed will be measured along the centerlines of the pipe from end to end of pipe without deductions for diameter of manholes. Pipe will be paid for at the contract unit price for the number of linear feet of culverts, or storm drains, or underdrain placed in the accepted work. Payment per linear foot of underdrain shall include the pipe, filter fabric, and incidentals as needed to install the pipe.

## 1.1.2 Headwalls

Walls and headwalls will be measured by the number of cubic yards of reinforced concrete or plain concrete including all reinforcing steel used in the construction of the walls and headwalls. Wall and headwalls will be paid for at the contract unit price for the number of walls and headwalls constructed in the completed work.

## 1.1.3 Flared End Sections

Flared end sections will be measured by the unit. Flared end sections will be paid for at the contract unit price for the various sizes in the accepted work.

## 1.1.4 Rock Excavation

Payment will be made for the number of cubic yards of material acceptably excavated, as specified and defined as rock excavation in Section 31 00 00 EARTHWORK.

## 1.1.5 Backfill Replacing Unstable Material

Payment will be made for the number of cubic yards of select granular material required to replace unstable material for foundations under pipes or drainage structures, which will constitute full compensation for this backfill material, including removal and disposal of unstable material and all excavating, hauling, placing, compacting, and all incidentals necessary to complete the construction of the foundation satisfactorily.

## 1.2 PAYMENT PROCEDURES

Payment will constitute full compensation for all labor, equipment, tools, supplies, and incidentals necessary to complete the work.

## 1.3 REFERENCES

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

## ASTM INTERNATIONAL (ASTM)

ASTM C 76	(2010a) Standard Specification for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe
ASTM D 1557	(2009) Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft <sup>3</sup> ) (2700 kN-m/m <sup>3</sup> )
ASTM D 2167	(2008) Density and Unit Weight of Soil in Place by the Rubber Balloon Method
ASTM D 3350	(2010) Polyethylene Plastics Pipe and Fittings Materials
ASTM D 6938	(2010) Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)

## 1.4 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-05 Mix Design Submittal for Concrete

SD-07 Certificates

Resin Certification Pipeline Testing  
Determination of Density

## 1.5 DELIVERY, STORAGE, AND HANDLING

## 1.5.1 Delivery and Storage

Material delivered to site shall be inspected for damage, unloaded, and stored with a minimum of handling. Material shall not be stored directly on the ground. The inside of pipes and fittings shall be kept free of dirt and debris. Before, during, and after installation, plastic pipe and fittings shall be protected from any environment that would result in damage or deterioration to the material. Keep a copy of the manufacturer's instructions available at the construction site at all times and follow these instructions unless directed otherwise by the Contracting Officer. Solvents, solvent compounds, lubricants, elastomeric gaskets, and any similar material required to install plastic pipe shall be stored in accordance with the manufacturer's recommendations and shall be discarded if the storage period exceeds the recommended shelf life. Solvents in use shall be discarded when the recommended pot life is exceeded.

## 1.5.2 Handling

Material shall be handled in a manner that ensures 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 UNDERDRAINAGE SYSTEMS

Pipe for culverts and underdrainage systems shall be of the sizes indicated and shall conform to the requirements specified.

#### 2.1.1 Concrete Pipe

Manufactured in accordance with and conforming to ASTM C 76, Class V.

#### 2.1.2 Perforated High Density PE Pipe

Submit the pipe manufacturer's resin certification, indicating the cell classification of PE used to manufacture the pipe, prior to installation of the pipe. The minimum cell classification for polyethylene plastic shall apply to each of the seven primary properties of the cell classification limits in accordance with ASTM D 3350.

Perforations shall be as shown on the drawings.

### 2.2 DRAINAGE STRUCTURES

#### 2.2.1 Reinforced Concrete for Headwalls

Unless otherwise specified, reinforced concrete shall have a minimum compressive strength of 3250 psi and shall contain a minimum of 560 lbs/cubic-yards of portland cement. The maximum aggregate size shall be 1.5 inches. The maximum slump shall be 4 inches. Air content shall be determined in accordance with ASTM C231. The concrete covering over steel reinforcement shall not be less than 2 inches. Concrete deposited directly against the ground shall have a thickness of at least 3 inches between steel and ground.

#### 2.2.2 Steel Reinforcement

Steel reinforcement shall conform to the following requirements:

Reinforcing bars shall be low alloy steel deformed bars conforming to the requirements in ASTM Designation: A 615/A 615M, Grade 40 or 60. Reinforcing bars shall be placed in accordance with the size and spacing shown on the plans. Reinforcement shall have a clear coverage of 2 inches, except as otherwise noted in these specifications. Clear coverage shall be measured from the surface of the concrete to the outside of the reinforcement.

Reinforcement shall be accurately placed as shown on the plans and shall be firmly and securely held in position by wiring at intersections and splices and by using precast mortar blocks or ferrous metal chairs, spacers, metal hangers, supporting wires, and other approved devices of sufficient strength to resist crushing under applied loads. Wooden, aluminum and plastic supports shall not be used. Placing bars on layers of fresh concrete as the work progresses is not permitted.

Metal supports shall have a clear coverage of not less than one inch. Protective coatings on metal supports shall not be considered when

determining clear coverage. Where the clear coverage to reinforcing steel as shown on the plans or ordered by the Engineer exceeds the minimum coverage specified herein, the clear coverage for metal supports shall be increased accordingly.

### 2.2.3 Flared End Sections

- a. Flared end sections shall be constructed in accordance with the details and dimensions shown on the plans, except that minor variations may be accepted to permit the use of the manufacturer's standard methods of fabrication.
- b. Precast concrete flared end sections shall conform to the requirements for Class III Reinforced Concrete pipe in AASHTO Designation: M 170.
- c. The area of steel reinforcement per linear foot of flared end section shall be at least equal to the minimum steel requirements for circular reinforcement in circular pipe for the internal diameter of the circular portion of the flared end section. The basis of acceptance of the precast concrete flared end section shall conform to the requirements of Section 5.1.2 of AASTHTO Designation: M170.

## 2.3 MISCELLANEOUS MATERIAL

### 2.3.1 Joints

#### 2.3.1.1 High Density PE Pipe

Pipe shall be joined using butt fusion method as recommended by the pipe manufacturer.

## 2.4 EROSION CONTROL RIPRAP

Provide as specified in SECTION 31 23 00.00 20 EXCAVATION AND FILL.

## PART 3 EXECUTION

### 3.1 EXCAVATION FOR PIPE CULVERTS AND UNDERDRAINAGE SYSTEMS

Excavation of trenches, and for appurtenances and backfilling for culverts and underdrainage systems, shall be in accordance with the applicable portions of Section 31 23 00.00 20 EXCAVATION AND FILL 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 610 mm (24 inches) to permit satisfactory jointing and thorough tamping of the bedding material under and around the pipe.

### 3.2 BEDDING

The bedding surface for the pipe shall provide a firm foundation of uniform density throughout the entire length of the pipe.

#### 3.2.1 Concrete Pipe Requirements

Provide as specified in SECTION 31 23 00.00 20 EXCAVATION AND FILL.

Bell holes and depressions for joints shall be removed and formed so entire barrel of pipe is uniformly supported. The bell hole and depressions for the joints shall be not more than the length, depth, and width required for properly making the particular type of joint.

### 3.2.2 Plastic Pipe

Provide as specified in SECTION 31 23 00.00 20 EXCAVATION AND FILL.

### 3.3 PLACING PIPE

Each pipe shall be thoroughly examined before being laid; defective or damaged pipe shall not be used. Plastic pipe shall be protected from exposure to direct sunlight prior to laying, if necessary to maintain adequate pipe stiffness and meet installation deflection requirements. 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. Pipe shall not be laid in water, and pipe shall not 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. Deflection of installed flexible pipe shall not exceed the following limits:

TYPE OF PIPE	MAXIMUM ALLOWABLE DEFLECTION (%)
Plastic (HDPE)	5

Note post installation requirements of paragraph 'Deflection Testing' in PART 3 of this specification for all pipe products including deflection testing requirements for flexible pipe.

### 3.3.1 Concrete Pipe

Laying shall proceed upgrade with spigot ends of bell-and-spigot pipe and tongue ends of tongue-and-groove pipe pointing in the direction of the flow.

### 3.3.2 HDPE Pipe

Laying shall be with the separate sections joined firmly on a bed shaped to line and grade and shall follow manufacturer's recommendations.

### 3.4 JOINTING

#### 3.4.1 Concrete Pipe

##### 3.4.1.1 Cement-Mortar Bell-and-Spigot Joint

The first pipe shall be bedded to the established grade line, with the bell end placed upstream. The interior surface of the bell shall be thoroughly cleaned with a wet brush and the lower portion of the bell filled with mortar as required to bring inner surfaces of abutting pipes flush and even. The spigot end of each subsequent pipe shall be cleaned with a wet brush and uniformly matched into a bell so that sections are closely fitted. After each section is laid, the remainder of the joint shall be filled with mortar, and a bead shall be formed around the outside

of the joint with sufficient additional mortar. If mortar is not sufficiently stiff to prevent appreciable slump before setting, the outside of the joint shall be wrapped or bandaged with cheesecloth to hold mortar in place.

### 3.5 DRAINAGE STRUCTURES

#### 3.5.1 Headwalls

Construction shall be as indicated on the drawings.

### 3.6 BACKFILLING

#### 3.6.1 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. The fill shall be thoroughly compacted 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 equal to the midpoint (spring line) of RCP or has reached an elevation of at least 12 inches above the top of the pipe for flexible pipe. 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 shall be made as necessary to ensure conformance to the compaction requirements specified below. Where it is necessary, in the opinion of the Contracting Officer, that sheeting or portions of bracing used be left in place, the contract will be adjusted accordingly. Untreated sheeting shall not be left in place beneath structures or pavements.

#### 3.6.2 Movement of Construction Machinery

When 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.

#### 3.6.3 Compaction

##### 3.6.3.1 General Requirements

Cohesionless materials include gravels, gravel-sand mixtures, sands, and gravelly sands. Cohesive materials include clayey and silty gravels, gravel-silt mixtures, clayey and silty sands, sand-clay mixtures, clays, silts, and very fine sands. When results of compaction tests for moisture-density relations are recorded on graphs, cohesionless soils will show straight lines or reverse-shaped moisture-density curves, and cohesive soils will show normal moisture-density curves.

##### 3.6.3.2 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, which will be determined as

specified below.

- a. Under unpaved or turfed traffic areas, density shall not be less than 90 percent of maximum density for cohesive material and 95 percent of maximum density for cohesionless material.
- b. Under nontraffic areas, density shall be not less than that of the surrounding material.

#### 3.6.4 Determination of Density

Testing is the responsibility of the Contractor and performed at no additional cost to the Government. 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 6938. When ASTM D 6938 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 6938 results in a wet unit weight of soil and ASTM D 6938 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 6938. Test results shall be furnished 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.

#### 3.7 PIPELINE TESTING

##### 3.7.1 Post-Installation Inspection

One hundred percent of all reinforced concrete pipe installations shall be checked for joint separations, soil migration through the joint, cracks greater than 0.01 inches, settlement and alignment. One hundred percent of all flexible pipes (HDPE) shall be checked for rips, tears, joint separations, soil migration through the joint, cracks, localized bucking, bulges, settlement and alignment.

- a. Replace pipes having cracks greater than 0.1 inches in width or deflection greater than 5 percent deflection. An engineer shall evaluate all pipes with cracks greater than 0.01 inches but less than 0.10 inches to determine if any remediation or repair is required. RCP with crack width less than 0.10 inches and located in a non-corrosive environment (pH 5.5) are generally acceptable. Repair or replace any pipe with crack exhibiting displacement across the crack, exhibiting bulges, creases, tears, spalls, or delamination.
- b. Reports: The deflection results and final post installation inspection report shall include: a copy of all video taken, pipe location identification, equipment used for inspection, inspector name, deviation from design, grade, deviation from line, deflection and deformation of flexible pipe systems, inspector notes, condition of joints, condition of pipe wall (e.g. distress, cracking, wall damage dents, bulges, creases, tears, holes, etc.).



Solicitation No.  
**N40192-16-R-1305**

**FY16 MILCON P-635  
MUNICIPAL SOLID WASTE LANDFILL CLOSURE**

**ANDERSEN AIR FORCE BASE, GUAM**

**PART C  
DRAWINGS**

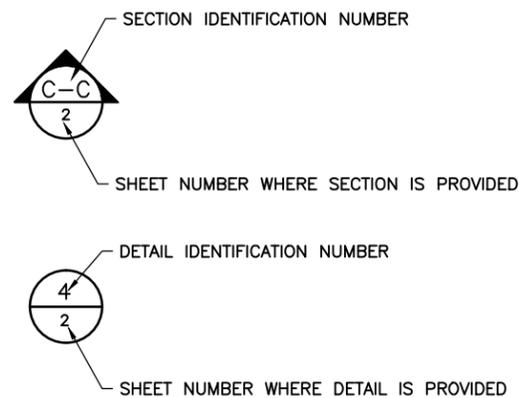


**GENERAL NOTES:**

- ALL CONSTRUCTION AND MATERIALS SHALL BE AS SPECIFIED AND IN ACCORDANCE WITH ALL APPLICABLE CODES, ORDINANCES, LAWS, PERMITS, THE CONTRACT DOCUMENTS AND THE CONTRACT SPECIFICATIONS.
- APPROVAL OF THESE PLANS DOES NOT CONSTITUTE A REPRESENTATION AS TO THE ACCURACY OR COMPLETENESS OF THE LOCATION OF EXISTING UTILITIES OR STRUCTURES WITHIN THE LIMITS OF THE PROJECT. THE CONTRACTOR SHALL VERIFY THE LOCATION OF EXISTING UTILITIES TO HIS/HER OWN SATISFACTION AND SHALL NOTIFY THE CONTRACTING OFFICER PRIOR TO BEGINNING WORK IF DISCREPANCIES ARE FOUND.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL REQUIRED PERMITS PRIOR TO COMMENCEMENT OF CONSTRUCTION.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL TRAFFIC CONTROL WITHIN AND ADJACENT TO ANDERSEN AIR FORCE BASE AS REQUIRED TO PERFORM HIS/HER CONSTRUCTION ACTIVITIES.
- ACCESS TO THE JOB SITE IS TO BE PROVIDED BY ANDERSEN AIR FORCE BASE. CONTRACTOR TO COORDINATE OPERATING SCHEDULE OF ACCESS GATE AND SHALL PROVIDE REQUIRED SIGNAGE TO DIRECT CONSTRUCTION PERSONNEL TO CONSTRUCTION AREA.
- THE CONTRACTOR SHALL COORDINATE ALL SECURITY BADGING REQUIREMENTS FOR CONSTRUCTION PERSONNEL WITH ANDERSEN AIR FORCE BASE.
- SHOULD A CONFLICT OCCUR BETWEEN THE DRAWINGS AND THE SPECIFICATIONS, THE SPECIFICATIONS SHALL TAKE PRECEDENCE UNLESS A WRITTEN DECISION HAS BEEN OBTAINED FROM THE CONTRACTING OFFICER WHICH DESCRIBES A CLARIFICATION OR ALTERNATE METHOD AND/OR MATERIALS.
- THE JOB SITE SHALL BE MAINTAINED IN A CLEAN, ORDERLY CONDITION FREE OF DEBRIS AND LITTER AND SHALL NOT BE UNREASONABLY ENCUMBERED WITH ANY MATERIALS OR EQUIPMENT. EACH SUBCONTRACTOR IMMEDIATELY UPON COMPLETION OF EACH PHASE OF HIS/HER WORK SHALL REMOVE ALL TRASH AND DEBRIS AS A RESULT OF HIS/HER OPERATION.
- ALL MATERIAL STORED ON THE SITE SHALL BE PROPERLY STACKED AND PROTECTED TO PREVENT DAMAGE AND DETERIORATION. FAILURE TO PROTECT MATERIALS MAY BE CAUSE FOR REJECTION OF WORK.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR SAFETY AND PROTECTION WITHIN AND ADJACENT TO THE JOB SITE. ALL CONSTRUCTION PERSONNEL SHALL BE TRAINED AS REQUIRED BY PERTINENT REGULATIONS.
- ALL PATCHING, REPAIRING, AND REPLACING OF MATERIALS AND SURFACES, CUT OR DAMAGED DURING CONSTRUCTION, SHALL BE DONE WITH LIKE MATERIALS SO THAT SURFACES REPLACED WILL UPON COMPLETION OF WORK MATCH SURROUNDING SURFACES. REPAIRS TO ANY DAMAGED STREETS OR SURFACES SHALL BE MADE TO THE SATISFACTION OF THE CONTRACTING OFFICER AND IS THE RESPONSIBILITY OF THE CONTRACTOR.
- NO HAZARDOUS CHEMICALS, TOXINS, CORROSIVES, FLAMMABLES, OIL, GREASE OR OTHERWISE HARMFUL SUBSTANCES SHALL BE DISCHARGED TO THE GROUND SURFACE DURING CONSTRUCTION ACTIVITIES.

**GRADING NOTES:**

- ALL REQUIREMENTS OF THE GUAM SOIL EROSION AND SEDIMENT CONTROL REGULATIONS SHALL BE INCORPORATED INTO THE CONSTRUCTION OF THE PROPOSED GRADING/IMPROVEMENTS CONSISTENT WITH THE APPROVED EROSION CONTROL PLAN FOR CONSTRUCTION LEVEL BEST MANAGEMENT PRACTICES (BMP).
- LOGS OF THE EXPLORATORY BORINGS TAKEN AT THE BORROW AREA ON THE PROJECT SITE ARE PROVIDED IN THE PROJECT BASIS OF DESIGN REPORT.
- THE CONTRACTOR SHALL ENSURE THAT GRADED SURFACES USED FOR OFF-ROAD PARKING, MATERIALS LAY-DOWN, OR AWAITING FUTURE CONSTRUCTION SHALL BE ESTABLISHED FOR DUST CONTROL AS NEEDED. DUST SHALL BE CONTROLLED BY WATERING. THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING ALL PERMITS REQUIRED FOR DUST CONTROL.
- ALL EXPORT AND IMPORT OF MATERIAL OVER ANDERSEN AIR FORCE BASE STREETS SHALL BE UNDERTAKEN OR CONDUCTED BY EQUIPMENT THAT COMPLIES IN ALL RESPECTS TO THE BASE RULES AND REGULATIONS.
- THE CONTRACTOR SHALL IMPLEMENT PREVENTIVE MEASURES TO ASSURE THAT NO ROCK, SOIL, DUST, OR DEBRIS OF ANY FORM SHALL FALL ONTO STREETS WHILE HAULING TO/FROM THE PROJECT SITE. ALL VEHICLE LOADS SHALL BE TRIMMED AND WATERED OR OTHERWISE SECURED SO AS TO PREVENT SPILLAGE FROM THE EQUIPMENT. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CLEANUP OF SILT OR MUD ON ADJACENT STREETS AND STORM DRAIN SYSTEM DUE TO CONSTRUCTION ACTIVITIES OR THE HAULING OF MATERIAL.
- ALL NECESSARY MATERIALS SHALL BE STOCKPILED ON SITE AT CONVENIENT LOCATIONS TO FACILITATE RAPID CONSTRUCTION OF TEMPORARY STORM WATER POLLUTION PREVENTION DEVICES WHEN RAIN IS IMMINENT.
- EROSION CONTROL MEASURES AND DEVICES SHALL BE MAINTAINED TO THE FULLEST EXTENT POSSIBLE DURING GRADING ACTIVITIES AND TO THE SATISFACTION OF THE CONTRACTING OFFICER.
- THE CONTRACTOR SHALL ONLY GRADE, INCLUDING CLEARING AND GRUBBING, FOR THE AREAS FOR WHICH THE CONTRACTOR CAN PROVIDE EROSION/SEDIMENT CONTROL MEASURES. THE CONTRACTOR SHALL INSTALL EROSION/SEDIMENT CONTROL DEVICES AS MAY BE REQUIRED BY THE CONTRACTING OFFICER DUE TO UNCOMPLETED GRADING OPERATIONS OR UNFORESEEN CIRCUMSTANCES WHICH MAY ARISE.
- THE CONTRACTOR SHALL RESTORE ALL EROSION/SEDIMENT CONTROL DEVICES TO WORKING ORDER TO THE SATISFACTION OF THE CONTRACTING OFFICER AFTER EACH RUNOFF PRODUCING RAINFALL.

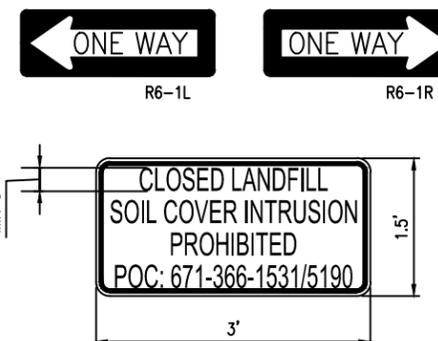


DRAWING INDEX		
NAVPAC DRAWING NO.	SHEET NO.	SHEET TITLE
1718-4179	1	COVER SHEET - LOCATION MAP AND VICINITY MAP
1718-4180	2	ABBREVIATIONS - LEGEND - NOTES AND DRAWING INDEX
1718-4181	3	HISTORICAL BORROW PIT BOUNDARY
1718-4182	4	OVERALL SITE PLAN
1718-4183	5	CELLS 1&2 EXISTING GRADES
1718-4184	6	BORROW AREA EXISTING GRADES
1718-4185	7	BORROW AREA EXCAVATION PLAN
1718-4186	8	CELLS 1 & 2 SITE PLAN AND HORIZONTAL CONTROL
1718-4187	9	FINAL GRADING PLAN
1718-4188	10	UNDER DRAIN SYSTEM LAYOUT
1718-4189	11	COORDINATE TABLES
1718-4190	12	CROSS SECTIONS - BORROW AREA
1718-4191	13	CROSS SECTIONS - CELLS 1 AND 2
1718-4192	14	CROSS SECTIONS - CELLS 1 AND 2
1718-4193	15	CONSTRUCTION DETAILS - 1 OF 3
1718-4194	16	CONSTRUCTION DETAILS - 2 OF 3
1718-4195	17	CONSTRUCTION DETAILS - 3 OF 3
1718-4196	18	PARTIAL ELECTRICAL AND MECHANICAL SITE PLAN

**LIST OF ABBREVIATIONS:**

AP	ANGLE POINT
AAFB	ANDERSEN AIR FORCE BASE
BOL	BOLLARD
CMH	COMMUNICATION HANDHOLE
EG	EXISTING GROUND
EL	ELEVATION
FG	FINISH GRADE
FH	FIRE HYDRANT
FL	FLOW LINE
FS	FINISH SURFACE
GB	GRADE BREAK
GCD	GEOCOMPOSITE DRAIN
GCL	GEOSYNTHETIC CLAY LINER
GMB	GEOMEMBRANE
HDPE	HIGH DENSITY POLYETHYLENE
HP	HIGH POINT
INV	INVERT
LFG	LANDFILL GAS
LLDPE	LINEAR LOW DENSITY POLYETHYLENE
MIL	ONE THOUSAND OF AN INCH
NO.	NUMBER
PC	POINT OF CURVATURE
PVC	POLYVINYL CHLORIDE
SG	SUBGRADE
TBM	TEMPORARY BENCHMARK
TOE	TOE OF SLOPE
TOP	TOP OF SLOPE
TW	TOP OF WALL

**SIGN LEGEND:**



**LEGEND**

EXISTING TREE	
EXISTING SET NO. 4 REBAR	
EXISTING SIGN	
EXISTING VENT	
EXISTING FIRE HYDRANT (FH)	
EXISTING BOLLARD (BOL)	
EXISTING BORING HOLE	
EXISTING MINOR CONTOURS	
EXISTING MAJOR CONTOURS	
EDGE OF EXISTING VEGETATION	
EXISTING CHAIN LINK FENCE	
EXISTING GRAVEL ROAD	
EXISTING BUILDING/STRUCTURE	
FLOW LINE SLOPE	
COORDINATE IDENTIFICATION NUMBER	
PLANNED LIMITS OF WORK	

**ESTIMATED EARTHWORK QUANTITIES:**

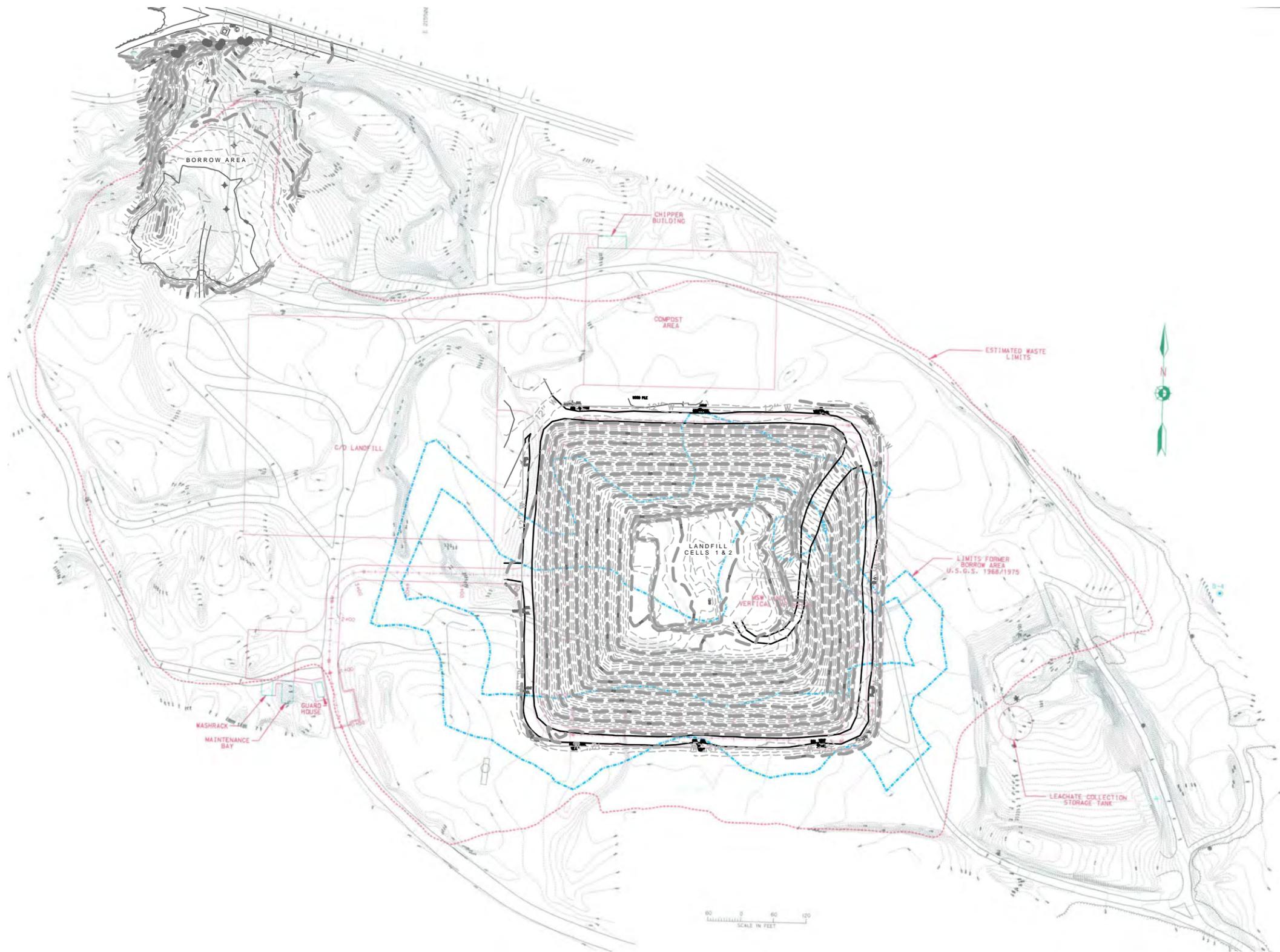
	CUT	FILL
<b>BORROW SITE:</b>		
RAW QUANTITIES:	27,953	32
<b>CELLS 1 AND 2:</b>		
TOPSOIL STRIPPING	4,054	
RAW QUANTITIES:	2,960	31,200
SUB TOTAL:	30,913	31,232

**NOTES:**

- ESTIMATED EARTHWORK QUANTITIES ARE NOT INTENDED TO BE USED FOR BIDDING PURPOSES. CONTRACTOR IS RESPONSIBLE FOR THEIR OWN CUT/FILL QUANTITIES.
- CELLS 1 AND 2 RAW QUANTITIES ACCOUNT FOR THE MATERIALS REQUIRED TO BRING THE SITE TO THE FINISHED GRADE SHOWN ON THESE DRAWINGS AFTER STRIPPING OPERATIONS.
- FILL MATERIALS TO BE PLACED ON FINAL COVER TO BE PROVIDED FROM EXISTING BORROW AREA AT PROJECT SITE.

THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK AMONG THE VARIOUS TRADES AS NECESSARY TO AVOID CONFLICTS AND TO INSURE THE INSTALLATION OF ALL WORK WITHIN THE AVAILABLE SPACE.

DATE	APPROVED
DESCRIPTION	SYMBOL
<b>AECOM</b>	
<small>990 TOWN &amp; COUNTRY ROAD ORANGE, CALIFORNIA 92668 T: 714.952.3400 F: 714.952.2729 www.aecom.com</small>	
SUBMITTED BY	SEAL
HARVINDER SINGH	
FIRM MEMBER	DATE 3/25/2016
APPROVED	
VINCENT SABLAN, R.A. FOR COMMANDER NAIFAC	
ACTIVITY	
THOMAS SPRIGGS, Ph.D., P.E. SATISFACTORY TO DATE	
DES DCW	DR DCW
CHK BH	QC BH
CH ENG HWC	
PA/OM	B.B./N.O.
BRANCH MANAGER	
CHIEF ENG/ARCH	
FIRE PROTECTION	
DEPARTMENT OF THE NAVY	NAVAL FACILITIES ENGINEERING COMMAND
NAVFAC MARIANAS	PFTL, GUAM
ANDERSEN AIR FORCE BASE	Y/CO, GUAM
<b>MUNICIPAL SOLID WASTE LANDFILL FINAL CLOSURE CONSTRUCTION DRAWINGS</b>	
ABBREVIATIONS - LEGEND - NOTES AND DRAWING INDEX	
CODE ID. NO. ---	SIZE D
SCALE: AS SHOWN	
WORK ORDER NO.	
1333930	
SPEC. NO. ---	
NAVFAC DRAWING NO.	
1718-4180	
SHEET 2 OF 18	
<b>C-001</b>	



INFORMATION SHOWN ON THIS DRAWING IS FOR REFERENCE ONLY

NO.	DATE	DESCRIPTION	APP'D



SUBMITTED BY  
**HARVINDER SINGH**

FIRM MEMBER DATE **3/25/2016**

APPROVED  
**VINCENT SABLON, R.A.**  
FOR COMMANDER NAVFAC

ACTIVITY  
**THOMAS SPRIGGS, Ph.D., P.E.**

DES	DCW	DR	DCW
CHK	BH	QC	BH
CH	ENG	HWC	
PA/OM	B.B./N.O.		
BRANCH MANAGER			
CHIEF ENG/ARCH			
FIRE PROTECTION			

DEPARTMENT OF THE NAVY  
NAVFAC MARIANAS  
FTL, GUAM  
ANDERSEN AIR FORCE BASE  
MUNICIPAL SOLID WASTE LANDFILL  
FINAL CLOSURE CONSTRUCTION DRAWINGS  
HISTORICAL BORROW PIT BOUNDARY  
Y/CO, GUAM

CODE ID. NO. --	SIZE D
SCALE: <b>AS SHOWN</b>	
WORK ORDER NO. <b>1333930</b>	
SPEC. NO. --	
NAVFAC DRAWING NO. <b>1718-4181</b>	
SHEET <b>3</b> OF <b>18</b>	
<b>C-002</b>	

THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK AMONG THE VARIOUS TRADES AS NECESSARY TO AVOID CONFLICTS AND TO INSURE THE INSTALLATION OF ALL WORK WITHIN THE AVAILABLE SPACE.

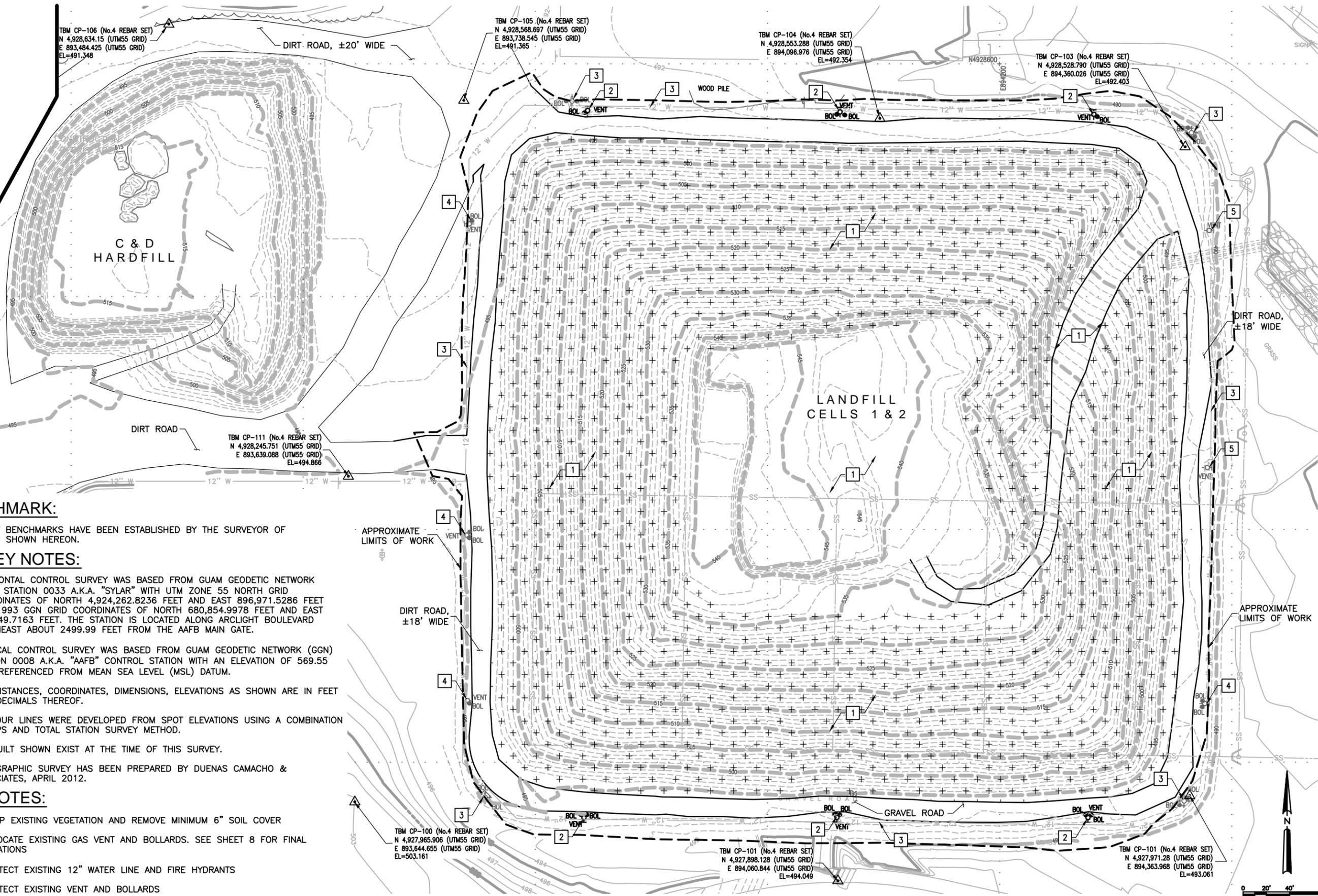
IF SHEET IS LESS THAN 22" X 34"  
REDUCED PRINT - USE GRAPHIC SCALES

ACAD DWG. FILE: mmsa.dwg  
PLOT SCALE: xx"=y'-x"

NAVFORM REVISION JUNE 2004



MATCHLINE - SEE SHEET C-112



**BENCHMARK:**

TEMPORARY BENCHMARKS HAVE BEEN ESTABLISHED BY THE SURVEYOR OF RECORD AS SHOWN HEREON.

**SURVEY NOTES:**

- HORIZONTAL CONTROL SURVEY WAS BASED FROM GUAM GEODETIC NETWORK (GGN) STATION 0033 A.K.A. "SYLAR" WITH UTM ZONE 55 NORTH GRID COORDINATES OF NORTH 4,924,262.8236 FEET AND EAST 896,971.5286 FEET AND 1993 GGN GRID COORDINATES OF NORTH 680,854.9978 FEET AND EAST 383,449.7163 FEET. THE STATION IS LOCATED ALONG ARCHLIGHT BOULEVARD NORTHEAST ABOUT 2499.99 FEET FROM THE AAFB MAIN GATE.
- VERTICAL CONTROL SURVEY WAS BASED FROM GUAM GEODETIC NETWORK (GGN) STATION 0008 A.K.A. "AAFBI" CONTROL STATION WITH AN ELEVATION OF 569.55 FEET REFERENCED FROM MEAN SEA LEVEL (MSL) DATUM.
- ALL DISTANCES, COORDINATES, DIMENSIONS, ELEVATIONS AS SHOWN ARE IN FEET AND DECIMALS THEREOF.
- CONTOUR LINES WERE DEVELOPED FROM SPOT ELEVATIONS USING A COMBINATION OF GPS AND TOTAL STATION SURVEY METHOD.
- AS-BUILT SHOWN EXIST AT THE TIME OF THIS SURVEY.
- TOPOGRAPHIC SURVEY HAS BEEN PREPARED BY DUENAS CAMACHO & ASSOCIATES, APRIL 2012.

**KEY NOTES:**

- STRIP EXISTING VEGETATION AND REMOVE MINIMUM 6" SOIL COVER
- RELOCATE EXISTING GAS VENT AND BOLLARDS. SEE SHEET 8 FOR FINAL LOCATIONS
- PROTECT EXISTING 12" WATER LINE AND FIRE HYDRANTS
- PROTECT EXISTING VENT AND BOLLARDS
- ADJUST AND EXTEND GAS VENT AND BOLLARDS AS NEEDED

NO.	DATE	DESCRIPTION	APP'D.



SUBMITTED BY: HARVINDER SINGH

FIRM MEMBER DATE: 3/25/2016

APPROVED: VINCENT SABLAN, R.A.  
FOR COMMANDER NAIFAC

ACTIVITY: THOMAS SPRIGGS, Ph.D., P.E.  
SATISFACTORY TO: DATE: ---

DES	DCW	DR	DCW
CHK	BH	QC	BH
CH	ENG	HWC	
PA/OM	B.B./N.O.		
BRANCH MANAGER			
CHIEF ENG/ARCH			
FIRE PROTECTION			

DEPARTMENT OF THE NAVY  
NAVFAC MARIANAS  
PHTL, GUAM

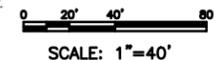
ANDERSEN AIR FORCE BASE  
MUNICIPAL SOLID WASTE LANDFILL  
FINAL CLOSURE CONSTRUCTION DRAWINGS

CELLS 1&2 EXISTING GRADES

Y/CO. GUAM

CODE ID. NO. ---	SIZE D
SCALE: AS SHOWN	
WORK ORDER NO. 1333930	
SPEC. NO. ---	
NAVFAC DRAWING NO. 1718-4183	
SHEET 5 OF 18	

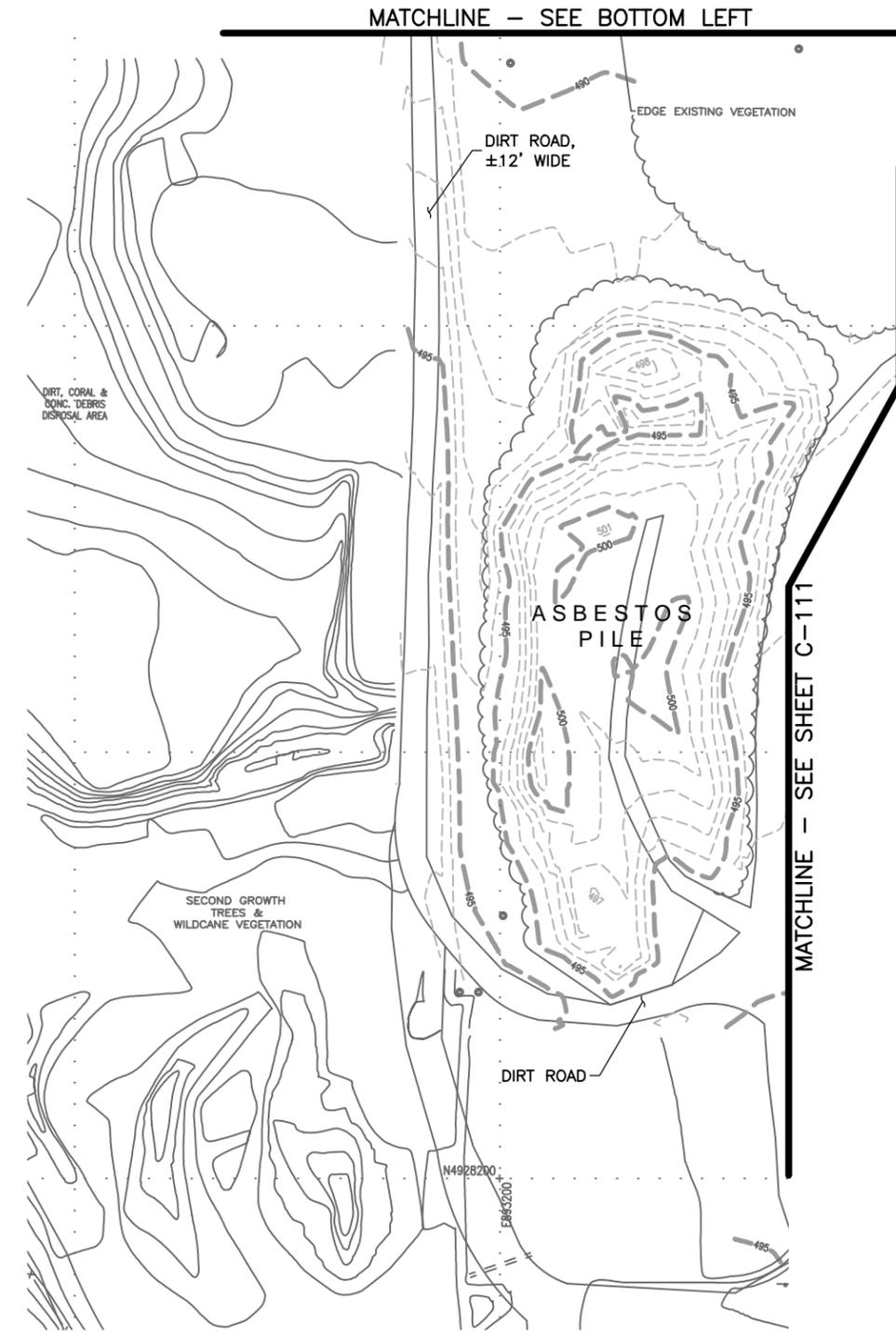
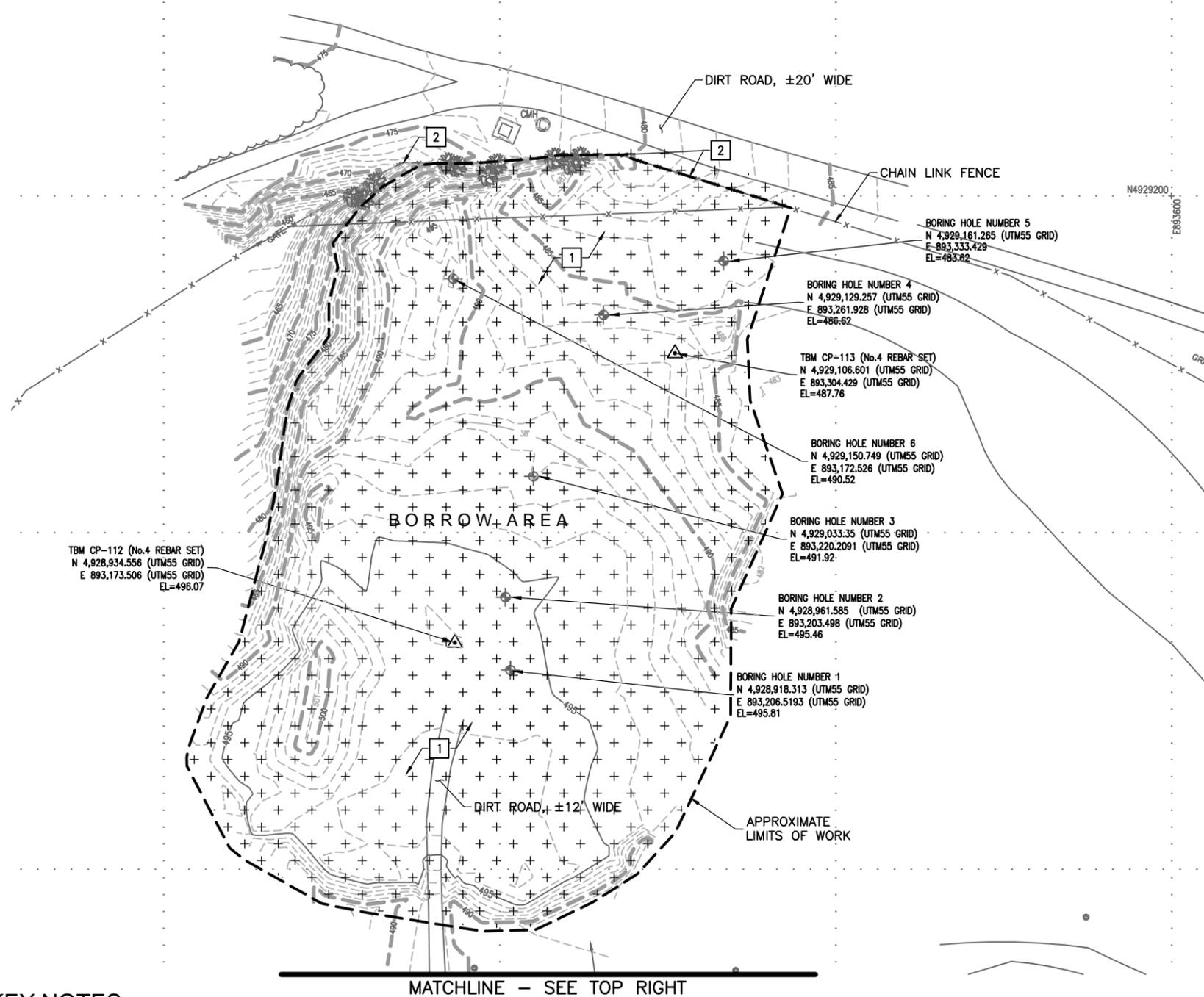
**C-111**



THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK AMONG THE VARIOUS TRADES AS NECESSARY TO AVOID CONFLICTS AND TO INSURE THE INSTALLATION OF ALL WORK WITHIN THE AVAILABLE SPACE.

IF SHEET IS LESS THAN 22" X 34"  
REDUCED PRINT - USE GRAPHIC SCALES

PLOT SCALE: xx"=yy"

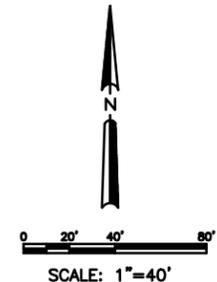


**KEY NOTES:**

- 1 STRIP EXISTING VEGETATION PRIOR TO EXCAVATION
- 2 PROTECT EXISTING FENCE

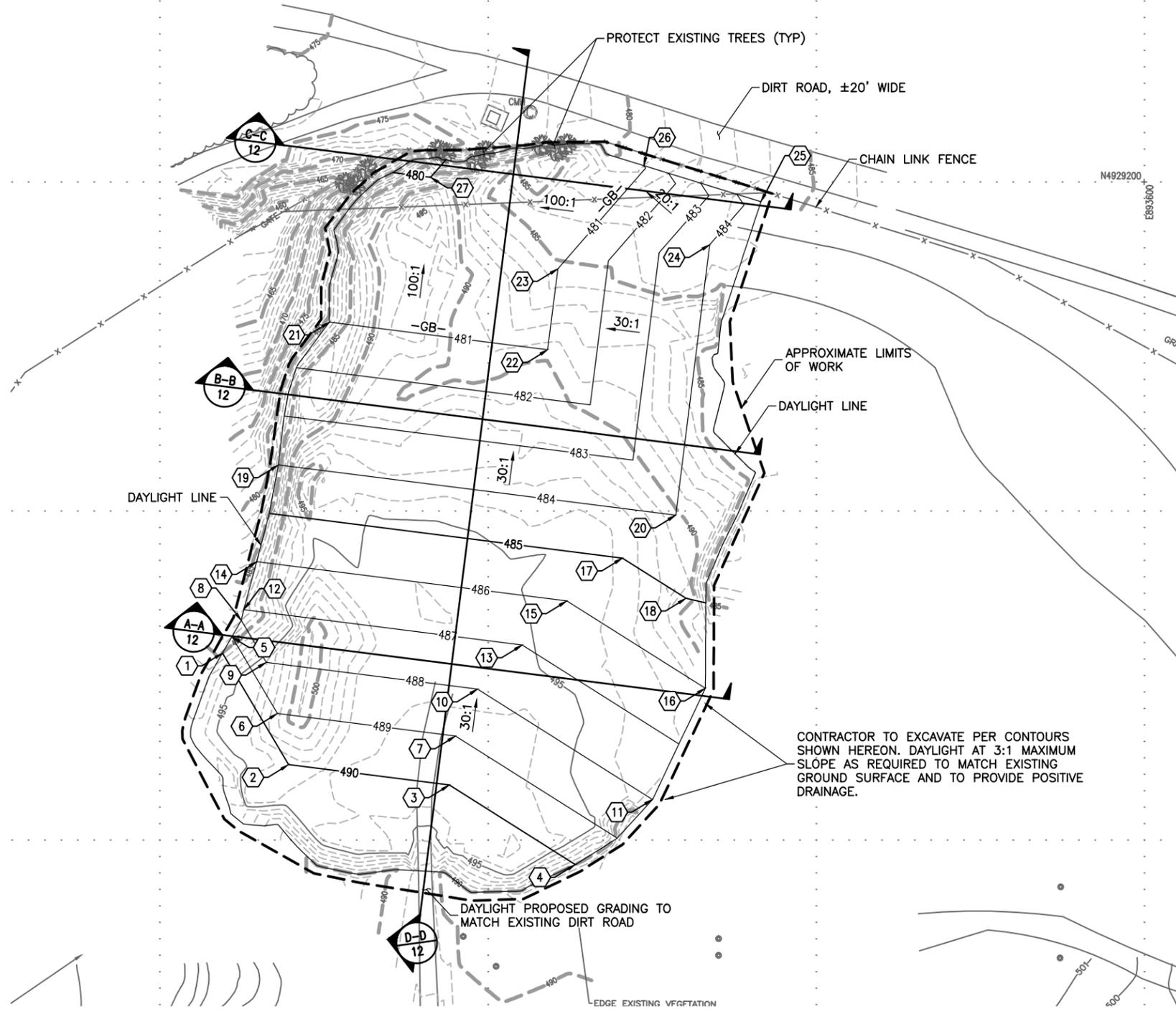
**GENERAL NOTES:**

1. THE EXISTING CONTOURS AND ELEVATIONS SHOWN HEREON ARE BASED ON A TOPOGRAPHIC SURVEY PREPARED IN APRIL 2012. CONTRACTOR SHALL PREPARE HIS/HER OWN TOPOGRAPHIC SURVEY PRIOR TO EXCAVATION IN ORDER TO DETERMINE THE DIFFERENTIAL OF THE EXISTING GROUND ELEVATIONS SHOWN HEREON AND THE GROUND ELEVATIONS RESULTING FROM THE ADDITIONAL PLACEMENT OF MATERIAL AFTER APRIL 2012.
2. ALL DISTANCES, COORDINATES, DIMENSIONS, ELEVATIONS AS SHOWN ARE IN FEET AND DECIMALS THEREOF.



THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK AMONG THE VARIOUS TRADES AS NECESSARY TO AVOID CONFLICTS AND TO INSURE THE INSTALLATION OF ALL WORK WITHIN THE AVAILABLE SPACE.

	DATE
	APPROVAL
<b>AECOM</b>	
999 TOWN & COUNTRY ROAD ORANGE, CALIFORNIA 92668 TEL: 714.952.3400 F: 714.952.2729 www.aecom.com	
SUBMITTED BY <b>HARVINDER SINGH</b>	
FIRM MEMBER DATE <b>3/25/2016</b>	
APPROVED <b>VINCENT SABLAN, R.A.</b> FOR COMMANDER NAIFAC	
ACTIVITY <b>THOMAS SPRIGGS, Ph.D., P.E.</b>	
SATISFACTORY TO DATE	
DES DCW	DR DCW
CHK BH	QC BH
CH ENG HWC	
PA/OM B.B./N.O.	
BRANCH MANAGER	
CHIEF ENG/ARCH	
FIRE PROTECTION	
DEPARTMENT OF THE NAVY NAVFAC MARIANAS FTL, GUAM	Y/CO, GUAM
ANDERSEN AIR FORCE BASE <b>MUNICIPAL SOLID WASTE LANDFILL FINAL CLOSURE CONSTRUCTION DRAWINGS</b>	
BORROW AREA EXISTING GRADES	
CODE ID. NO. ---	SIZE D
SCALE: <b>AS SHOWN</b>	
WORK ORDER NO. <b>1333930</b>	
SPEC. NO. ---	
NAVFAC DRAWING NO. <b>1718-4184</b>	
SHEET <b>6</b> OF <b>18</b>	
<b>C-112</b>	

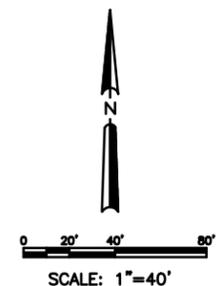


**COORDINATE TABLE - BORROW EXCAVATION**

PT NO.	NORTHING	EASTING	ELEVATION
1	4928913.59	893038.37	490.00
2	4928845.78	893078.60	490.00
3	4928833.41	893176.58	490.00
4	4928785.07	893253.35	490.00
5	4928923.47	893044.14	489.00
6	4928876.88	893071.78	489.00
7	4928863.17	893180.29	489.00
8	4928933.48	893049.83	488.00
9	4928907.97	893064.96	488.00
10	4928891.71	893193.80	488.00
11	4928824.64	893300.31	488.00
12	4928939.94	893051.30	487.00
13	4928918.51	893220.98	487.00
14	4928969.18	893059.22	486.00
15	4928945.32	893248.16	486.00
16	4928892.20	893332.52	486.00
17	4928971.29	893281.99	485.00
18	4928946.86	893320.78	485.00
19	4929027.98	893072.49	484.00
20	4928997.42	893314.51	484.00
21	4929114.77	893103.52	481.00
22	4929097.98	893236.49	481.00
23	4929147.22	893242.71	481.00
24	4929161.88	893335.28	484.00
25	4929187.94	893366.49	484.39
26	4929209.84	893295.15	481.00
27	4929202.76	893165.07	480.00

**GENERAL NOTES:**

1. THE BORROW AREA SHOWN HEREON WAS PREVIOUSLY AN EXCAVATED SITE THAT HAS BEEN BACKFILLED WITH UNKNOWN QUANTITIES OF SATISFACTORY AND UNSATISFACTORY MATERIALS AS DESCRIBED IN THE PROJECT SPECIFICATIONS. IF THE QUANTITY OF SATISFACTORY MATERIALS REQUIRED TO COMPLETE THE WORK CANNOT BE EXCAVATED AT THE BORROW AREA THEN ADDITIONAL MATERIAL WILL BE REQUIRED TO BE IMPORTED FROM AN ALTERNATE SOURCE APPROVED BY THE CONTRACTING OFFICER.
2. THE EXISTING CONTOURS AND ELEVATIONS SHOWN HEREON ARE BASED ON A TOPOGRAPHIC SURVEY PREPARED IN APRIL 2012. CONTRACTOR SHALL PREPARE HIS/HER OWN TOPOGRAPHIC SURVEY PRIOR TO EXCAVATION IN ORDER TO DETERMINE THE DIFFERENTIAL OF THE EXISTING GROUND ELEVATIONS SHOWN HEREON AND THE GROUND ELEVATIONS RESULTING FROM THE ADDITIONAL PLACEMENT OF MATERIAL AFTER APRIL 2012. CONTRACTOR SHALL ADJUST THE EXCAVATION DESIGN SHOWN HEREON TO HIS/HER OWN SATISFACTION IN ORDER TO GENERATE THE REQUIRED VOLUME OF MATERIAL TO PERFORM THE FINAL GRADING OPERATIONS AT CELLS 1&2.
3. TEMPORARY BENCHMARKS WERE ESTABLISHED WITHIN THE PLANNED LIMITS OF EXCAVATION AT THE BORROW AREA BY THE PROJECT SURVEYOR. CONTRACTOR SHALL RE-ESTABLISH SAID TEMPORARY BENCHMARKS AS NEEDED TO PERFORM THE WORK AND TO MAINTAIN HORIZONTAL CONTROL FOR THE DURATION OF EXCAVATION.
4. ALL DISTANCES, COORDINATES, DIMENSIONS, ELEVATIONS AS SHOWN ARE IN FEET AND DECIMALS THEREOF.

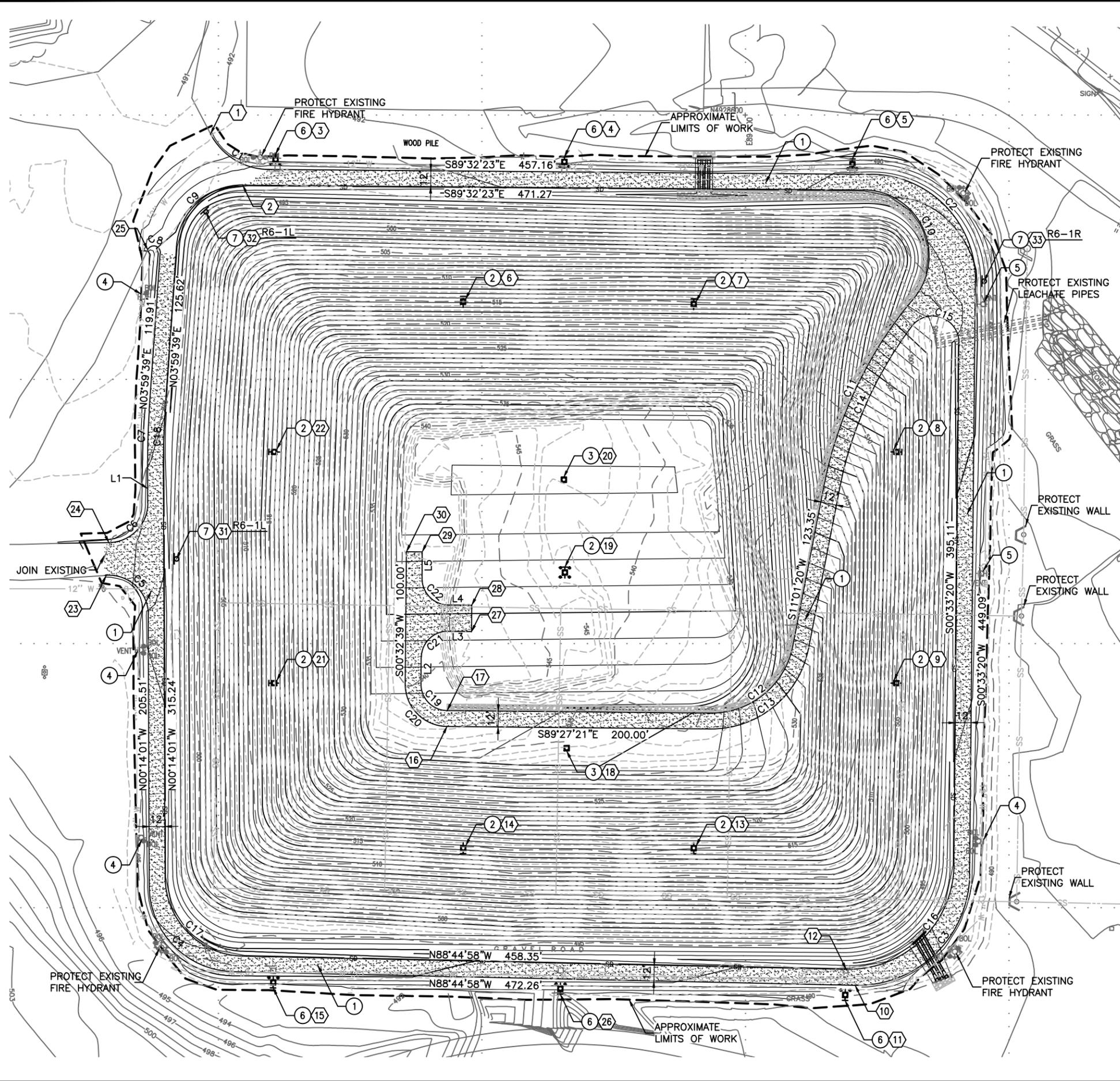


<p>DEPARTMENT OF THE NAVY NAVFAC MARIANAS PFTL, GUAM</p> <p>ANDERSEN AIR FORCE BASE MUNICIPAL SOLID WASTE LANDFILL FINAL CLOSURE CONSTRUCTION DRAWINGS</p> <p>Y/CO, GUAM</p> <p>BORROW AREA EXCAVATION PLAN</p>	<p>DATE: _____</p> <p>SYMBOL: _____</p> <p><b>AECOM</b></p> <p>990 TOWN &amp; COUNTRY ROAD ORANGE, CALIFORNIA 92668 T: 714.952.3400 F: 714.952.2729 www.aecom.com</p> <p><b>HARVINDER SINGH</b> No. 1856 Professional Engineer GUAM</p> <p>SUBMITTED BY: HARVINDER SINGH</p> <p>FIRM MEMBER DATE: 3/25/2016</p> <p>APPROVED: VINCENT SABLAN, R.A. FOR COMMANDER NAFAC</p> <p>ACTIVITY: THOMAS SPRIGGS, Ph.D., P.E. SATISFACTORY TO: _____ DATE: _____</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>DES</td><td>DCW</td><td>DR</td><td>DCW</td> </tr> <tr> <td>CHK</td><td>BH</td><td>QC</td><td>BH</td> </tr> <tr> <td>CH ENG</td><td>HWC</td><td></td><td></td> </tr> <tr> <td>PA/OM</td><td>B.B./N.O.</td><td></td><td></td> </tr> <tr> <td>BRANCH MANAGER</td><td></td><td></td><td></td> </tr> <tr> <td>CHIEF ENG/ARCH</td><td></td><td></td><td></td> </tr> <tr> <td>FIRE PROTECTION</td><td></td><td></td><td></td> </tr> </table> <p>CODE ID. NO. --- SIZE D</p> <p>SCALE: AS SHOWN</p> <p>WORK ORDER NO. 1333930</p> <p>SPEC. NO. ---</p> <p>NAVFAC DRAWING NO. 1718-4185</p> <p>SHEET 7 OF 18</p> <p><b>C-121</b></p>	DES	DCW	DR	DCW	CHK	BH	QC	BH	CH ENG	HWC			PA/OM	B.B./N.O.			BRANCH MANAGER				CHIEF ENG/ARCH				FIRE PROTECTION			
DES	DCW	DR	DCW																										
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IF SHEET IS LESS THAN 22" X 34"  
REDUCED PRINT - USE GRAPHIC SCALES

ACAD DWG. FILE: noma.dwg PLOT SCALE: xx"=y'-x"



**KEY NOTES:**

- ① CONSTRUCT MAINTENANCE ACCESS ROAD PER DETAIL 3 ON SHEET 15
- ② INSTALL GAS VENT PER DETAIL 2 ON SHEET 15
- ③ INSTALL SETTLEMENT MONUMENT PER DETAIL 4 ON SHEET 15
- ④ PROTECT EXISTING VENT AND BOLLARDS
- ⑤ ADJUST AND EXTEND VERTICALLY GAS VENT AND BOLLARDS AS NEEDED.
- ⑥ RELOCATE GAS VENT AND BOLLARDS PER DETAIL 8 ON SHEET 16
- ⑦ INSTALL SIGN POST AND FOUNDATION PER DETAIL 9 ON SHEET 16. SIGN TYPE PER PLAN

**LINE TABLE:**

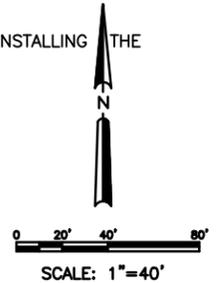
LINE	LENGTH	BEARING
L1	31.76	N00°14'01\"W
L2	20.00	N00°32'39\"E
L3	18.00	S89°27'21\"E
L4	18.00	N89°27'21\"W
L5	20.00	N00°32'39\"E

**CURVE TABLE:**

CURVE	RADIUS	LENGTH	TANGENT	DELTA
C1	50.00	54.13	30.06	62°01'30\"
C2	80.00	125.80	80.13	90°05'42\"
C3	85.00	134.55	86.04	90°41'42\"
C4	65.00	100.42	63.34	88°30'57\"
C5	30.00	48.78	31.70	93°09'17\"
C6	30.00	46.76	29.64	89°18'09\"
C7	512.00	37.78	18.90	04°13'39\"
C8	5.00	13.90	27.32	159°15'21\"
C9	50.00	75.46	47.01	86°27'59\"
C10	50.00	113.21	106.57	129°43'50\"
C11	312.00	158.84	81.18	29°10'07\"
C12	63.00	87.44	52.42	79°31'18\"
C13	75.00	104.09	62.40	79°31'18\"
C14	300.00	135.63	68.99	25°54'11\"
C15	20.00	50.14	60.88	143°37'49\"
C16	80.00	126.63	80.98	90°41'42\"
C17	60.00	92.69	58.47	88°30'57\"
C18	500.00	36.89	18.45	04°13'39\"
C19	20.00	31.42	20.00	90°00'00\"
C20	32.00	50.27	32.00	90°00'00\"
C21	20.00	31.42	20.00	90°00'00\"
C22	20.00	31.42	20.00	90°00'00\"

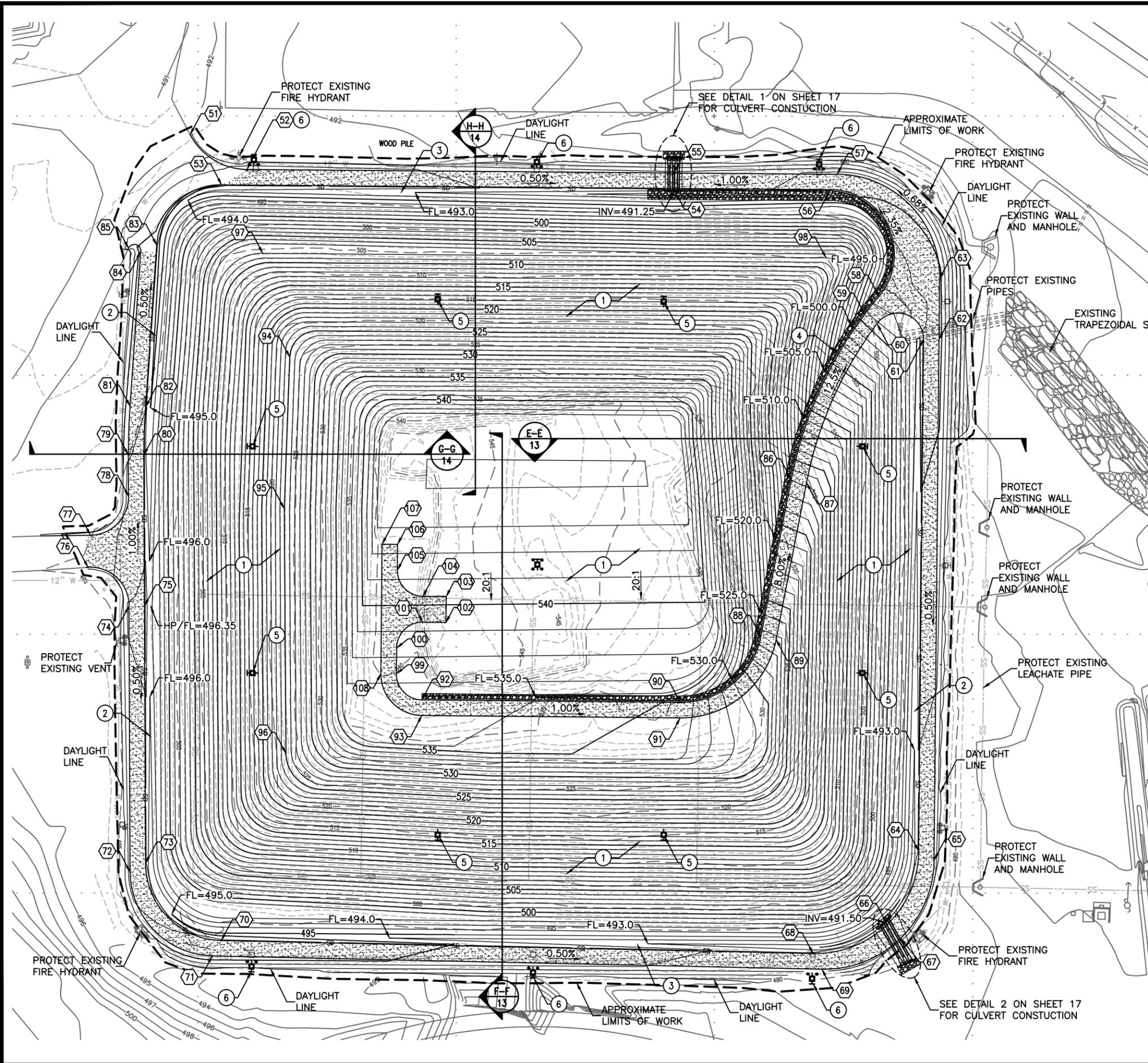
**GENERAL NOTES:**

- 1. CONTRACTOR SHALL FIELD VERIFY ALL EXISTING UTILITIES TO HIS/ER SATISFACTION PRIOR TO GRADING ACTIVITIES. ALL UTILITIES SHALL BE PROTECTED IN PLACE UNLESS NOTED OTHERWISE.
- 2. TEMPORARY BENCHMARKS WERE ESTABLISHED WITHIN THE PLANNED LIMITS OF WORK AT CELLS 1 & 2 BY THE PROJECT SURVEYOR. CONTRACTOR SHALL RE-ESTABLISH SAID TEMPORARY BENCHMARKS AS NEEDED TO PERFORM THE WORK AND TO MAINTAIN HORIZONTAL CONTROL FOR THE DURATION OF CONSTRUCTION ACTIVITIES.
- 3. ALL DISTANCES, COORDINATES, DIMENSIONS, ELEVATIONS AS SHOWN ARE IN FEET AND DECIMALS THEREOF.
- 4. REFER TO SHEET 11 FOR LISTING OF COORDINATES FOR POINTS SHOWN HEREON.
- 5. AVOID DAMAGE TO THE UNDERLYING GCL WHEN INSTALLING THE SETTLEMENT MONUMENTS.



THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK AMONG THE VARIOUS TRADES AS NECESSARY TO AVOID CONFLICTS AND TO INSURE THE INSTALLATION OF ALL WORK WITHIN THE AVAILABLE SPACE.

<p><b>AECOM</b></p> <p>990 TOWN &amp; COUNTRY ROAD ORANGE, CALIFORNIA 92668 P: 714.952.3400 F: 714.952.2729 www.aecom.com</p>	<p><b>HARVINDER SINGH</b> CERTIFIED PROFESSIONAL ENGINEER No. 13565 Exp. 02/2017 GUAM</p>
<p>SUBMITTED BY: <b>HARVINDER SINGH</b></p> <p>FIRM MEMBER: <b>DATE 3/25/2016</b></p> <p>APPROVED: <b>VINCENT SABLON, R.A.</b> FOR COMMANDER WAFIC</p> <p>ACTIVITY: <b>THOMAS SPRIGGS, Ph.D., P.E.</b> SATISFACTORY TO: <b>DATE</b></p> <p>DES: DCW DR: DCW CHK: BH QC: BH CH ENG: HWC PA/OM: B.B./N.O. BRANCH MANAGER: CHIEF ENG/ARCH: FIRE PROTECTION:</p>	
<p>DEPARTMENT OF THE NAVY NAVFAC MARIANAS PHTL, GUAM</p> <p>ANDERSEN AIR FORCE BASE MUNICIPAL SOLID WASTE LANDFILL FINAL CLOSURE CONSTRUCTION DRAWINGS CELLS 1 &amp; 2 SITE PLAN AND HORIZONTAL CONTROL</p>	
<p>CODE ID. NO. --- SIZE D SCALE: <b>AS SHOWN</b> WORK ORDER NO. <b>1333930</b> SPEC. NO. --- NAVFAC DRAWING NO. <b>1718-4186</b> SHEET <b>8</b> OF <b>18</b> <b>C-130</b></p>	

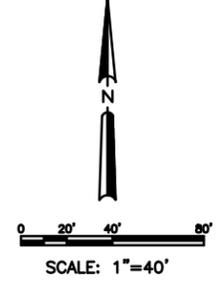


**KEY NOTES:**

- ① CONSTRUCT FINAL LANDFILL COVER PER DETAIL 1 ON SHEET 15.
- ② CONSTRUCT DRAINAGE SWALE PER DETAIL 1 ON SHEET 14.
- ③ CONSTRUCT DRAINAGE SWALE PER DETAIL 2 ON SHEET 14.
- ④ CONSTRUCT RIP-RAP LINED DRAINAGE SWALE PER DETAIL 1 ON SHEET 13.
- ⑤ INSTALL NEW GAS VENT PIPE AND BOLLARDS PER DETAIL 2 ON SHEET 15.
- ⑥ RELOCATE GAS VENT AND BOLLARDS PER DETAIL 8 ON SHEET 16

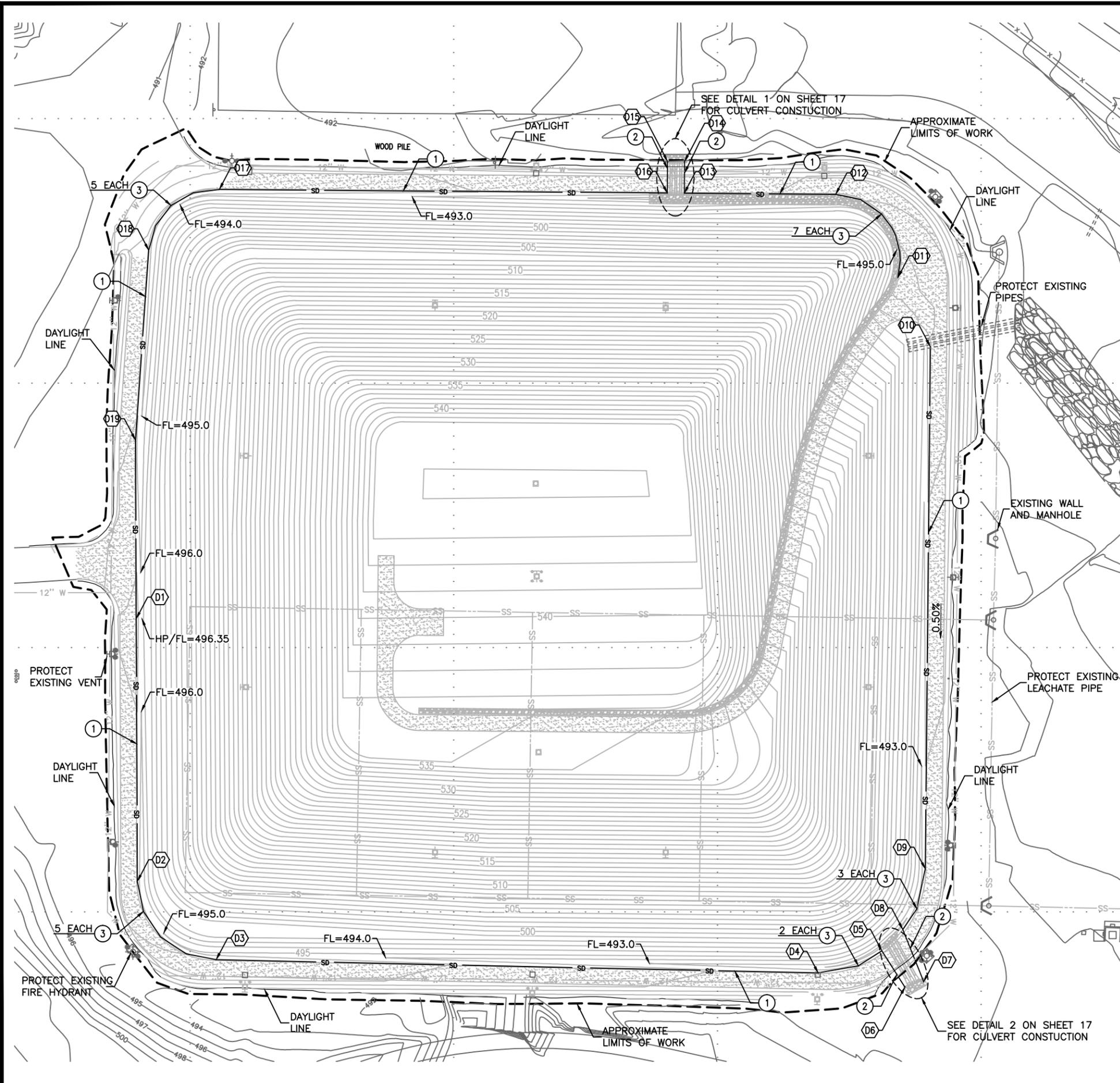
**GENERAL NOTES:**

- 1. CONTRACTOR SHALL FIELD VERIFY ALL EXISTING UTILITIES TO HIS/ER SATISFACTION PRIOR TO GRADING ACTIVITIES. ALL UTILITIES SHALL BE PROTECTED IN PLACE UNLESS NOTED OTHERWISE.
- 2. TEMPORARY BENCHMARKS WERE ESTABLISHED WITHIN THE PLANNED LIMITS OF WORK AT CELLS 1 & 2 BY THE PROJECT SURVEYOR. CONTRACTOR SHALL RE-ESTABLISH SAID TEMPORARY BENCHMARKS AS NEEDED TO PERFORM THE WORK AND TO MAINTAIN HORIZONTAL CONTROL FOR THE DURATION OF CONSTRUCTION ACTIVITIES.
- 3. ALL DISTANCES, COORDINATES, DIMENSIONS, ELEVATIONS AS SHOWN ARE IN FEET AND DECIMALS THEREOF.
- 4. REFER TO SHEET 10 FOR LISTING OF COORDINATES AND ELEVATIONS SHOWN HEREON.
- 5. REFER TO DETAIL 7 ON SHEET 16 FOR TYPICAL LINER SYSTEM AND UNDERDRAIN INSTALLATION.



THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK AMONG THE VARIOUS TRADES AS NECESSARY TO AVOID CONFLICTS AND TO INSURE THE INSTALLATION OF ALL WORK WITHIN THE AVAILABLE SPACE.

	DATE: _____ APP'D: _____
<b>AECOM</b>	
SUBMITTED BY: HARVINDER SINGH	
FIRM MEMBER: DATE 3/25/2016	
APPROVED: VINCENT SABLAN, R.A. FOR COMMANDER NAFAC	
ACTIVITY: THOMAS SPRIGGS, Ph.D., P.E.	
SATISFACTORY TO: DATE: _____	
DES: DCW	DR: DCW
CHK: BH	QC: BH
CH ENG: HWC	
PA/OM: B.B./N.O.	
BRANCH MANAGER:	
CHIEF ENG/ARCH:	
FIRE PROTECTION:	
DEPARTMENT OF THE NAVY NAVFAC MARIANAS PFTL, GUAM	Y/CO, GUAM
ANDERSEN AIR FORCE BASE	
<b>MUNICIPAL SOLID WASTE LANDFILL FINAL CLOSURE CONSTRUCTION DRAWINGS</b>	
<b>FINAL GRADING PLAN</b>	
CODE ID. NO. ---	SIZE D
SCALE: AS SHOWN	
WORK ORDER NO. 1333930	
SPEC. NO. ---	
NAVFAC DRAWING NO. <b>1718-4187</b>	
SHEET 9 OF 18	
<b>C-131</b>	



**KEY NOTES:**

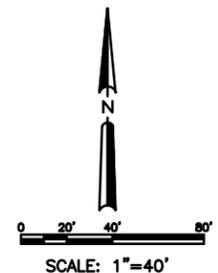
- ① INSTALL UNDER DRAIN SYSTEM PER DETAIL 7 ON SHEET 16.
- ② INSTALL 4" NON-PERFORATED HDPE PIPE.
- ③ INSTALL 4" 11.25' BEND. QUANTITY PER PLAN. SEE NOTE 5 BELOW.

**COORDINATE TABLE - UNDER DRAIN SYSTEM**

PT NO.	NORTHING	EASTING	INVERT	DESCRIPTION
D1	4928221.77	893759.36	495.68	HIGH POINT
D2	4928023.08	893760.17	494.69	11.25' BEND
D3	4927963.80	893820.03	493.98	11.25' BEND
D4	4927953.83	894276.61	491.69	11.25' BEND
D5	4927970.53	894324.92	491.40	90° BEND
D6	4927943.05	894342.43	490.00	OUTLET
D7	4927947.23	894356.75	490.00	OUTLET
D8	4927986.61	894340.88	491.69	11.25', 22.5' BEND
D9	4928032.54	894357.85	491.94	11.25' BEND
D10	4928427.63	894361.68	493.92	HIGH POINT
D11	4928479.95	894337.17	494.88	HIGH POINT
D12	4928542.72	894289.88	492.54	11.25' BEND
D13	4928543.64	894175.08	491.39	90° BEND
D14	4928567.59	894175.28	490.00	OUTLET
D15	4928567.69	894162.33	490.00	OUTLET
D16	4928543.74	894162.14	491.35	90° BEND
D17	4928546.47	893822.37	493.06	11.25' BEND
D18	4928500.45	893768.85	493.71	11.25' BEND
D19	4928356.75	893758.81	494.73	DEFLECTION POINT

**GENERAL NOTES:**

1. CONTRACTOR SHALL FIELD VERIFY ALL EXISTING UTILITIES TO HIS/ER SATISFACTION PRIOR TO GRADING ACTIVITIES. ALL UTILITIES SHALL BE PROTECTED IN PLACE UNLESS NOTED OTHERWISE.
2. TEMPORARY BENCHMARKS WERE ESTABLISHED WITHIN THE PLANNED LIMITS OF WORK AT CELLS 1 & 2 BY THE PROJECT SURVEYOR. CONTRACTOR SHALL RE-ESTABLISH SAID TEMPORARY BENCHMARKS AS NEEDED TO PERFORM THE WORK AND TO MAINTAIN HORIZONTAL CONTROL FOR THE DURATION OF CONSTRUCTION ACTIVITIES.
3. ALL DISTANCES, COORDINATES, DIMENSIONS, ELEVATIONS AS SHOWN ARE IN FEET AND DECIMALS THEREOF.
4. REFER TO DETAIL 7 ON SHEET 16 FOR TYPICAL LINER SYSTEM AND UNDERDRAIN INSTALLATION.
5. THE QUANTITY OF BENDS SHOWN HEREON ARE THOSE REQUIRED TO ALIGN THE PERFORATED PIPE ALONG THE CURVE OF THE MAINTENANCE ROAD. CONTRACTOR TO INSTALL BENDS TO SUIT FIELD CONDITION AS NEEDED TO KEEP CENTERLINE OF PERFORATED PIPE APPROXIMATELY 0.50' FROM EDGE OF MAINTENANCE ROAD.



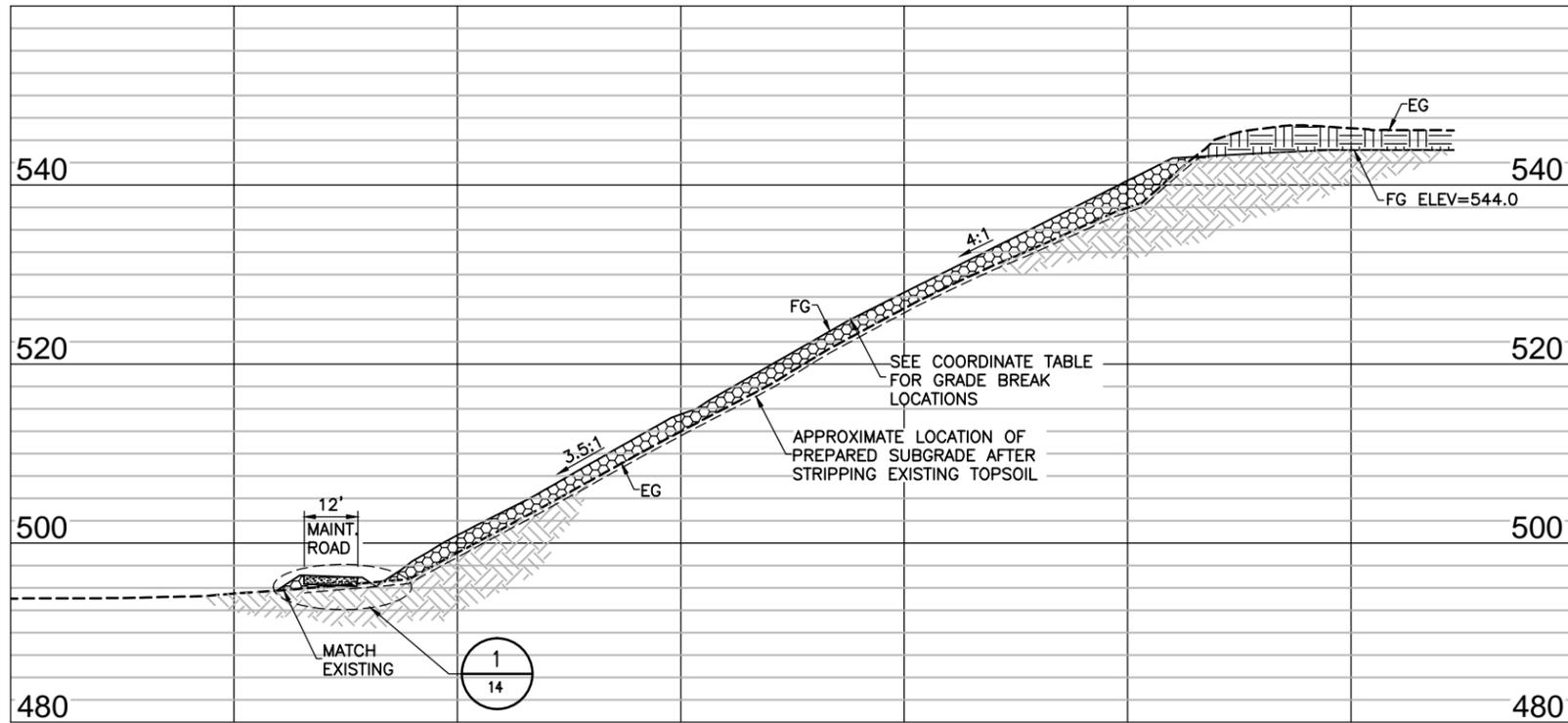
THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK AMONG THE VARIOUS TRADES AS NECESSARY TO AVOID CONFLICTS AND TO INSURE THE INSTALLATION OF ALL WORK WITHIN THE AVAILABLE SPACE.

<p>DEPARTMENT OF THE NAVY NAVFAC MARIANAS PHTL, GUAM</p> <p>ANDERSEN AIR FORCE BASE MUNICIPAL SOLID WASTE LANDFILL FINAL CLOSURE CONSTRUCTION DRAWINGS</p> <p>NAVAL FACILITIES ENGINEERING COMMAND Y/CO, GUAM</p>	<p>DATE: _____</p> <p>APPR: _____</p> <p>SYL: _____</p> <p><b>AECOM</b></p> <p>999 TOWN &amp; COUNTRY ROAD ORANGE, CALIFORNIA 92668 T: 714.952.3400 F: 714.952.2729 www.aecom.com</p> <p><b>HARVINDER SINGH</b> CERTIFIED PROFESSIONAL ENGINEER No. 13866 Exp. 03/31/2017 GUAM</p> <p>SUBMITTED BY: <b>HARVINDER SINGH</b></p> <p>FIRM MEMBER DATE: <b>3/25/2016</b></p> <p>APPROVED: <b>VINCENT SABLAN, R.A.</b> FOR COMMANDER NAFAC</p> <p>ACTIVITY: <b>THOMAS SPRIGGS, Ph.D., P.E.</b></p> <p>SATISFACTORY TO: _____ DATE: _____</p> <p>DES: DCW DR: DCW CHK: BH QC: BH CH ENG: HWC PA/OM: B.B./N.O. BRANCH MANAGER CHIEF ENG/ARCH FIRE PROTECTION</p> <p>CODE ID. NO. --- SIZE D SCALE: <b>AS SHOWN</b> WORK ORDER NO. <b>1333930</b> SPEC. NO. --- NAVFAC DRAWING NO. <b>1718-4188</b> SHEET 10 OF 18</p> <p><b>C-132</b></p>
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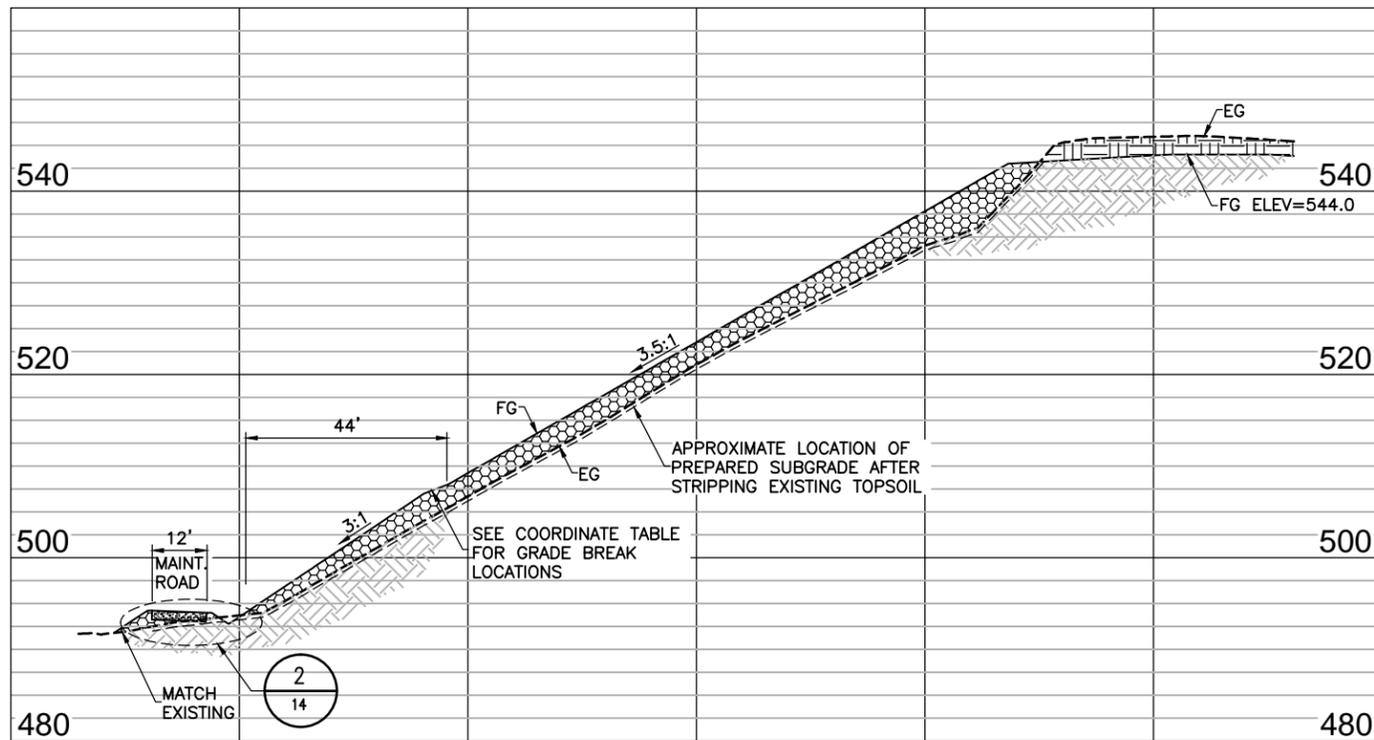




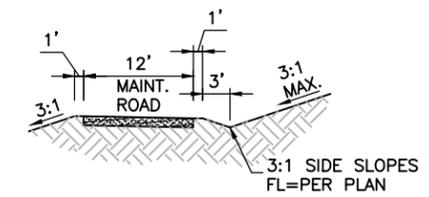




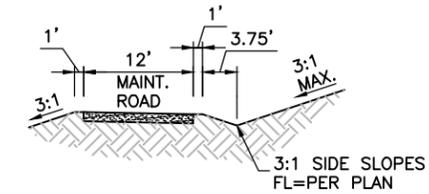
**G-G**  
14  
SECTION G-G (WEST SIDE)  
SCALE: 1"=20' HORIZONTAL  
1"=10' VERTICAL



**H-H**  
14  
SECTION H-H (NORTH SIDE)  
SCALE: 1"=20' HORIZONTAL  
1"=10' VERTICAL



**1**  
14  
TYPICAL DRAINAGE SWALE (1.0' DEEP MIN.)  
SCALE: 1"=10'



**2**  
14  
TYPICAL DRAINAGE SWALE (1.25' DEEP MIN.)  
SCALE: 1"=10'

NO.	DATE	DESCRIPTION



SUBMITTED BY	HARVINDER SINGH
FIRM MEMBER	DATE 3/25/2016
APPROVED	VINCENT SABLAN, R.A. FOR COMMANDER NAVFAC
ACTIVITY	THOMAS SPRIGGS, Ph.D., P.E. SATISFACTORY TO DATE
	DES DCW DR DCW
	CHK BH QC BH
	CH ENG HWC
	PA/OM B.B./N.O.
	BRANCH MANAGER
	CHIEF ENG/ARCH
	FIRE PROTECTION

DEPARTMENT OF THE NAVY	NAVAL FACILITIES ENGINEERING COMMAND
NAVFAC MARIANAS	PFTL, GUAM
ANDERSEN AIR FORCE BASE	Y/CO, GUAM
<b>MUNICIPAL SOLID WASTE LANDFILL</b>	
<b>FINAL CLOSURE CONSTRUCTION DRAWINGS</b>	
CROSS SECTIONS - CELLS 1 AND 2	

CODE ID. NO. ---	SIZE D
SCALE: AS SHOWN	
WORK ORDER NO.	1333930
SPEC. NO. ---	
NAVFAC DRAWING NO.	1718-4192
SHEET 14 OF 18	

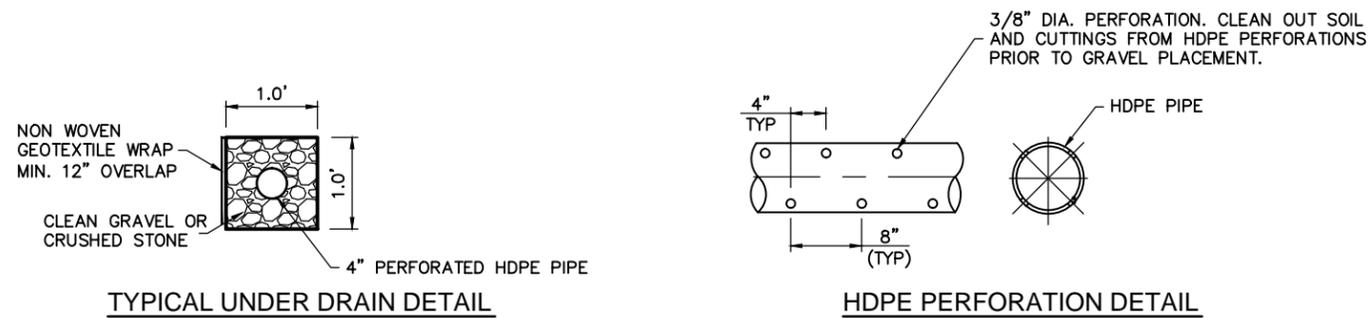
**C-303**

THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK AMONG THE VARIOUS TRADES AS NECESSARY TO AVOID CONFLICTS AND TO INSURE THE INSTALLATION OF ALL WORK WITHIN THE AVAILABLE SPACE.

IF SHEET IS LESS THAN 22" X 34"  
REDUCED PRINT - USE GRAPHIC SCALES

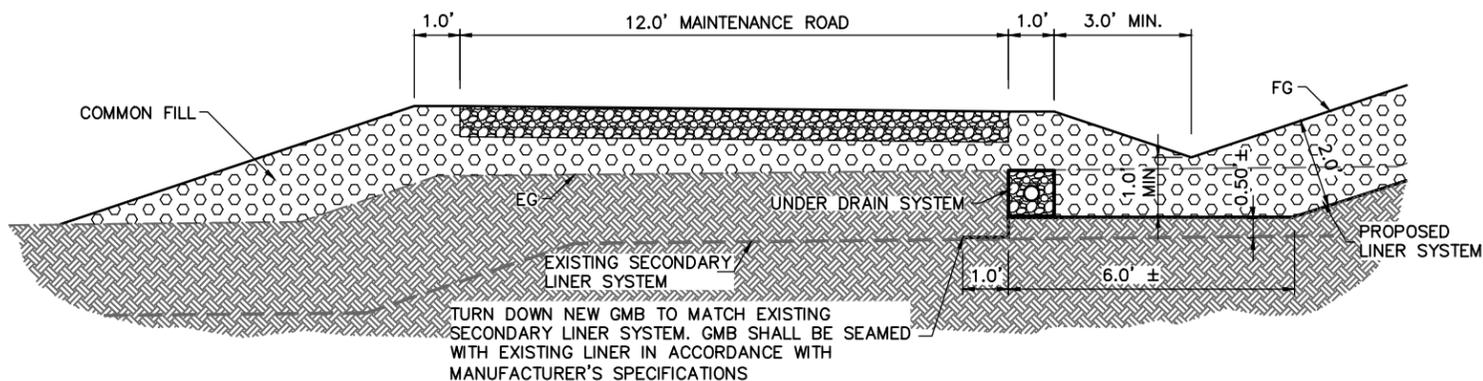
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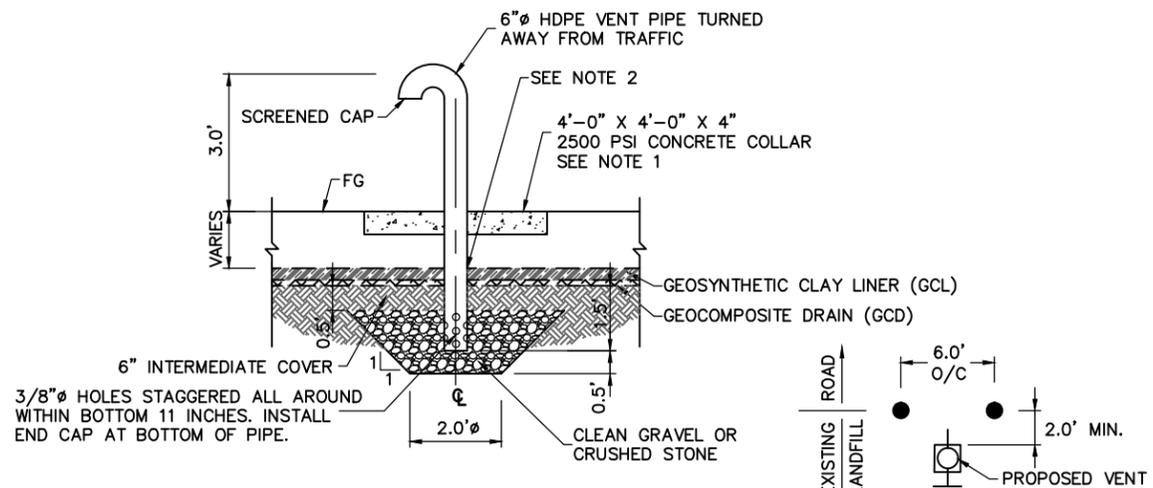


TYPICAL UNDER DRAIN DETAIL

HDPE PERFORATION DETAIL



7 TYPICAL LINER SYSTEM AND UNDERDRAIN INSTALLATION DETAIL  
16 NOT TO SCALE

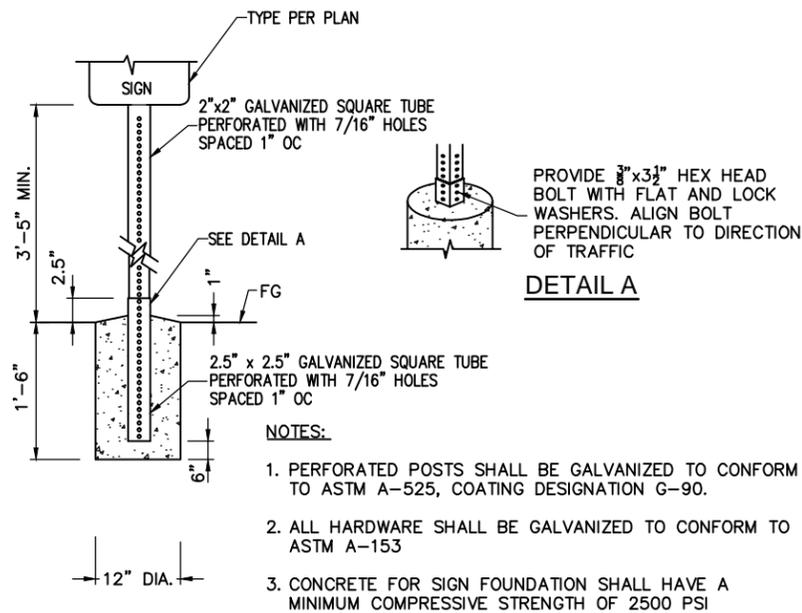


TYPICAL VENT/BOLLARD LAYOUT

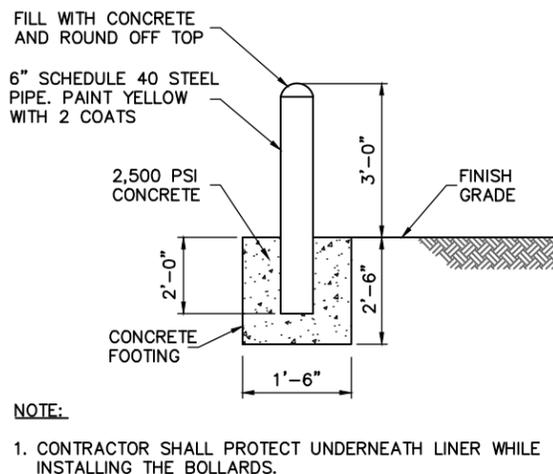
NOTES:

- VENTS INSTALLED ON SIDE SLOPES SHALL PROVIDE A CONCRETE COLLAR FLUSH WITH THE FINISH GRADE. VENT PIPE SHALL BE INSTALLED IN A VERTICAL POSITION.
- CONTRACTOR SHALL REMOVE PORTIONS OF THE EXISTING GCL AND GEONET TO INSTALL THE NEW VENT PIPE. PROPERLY PATCH THE GCL AND GEONET PER MANUFACTURER'S SPECIFICATIONS AFTER THE VENT PIPE SYSTEM IS INSTALLED.
- INSTALL BOLLARD PER DETAIL 10 ON SHEET 16.
- SCREENED CAP TO CONSIST OF 0.25 INCH GALVANIZED MESH FIXED TO THE VENT OPENING.

8 RELOCATED GAS VENT DETAIL  
16 NOT TO SCALE



9 SIGN POST AND FOUNDATION DETAIL  
16 NOT TO SCALE



10 BOLLARD DETAIL  
16 NOT TO SCALE

NO.	DATE	DESCRIPTION	BY



SUBMITTED BY		HARVINDER SINGH	
FIRM MEMBER	DATE	3/25/2016	
APPROVED		VINCENT SABLAN, R.A. FOR COMMANDER NAVFAC	
ACTIVITY		THOMAS SPRIGGS, Ph.D., P.E. SATISFACTORY TO DATE	
DES	DCW	DR	DCW
CHK	BH	QC	BH
CH ENG		HWC	
PM/OM		B.B./N.O.	
BRANCH MANAGER			
CHIEF ENG/ARCH			
FIRE PROTECTION			

DEPARTMENT OF THE NAVY  
NAVFAC MARIANAS  
PFTL, GUAM  
ANDERSEN AIR FORCE BASE  
MUNICIPAL SOLID WASTE LANDFILL  
FINAL CLOSURE CONSTRUCTION DRAWINGS  
Y/CO, GUAM  
CONSTRUCTION DETAILS - 2 OF 3

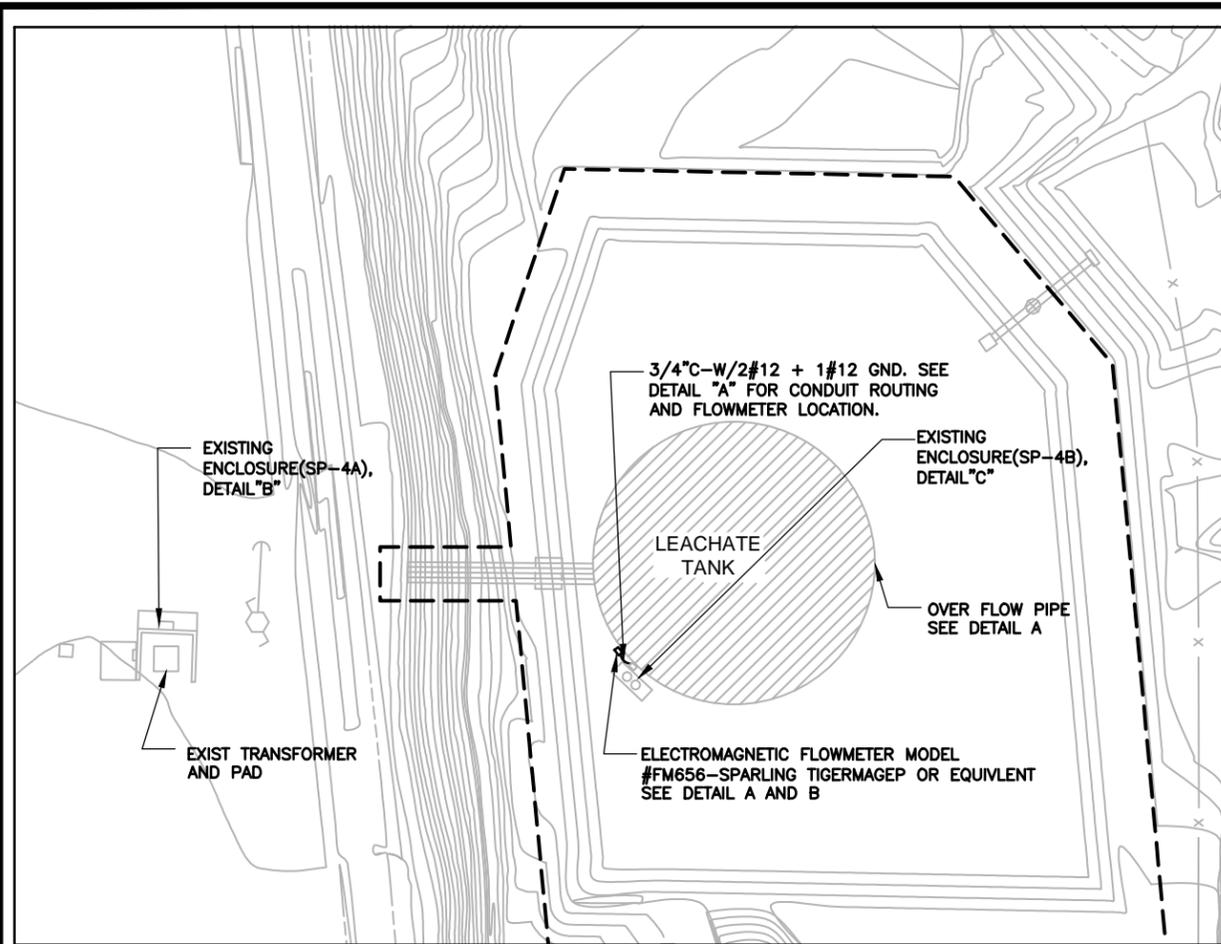
CODE ID. NO. ---	SIZE D
SCALE: AS SHOWN	
WORK ORDER NO.	1333930
SPEC. NO. ---	
NAVFAC DRAWING NO.	1718-4194
SHEET	16 OF 18
C-502	

THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK AMONG THE VARIOUS TRADES AS NECESSARY TO AVOID CONFLICTS AND TO INSURE THE INSTALLATION OF ALL WORK WITHIN THE AVAILABLE SPACE.

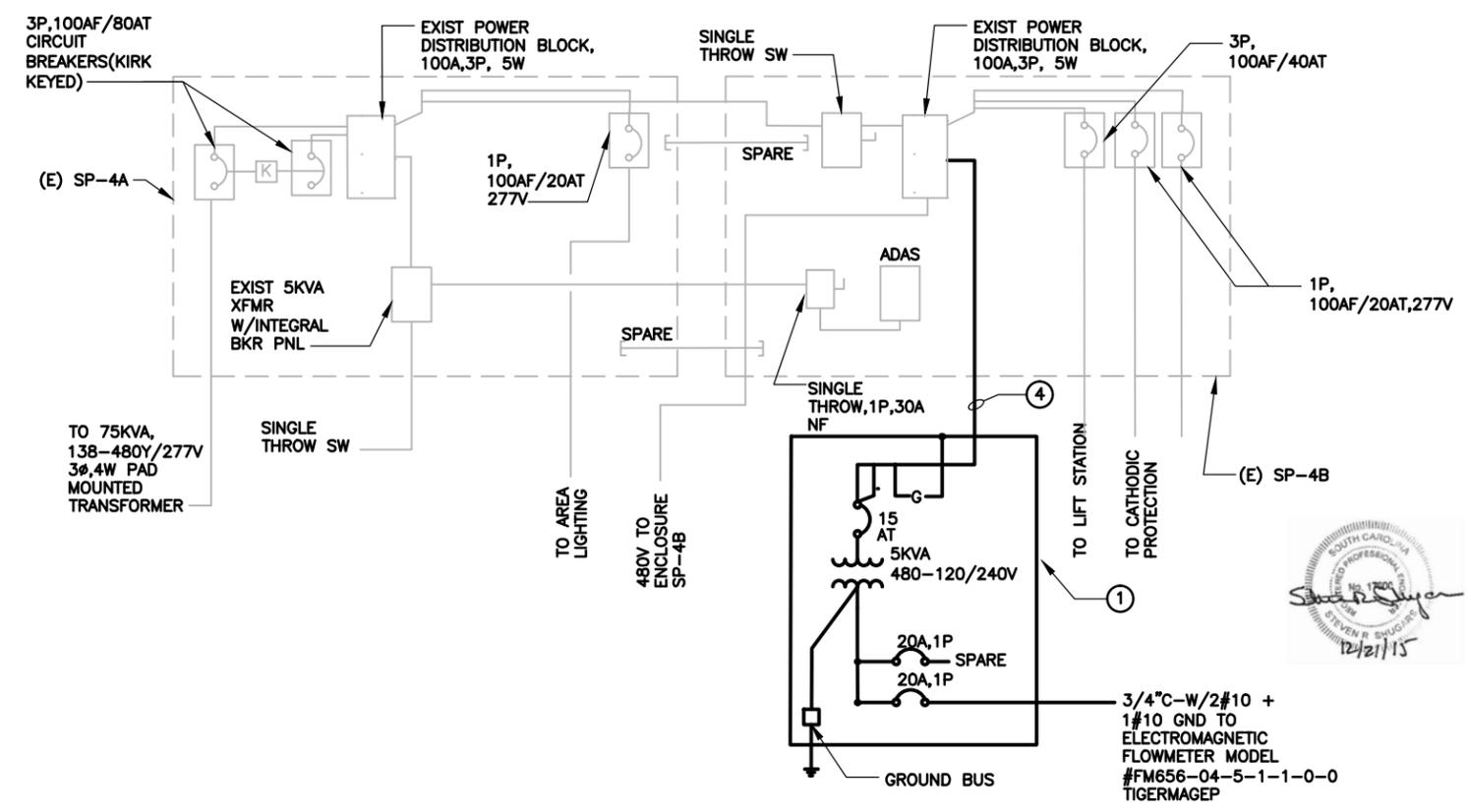
IF SHEET IS LESS THAN 22" X 34" REDUCED PRINT - USE GRAPHIC SCALES

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PLOT SCALE: xx"=1'-0"

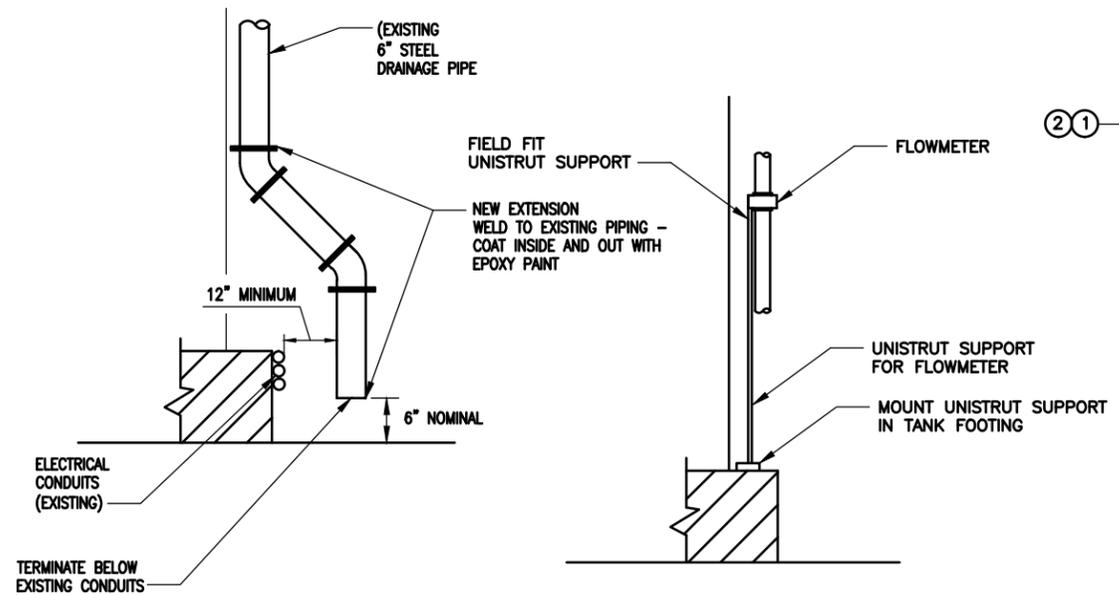




**1 PARTIAL ELECTRICAL SITE PLAN**  
1"=20'

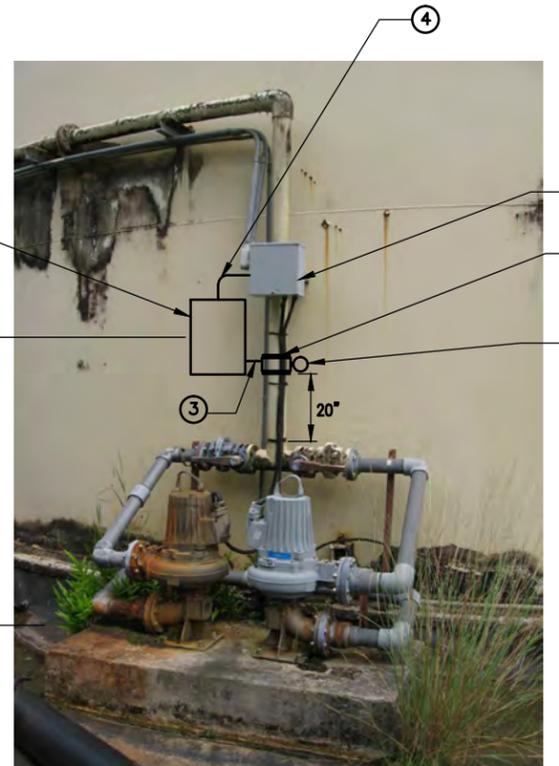


**D EXISTING SINGLE LINE DIAGRAM**  
NOT TO SCALE



**A DETAIL**  
NOT TO SCALE

**B DETAIL**  
NOT TO SCALE



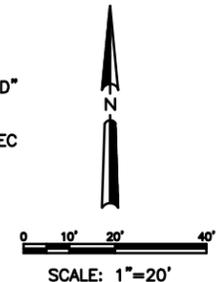
**C DETAIL**  
NOT TO SCALE

**GENERAL NOTES:**

1. CONTRACTOR SHALL FIELD VERIFY ALL CONDUIT ROUTING IN CONJUNCTION TO EXISTING FIELD CONDITION.
2. FINAL LOCATION, ROUTING INSTALLATION METHOD SHALL BE DETERMINED IN THE FIELD AT THE TIME OF INSTALLATION. COORDINATE ELECTRICAL WORK WITH ALL OTHER TRADES TO AVOID CONFLICTS AND DELAYS.
3. ALL EXPOSED CONDUIT SHALL BE RIGID GALVANIZED STEEL PVC COATED.

**NOTES:**

- ① 5 KVA-MINI POWER ZONE (TRANSFORMER) "SQ. D" NEMA 3R ENCLOSURE OR EQUAL 480-120/240V 1Ø 3W PROVIDE GALVANIZED UNISTRUT SUPPORT PER NEC REQUIREMENT.
- ② 3/4"C-W/2#10+1#10 GND(ELECTROMAGNETIC FLOWMETER MODEL #FM656-TIGERMAGEP)
- ③ 3/4"C-W/2#12 + 1#12 GND.



DATE	APPROVED
DESCRIPTION	SYMBOL
<b>AECOM</b>	
<small>999 TOWN &amp; COUNTRY ROAD ORANGE, CALIFORNIA 92668 T: 714.952.3400 F: 714.952.2729 www.aecom.com</small>	
SUBMITTED BY	HARVINDER SINGH
FIRM MEMBER	DATE 3/25/2016
APPROVED	VINCENT SABLAN, R.A. FOR COMMANDER NAFAC
ACTIVITY	THOMAS SPRIGGS, Ph.D., P.E. SATISFACTORY TO DATE
DES	DCW DR DCW
CHK	BH QC BH
CH ENG	HWC
PA/OM	B.B./N.O.
BRANCH MANAGER	
CHIEF ENG/ARCH	
FIRE PROTECTION	
DEPARTMENT OF THE NAVY	NAVFAC MARIANAS
NAVFAC MARIANAS	PFTL, GUAM
ANDERSEN AIR FORCE BASE	Y/CO, GUAM
<b>MUNICIPAL SOLID WASTE LANDFILL</b>	
<b>FINAL CLOSURE CONSTRUCTION DRAWINGS</b>	
<b>PARTIAL ELECTRICAL AND MECHANICAL SITE PLAN</b>	
CODE ID. NO. ---	SIZE D
SCALE: AS SHOWN	
WORK ORDER NO.	1333930
SPEC. NO. ---	
NAVFAC DRAWING NO.	1718-4196
SHEET	18 OF 18
<b>E100</b>	

THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK AMONG THE VARIOUS TRADES AS NECESSARY TO AVOID CONFLICTS AND TO INSURE THE INSTALLATION OF ALL WORK WITHIN THE AVAILABLE SPACE.

IF SHEET IS LESS THAN 22" X 34"  
REDUCED PRINT - USE GRAPHIC SCALES

ACAD DWG. FILE: noma.dwg  
PLOT SCALE: xx"=y'-x"



Solicitation No.  
**N40192-16-R-1305**

**FY16 MILCON P-635  
MUNICIPAL SOLID WASTE LANDFILL CLOSURE**

**ANDERSEN AIR FORCE BASE, GUAM**

**PART D  
OTHER PERTINENT DOCUMENTS**

REQUEST FOR PROPOSAL – PART D  
OTHER PERTINENT DOCUMENTS

**D.1 Scheduled Government Furnished Property**

Reset Form

# Scheduled Government Furnished Property

Save

Attachment Number

Contract Number

DoD Enterprise Identifier

Year

Procurement  
Instrument  
Type Code

Serialized Identifier

Order Number

OR

Non-DoD Number

## Serialized Items List

Add	Copy	Item#	Descr	CAGE	Marking Instr	Model #	NSN	Nomen	Part #	Part or Ident #	Qty	Serial #	Type Designator	Unique Item #	Unit Acq Cost	Unit of Measure	Use As Is
X	#	1	Poly-Flex 60-mil textured HDPE (23 feet x 500 feet <input type="text" value="+"/>			GHT-060-050 0P HT2-6-10-00 225 <input type="text" value="+"/>					9					Roll	true
X	#	2	60 rolls of Bentomat DN Geosynthetic Clay Liner (14.5 feet x 150 feet per <input type="text" value="+"/>								60					Roll	true
X	#	3	Skaps Industries Transnet 220-2-6 Drainage Geocomposite (14.5 feet <input type="text" value="+"/>			220-2-6					37					Roll	true

## Non-Serialized Items List

Add	Copy	Item#	Descr	CAGE	Marking Instr	Model #	NSN	Nomen	Part #	Part or Ident #	Qty	Type Designator	Unit Acq Cost	Unit of Measure	Use As Is
X	#		Soil at AAFB Landfill Borrow Site								28200			Cubic Yard	true
X	#		Green and Wood Material for mulching and incorporation into <input type="text" value="+"/>								10000			Cubic Yard	true

REQUEST FOR PROPOSAL – PART D  
OTHER PERTINENT DOCUMENTS

**D.2 Original Borrow Pit Topographic Map**

E 215500 N 203200

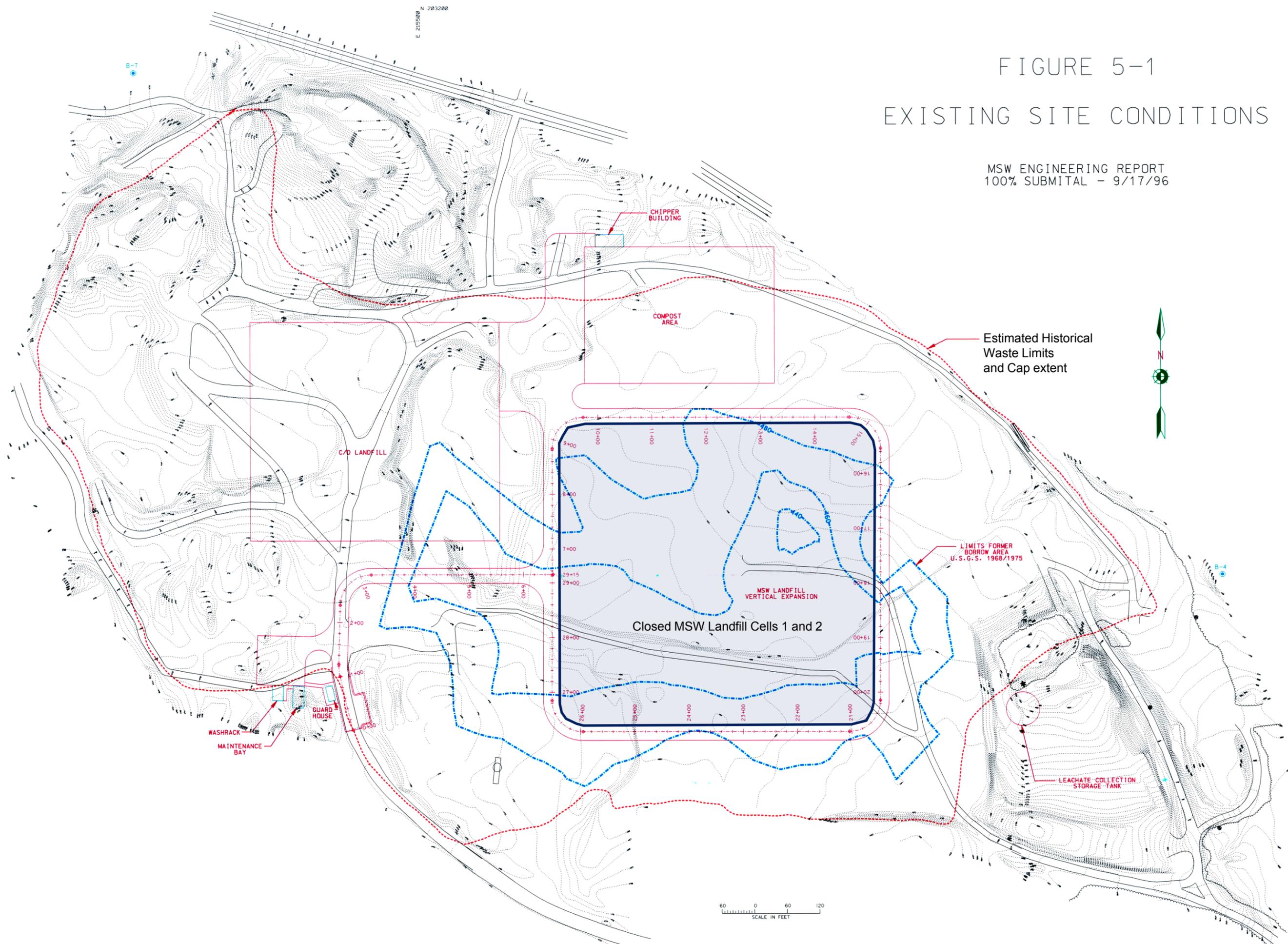
# FIGURE 5-1

## EXISTING SITE CONDITIONS

MSW ENGINEERING REPORT  
100% SUBMITAL - 9/17/96

**LEGEND**

-  Estimated Historical Waste Limits and Landfill Cap Extent
-  Estimated Extent of Historical Borrow Pit
-  MSW Landfill Cells 1 and 2 (Closed)



**Figure D-1**  
Original Borrow Pit Extent and Elevations,  
Historical Landfill Waste and Cap Extent  
Andersen AFB SWMC

REQUEST FOR PROPOSAL – PART D  
OTHER PERTINENT DOCUMENTS

**D.3 1999 and 2000 Record Drawings - Selected Sheets**

## **Record Drawings – Areas Capped in 1998**

PACIFIC DIVISION,  
NAVAL FACILITIES ENGINEERING COMMAND  
DEPARTMENT OF THE NAVY  
MAKALAPA, HAWAII

REVISIONS				
LTR	DESCRIPTION	PREPD BY	DATE	APPROVED
AS-BUILT		DHS	3/19/99	

PLANS FOR CONSTRUCTION OF  
**FY93 MCAF AJJY953109**  
**SOLID WASTE MANAGEMENT COMPLEX**  
**PHASE II - LANDFILL COMPLEX**  
  
**ANDERSEN AIR FORCE BASE**  
**GUAM, M.I.**

INDEX OF DRAWINGS

SHEET NO.	DRAWING NO.	NAVFAC NO.	DESCRIPTION	SHEET NO.	DRAWING NO.	NAVFAC NO.	DESCRIPTION	SHEET NO.	DRAWING NO.	NAVFAC NO.	DESCRIPTION																
<b>GENERAL</b>																											
1	G-1	7921134	COVER SHEET AND DRAWING INDEX	50	S-1	7921195	GENERAL STRUCTURAL NOTES	70	E-1	7921225	LEGEND AND ABBREVIATIONS																
2	G-2	7921135	LOCATION MAP	51	S-2	7921196	GUARD HOUSE PLANS AND SECTION	71	E-2	7921226	ELECTRICAL SITE PLAN 1																
3	G-3	7921136	LEGEND AND ABBREVIATIONS	52	S-3	7921197	MAINTENANCE BUILDING FOUNDATION/ FLOOR AND ROOF PLAN, SECTIONS AND DETAILS	72	E-3	7921227	ELECTRICAL SITE PLAN 2																
<b>CIVIL</b>																											
4	C-1	7921140	LANDFILL COMPLEX DEMOLITION AND REMOVAL PLAN	53	S-4	7921198	MAINTENANCE BUILDING CONCRETE BEAMS AND COLUMNS TYPICAL REINFORCEMENT	73	E-4	7921228	ELECTRICAL SITE PLAN 3																
5	C-2	7921141	LANDFILL COMPLEX KEY PLAN	54	S-5	7921199	MAINTENANCE BUILDING SECTIONS AND DETAILS	74	E-5	7921229	ELECTRICAL SITE PLAN 4																
6	C-3	7921142	COMPOST AREA INITIAL SITE GRADING PLAN	55	S-6	7921200	WASH PAD PLAN, SECTIONS AND DETAILS	75	E-6	7921230	ONE LINE DIAGRAM																
7	C-4	7921143	C/D AREA INITIAL SITE GRADING PLAN	56	S-7	7921201	CHIPPER BUILDING FOUNDATION/ FLOOR AND ROOF PLAN	76	E-7	7921231	GUARD HOUSE AND MAINTENANCE BUILDING GROUNDING PLANS AND DETAILS																
8	C-5	7921144	ADMIN AREA INITIAL SITE GRADING PLAN	57	S-8	7921202	CHIPPER BUILDING FOUNDATION DETAILS	77	E-8	7921232	GUARD HOUSE AND MAINTENANCE BUILDING LIGHTING PLANS																
9	C-6	7921145	MSW AREA INITIAL SITE GRADING PLAN	58	S-9	7921203	CHIPPER BUILDING CONCRETE BEAMS AND COLUMNS TYPICAL REINFORCEMENT	78	E-9	7921233	GUARD HOUSE AND MAINTENANCE BUILDING POWER PLANS																
10	C-7	7921146	MSW AREA CELL 1 GRADING PLAN	59	S-10	7921204	LEACHATE STORAGE TANK FOUNDATION PLAN, SECTIONS AND DETAILS	79	E-10	7921234	PANEL AND LIGHTING SCHEDULES																
11	C-8	7921147	MSW AREA CELL 1 LINER PLAN	60	S-11	7921205	LEACHATE STORAGE TANK PIPE BRIDGE SECTIONS AND DETAILS	80	E-11	7921235	MISCELLANEOUS DETAILS 1																
12	C-9	7921148	MSW AREA CELL 2 GRADING PLAN	61	S-12	7921206	TYPICAL CONCRETE DETAILS	81	E-12	7921236	MISCELLANEOUS DETAILS 2																
13	C-10	7921149	MSW AREA CELL 2 LINER PLAN	62	S-13	7921207	TYPICAL MASONRY DETAILS	82	E-13	7921237	OVERHEAD TRANSMISSION AND DISTRIBUTION POLE DETAILS AND SCHEDULE																
14	C-11	7921150	MSW LANDFILL OPERATION PRIOR TO CLOSURE	<b>ARCHITECTURAL</b>								83	E-14	7921238	OVERHEAD TRANSMISSION AND DISTRIBUTION POLE DETAILS												
15	C-12	7921151	MSW LANDFILL CLOSURE PLAN									63	A-1	7921213	GUARD HOUSE FLOOR PLAN	84	E-15	7921239	OVERHEAD TRANSMISSION AND DISTRIBUTION MISCELLANEOUS DETAILS								
16	C-13	7921152	MSW LINER SECTIONS AND DETAILS									64	A-2	7921214	MAINTENANCE BUILDING FLOOR PLAN	85	E-16	7921240	LIFT STATION SP-1 CONTROL DIAGRAMS AND DETAILS								
17	C-14	7921153	MSW LANDFILL MISCELLANEOUS DETAILS									65	A-3	7921215	CHIPPER BUILDING FLOOR PLAN	86	E-17	7921241	LIFT STATION SP-2 AND SP-3 CONTROL DIAGRAMS AND DETAILS								
18	C-15	7921154	C/D AREA FINAL SITE AND GRADING PLAN									66	A-4	7921216	GUARD HOUSE, MAINTENANCE BUILDING, AND CHIPPER BUILDING DETAILS	87	E-18	7921242	LIFT STATION SP-4 ENCLOSURE SP-4A DETAILS								
19	C-16	7921155	C/D AREA C/D LANDFILL CLOSURE PLAN									67	M-1	7921220	GUARD HOUSE HVAC AND PLUMBING PLANS, SECTIONS AND DETAILS	88	E-19	7921243	LIFT STATION SP-4 CONTROL DIAGRAMS AND ENCLOSURE SP-4B DETAILS								
20	C-17	7921156	COMPOST AREA FINAL SITE AND GRADING PLAN									68	M-2	7921221	LEACHATE STORAGE TANK SUBMERSIBLE PUMPS AND PIPING	89	E-20	7921244	LIFT STATION SP-4 MOUNTING DETAILS								
21	C-18	7921157	ADMIN AREA FINAL SITE PLAN									69	M-3	7921222		90	E-21	7921245	ENCLOSURE SP-4B AND CONTROL PANEL								
22	C-19	7921158	ADMIN AREA FINAL GRADING PLAN									<b>MECHANICAL</b>								91	E-22	7921246	CATHODIC PROTECTION DETAILS				
23	C-20	7921159	LANDFILL COMPLEX TURF PLAN																	92	E-23	7921247	LEACHATE TANK INTERIOR 1	92	E-23	7921247	CATHODIC PROTECTION DETAILS
24	C-21	7921160	LEACHATE STORAGE TANK SITE PLAN	<b>ELECTRICAL</b>																			LEACHATE TANK INTERIOR 2				
25	C-22	7921161	LEACHATE STORAGE TANK SECTIONS AND DETAILS																				CATHODIC PROTECTION DETAILS				LEACHATE TANK BOTTOM
26	C-23	7921162	STAKING DIAGRAM AND ACCESS ROAD/ PERIMETER BERM PROFILES 1																								
27	C-24	7921163	ACCESS ROAD/PERIMETER BERM PROFILES 2																								
28	C-25	7921164	UTILITY ROUTING KEY PLAN																								
29	C-26	7921165	FORCE MAIN "D" PLAN AND PROFILE 1																								
30	C-27	7921166	FORCE MAIN "D" PLAN AND PROFILE 2																								
31	C-28	7921167	FORCE MAIN "D" PLAN AND PROFILE 3																								
32	C-29	7921168	FORCE MAIN "D" AND "C" PLAN AND PROFILE 4																								
33	C-30	7921169	FORCE MAIN "C" PLAN AND PROFILE 5																								
34	C-31	7921170	FORCE MAIN "C" AND WATER DISTRIBUTION PLAN AND PROFILE 6																								
35	C-32	7921171	FORCE MAIN "C" AND WATER DISTRIBUTION PLAN AND PROFILE 7																								
36	C-33	7921172	FORCE MAIN "C", "A" AND WATER DISTRIBUTION PLAN AND PROFILE 8																								
37	C-34	7921173	FORCE MAIN "A" AND WATER DISTRIBUTION PLAN AND PROFILE 9																								
38	C-35	7921174	FORCE MAIN "B" PLAN AND PROFILE 10																								
39	C-36	7921175	WATER DISTRIBUTION PLAN AND PROFILE 11																								
40	C-37	7921176	WATER DISTRIBUTION PLAN AND PROFILE 12																								
41	C-38	7921177	MISCELLANEOUS UTILITY PROFILES LANDFILL COMPLEX																								
42	C-39	7921178	PERIMETER FENCING PLAN																								
43	C-40	7921179	FENCE DETAILS																								
44	C-41	7921180	LIFT STATION PLAN, SECTIONS AND DETAILS																								
45	C-42	7921181	UTILITY SECTIONS AND DETAILS 1																								
46	C-43	7921182	UTILITY SECTIONS AND DETAILS 2																								
47	C-44	7921183	PAVING SECTIONS AND DETAILS																								
48	C-45	7921184	MISCELLANEOUS SITE DETAILS 1																								
49	C-46	7921185	MISCELLANEOUS SITE DETAILS 2																								

CONSTRUCTION CONTRACT NO. N62766-96-C-0383  
SPECIFICATION 41-96-0383

**RECORD DRAWING**  
DATE: 03/19/99  
INITIALS: D.H.S.

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IF SHEET IS LESS THAN (22" X 34") IT IS A REDUCED PRINT-SCALE REDUCED ACCORDINGLY

G-1	SATISFACTORY TO	DATE	BLACK & VEATCH SPECIAL PROJECTS CORP.		DEPARTMENT OF THE NAVY NAVAL FACILITIES ENGINEERING COMMAND PACIFIC DIVISION MAKALAPA, HAWAII	
	TITLE		DES DHS	DR HFM	CHK TAH	ANDERSEN AFB
			SUPV DHS	CH ENG CLH		GUAM, MI
			SUBMITTED BY DATE		FY93 MCAF AJJY953109 SOLID WASTE MANAGEMENT COMPLEX PHASE II - LANDFILL COMPLEX	
			FIRM MEMBER (TITLE)		COVER SHEET AND DRAWING INDEX	
			PACDIV NPEC: RVD, BR MOR		SIZE CODE IDENT NO	
			DPPE, PDE, INSM		D 80091	
			DR		NAVFAC DRAWING NO	
			APPROVED DATE		7921134	
			FOR COMMANDER NAVFAC		CONSTR CONTR NO N62766-96-C-0383	
			SCALE NOTED		SPEC 41-96-0383	
					SHEET 1 OF 92	

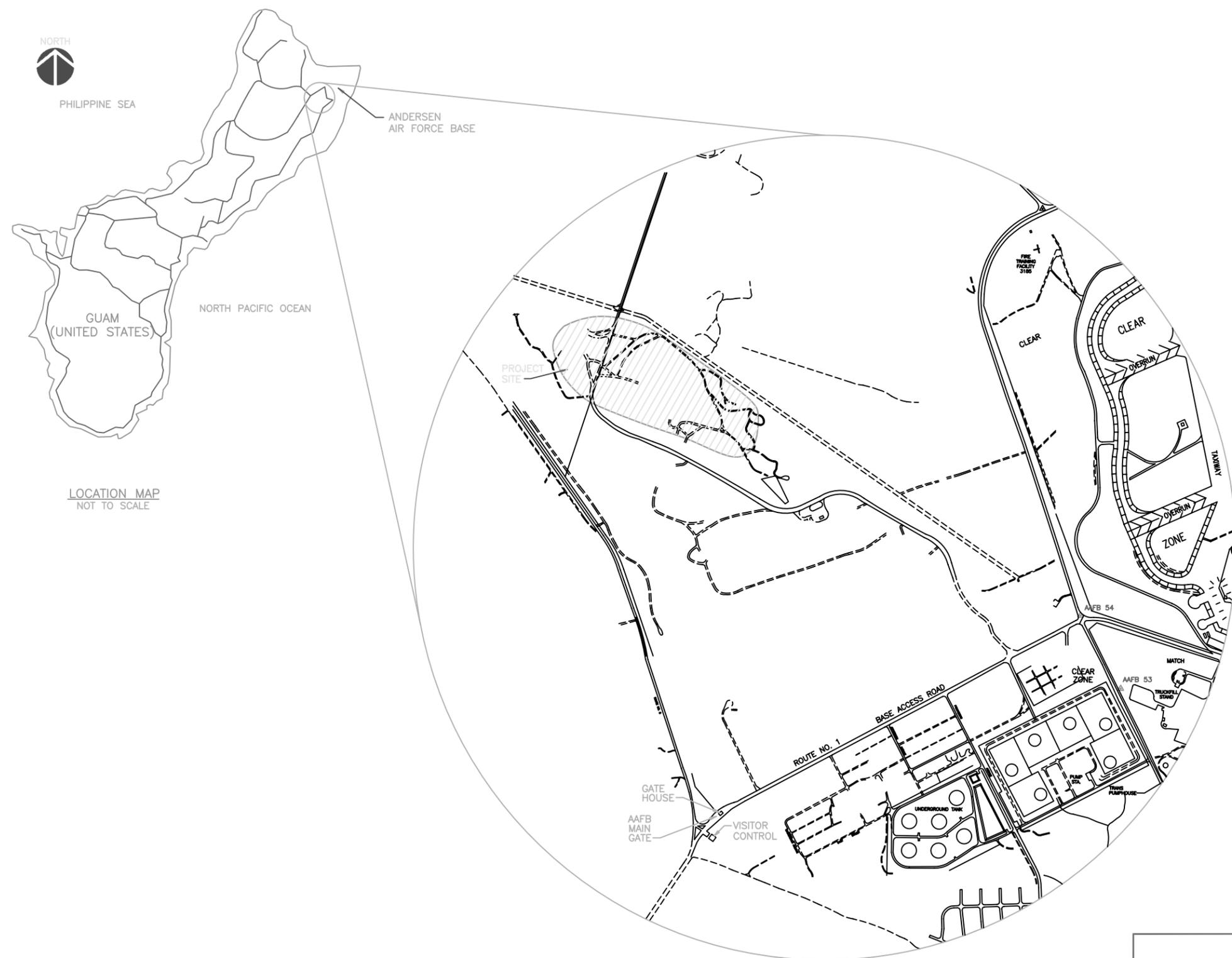
REVISIONS				
LTR	DESCRIPTION	PREP BY	DATE	APPROVED
AS-BUILT		DHS	3/19/99	

**SURVEY NOTES:**

1. HORIZONTAL CONTROL SURVEY WAS BASED ON AAFB SURVEY CONTROL NUMBERS "AAFB 53 & 54" LAND AND CLAIMS COMMISSION L&CC 1945 GRID.

STATION	BEARING	DISTANCE	NORTHING	EASTING	ELEVATION
AAFB 53			198548.02	221688.57	535.89'
AAFB 54	N 29°10'54" W	971.68'	199396.37	221214.80	535.08'

2. VERTICAL CONTROL SURVEY WAS BASED FROM "AAFB 54", A 40mm EMPTY SHELL IN CONCRETE WITH AN ELEVATION OF 535.08 FEET.



**RECORD DRAWING**  
 DATE: 03/19/99  
 INITIALS: D.H.S.

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0' 500' 1000' 1500'  
 APPROX SCALE 1" = 500'

G-2

		DEPARTMENT OF THE NAVY NAVY FACILITIES ENGINEERING COMMAND PACIFIC DIVISION MAKALAPA, HAWAII	
DES WRW DR LEN CHK TAH SUPV DHS CH ENG CLH SUBMITTED BY DATE		ANDERSEN AFB GUAM, HI FY93 MCAF AJJY953109 SOLID WASTE MANAGEMENT COMPLEX PHASE II - LANDFILL COMPLEX	
FIRM MEMBER (TITLE) PACDIV NREC: RVD BR MGR DFPE PDE INBM DIR		LOCATION MAP NAVFAC DRAWING NO <b>7921135</b>	
APPROVED DATE FOR COMMANDER NAVFAC		SIZE CODE IDENT NO <b>D 80091</b>	CONSTR CONTR NO <b>N62766-96-C-0383</b>
SATISFACTORY TO DATE TITLE		SCALE NOTED <b>41-96-0383</b>	SHEET <b>2</b> OF <b>92</b>

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ABBREVIATIONS:

@  
 A,AMP  
 AAFB  
 AC  
 ACP  
 ADMIN  
 AF  
 AH  
 AI  
 AIC  
 ALRM  
 ALUM  
 AM  
 &  
 AO  
 APPROX  
 AT  
 AUTO  
 AUX  
 AWG  
 AVE  
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 B  
 BK  
 BKR  
 BLDG  
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 CB  
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 CMP  
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 HPS  
 HR  
 HS  
 HT  
 HV  
 HVAC  
 AT  
 AMPERE  
 ANDERSEN AIR FORCE BASE  
 ALTERNATING CURRENT  
 ASBESTOS CEMENT PIPE  
 ADMINISTRATION  
 AMPERE FRAME  
 AHEAD  
 ANALOG INPUT  
 AMPERE INTERRUPTING CAPACITY(RMS SYM)  
 ALARM  
 ALUMINUM  
 AMMETER  
 AND  
 ANALOG OUTPUT  
 APPROXIMATELY  
 AMPERE TRIP  
 AUTOMATIC  
 AUXILIARY  
 AMERICAN WIRE GAGE  
 AVENUE  
 BATTERY (ELECTRICAL)  
 BASE LINE  
 BACK  
 BREAKER  
 BUILDING  
 CONDUIT  
 CIRCUIT BREAKER (ELECTRICAL)  
 CONSTRUCTION/DEMOLITION  
 CHANNEL  
 CONTROL JOINT  
 CIRCUIT  
 CURRENT LIMITING FUSE(S)  
 CORRUGATED METAL PIPE  
 CONCRETE MASONRY UNITS  
 CLEANOUT  
 CONCRETE  
 CONNECTION  
 CONTINUOUS OR CONTINUATION  
 CONTROL POWER TRANSFORMER  
 CONTROL RELAY  
 CONTROL STATION  
 CURRENT TRANSFORMER  
 COPPER  
 DIRECT CURRENT  
 DEGREE  
 DEMOLITION  
 DETAIL  
 DIGITAL INPUT (ELECTRICAL)  
 DIAMETER  
 DIFFERENTIAL  
 DISTRIBUTION  
 DIGITAL OUTPUT  
 DIFFERENTIAL PRESURE SWITCH  
 DOOR  
 DOWNSPOUT  
 DRAWING  
 EASTING OR ELECTRICAL  
 EACH  
 EACH FACE  
 EXHAUST FAN MOTOR  
 ELEVATION  
 ELECTRICAL METALIC TUBING  
 EQUAL  
 EQUIPMENT  
 EACH WAY  
 EACH WAY EACH FACE  
 EXHAUST  
 EXISTING  
 EXPANSION  
 EXTERIOR  
 FUSE  
 FLOOR DRAIN  
 FOUNDATION  
 FINISHED FLOOR  
 FIRE HYDRANT  
 FIXTURE  
 FLOW INDICATING TOTALIZER  
 FINISH  
 FLOW LINE  
 FLOOR  
 FLOWMETER OR FORCE MAIN  
 FOOT OR FEET  
 GROUND OR GREEN  
 GAUGE  
 GEOSYNTHETIC CLAY LINER  
 GROUND FAULT CIRCUIT INTERRUPTER  
 GLASS  
 GRADE  
 HIGH  
 HEAT DETECTOR  
 HARDWARE  
 HIGH DENSITY POLYETHYLENE  
 HANDHOLE  
 HORN  
 HAND-OFF-AUTO SWITCH  
 HORSEPOWER  
 HIGH PRESSURE SODIUM  
 HOUR  
 HAND SWITCH  
 HEIGHT  
 HIGH VOLTAGE  
 HEATING, VENTILATING AND AIR CONDITIONING

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 STRUCT  
 SYM  
 T  
 TB  
 TDC  
 TDO  
 TDR  
 HERTZ (60 CYCLES PER SECOND)  
 INTERMEDIATE METAL CONDUIT  
 INCH  
 INDICATOR  
 INPUT OUTPUT  
 INSULATION OR INSULATING  
 INVERT  
 JOINT  
 KILOVOLT  
 KILOVOLTAMPERE  
 KILOWATT  
 LINE SIDE OF 120V AC SUPPLY, 60HZ  
 LEVEL ELEMENT  
 LANDFILL GAS  
 LIQUIDTIGHT FLEXIBLE METAL CONDUIT  
 LOCAL INTERFACE OR LEVEL INDICATOR  
 LEVEL TRANSMITTER  
 LIGHT OR LIGHTING  
 MOTOR  
 MILLIAMPERE  
 MATERIAL  
 MAXIMUM  
 MOTOR CONTROL CENTER  
 MAXIMUM CONTINUOUS OPERATING VOLTAGE  
 METAL  
 MANHOLE  
 MILITARY  
 MINIMUM  
 MISCELLANEOUS  
 MANUAL MOTOR STARTER  
 MASONRY OPENING  
 MOTOR STARTER  
 MASTER STATION SYSTEM  
 MUNICIPAL SOLID WASTE  
 MOUNTING  
 MATERIAL  
 NORTH-NORTHING OR NEUTRAL  
 NORMALLY CLOSED  
 NATIONAL ELECTRICAL CODE  
 NATIONAL ELECTRICAL SAFETY CODE  
 NOT IN CONTRACT  
 NUMBER  
 NORMALLY OPEN  
 ON CENTER  
 OVERHEAD  
 THERMAL OVERLOAD RELAY CONTACT  
 OPENING  
 PUSHBUTTON OR PULLBOX  
 POINT OF CURVATURE  
 PERFORATED  
 PHASE  
 POINT OF INTERSECTION  
 PLATE  
 PLACES  
 PANEL  
 POSITION  
 POWER PANEL  
 PAIR  
 PRESSURE SWITCH  
 POINT OF TANGENCY  
 POLYVINYL CHLORIDE  
 POWER  
 RACEWAY,RED (ELECTRICAL)  
 RADIUS  
 RECEPTACLE  
 RECTIFIER  
 REFERENCE  
 REINFORCEMENT  
 REQUIRED  
 REVISION  
 RIGID GALVANIZED STEEL  
 REMOTE INTERFACE  
 REMOTE INPUT/OUTPUT  
 ROOM  
 REVOLUTIONS PER MINUTE  
 REMOTE TERMINAL UNIT  
 SOUTH OR SWITCH  
 SUPERVISORY CONTROL AND DATA ACQUISITION SYSTEM  
 SCHEDULE  
 SMOKE DETECTOR (ELECTRICAL)  
 SECOND (ELECTRICAL)  
 SHIELDED  
 SHEET  
 SIMILAR  
 SPECIFICATIONS  
 SQUARE  
 STAINLESS STEEL OR SANITARY SEWER  
 SURGE SUPPRESSOR (ELECTRICAL)  
 STREET  
 STANDARD  
 STEEL  
 STRUCTURAL  
 SYMMETRICAL  
 TELEPHONE OR THERMOSTAT  
 THERMAL BOARD OR BLOCK  
 TIME DELAY CLOSE  
 TIME DELAY OPEN  
 TIME DELAY RELAY

TEMP  
 TERM  
 TM  
 T/C  
 TYP  
 TVSS  
 UG  
 UH  
 UL  
 UNO  
 UPS  
 V  
 VAC  
 VCP  
 VERT  
 VDT  
 VRU  
 XFMR  
 XMITTER  
 W  
 WD  
 W/  
 W/O  
 WP  
 WWF  
 X1  
 X2  
 TEMPERED OR TEMPERATURE  
 TERMINAL  
 TIMER  
 TOP OF CONCRETE  
 TYPICAL  
 TRANSIENT VOLTAGE SURGE SUPPRESSOR  
 UNDERGROUND  
 UNIT HEATER-ELECTRIC  
 UNDERWRITER'S LABORATORIES INC.  
 UNLESS NOTED OTHERWISE  
 UNINTERRUPTABLE POWER SUPPLY  
 VOLT(S)  
 VOLTS ALTERNATING CURRENT (60 HERTZ)  
 VITRIFIED CLAY PIPE  
 VERTICAL  
 VIDEO DISPLAY TERMINAL  
 VOICE RESPONSE UNIT  
 TRANSFORMER  
 TRANSMITTER  
 WATER ,WIDE,WATT,WEST OR WIRE  
 WOOD  
 WITH  
 WITHOUT  
 WEATHERPROOF  
 WELDED WIRE FABRIC  
 FUSED SIDE OF CPT  
 GROUNDED SIDE OF CPT

LEGEND:

EXISTING	NEW	
	⊙	SANITARY MANHOLE
	⊞	WATER METER
⊕	⊕	FIRE HYDRANT
⊗	⊗	WATER VALVE
	⊕	YARD HYDRANT
—x—	—x—x—	FENCE
⊕	⊕	POWER POLE
----->	→	DOWN GUY
-----	⊞	CULVERT
—520—	—520—	MAJOR CONTOUR
—521—	—521—	MINOR CONTOUR
	⊞	CONTROL MONUMENT
~~~~~	⊙	GAS VENT
~~~~~	~~~~~	CLEAR & GRUB LIMITS
—		SIGN
▲ AAFB 54		SURVEY MONUMENT
⊞		INLET
* ⊕		TREES

RECORD DRAWING

DATE: 03/19/99  
INITIALS: D.H.S.

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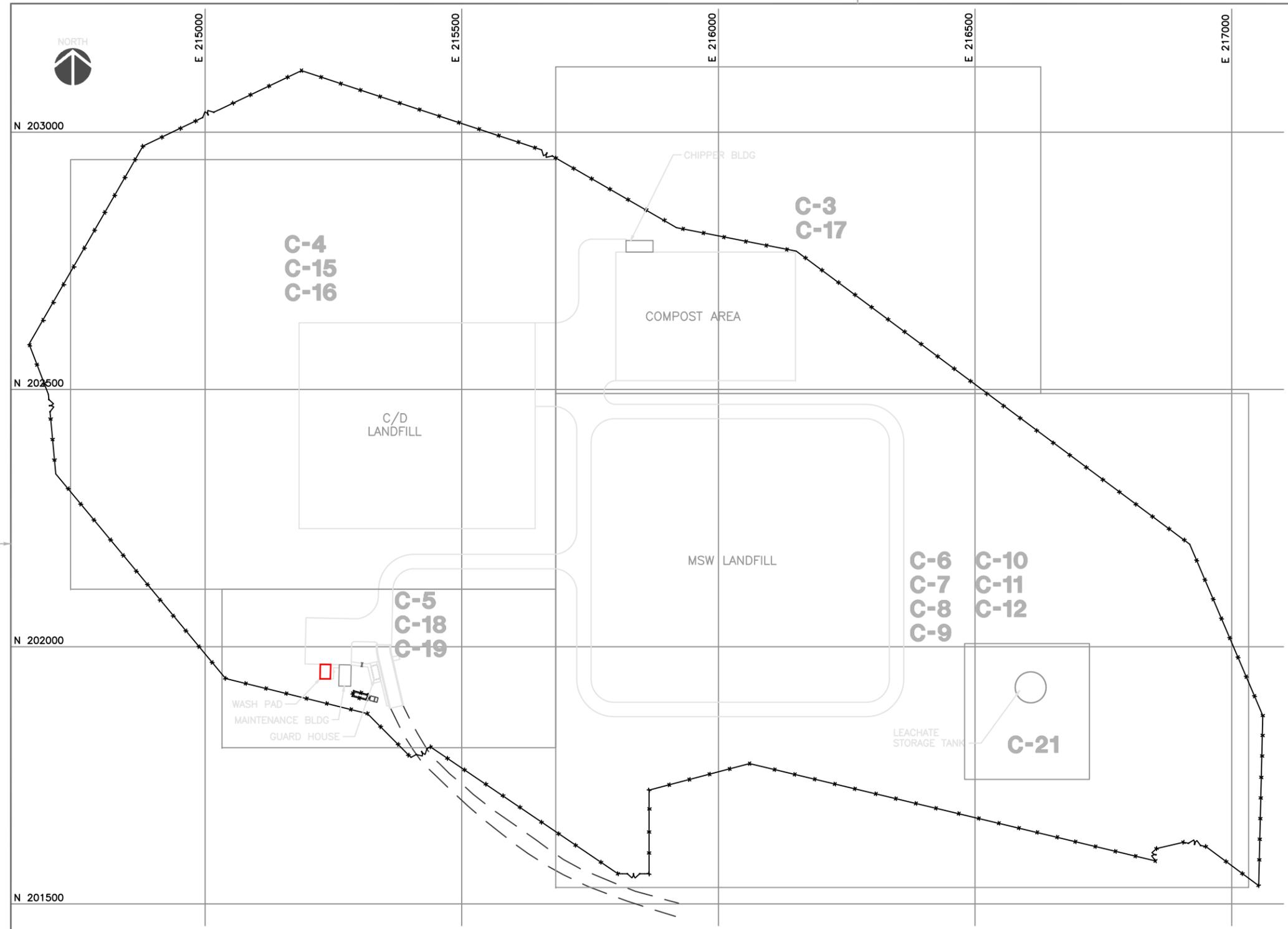
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G-3

		DEPARTMENT OF THE NAVY NAVY FACILITIES ENGINEERING COMMAND <b>PACIFIC DIVISION</b> MAKALAPA, HAWAII	
DES MWS	DR HFM	CHK TAH	GUAM, HI
SUPV DHS	CH ENG CLH	DATE	ANDERSEN AFB
FIRM MEMBER (TITLE)		FY93 MCAF AJJY953109 <b>SOLID WASTE MANAGEMENT COMPLEX</b> PHASE II - LANDFILL COMPLEX	
PACDIV NPEC: RVD _____ BR MGR _____ DFPE _____ PDE _____ INSM _____ DIR _____		<b>LEGEND AND ABBREVIATIONS</b> NAVFAC DRAWING NO <b>7921136</b>	
APPROVED	DATE	SIZE	CODE IDENT NO
		D	80091
Satisfactory TO _____ DATE _____ TITLE _____		CONSTR CONTR NO <b>N62766-96-C-0383</b>	
FOR COMMANDER NAVFAC		SCALE <b>NOTED</b>	SPEC <b>41-96-0383</b>
		SHEET <b>3</b> OF <b>92</b>	



REVISIONS				
LTR	DESCRIPTION	PREPD BY	DATE	APPROVED
	AS-BUILT CONDITION SHOWN	DHS	3/19/99	



**RECORD DRAWING**  
 DATE: 03/19/99  
 INITIALS: D.H.S.

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C-2	SATISFACTORY TO	DATE	BLACK & VEATCH SPECIAL PROJECTS CORP.	
	TITLE		DEPARTMENT OF THE NAVY NAVY FACILITIES ENGINEERING COMMAND PACIFIC DIVISION MAKALAPA, HAWAII	
	FOR COMMANDER NAVFAC		ANDERSEN AFB	GUAM, HI
			FY93 MCAF AJJY953109 SOLID WASTE MANAGEMENT COMPLEX PHASE II - LANDFILL COMPLEX	
			LANDFILL COMPLEX KEY PLAN	
			SIZE: D	CODE IDENT NO: 80091
			NAVFAC DRAWING NO: 7921141	
			CONSTR CONTR NO: N62766-96-C-0383	
			SCALE: NOTED	SPEC: 41-96-0383
			SHEET 5 OF 92	



N 202732.22  
E 215695.48  
EL 486.50

N 202678.93  
E 215695.48  
EL 486.00

N 202597.82  
E 215695.48  
EL 486.06

N 202538.58  
E 215695.48  
EL 486.80

N 202504.66  
E 215695.48  
EL 487.30

REVISIONS				
LTR	DESCRIPTION	PREP BY	DATE	APPROVED
AS-BUILT		DHS	3/19/99	

- NOTES:**
- INITIAL SITE GRADING AS SHOWN ON SHEETS C-3, C-4, C-5 AND C-6 REPRESENTS THE PREPARED SURFACE TO RECEIVE GEONET COMPOSITE AND GEOSYNTHETIC CLAY LINER, AS SHOWN ON SECTION C, SHEET C-14.
  - SLOPE ARROWS AND INDICATORS POINT DOWNSLOPE.

**LEGEND**

2.2% → FINISHED GRADE LINES WITH SLOPE

**RECORD DRAWING**  
DATE: 03/19/99  
INITIALS: D.H.S.

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C-3

		DEPARTMENT OF THE NAVY NAVY FACILITIES ENGINEERING COMMAND <b>PACIFIC DIVISION</b> MAKALAPA, HAWAII	
DES DHS	DR HFM	CHK TAH	ANDERSEN AFB GUAM, MI
SUPV DHS	CH ENG CLH	DATE	FY93 MCAF AJJY953109 SOLID WASTE MANAGEMENT COMPLEX PHASE II - LANDFILL COMPLEX
SUBMITTED BY		DATE	COMPOST AREA INITIAL SITE GRADING PLAN
FIRM MEMBER (TITLE)		DATE	SIZE CODE IDENT NO D 80091
PACDIV NFEC RVD	BR MGR	DATE	NAVAFAC DRAWING NO 7921142
DFPE	PDE	INSM	CONSTR CONTR NO N62766-96-C-0383
DIR	DATE	DATE	SCALE 1" = 50'
APPROVED	DATE	DATE	SPEC 41-96-0383
SATISFACTORY TO	DATE	DATE	SHEET 6 OF 92
TITLE	DATE	DATE	FOR COMMANDER NAVFAC

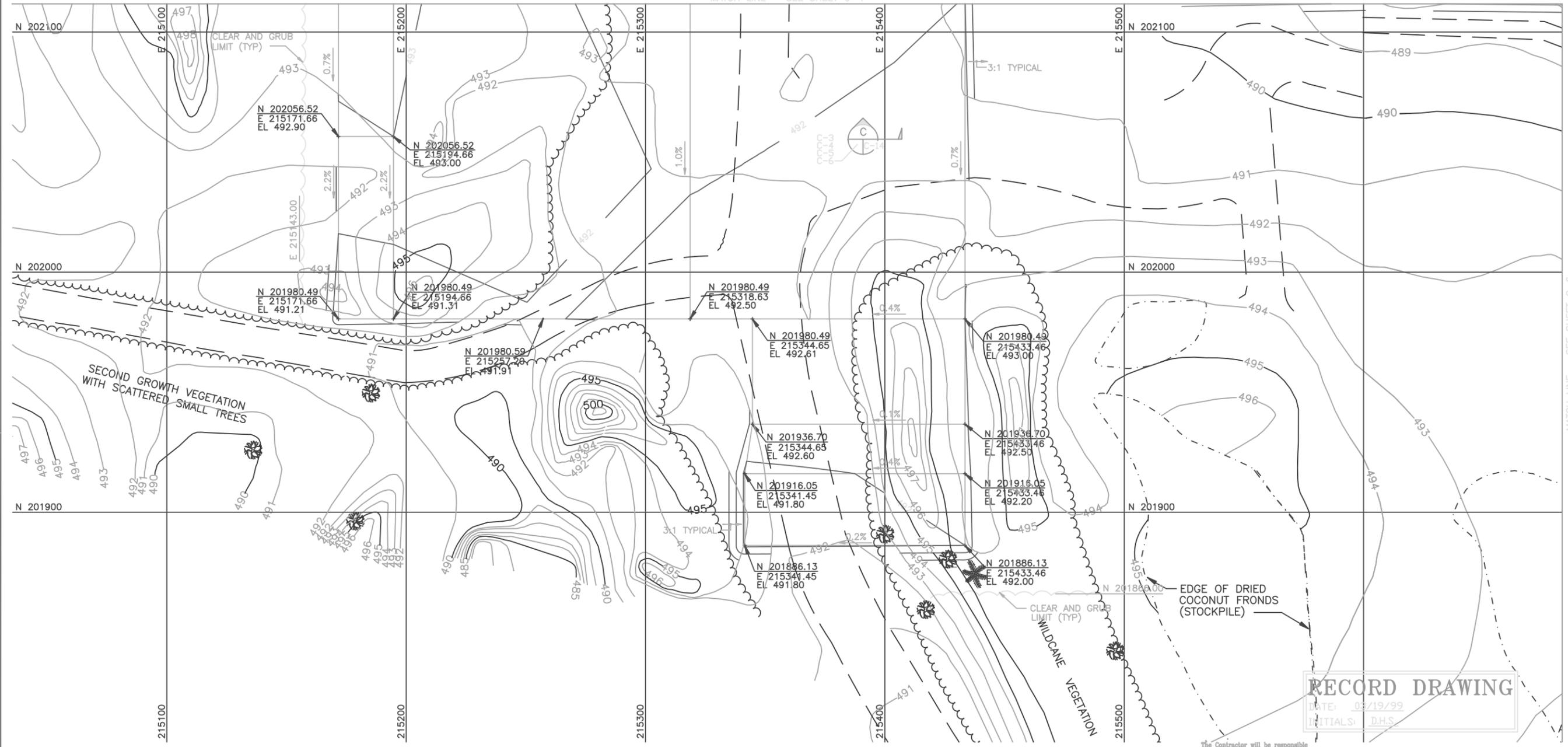
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REVISIONS				
LTR	DESCRIPTION	PREP BY	DATE	APPROVED
AS-BUILT		DHS	3/19/99	

MATCH LINE - SEE SHEET C-4



MATCH LINE - SEE SHEET C-6

**RECORD DRAWING**  
 DATE: 03/19/99  
 INITIALS: DHS

The Contractor will be responsible for coordinating the work among the various trades as necessary to avoid conflicts and to insure the installation of all work within the available space.

IF SHEET IS LESS THAN (22" X 34") IT IS A REDUCED PRINT - SCALE REDUCED ACCORDINGLY

- NOTES:**
- INITIAL SITE GRADING AS SHOWN ON SHEETS C-3, C-4, C-5 AND C-6 REPRESENTS THE PREPARED SURFACE TO RECEIVE GEONET COMPOSITE AND GEOSYNTHETIC CLAY LINER, AS SHOWN ON SECTION C, SHEET C-14.
  - SLOPE ARROWS AND INDICATORS POINT DOWNSLOPE.

**LEGEND**  
 FINISHED GRADE LINES W/SLOPE

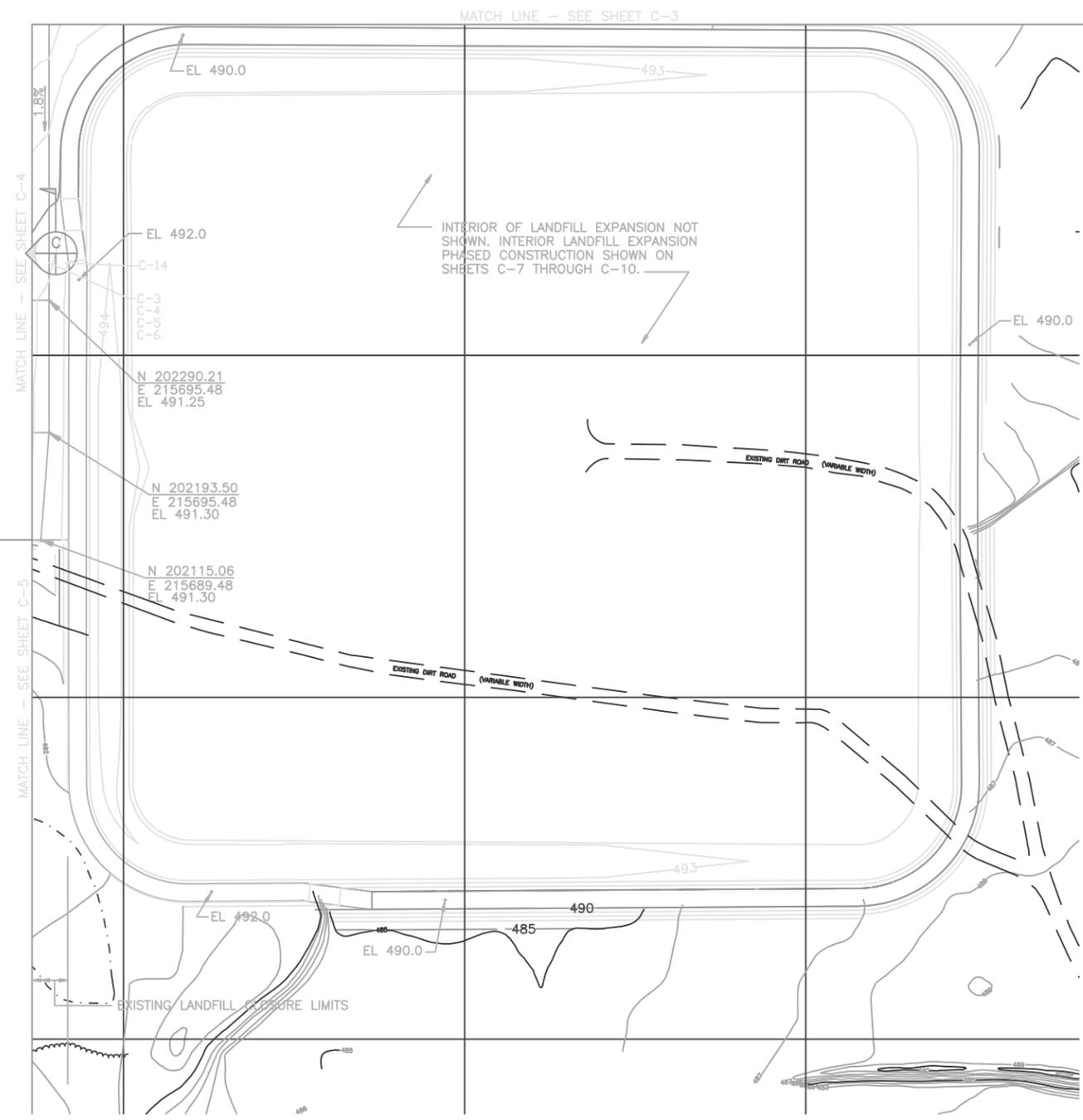


C-5	SATISFACTORY TO _____ DATE _____	FOR COMMANDER NAVFAC	DES DHS DR HFM CHK TAH	DEPARTMENT OF THE NAVY NAVY FACILITIES ENGINEERING COMMAND
	TITLE _____		SUPV DHS CH ENG CLH	PACIFIC DIVISION MAKALAPA, HAWAII

BLACK & VEATCH SPECIAL PROJECTS CORP.		FY93 MCAF A1JY953109 SOLID WASTE MANAGEMENT COMPLEX PHASE II - LANDFILL COMPLEX	
SUBMITTED BY _____ DATE _____		ADMIN AREA INITIAL SITE GRADING PLAN	
FIRM MEMBER (TITLE) _____		SIZE CODE IDENT NO D 80091	NAVFAC DRAWING NO 7921144
PACDIV NPEC: RVD _____ DR MOR _____		CONSTR CONTR NO N62766-96-C-0383	
DPR _____ JDF _____ INSM _____		SCALE NOTED	SPEC 41-96-0383
DIR _____		SHEET 8 OF 92	
APPROVED _____ DATE _____			

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- NOTES:
- INITIAL SITE GRADING AS SHOWN ON SHEETS C-3, C-4, C-5 AND C-6 REPRESENTS THE PREPARED SURFACE TO RECEIVE GEONET COMPOSITE AND GEOSYNTHETIC CLAY LINER, AS SHOWN ON SECTION C, SHEET C-14.
  - SLOPE ARROWS AND INDICATORS POINT DOWN SLOPE.

LEGEND

← 2.2% FINISHED GRADE LINES WITH SLOPE.

**RECORD DRAWING**  
 DATE: 03/19/99  
 INITIALS: D.H.S.

The Contractor will be responsible for coordinating the work among the various trades as necessary to avoid conflicts and to insure the installation of all work within the available space.

IF SHEET IS LESS THAN (22" X 34") IT IS A REDUCED PRINT-SCALE REDUCED ACCORDINGLY



C-6	SATISFACTORY TO _____	DATE _____	<b>BLACK &amp; VEATCH</b> SPECIAL PROJECTS CORP. DES: DHS DR: HFM CHK: TAH SUPV: DHS CH ENG: CLH SUBMITTED BY _____ DATE _____ FIRM MEMBER (TITLE) _____ PACDIV NPEC: RVD _____ BR MGR _____ DPRE _____ PDC _____ NRM _____ APPROVED _____ DATE _____ FOR COMMANDER NAVFAC		DEPARTMENT OF THE NAVY NAVY FACILITIES ENGINEERING COMMAND <b>PACIFIC DIVISION</b> MAKALAPA, HAWAII FY93 MCAF A1J953109 SOLID WASTE MANAGEMENT COMPLEX PHASE II - LANDFILL COMPLEX MSW AREA INITIAL SITE GRADING PLAN	
	TITLE _____	FOR COMMANDER NAVFAC	SCALE 1" = 50'	SPEC 41-96-0383	NAVFAC DRAWING NO. 7921145 CONSTR CONTR NO. N62766-96-C-0383	SHEET 9 OF 92

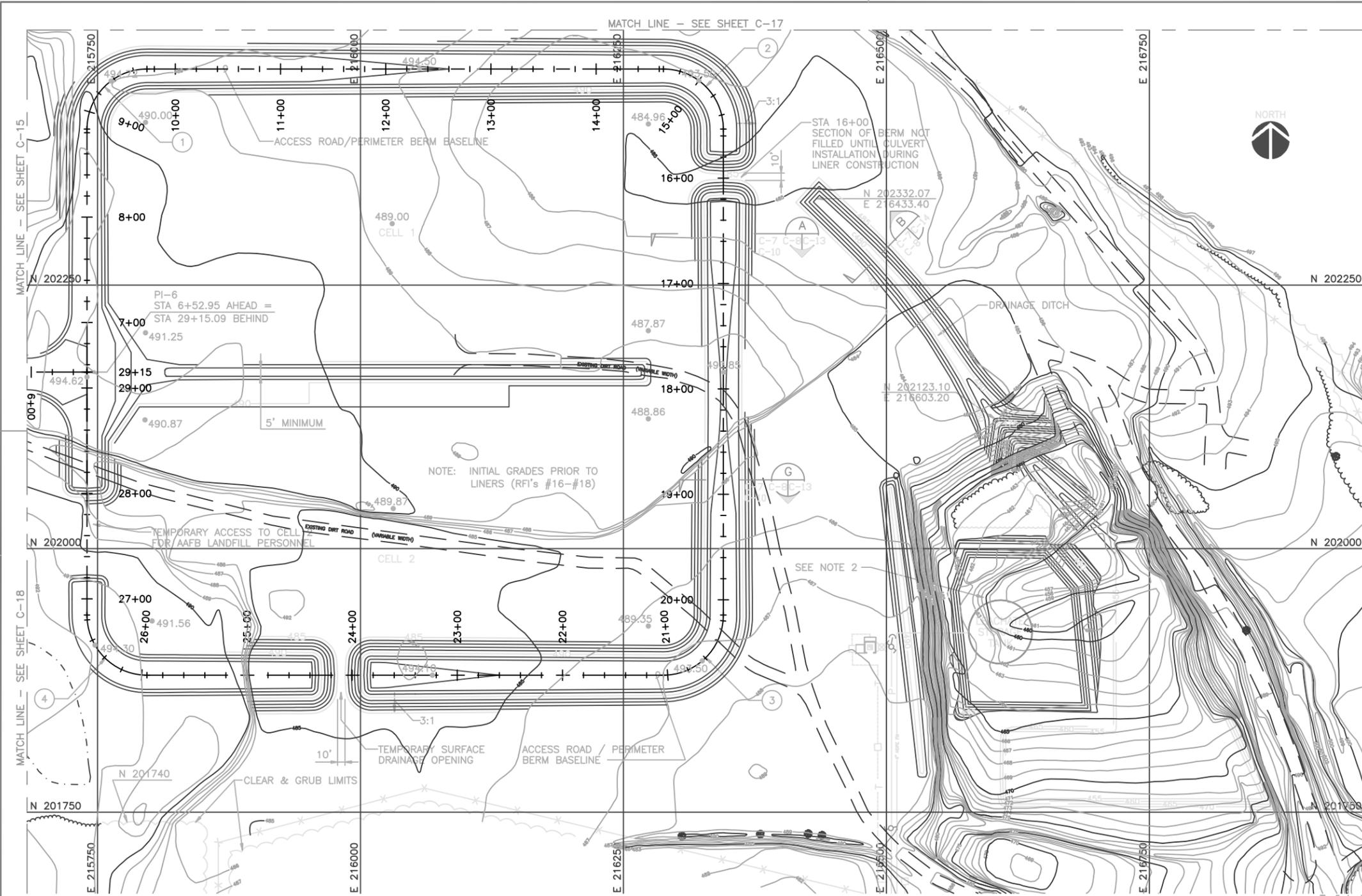
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REVISIONS				
LTR	DESCRIPTION	PREP BY	DATE	APPROVED
	AS-BUILT	DHS	3/19/99	

CELL 1 GRADING PLAN  
REQUIRED CONSTRUCTION SEQUENCE  
PHASE 1

- CONTRACTOR SHALL PERFORM SITE GRADING FOR CELL 1, PERIMETER BERM FOR CELL 2, AND RUNOFF CONTROL DITCHES AND BORROW AREA GRADING. IF EXISTING WASTE IS DISTURBED, CONTRACTOR SHALL PROCEED IN ACCORDANCE WITH THE REQUIREMENTS OF SPECIFICATION SECTION 02315.
- CONSTRUCT LEACHATE STORAGE TANK FOUNDATIONS AND CONTAINMENT BERMS.
- PROVIDE TEMPORARY ACCESS TO CELL 2 FOR AAFB WASTE DISPOSAL OPERATIONS AS SHOWN. INTERIOR OF CELL 2 SHALL BE USED BY AAFB PERSONNEL FOR MSW WASTE PLACEMENT UNTIL COMPLETION OF CELL 1. CONTRACTORS OPERATIONS SHALL BE COORDINATED WITH AAFB WASTE PLACEMENT OPERATIONS AND APPROVED BY THE CONTRACTING OFFICER.
- DITCH CONTOURS INDICATE LIMIT OF EXCAVATION.
- GRADING DOES NOT REFLECT LINER OR WASTE PLACEMENT.
- SEE SHEET C-23 FOR ACCESS ROAD/PERIMETER BERM STAKING DIAGRAM.

- NOTES:
- SEE SHEET C-21 FOR LEACHATE STORAGE TANK SITE PLAN.

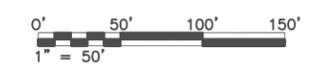


**RECORD DRAWING**  
DATE: 03/19/99  
INITIALS: DHS

The Contractor will be responsible for coordinating the work among the various trades as necessary to avoid conflicts and to insure the installation of all work within the available space.

IF SHEET IS LESS THAN (22" X 34") IT IS A REDUCED PRINT-SCALE REDUCED ACCORDINGLY

ACCESS ROAD BASELINE HORIZONTAL CONTROL DATA							
CURVE NO.	RADIUS	PI	PC	PT	LENGTH	DELTA	TANGENT
1	57.0'	PI-7 N 202455.0 E 215740.0	STA 8+83.5	STA 9+73.0	89.53'	90° 00'	57.0'
2	57.0'	PI-9 N 202455.0 E 216345.0	STA 14+64.0	STA 15+53.5	89.53'	90° 00'	57.0'
3	57.0'	PI-11 N 201880.0 E 216345.0	STA 20+14.5	STA 21+04.1	89.53'	90° 00'	57.0'
4	57.0'	PI-13 N 201880.0 E 215740.0	STA 25+95.1	STA 29+15.1	89.53'	90° 00'	57.0'



		DEPARTMENT OF THE NAVY NAVY FACILITIES ENGINEERING COMMAND	
		PACIFIC DIVISION MAKALAPA, HAWAII	
DES: KWD DR: GAS CHK: TAH		FY93 MCAF AJY953109 SOLID WASTE MANAGEMENT COMPLEX PHASE II - LANDFILL COMPLEX	
SUBP: DHS CH: ENG CLH		MSW AREA CELL 1 GRADING PLAN	
SUBMITTED BY: DATE:		NAVFAC DRAWING NO. 7921146	
FIRM MEMBER (TITLE):		SIZE: CODE IDENT NO. D 80091	
PACDIV NPEC: RVD BR: MGR		CONSTR CONTR NO. N62766-96-C-0383	
DFPE: PDE INM		SCALE: 1" = 50'	
DR:		SPEC: 41-96-0383	
APPROVED: DATE:		SHEET 10 OF 92	
FOR COMMANDER NAVFAC			

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REVISIONS				
LTR	DESCRIPTION	PREP BY	DATE	APPROVED
	AS-BUILT CONDITION SHOWN	DHS	3/19/99	

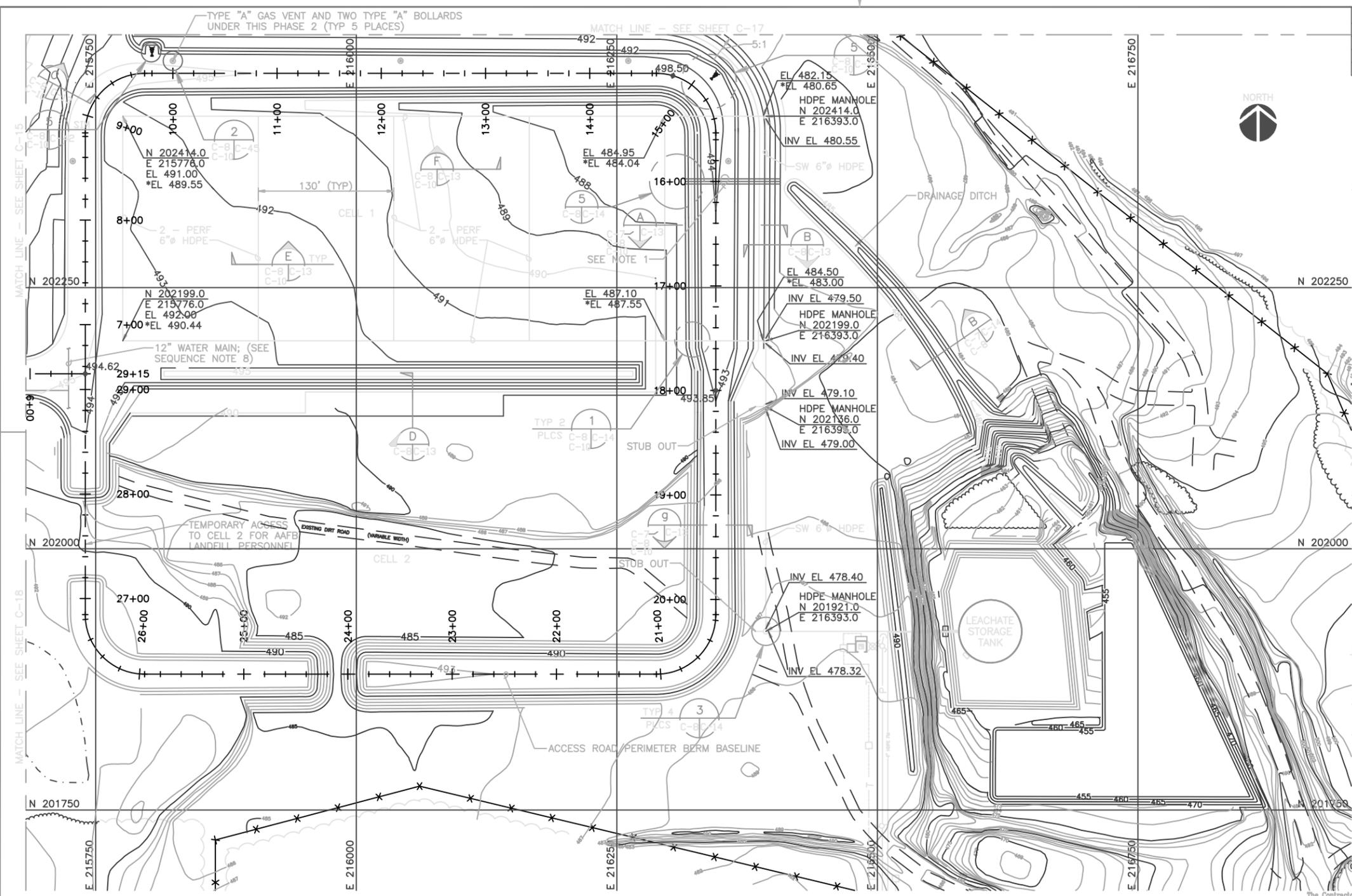
- CELL 1 LINER PLAN  
REQUIRED CONSTRUCTION SEQUENCE  
PHASE 2
- CONTRACTOR SHALL INSTALL LINER SYSTEMS AND GEOGRID PLACEMENT FOR CELL 1, AND COMPLETE LEACHATE COLLECTION SYSTEM AND RUNOFF CONTROL GRADING TO BORROW PIT.
  - CONTRACTOR SHALL COMPLETE WATER MAIN IMPROVEMENTS AROUND CELL 1 ONLY, PRIOR TO THE COMPLETION OF THE LEACHATE STORAGE TANK IN ORDER TO SUPPLY THE LEACHATE STORAGE TANK WITH ADEQUATE WATER TO CONDUCT TANK LEAK TESTING.  
  
WATER MAIN INSTALLATION FROM APPROXIMATELY WATERLINE STATIONS 73+85.7 TO 85+60.0 SHALL BE MADE DURING THIS PHASE 2. WATER MAIN IS NOT SHOWN ON THIS SHEET FOR CLARITY. SEE SHEET C-3B FOR WATER MAIN LAYOUT. CONTRACTOR SHALL PROVIDE RESTRAINED JOINTS BETWEEN STATIONS 84+60 AND 85+60, AND VALVE NEAR STATION 85+60. THIS WATER MAIN INSTALLATION IS REQUIRED IN ORDER TO PROVIDE OPERATIONAL FIRE HYDRANTS ADJACENT TO CELL 1, DURING PHASE 3 AND 4 CONSTRUCTION.
  - CONTRACTOR SHALL CONSTRUCT CELL 1 LINER SYSTEM, LEACHATE COLLECTION SYSTEM, LEACHATE STORAGE TANK (INCLUDING LEAK TESTING), APPROPRIATE ELECTRICAL SERVICE, PUMPS, LIFT STATIONS, AND FORCE MAIN COMPLETE TO THE DISCHARGE POINT AT THE EXISTING SANITARY MANHOLE NEAR THE AAFB MAIN GATE COMPLETE AND FULLY OPERATIONAL UNDER THIS PHASE 2. COMPLETE AND FULLY OPERATIONAL STATUS OF THESE ELEMENTS SHALL BE DETERMINED AND APPROVED BY THE CONTRACTING OFFICER.
  - CELL 1 AS SHOWN INDICATES FINISHED LINER PLACEMENT AND FINISHED ROAD SURFACING MATERIALS AROUND CELL 1 ONLY.
  - DURING THIS PHASE 2, THE INTERIOR OF CELL 2 WILL BE FILLED WITH WASTE BY AAFB PERSONNEL, NOT TO EXCEED THE ELEVATIONS INDICATED ON SHEET C-9, UNLESS APPROVED BY THE CONTRACTING OFFICER.
  - DITCH CONTOURS INDICATE FINISHED GRADE.
  - \* INDICATES PIPE INVERT ELEVATION IN SECONDARY LINER SYSTEM.

- NOTES:
- CONTRACTOR SHALL INSTALL 3 - 30"Ø CMP (90 FEET LONG), AT STATION 16+00. INLET INV EL 487.8, OUTLET INV EL 486.7.
  - SEE SHEET C-7 FOR ACCESS ROAD/PERIMETER BERM BASELINE HORIZONTAL CONTROL DATA.
  - SEE SHEET C-21 FOR LEACHATE STORAGE TANK SITE PLAN.

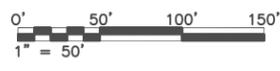
**RECORD DRAWING**  
DATE: 03/19/99  
INITIALS: DHS.

The Contractor will be responsible for coordinating the work among the various trades as necessary to avoid conflicts and to insure the installation of all work within the available space.

IF SHEET IS LESS THAN (22" X 34") IT IS A REDUCED PRINT—SCALE REDUCED ACCORDINGLY



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C-8	SATISFACTORY TO _____ DATE _____		DEPARTMENT OF THE NAVY NAVY FACILITIES ENGINEERING COMMAND		
	TITLE _____		PACIFIC DIVISION MAKALAPA, HAWAII		
FOR COMMANDER NAVFAC		DES KWD DR GAS CHK TAH SUPV DHS CH ENG CLH SUBMITTED BY _____ DATE _____ FIRM MEMBER (TITLE) _____ PACDIV NPEC: RVD _____ BR MGR _____ DPPE _____ PDE _____ INM _____ DIR _____ APPROVED _____ DATE _____		F993 MCAF AJY953109 SOLID WASTE MANAGEMENT COMPLEX PHASE II - LANDFILL COMPLEX MSW AREA CELL 1 LINER PLAN	
SCALE 1" = 50'		SIZE D	CODE IDENT NO 80091	NAVFAC DRAWING NO 7921147	
		CONSTR CONTR NO N62766-96-C-0383		SHEET 11 OF 92	

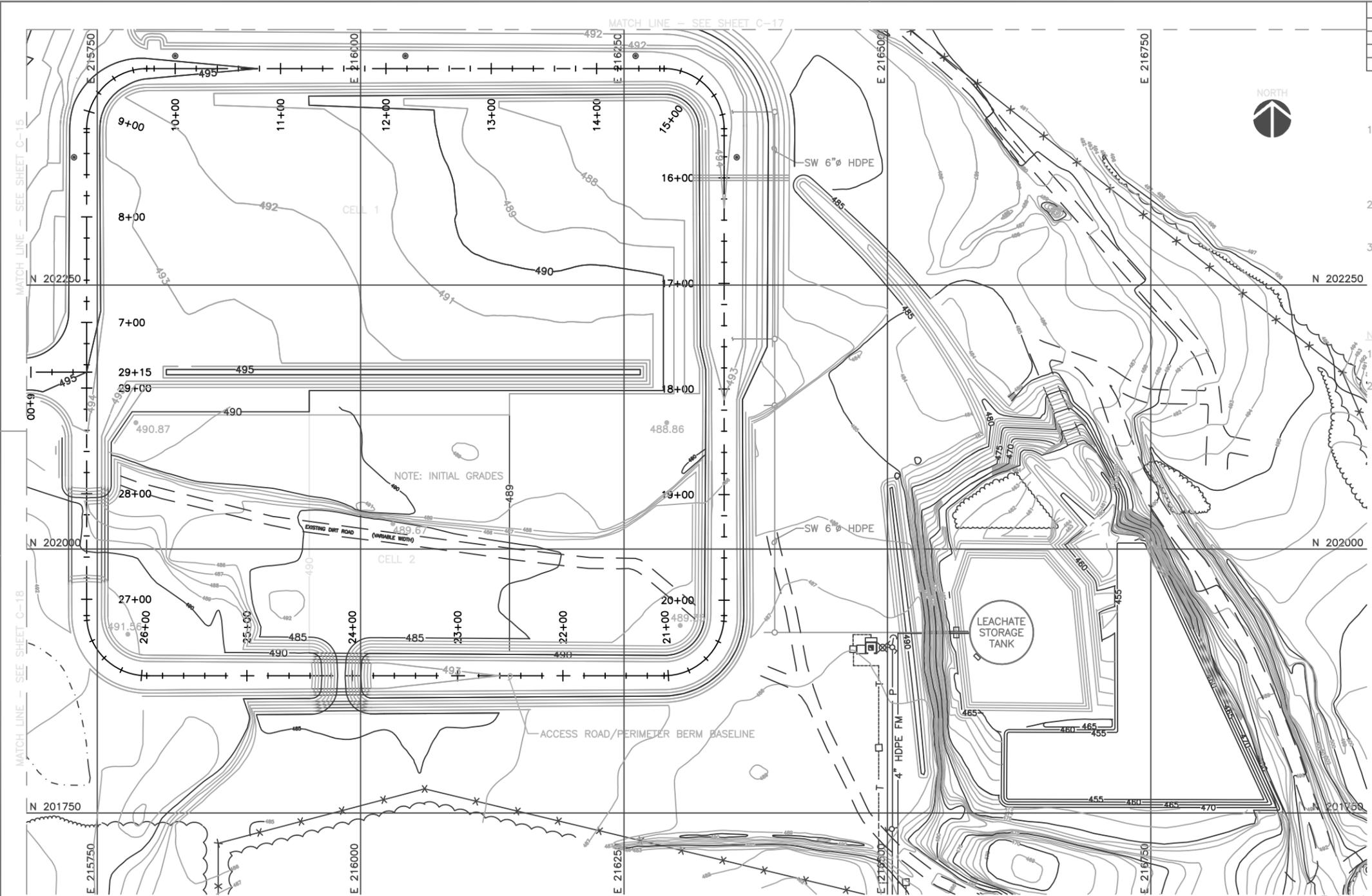
REVISIONS				
LTR	DESCRIPTION	PREP BY	DATE	APPROVED
	AS-BUILT CONDITION SHOWN	DHS	3/19/99	

CELL 2 GRADING PLAN  
REQUIRED CONSTRUCTION SEQUENCE  
PHASE 3

1. DURING THIS PHASE 3, WASTE PLACEMENT OPERATIONS BY AAFB PERSONNEL IN CELL 1 WILL COMMENCE. THE CONTRACTORS OPERATIONS SHALL ACCOMMODATE AND BE FULLY COORDINATED WITH AAFB WASTE PLACEMENT OPERATIONS IN CELL 1, AS APPROVED BY THE CONTRACTING OFFICER.
2. CONTRACTOR SHALL PERFORM GRADING FOR CELL 2, INCLUDING COMPLETION OF THE PERIMETER BERM, IN ACCORDANCE WITH THIS DRAWING.
3. NO WATER MAIN INSTALLATION AROUND CELL 2 UNDER THIS PHASE 3.

NOTES:

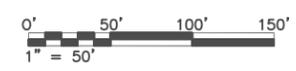
1. SEE SHEET C-7 FOR ACCESS ROAD/PERIMETER BERM BASELINE CONTROL DATA.
2. SEE SHEET C-21 FOR LEACHATE STORAGE TANK SITE PLAN.



**RECORD DRAWING**  
DATE: 03/19/99  
INITIALS: DHS

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C-9

<b>BLACK &amp; VEATCH</b> SPECIAL PROJECTS CORP.		DEPARTMENT OF THE NAVY NAVY FACILITIES ENGINEERING COMMAND PACIFIC DIVISION MAKALAPA, HAWAII	
DES KWD	DR GAS	CHK TAH	
SURV DHS	CH ENG CLH	DATE	
SUBMITTED BY			
FIRM MEMBER (TITLE)			
PACDIV NFEC: RVD	DR MOR		
DFPE	PDE	INM	
DIR			
APPROVED		DATE	
FOR COMMANDER NAVFAC			
SIZE	CODE	IDENT NO	NAVFAC DRAWING NO
D	80091		9721148
SCALE 1" = 50'		SPEC	41-96-0383
		SHEET 12 OF 92	

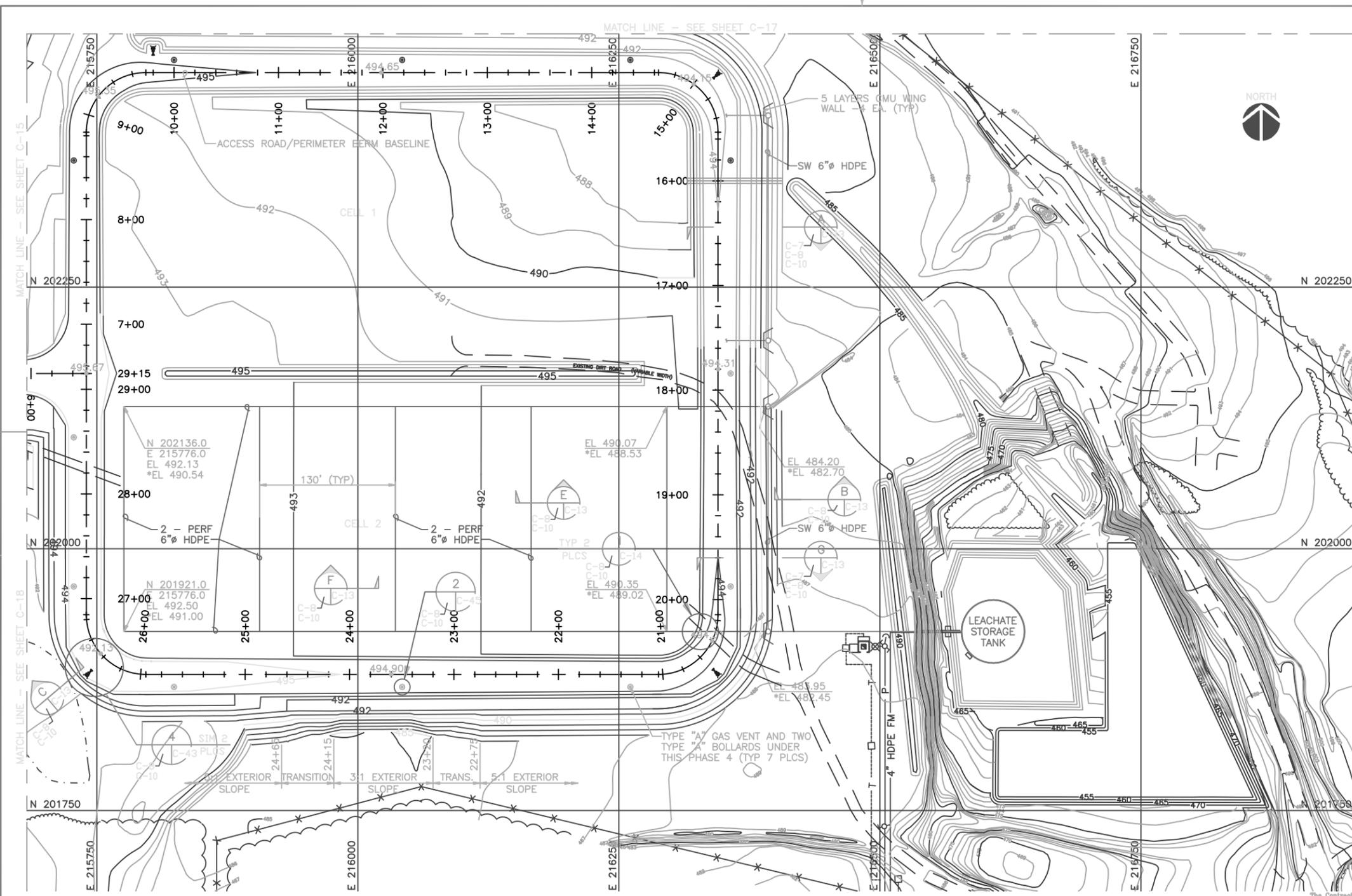
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REVISIONS				
LTR	DESCRIPTION	PREPD BY	DATE	APPROVED
1	NEW ELEVATION PER RF1 #16-#17 APPROVED	DHS	10/17/97	
	AS-BUILT CONDITION SHOWN	DHS	3/19/99	

- CELL 2 LINER PLAN**  
REQUIRED CONSTRUCTION SEQUENCE  
PHASE 4
- CONTRACTOR SHALL INSTALL ALL CELL 2 LINER SYSTEMS AND GEOGRID PLACEMENT IN ACCORDANCE WITH THIS DRAWING. ALONG THE "CELL 1/ CELL 2" BOUNDARY, THE CONTRACTOR SHALL CONNECT EACH CELL 2 GEOSYNTHETIC AND AGGREGATE LAYER TO THE CORRESPONDING CELL 1 GEOSYNTHETIC AND AGGREGATE LAYER PLACED UNDER PHASE 2.
  - CONTRACTOR SHALL COMPLETE THE CELL 2 LEACHATE COLLECTION SYSTEM, INCLUDING CONNECTIONS TO THE HDPE MANHOLE STUB-OUTS INSTALLED DURING PHASE 2.
  - CELL 2 GRADES AS SHOWN INDICATE FINISHED LINER PLACEMENT AND FINISHED ROAD SURFACING MATERIALS AROUND CELL 2.
  - \* INDICATES PIPE INVERT ELEVATION IN SECONDARY LINER SYSTEM.
  - WATER MAIN INSTALLATION FROM APPROXIMATELY WATERLINE STATIONS 85+60 TO 97+73 SHALL BE MADE DURING THIS PHASE 4. WATER MAIN IS NOT SHOWN ON THIS SHEET FOR CLARITY. SEE SHEET C-38 FOR WATER MAIN LAYOUT.

- NOTES:**
- SEE SHEET C-7 FOR ACCESS ROAD/PERIMETER BERM BASELINE HORIZONTAL CONTROL DATA.
  - SEE SHEET C-21 FOR LEACHATE STORAGE TANK SITE PLAN.



**RECORD DRAWING**  
DATE: 03/19/99  
INITIALS: D.H.S.

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IF SHEET IS LESS THAN (22" X 34") IT IS A REDUCED PRINT-SCALE REDUCED ACCORDINGLY



C-10

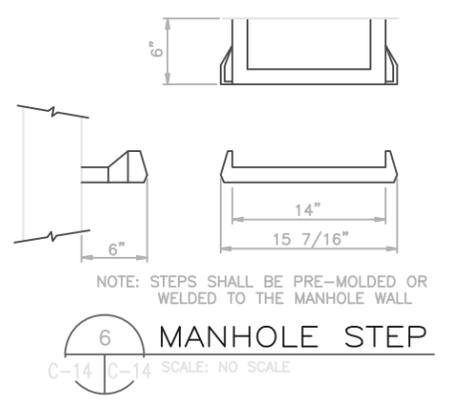
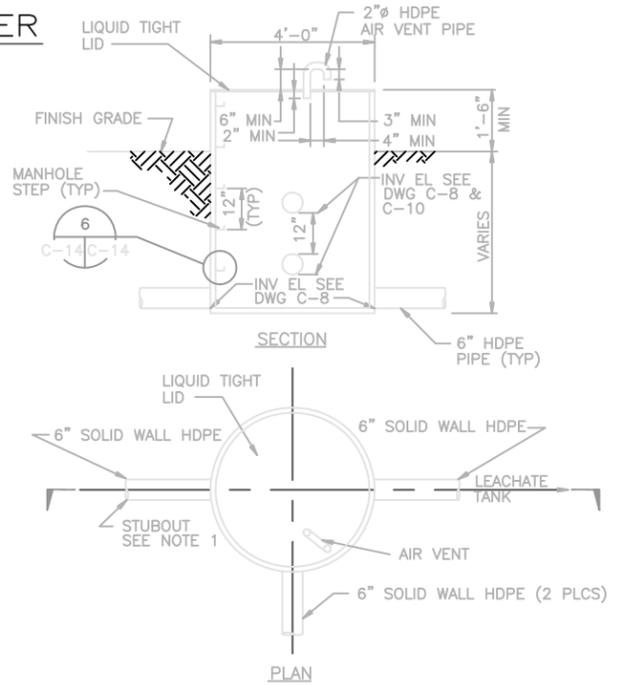
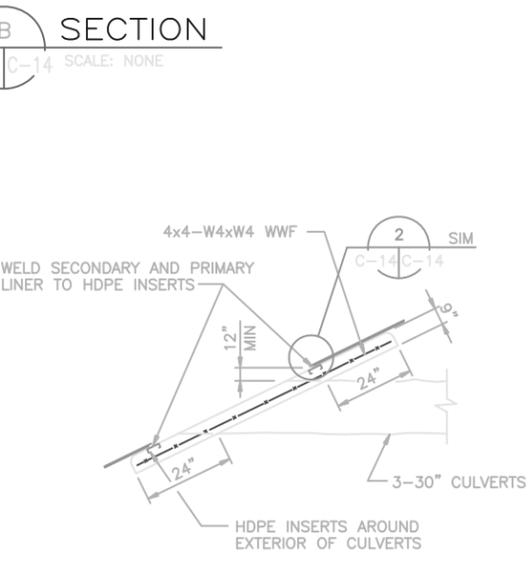
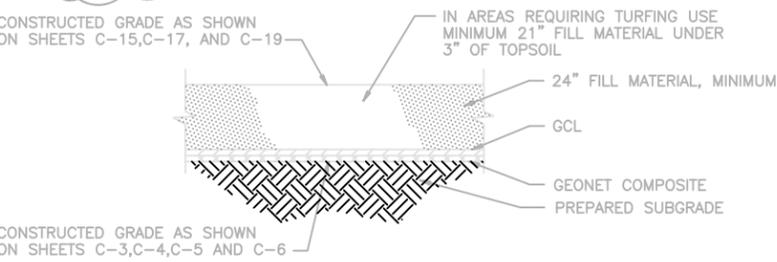
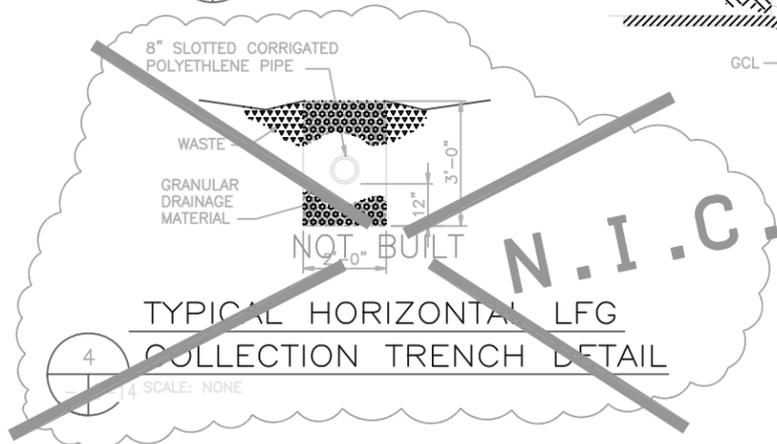
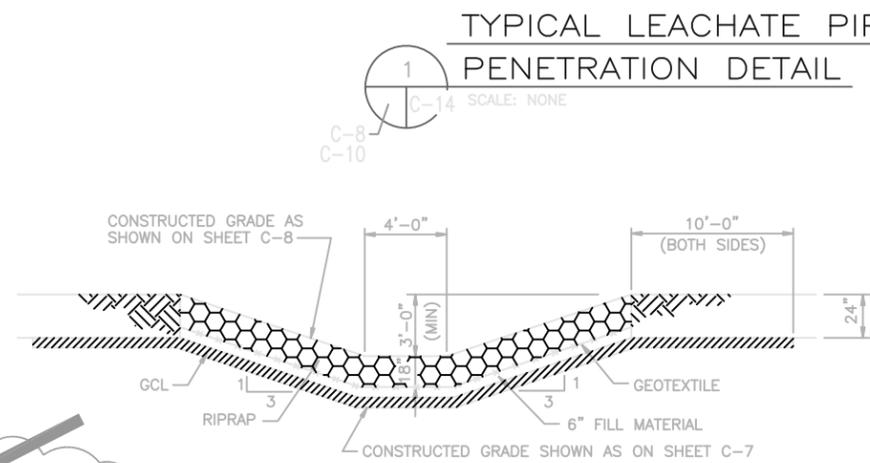
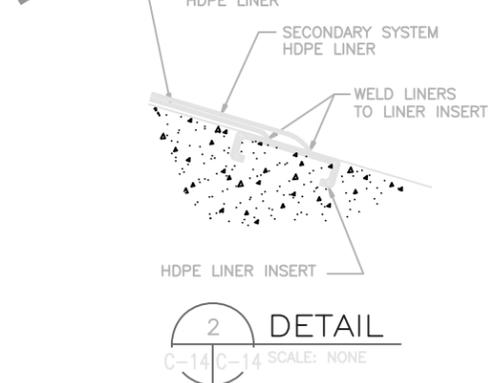
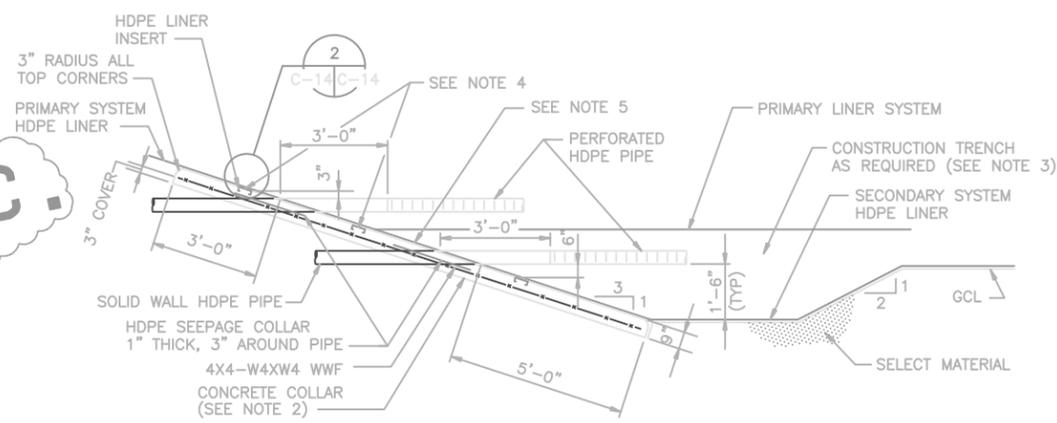
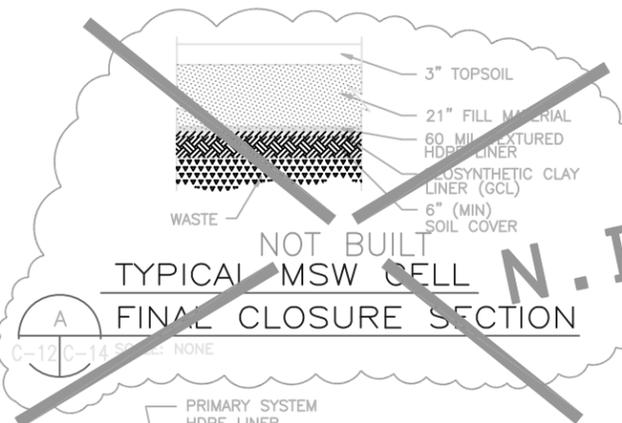
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		FY93 MCAF A1J953109 SOLID WASTE MANAGEMENT COMPLEX PHASE II - LANDFILL COMPLEX	
DES: KWD DR: GAS CHK: TAH SUPV: DHS CH ENG: CLH SUBMITTED BY: DATE:		MSW AREA <b>CELL 2 LINER PLAN</b>	
FIRM MEMBER (TITLE): PACDIV NPEC: RVD BR MGR: DPPE: PDE INSM: DR:		SIZE: CODE IDENT NO: <b>D 80091</b>	NAVFAC DRAWING NO: <b>7921149</b>
APPROVED: DATE:		CONSTR CONTR NO: <b>N62766-96-C-0383</b>	
SATISFACTORY TO: DATE:		SCALE: <b>1" = 50'</b> SPEC: <b>41-96-0383</b> SHEET: <b>13 OF 92</b>	
TITLE:		FOR COMMANDER NAVFAC	



REVISIONS				
LTR	DESCRIPTION	PREP BY	DATE	APPROVED
AS-BUILT		DHS	3/19/99	

**NOTES:**

- PIPE STUBOUTS SHALL BE WELDED TO MANHOLES PRIOR TO INSTALLATION. STUBOUT LENGTH IS ACCORDING TO WELDING MACHINE REQUIREMENTS. PROVIDE TEMPORARY PLUG IN STUB-OUT, INSERTED FROM MANHOLE INTERIOR. SEE SHEET C-8 FOR STUB-OUT CONFIGURATION.
- COLLAR SHALL EXTEND 3 FT EITHER SIDE OF PIPE.
- BACKFILL CONSTRUCTION TRENCH WITH CLEAN GRANULAR MATERIAL.
- JOIN PRIMARY AND SECONDARY HDPE LINERS TO LINER INSERT UNDER SECONDARY LEACHATE PIPE.
- HDPE LINER BOXOUTS AROUND PIPES SHALL BE 1 FT SQUARE, MINIMUM.



**RECORD DRAWING**  
 DATE: 03/19/99  
 INITIALS: D.H.S.

The Contractor will be responsible for coordinating the work among the various trades as necessary to avoid conflicts and to insure the installation of all work within the available space.

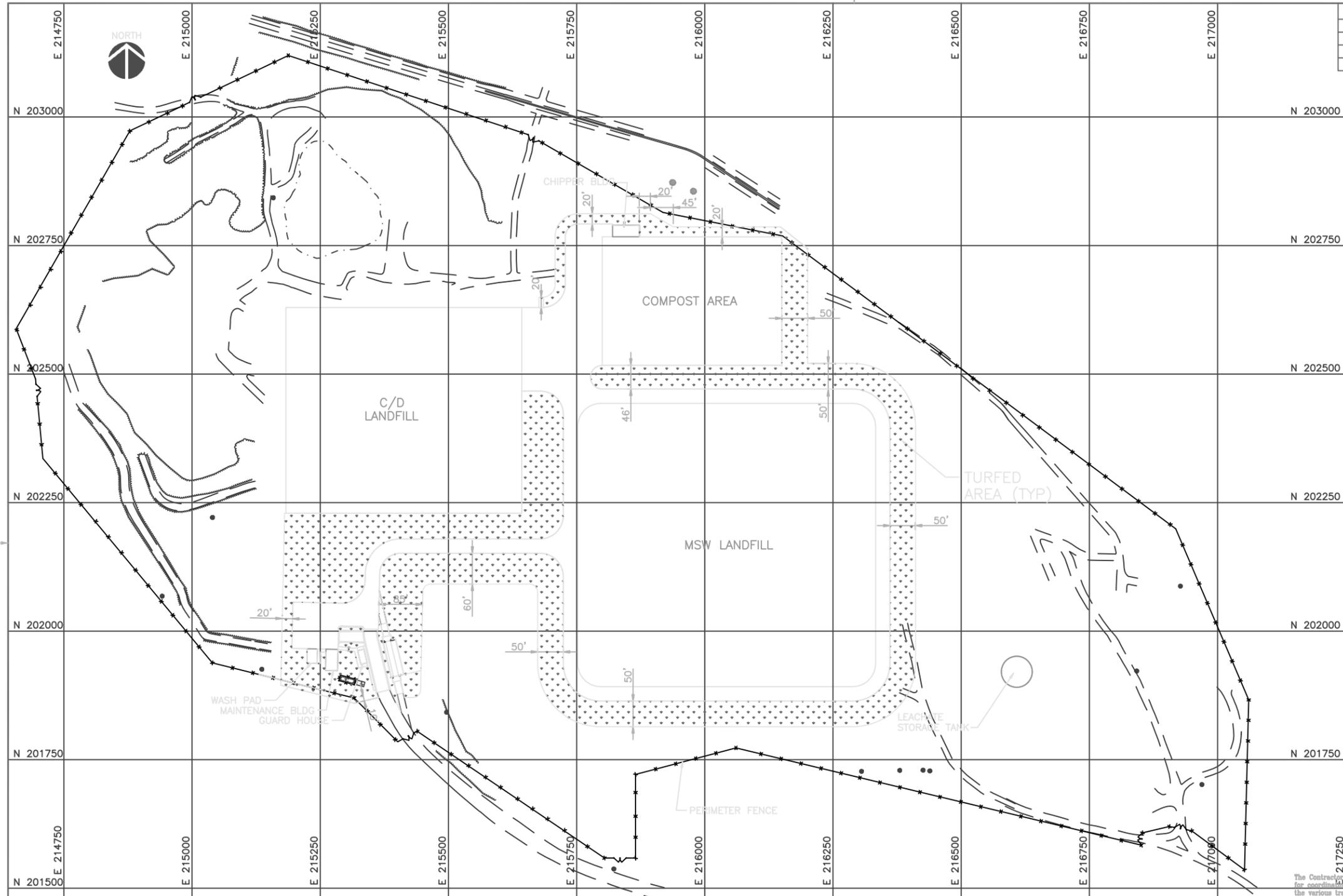
IF SHEET IS LESS THAN (22" X 34") IT IS A REDUCED PRINT-SCALE REDUCED ACCORDINGLY

C-3, C-15  
 C-4, C-17  
 C-5, C-19  
 C-6

C-14 SATISFACTORY TO DATE TITLE FOR COMMANDER NAVFAC

<b>BLACK &amp; VEATCH</b> SPECIAL PROJECTS CORP.		DEPARTMENT OF THE NAVY NAVY FACILITIES ENGINEERING COMMAND PACIFIC DIVISION MAKALAPA, HAWAII	
DES: KWD	DR: GAS	CHK: TAH	DATE:
SUPV: DHS	QH: ENG	CLH	DATE:
FIRM MEMBER (TITLE)			
PACDVTY NFEC: RVD	BR: MGR		
DFPE: PDE	INBM		
DIR:			
APPROVED:	DATE:	SIZE: D	CODE IDENT NO: 80091
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SCALE: NOTED	SPEC: 41-96-0383	SHEET 17 OF 92	

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REVISIONS			
TR	DESCRIPTION	PREP BY	DATE
	AS-BUILT CONDITION SHOWN	DHS	3/19/99

**RECORD DRAWING**  
 DATE: 03/19/99  
 INITIALS: D.H.S.

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IF SHEET IS LESS THAN (22" X 34") IT IS A REDUCED PRINT-SCALE REDUCED ACCORDINGLY



C-20

		DEPARTMENT OF THE NAVY NAVY FACILITIES ENGINEERING COMMAND PACIFIC DIVISION MAKALAPA, HAWAII	
DES DHS	DR KLL	CHK TAH	GUAM, HI
SUPV DHS	CH ENG CLH	DATE	
FIRM MEMBER (TITLE)		NAVY FAC DRAWING NO	
PACDIV NPFC RVD	BR MGR	7921159	
DFPE	PDE	CONSTR CONTR NO N62766-96-C-0383	
DIR	INSM	SCALE NOTED SPEC 41-96-0383 SHEET 23 OF 92	
APPROVED	DATE		
FOR COMMANDER NAVFAC			

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REVISIONS				
LTR	DESCRIPTION	PREP BY	DATE	APPROVED
	AS-BUILT CONDITION SHOWN	DHS	3/19/99	

**NOTES:**

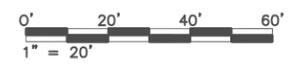
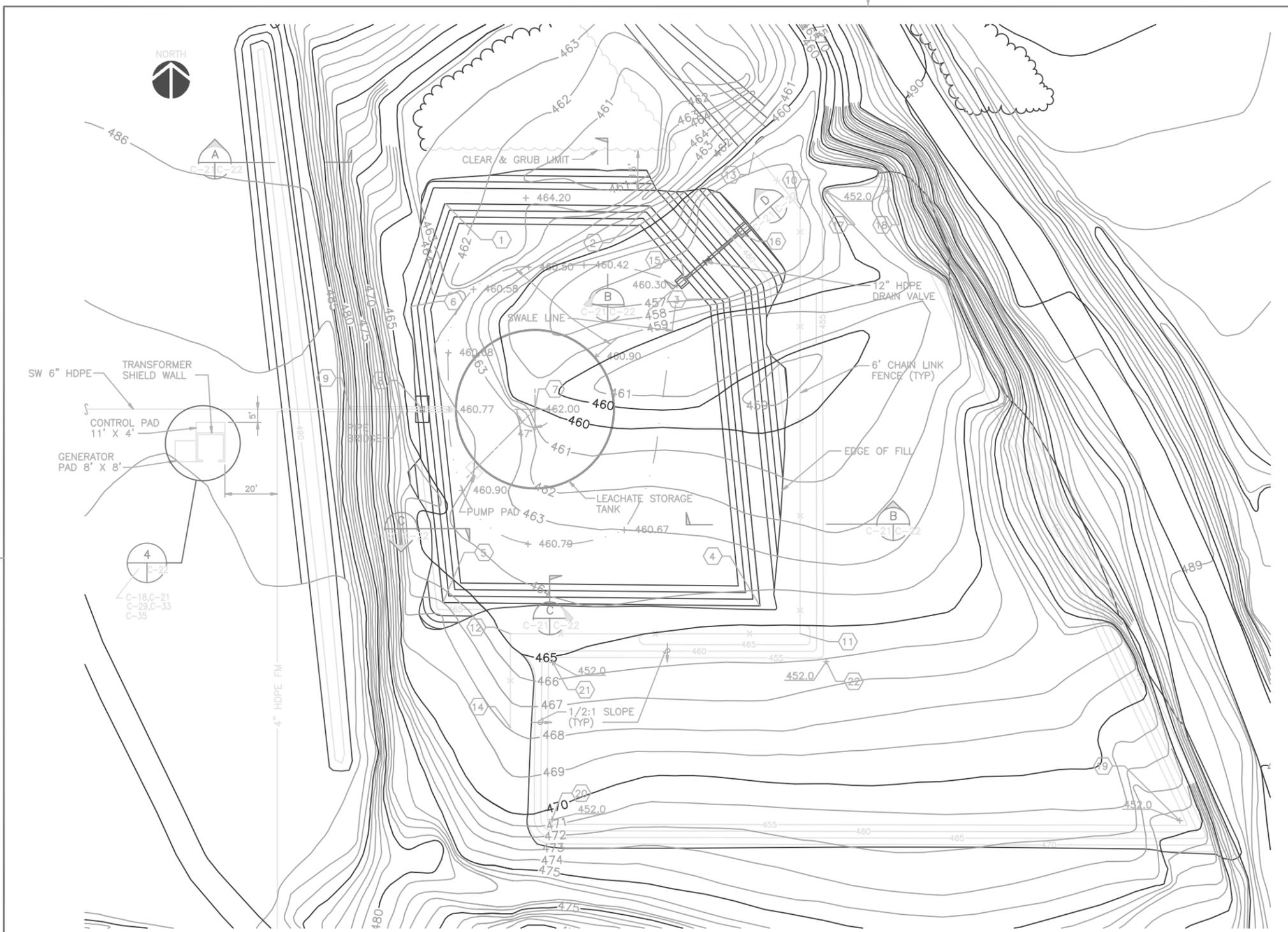
- SEE SHEET S-10 FOR STORAGE TANK FOUNDATION, PIPE BRIDGE, AND PUMP PAD DETAILS.
- SEE SHEETS M-2 AND M-3 FOR STORAGE TANK, PIPING AND PUMP DETAILS.
- SEE SHEET C-8 FOR 6" LEACHATE COLLECTION PIPING INFORMATION.
- SEE SHEET C-35 FOR 4" FORCE MAIN PIPING PLAN AND PROFILE.

POINT NUMBER	NORTHING	EASTING	REMARKS
1	201999.2	216573.9	EDGE OF BERM
2	201998.4	216652.2	EDGE OF BERM
3	201963.1	216682.6	EDGE OF BERM
4	201846.1	216694.3	EDGE OF BERM
5	201847.4	216573.3	EDGE OF BERM
6	201960.1	216561.0	EDGE OF BERM
7	201921.0	216608.34	CENTER OF TANK
8	201921.0	216565.4	CENTER OF BRIDGE PIER
9	201921.0	216537.9	END OF BRIDGE C
10	201997.4	216709.6	FENCE CORNER
11	201835.5	216709.6	FENCE CORNER
12	201835.6	216599.0	FENCE CORNER
13	202018.8	216691.9	END OF FENCE
14	201799.8	216599.0	END OF FENCE
15	201970.4	216665.4	DRAIN PIPE INLET INV. EL 459.63
16	201988.2	216686.4	DRAIN PIPE OUTLET INV. EL 457.00
17	202004.1	216719.6	BOTTOM CORNER BORROW PIT
18	202004.1	216742.9	BOTTOM CORNER BORROW PIT
19	201764.3	216854.6	BOTTOM CORNER BORROW PIT
20	201764.7	216615.0	BOTTOM CORNER BORROW PIT
21	201824.6	216615.0	BOTTOM CORNER BORROW PIT
22	201824.6	216719.6	BOTTOM CORNER BORROW PIT

**RECORD DRAWING**  
 DATE: 03/19/99  
 INITIALS: D.H.S.

The Contractor will be responsible for coordinating the work among the various trades as necessary to avoid conflicts and to insure the installation of all work within the available space.

IF SHEET IS LESS THAN (22" X 34") IT IS A REDUCED PRINT-SCALE REDUCED ACCORDINGLY



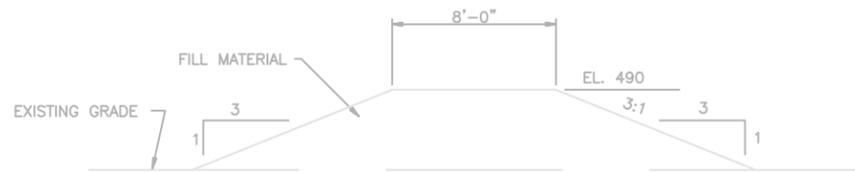
C-21

<b>BLACK &amp; VEATCH</b> SPECIAL PROJECTS CORP.		DEPARTMENT OF THE NAVY NAVY FACILITIES ENGINEERING COMMAND PACIFIC DIVISION MAKALAPA, HAWAII	
DES MWS	DR KLL	CHK TAH	ANDERSEN AFB GUAM, HI
SUPY DHS	CH ENG CLH	DATE	FY93 MCAF AJJY953109 SOLID WASTE MANAGEMENT COMPLEX PHASE II - LANDFILL COMPLEX
SUBMITTED BY		LEACHATE STORAGE TANK SITE PLAN	
FIRM MEMBER (TITLE)		SIZE	CODE IDENT NO
PACDIV NFEC: RVD BR MGR		D	80091
DFPE: PDE INBW		NAVFAC DRAWING NO 7921160	
APPROVED DATE		CONSTR CONTR NO N62766-96-C-0383	
FOR COMMANDER NAVFAC		SCALE	NOTED
		SPEC	41-96-0383
		SHEET	24 OF 92

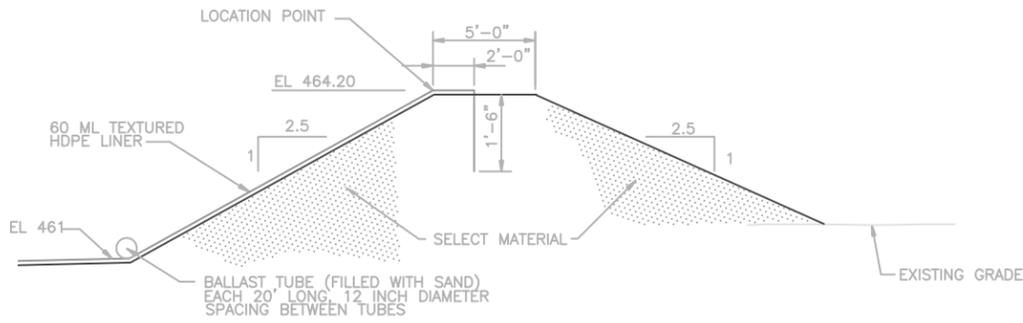
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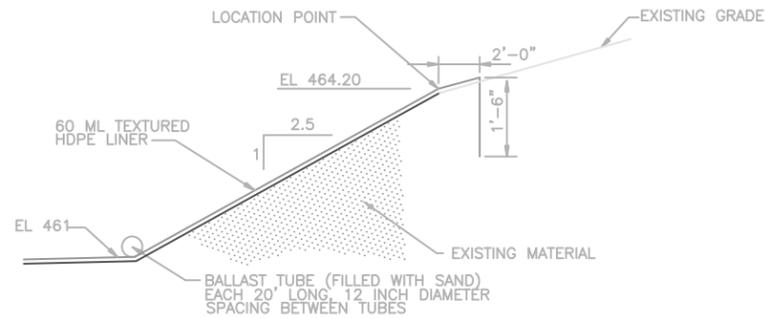
REVISIONS				
LTR	DESCRIPTION	PREP BY	DATE	APPROVED
AS-BUILT		DHS	3/19/99	



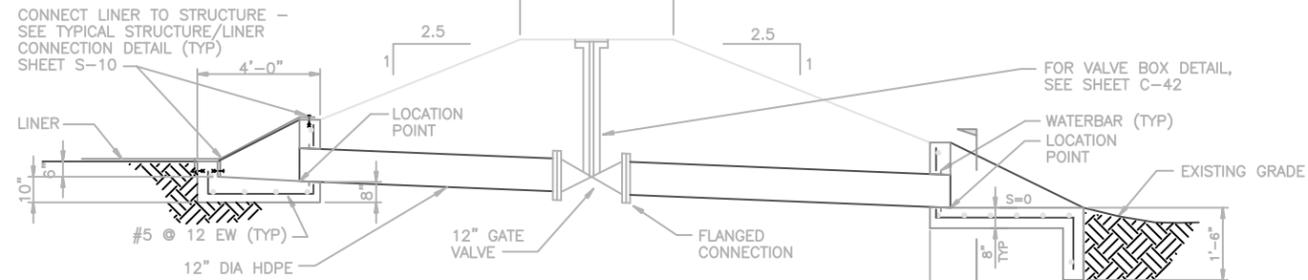
**A SECTION**  
C-21 | C-22 SCALE: NO SCALE



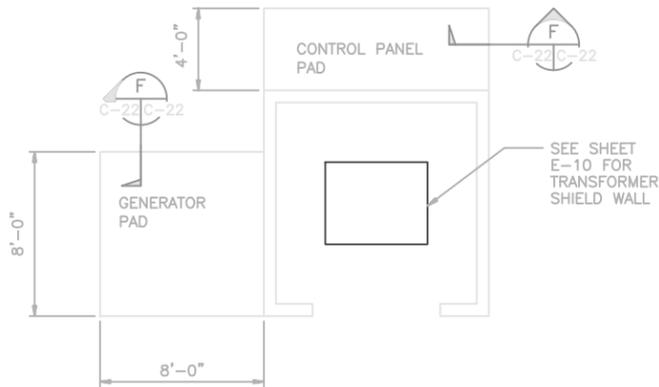
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C-21 | C-22 SCALE: NO SCALE



**C SECTION**  
C-21 | C-22 SCALE: NO SCALE

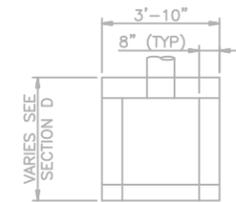


**D SECTION**  
C-21 | C-22 SCALE: NO SCALE

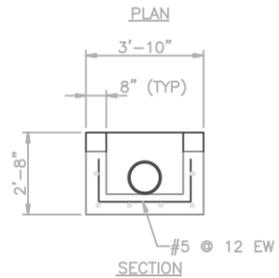


NOTE: MAINTAIN MINIMUM 3'-0" CLEARANCE FROM LIFT STATIONS.

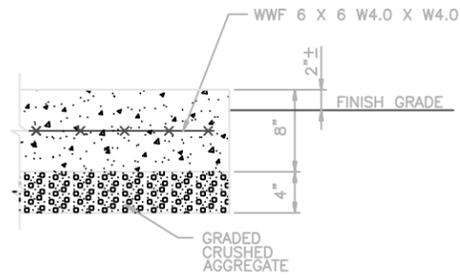
**4 DETAIL**  
C-18 | C-22 SCALE: NO SCALE



NOTE: INLET STRUCTURE SHALL HAVE 8" WIDE LIP AT FRONT EDGE AS SHOWN IN SECTION D, THIS SHEET.



**E TYPICAL HEADWALL**  
C-22 | C-22 SCALE: NO SCALE



**F SECTION**  
C-22 | C-22 SCALE: NO SCALE

**RECORD DRAWING**  
DATE: 03/19/99  
INITIALS: D.H.S.

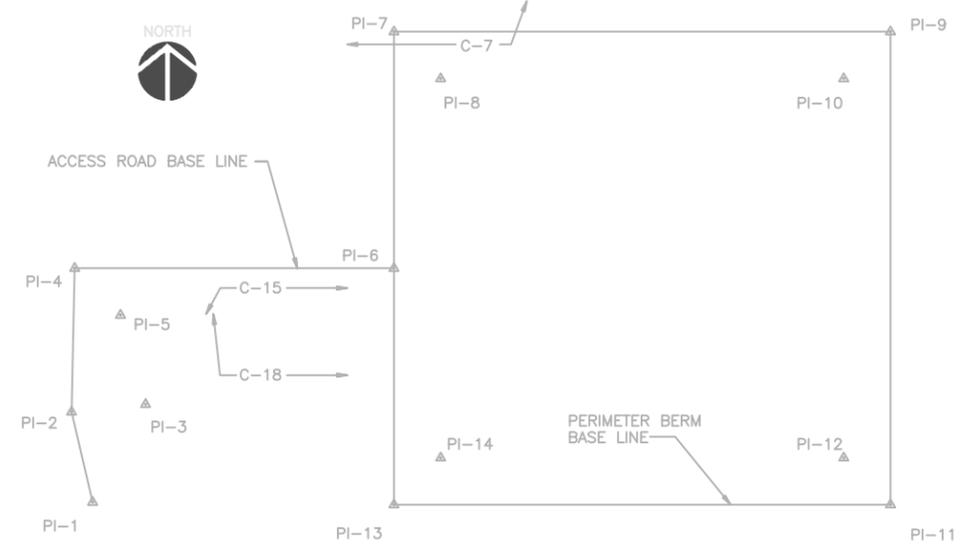
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<b>BLACK &amp; VEATCH</b> SPECIAL PROJECTS CORP.		DEPARTMENT OF THE NAVY NAVY FACILITIES ENGINEERING COMMAND <b>PACIFIC DIVISION</b> MAKALAPA, HAWAII	
DES WRW	DR HFM	CHK TAH	GUAM, HI
SUPV DHS	CH ENO	CLH	ANDERSEN AFB
SUBMITTED BY		DATE	FY93 MCAF AJY953109
FIRM MEMBER (TITLE)			SOLID WASTE MANAGEMENT COMPLEX
PACDIV NFOC: RVD	BR MGR		PHASE II - LANDFILL COMPLEX
DFPE	PDE	INBM	<b>LEACHATE STORAGE TANK</b>
DIR			<b>SECTIONS AND DETAILS</b>
APPROVED	DATE		SIZE CODE IDENT NO
			D 80091
FOR COMMANDER NAVFAC			NAVFAC DRAWING NO
			7921161
SATISFACTORY TO		DATE	CONSTR CONTR NO
TITLE			N62766-96-C-0383
SCALE NOTED		SPEC	41-96-0383
			SHEET 25 OF 92

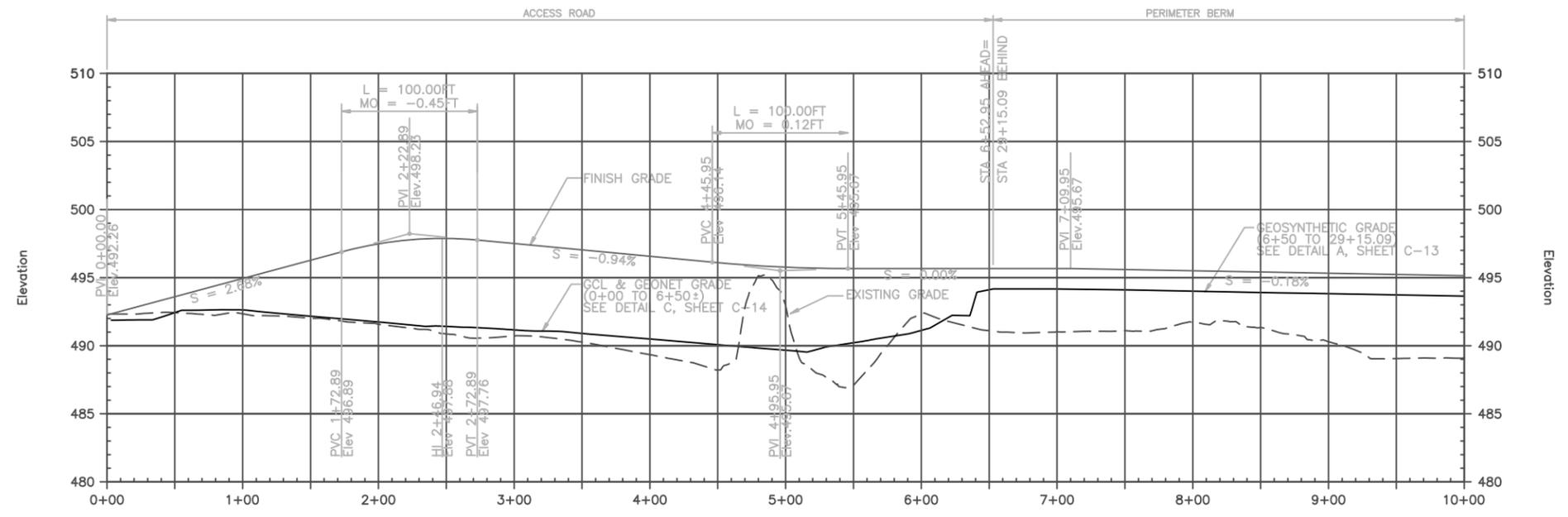
REVISIONS				
LTR	DESCRIPTION	PREP BY	DATE	APPROVED
AS-BUILT		DHS	3/19/99	

NOTES:  
1. FOR ACCESS ROAD/PERIMETER BERM PLAN, SEE SHEETS C-18, C-15 AND C-7.



HORIZONTAL CONTROL POINT SCHEDULE			
PI	NORTHING	EASTING	REMARKS
PI-1	201883.09	215372.88	STA 0+00 ACCESS ROAD @
PI-2	201992.67	215347.23	SEE SHEET C-18 FOR CURVE DATA
PI-3	202002.08	215437.46	SEE SHEET C-18 FOR CURVE DATA
PI-4	202167.50	215351.12	SEE SHEET C-15 FOR CURVE DATA
PI-5	202110.50	215406.86	RADIUS POINT
PI-6	202167.50	215740.00	STA 6+52.95 AH = STA 29+15.09 BK ACCESS ROAD @
PI-7	202455.00	215740.00	SEE SHEET C-7 FOR CURVE DATA
PI-8	202398.00	215797.00	RADIUS POINT
PI-9	202455.00	216345.00	SEE SHEET C-7 FOR CURVE DATA
PI-10	202398.00	216288.00	RADIUS POINT
PI-11	201880.00	216345.00	SEE SHEET C-7 FOR CURVE DATA
PI-12	201937.00	216288.00	RADIUS POINT
PI-13	201880.00	215740.00	SEE SHEET C-7 FOR CURVE DATA
PI-14	201937.00	215797.00	RADIUS POINT

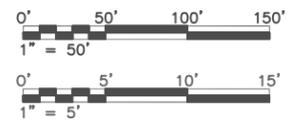
ACCESS ROAD/PERIMETER BERM STAKING DIAGRAM  
SCALE: NO SCALE



ACCESS ROAD/PERIMETER BERM PROFILE  
HORZ. SCALE: 1"=50'  
VERT. SCALE: 1"=5'

**RECORD DRAWING**  
DATE: 03/19/99  
INITIALS: D.H.S.

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C-23

BLACK & VEATCH SPECIAL PROJECTS CORP.		DEPARTMENT OF THE NAVY NAVY FACILITIES ENGINEERING COMMAND PACIFIC DIVISION MAKALAPA, HAWAII	
DES TFP	DR HFM	CHK TAH	ANDERSEN AFB
SUPV DHS	CH ENG CLH	DATE	GUAM, HI
SUBMITTED BY		FY93 MCAF A1JY953109 SOLID WASTE MANAGEMENT COMPLEX PHASE II - LANDFILL COMPLEX	
FIRM MEMBER (TITLE)		ACCESS ROAD/PERIMETER BERM PROFILES 1	
PACDVI NPEC RVD	BR MOR	SIZE	NAVFAC DRAWING NO
OFFE	JDE	80091	7921162
DIR	INBM	CONSTR CONTR NO	N62766-96-C-0383
APPROVED	DATE	SCALE	NOTED
		SPEC	41-96-0383
SATISFACTORY TO		SHEET 26 OF 92	
DATE			
FOR COMMANDER NAVFAC			

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## **Record Drawings – Areas Capped in 2000**

# PLANS FOR CONSTRUCTION OF FY00 MILCON AJJY971614 LANDFILL CAP ANDERSEN AIR FORCE BASE GUAM, M.I.

INDEX OF DRAWINGS

SHEET NO.	DRAWING NO.	NAVFAC NO.	DESCRIPTION
1	G-1	7941664	COVER SHEET, LEGEND, & ABBREVIATIONS
2	G-2	7941665	LOCATION MAP
CIVIL			
3	C-1	7941666	DEMOLITION AND REMOVAL PLAN
4	C-2	7941667	DEMOLITION PHOTOS
5	C-3	7941668	KEY PLAN
6	C-4	7941669	BASIS-OF-BID - WOOD WASTE EXCAVATION PLAN
7	C-5	7941670	INITIAL GRADING - PLAN 1
8	C-6	7941671	INITIAL GRADING - PLAN 2
9	C-7	7941672	INITIAL GRADING - PLAN 3
10	C-8	7941673	INITIAL GRADING - PLAN 4
11	C-9	7941674	INITIAL GRADING - PLAN 5
12	C-10	7941675	INITIAL GRADING - PLAN 6
13	C-11	7941676	FINISH GRADING - PLAN 1
14	C-12	7941677	FINISH GRADING - PLAN 2
15	C-13	7941678	FINISH GRADING - PLAN 3
16	C-14	7941679	FINISH GRADING - PLAN 4
17	C-15	7941680	FINISH GRADING - PLAN 5
18	C-16	7941681	FINISH GRADING - PLAN 6
19	C-17	7941682	INITIAL GRADE CONTROL POINTS
20	C-18	7941683	FINISHED GRADE CONTROL POINTS
21	C-19	7941684	TURFING PLAN
22	C-20	7941685	ACCESS ROAD PROFILES
23	C-21	7941686	MISCELLANEOUS EARTH DETAILS - SHEET 1 OF 3
24	C-22	7941687	MISCELLANEOUS EARTH DETAILS - SHEET 2 OF 3
25	C-23	7941688	MISCELLANEOUS EARTH DETAILS - SHEET 3 OF 3
26	C-24	7941689	TYPE II CLOSURE DETAILS
27	C-25	7941690	STORM DRAINAGE DETAILS
28	C-26	7941691	FENCE DETAILS
ELECTRICAL			
29	E-1	7941692	ELECTRICAL SITE PLAN
30	E-2	7941693	ONE-LINE DIAGRAM
31	E-3	7941694	MISCELLANEOUS DETAILS
32	E-4	7941695	ENCLOSURE SP-4A DETAILS

LEGEND:

EXISTING	NEW	DESCRIPTION
		FIRE HYDRANT
		WATER VALVE
		WATERLINE
		FENCE
		CONCRETE POWER POLE (CPP)
		GUY WIRE (GW)
		CULVERT
		MAJOR CONTOUR
		MINOR CONTOUR
		CLOSURE/FINISHED BOUNDARY
		GRADE BREAK LINE
		BERM CENTERLINE
		MONUMENT ASSEMBLY (MONUMENT AND 1 BOLLARD)
		VENT ASSEMBLY (GAS VENT AND 2 BOLLARDS)
		CLEAR & GRUB LIMITS
		SIGN
		SURVEY MONUMENT
		SURVEY CONTROL POINT
		ACCESS ROAD SURVEY MONUMENT
		ACCESS ROAD SURVEY CONTROL POINT
		INLET
		TREE
		COCO TREE
		WOODEN POWER POLE (WPP)
		SEWER MANHOLE (SMH)
		WATER MANHOLE (WMH)
		ELECTRICAL BOX (E-BOX)
		ELECTRICAL MANHOLE (EMH)
		TELEPHONE MANHOLE (TMH)
		FENCE REMOVAL
		COMMON FILL MATERIAL
		FILL MATERIAL

ABBREVIATIONS:

AAFB	ANDERSEN AIR FORCE BASE	LFG	LANDFILL GAS
ADMIN	ADMINISTRATION	MH	MANHOLE
AND	AND	M	METER(S)
APPROX	APPROXIMATELY	MIL	MILITARY
AWG	AMERICAN WIRE GAGE	MIN	MINIMUM
BL	BASE LINE	MISC	MISCELLANEOUS
BK	BACK	MSW	MUNICIPAL SOLID WASTE
BLDG	BUILDING	N	NORTH, NORTHING OR NEUTRAL
C/D	CONSTRUCTION/DEMOLITION	N.I.C.	NOT IN CONTRACT
CJ	CONTROL JOINT	OC	ON CENTER
CMP	CORRUGATED METAL PIPE	PC	POINT OF CURVATURE
CMU	CONCRETE MASONRY UNITS	PERF	PERFORATED
CO	CLEANOUT	PI	POINT OF INTERSECTION
CONC	CONCRETE	PT	POINT OF TANGENCY
DEG	DEGREE	PVC	POLYVINYL CHLORIDE
DEMO	DEMOLITION	R	RADIUS
DET	DETAIL	REINF	REINFORCEMENT
DIA	DIAMETER	RCP	REINFORCED CONCRETE PIPE
DND	DO NOT DISTURB	RCPA	REINFORCED CONCRETE PIPE ARCH
DWG	DRAWING	REQ'D	REQUIRED
E	EASTING OR ELECTRICAL	REV	REVISION
EA	EACH	S	SOUTH OR SWITCH
EF	EACH FACE	SEC	SECTION
EL	ELEVATION	SHT	SHEET
EQ	EQUAL	SIM	SIMILAR
EW	EACH WAY	SPEC	SPECIFICATIONS
EWEF	EACH WAY EACH FACE	SS	STAINLESS STEEL OR SANITARY SEWER
FF	FINISHED FLOOR	SYM	SYMMETRICAL
FL	FLOW LINE	T/C	TOP OF CONCRETE
GCL	GEOSYNTHETIC CLAY LINER	TYP	TYPICAL
GR	GRADE	UNO	UNLESS NOTED OTHERWISE
HDPE	HIGH DENSITY POLYETHYLENE	VCP	VITRIFIED CLAY PIPE
HVAC	HEATING, VENTILATING AND AIR CONDITIONING	VERT	VERTICAL
INV	INVERT	W	WATER, WIDE, WATT, WEST OR WIRE
		WWF	WELDED WIRE FABRIC

## RECORD DRAWING

DATE OF ISSUE 06-08-01



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THE CONTRACTOR WILL BE RESPONSIBLE FOR COORDINATING THE WORK AMONG THE VARIOUS TRADES AS NECESSARY TO AVOID CONFLICTS AND TO INSURE THE INSTALLATION OF ALL WORK WITHIN THE AVAILABLE SPACE.

IF SHEET IS LESS THAN (22" X 34") IT IS A REDUCED PRINT - SCALE REDUCED ACCORDINGLY

CONSTRUCTION CONTRACT NO. N62766-98-C-0204  
SPECIFICATION 41-98-0204

G-1 SATISFACTORY TO PER HQPACAF G. TANG E-MAIL OF 7-7-99 DATE

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED

		DEPARTMENT OF THE NAVY NAVAL FACILITIES ENGINEERING COMMAND PACIFIC DIVISION MAKALAPA, HAWAII	
DES KAP	DR KAP	CHK WRW	
SUPV DHS	CH ENG HMF		
SUBMITTED BY HENRY M. FOOTE		DATE 7-15-99	
FIRM MEMBER (TITLE)			
PACDIV NFEC: RVD_KWH BR MGR_MTT			
DFPE JRC_PDE_KWH INBM_MTT			
DIR M. TSUTAHARA			
APPROVED		DATE 7-23-99	
CLYDE T. MORTA			
FOR COMMANDER NAVFAC			
SIZE D	CODE IDENT NO 80091	NAVFAC DRAWING NO 7941664	
SCALE NONE		SPEC 41-98-0204	
		CONSTR CONTR NO N62766-98-C-0204	
		SHEET 1 OF 32	



PHILIPPINE SEA

ANDERSEN AIR FORCE BASE

GUAM (UNITED STATES)

NORTH PACIFIC OCEAN

LOCATION MAP  
NOT TO SCALE

PROJECT SITE

FIRE TRAINING FACILITY 3085

CLEAR

CLEAR

OVERFLOW

HATCH

CLEAR ZONE

AAFB 53

TRUCKFILL STING

AAFB 57 ROUTE NO. 4

BASE ACCESS ROAD

GATE HOUSE

AAFB MAIN GATE

VISITOR CONTROL

UNDERGROUND TANK

PUMP STA

TANK PUMPHOUSE



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G-2

SATISFACTORY TO \_\_\_\_\_ DATE \_\_\_\_\_

**SURVEY NOTES:**

1. HORIZONTAL AND VERTICAL CONTROL SURVEY WAS BASED FROM "AAFB 53" AND "AAFB 57" 1945 L&CC GRID.

STATION	BEARING	DISTANCE	NORTHING	EASTING	ELEV.(MSW)
AAFB 53	S 77°40'36" W	1,067.668 M	60,517.558	67,570.812	163.340 M
AAFB 57			60,289.686	66,527.745	185.611 M

2. ALL DISTANCES, DIMENSIONS, ELEVATIONS AND COORDINATES ARE IN METERS AND DECIMALS THEREOF.

3. CONTOURS WERE DEVELOPED FROM SPOT ELEVATIONS USING A COMBINATION OF STANDARD GROUND TOPOGRAPHIC SURVEY METHOD AND GLOBAL POSITIONING SYSTEM (GPS).

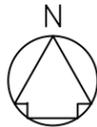
**RECORD DRAWING**

DATE OF ISSUE 06-08-01

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED

		DEPARTMENT OF THE NAVY NAVY FACILITIES ENGINEERING COMMAND <b>PACIFIC DIVISION</b> MAKALAPA, HAWAII	
DES KAP	DR KAP	CHK WRW	
SUPV DHS	CH ENG HMF		
SUBMITTED BY HENRY M. FOOTE		DATE 7-15-99	
FIRM MEMBER (TITLE)			
PACDIV NFEC: RVD_KWH BR MGR_MIT			
DFPE JRC PDE_KWH INSM_MIT			
DIR M. TSUTAHARA			
APPROVED		DATE 7-23-99	
CLYDE T. MORTA			
FOR COMMANDER NAVFAC			
SIZE D	CODE IDENT NO 80091	NAVFAC DRAWING NO 7941665	
		CONSTR CONTR NO N62766-98-C-0204	
SCALE 1:750	SPEC 41-98-0204	SHEET 2 OF 32	



RELOCATE 2 15 METER LONG CONCRETE POWER POLES TO THE EXISTING C/D LANDFILL

METAL WASTE PILE SHALL BE REMOVED IN ACCORDANCE WITH THE REQUIREMENTS OF SECTION 02220-SITE DEMOLITION

REMOVE, CRUSH, AND RELOCATE 2 ABANDONED HEXAGONAL CONCRETE GUARD HOUSES TO EXISTING C/D LANDFILL (1.0M MAX SIZE)

WOOD WASTE PILE SHALL BE REMOVED IN ACCORDANCE WITH THE REQUIREMENTS OF SECTION 02220-SITE DEMOLITION (SEE SHEET C-3)

REMOVE AND RELOCATE 1100 CUBIC METERS OF MISCELLANEOUS WASTE MATERIALS IN ACCORDANCE WITH THE REQUIREMENTS OF SECTION 02220- SITE DEMOLITION

RELOCATE 4 WOOD POWER POLES TO EXISTING C/D LANDFILL

REMOVE EXISTING 203mm THICK ASPHALT PAVEMENT TO C/D AREA

RELOCATE APPROXIMATELY 400 CUBIC METERS OF CONCRETE RUBBLE TO LOCATION UNDER TYPE I CLOSURE, OR USE AS SOURCE MATERIAL FOR RIPRAP AND BEDDING MATERIAL, AT CONTRACTOR'S OPTION

REMOVE, CRUSH AND RELOCATE 7M LONG, 0.3M DIA RCP CULVERT TO EXISTING C/D LANDFILL (0.3M MAX SIZE)

RELOCATE 150 CUBIC METERS OF BROKEN ASPHALT CHUNKS TO EXISTING C/D LANDFILL

CONCRETE RUBBLE SHALL BE REMOVED IN ACCORDANCE WITH THE REQUIREMENTS OF SECTION 02220-SITE DEMOLITION

RELOCATE 5 WOODEN POWER POLES TO EXISTING C/D LANDFILL

REMOVE, CRUSH AND RELOCATE 7M LONG, 0.3M DIA RCP CULVERT TO EXISTING C/D LANDFILL (0.3M MAX SIZE)

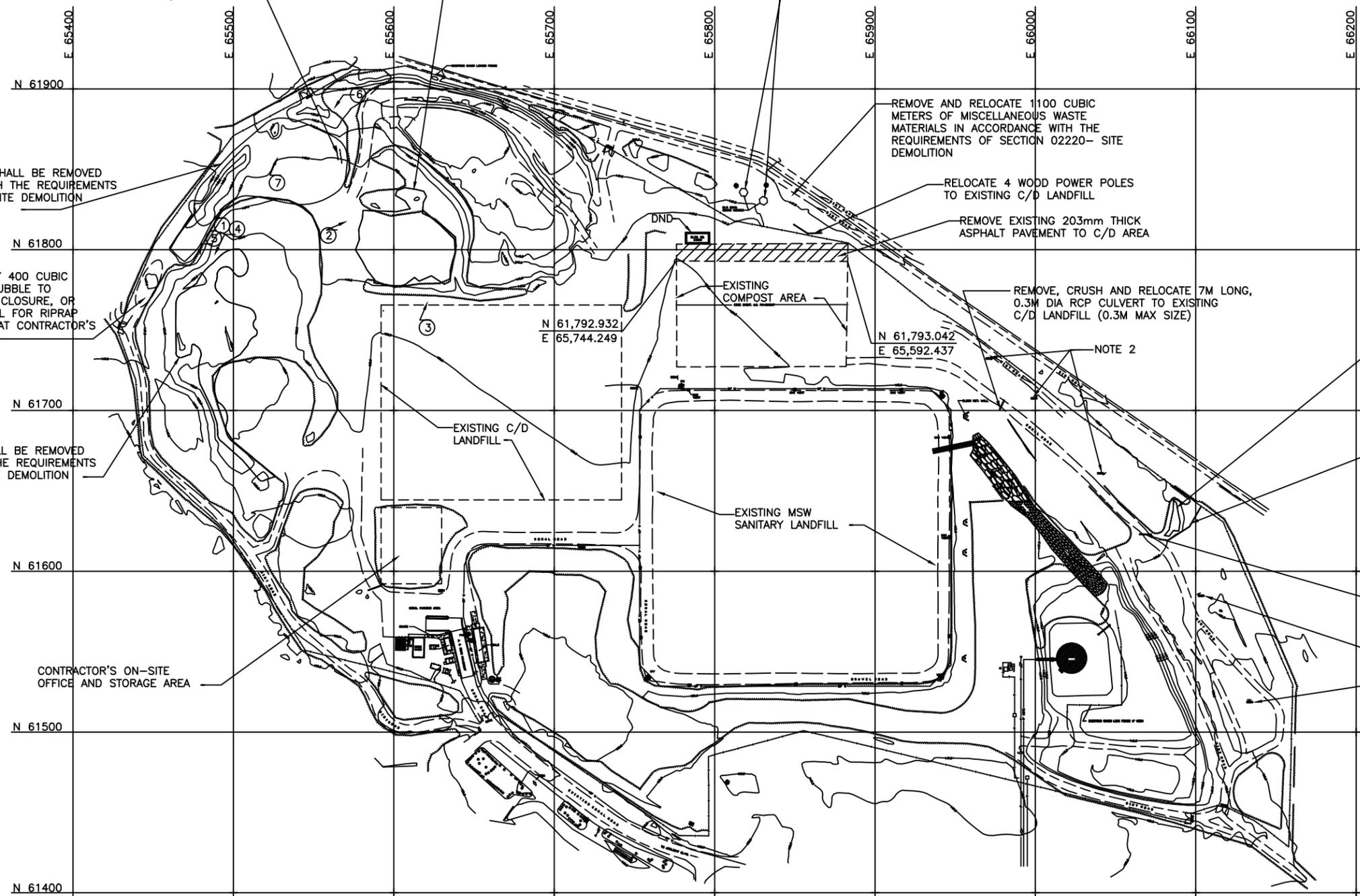
CONTRACTOR'S ON-SITE OFFICE AND STORAGE AREA

**NOTES:**

1. BASIS-OF-BID QUANTITIES FOR SELECTED DEMOLITIONS AND REMOVALS SHOWN ON THIS SHEET ARE IN SECTION 02220- SITE DEMOLITION AND IN SECTION 02315- EXCAVATION AND FILL.
2. REMOVE AND TRANSPORT SIGNS TO LOCATION ON-SITE AS DIRECTED BY THE CONTRACTING OFFICER.
3. FENCE REMOVALS SHOWN ON INITIAL GRADING PLANS.

**LEGEND:**

○ DEMOLITION PHOTO LOCATION AND VIEW DIRECTION



# RECORD DRAWING

DATE OF ISSUE 06-08-01



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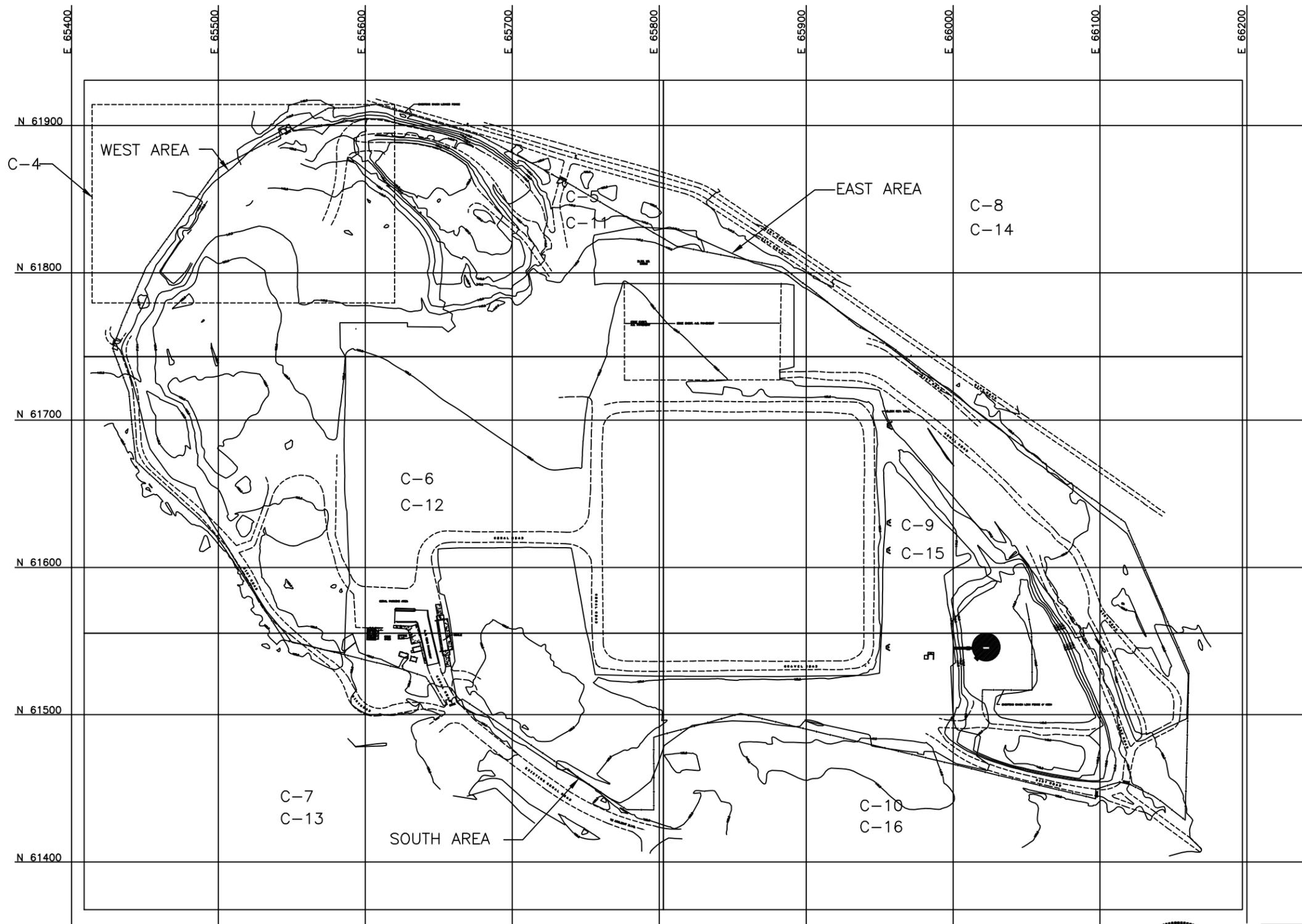


C-1 SATISFACTORY TO DATE TITLE

**REVISIONS**

LTR	DESCRIPTION	DATE	APPROVED
	AS-BUILT	4-20-01	

<b>BLACK &amp; VEATCH</b> SPECIAL PROJECTS CORP.		DEPARTMENT OF THE NAVY NAVY FACILITIES ENGINEERING COMMAND PACIFIC DIVISION MAKALAPA, HAWAII	
DES DHS	DR KAP	CHK WRW	ANDERSEN AFB
SUPV DHS	CH ENG HMF	DATE 7-15-99	FY00 MILCON AJJY971614 LANDFILL CAP
SUBMITTED BY HENRY M. FOOTE		DATE 7-15-99	GUAM, MI
FIRM MEMBER (TITLE)		DEMOLITION AND REMOVAL PLAN	
PACDIV NFEC: RVD_KWH	BR MGR_MIT	SIZE D	CODE IDENT NO 80091
DFPE JRC	PDE_KWH	INBM_MIT	NAVAC DRAWING NO 7941666
DIR M. TSUTAHARA			CONSTR CONTR NO N62766-98-C-0204
APPROVED	DATE 7-23-99	SCALE 1:150	SPEC 41-98-0204
Clyde T. Morta			SHEET 3 OF 32
FOR COMMANDER NAVFAC			



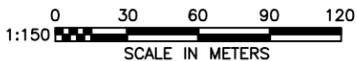
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IF SHEET IS LESS THAN (22" X 34") IT IS A REDUCED PRINT - SCALE REDUCED ACCORDINGLY

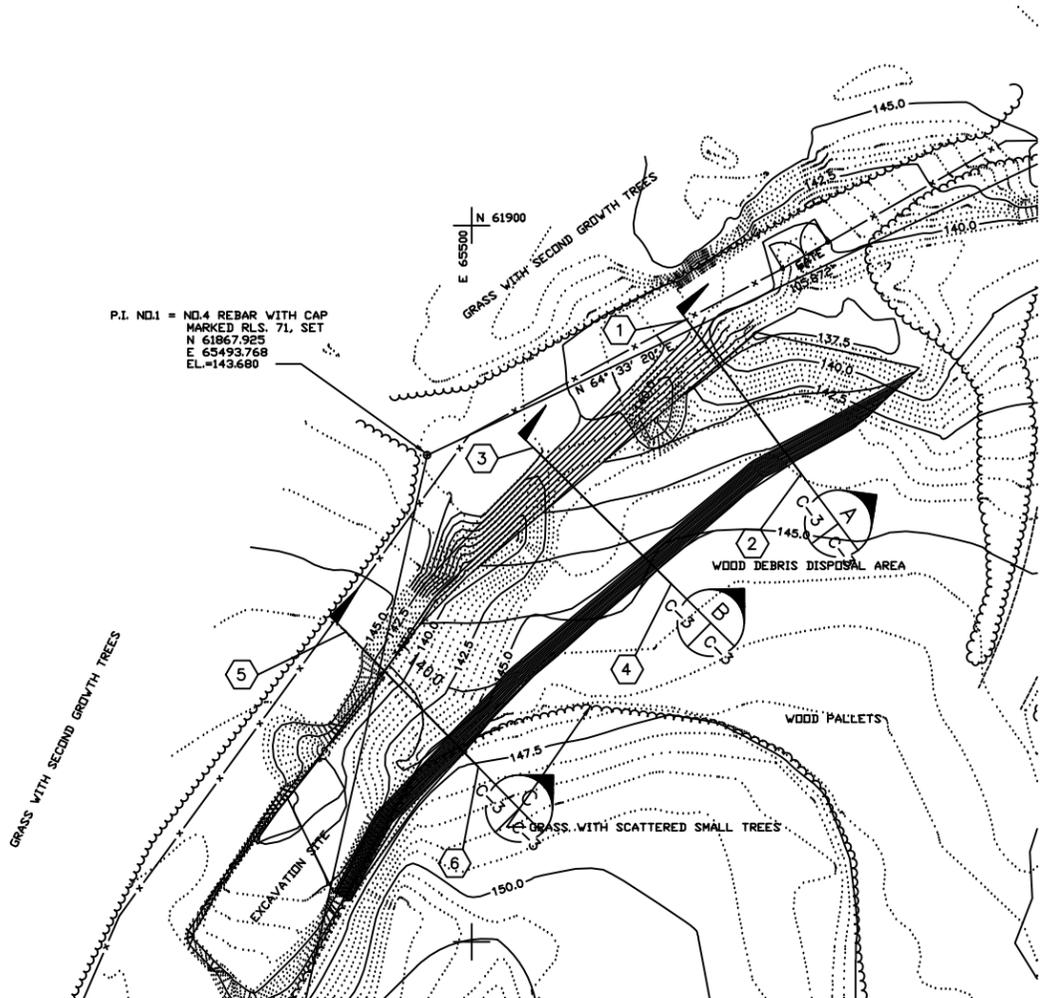
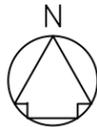
C-3 SATISFACTORY TO DATE TITLE

### REVISIONS

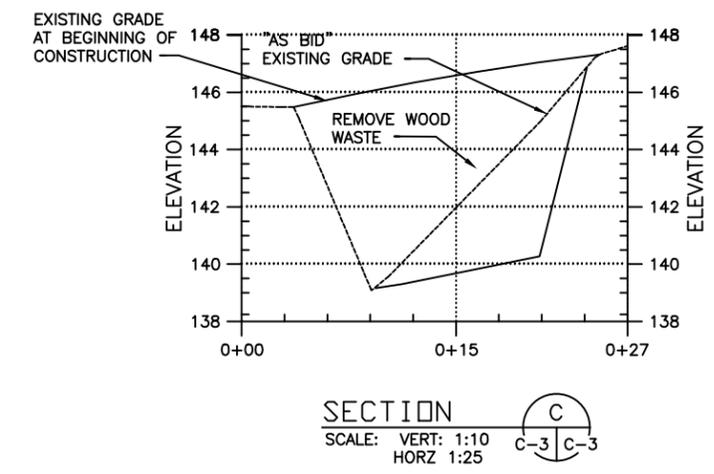
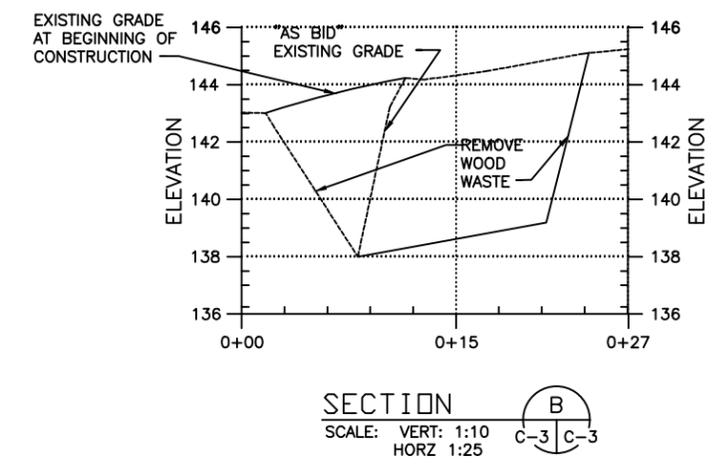
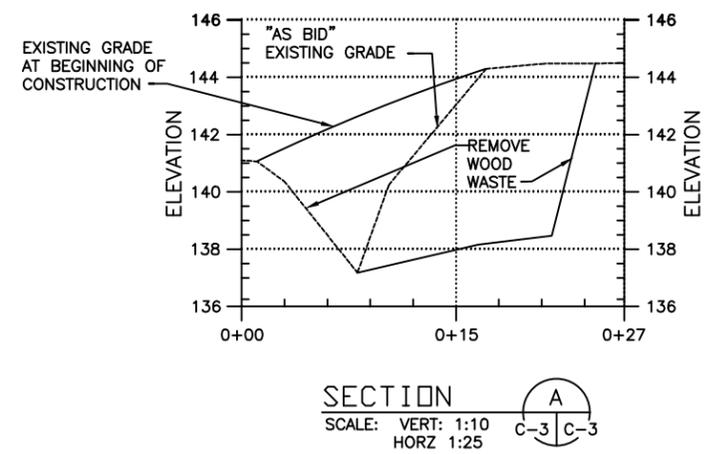
LTR	DESCRIPTION	DATE	APPROVED

<b>BLACK &amp; VEATCH</b> SPECIAL PROJECTS CORP.		DEPARTMENT OF THE NAVY NAVY FACILITIES ENGINEERING COMMAND <b>PACIFIC DIVISION</b> MAKALAPA, HAWAII	
DES KAP	DR KAP	CHK WRW	
SUPV DHS	CH ENG HMF		
SUBMITTED BY HENRY M. FOOTE		DATE 7-15-99	
FIRM MEMBER (TITLE)			
PACDIV NFEC: RVD_KWH BR MGR_MIT			
DFPE JRC PDE_KWH INBM_MIT			
DIR M. TSUTAHARA			
APPROVED		DATE 7-23-99	
CLYDE T. MORTA			
FOR COMMANDER NAVFAC			
SIZE D	CODE IDENT NO 80091	NAVFAC DRAWING NO 7941668	
		CONSTR CONTR NO N62766-98-C-0204	
SCALE 1:150	SPEC 41-98-0204	SHEET 5 OF 32	

### KEY PLAN



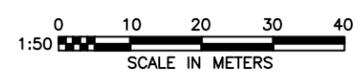
BASIS-OF-BID WOOD WASTE EXCAVATION LIMITS



NOTES:

- SOME OF THE WOOD WASTE MATERIALS ON-SITE ARE CURRENTLY SMOLDERING BELOW GRADE, EVIDENCED BY THE OBSERVATION OF SMOKE AND WARM SOIL TEMPERATURES AT EXISTING GRADE. THE LIKELIHOOD OF INITIATING OPEN COMBUSTION DURING REMOVAL OF THE WOOD WASTES MAY BE HIGH. THEREFORE, THE CONTRACTOR SHALL REMOVE THE REQUIRED WASTES IN ACCORDANCE WITH THE REQUIREMENTS OF HIS WORK PLAN, HIS ACCIDENT PREVENTION PLAN, HIS ACTIVITY HAZARD ANALYSES AND HIS HEALTH AND SAFETY PLAN, SO THAT THE RISK OF OPEN COMBUSTION DURING REMOVAL IS MINIMIZED, TO THE SATISFACTION OF THE CONTRACTING OFFICER. THE CONTRACTOR SHALL IMMEDIATELY EXTINGUISH ANY OPEN COMBUSTION THAT MAY OCCUR DURING WOOD WASTE REMOVAL, ALSO IN ACCORDANCE WITH THE REQUIREMENTS OF HIS WORK PLAN, HIS ACCIDENT PREVENTION PLAN, HIS ACTIVITY HAZARD ANALYSES, AND HIS HEALTH AND SAFETY PLAN. THE DISCHARGE OF SPENT FIRE PREVENTION WATER SHALL BE MANAGED AS DESCRIBED IN THE CONTRACTOR'S APPROVED ENVIRONMENTAL PROTECTION PLAN.
- PLAN VIEW REFLECTS TOPOGRAPHY OF WOOD WASTE "AS BID". SECTIONS REFLECT TOPOGRAPHY OF WOOD WASTE BOTH "AS BID" AND AS ACTUALLY ENCOUNTERED BY CONTRACTOR DURING CONSTRUCTION.

SECTION SURVEY CONTROL POINTS			
POINT	NORTHING	EASTING	REMARKS
1	61,886.80	65,530.13	
2	61,865.32	65,546.12	
3	61,868.98	65,508.66	
4	61,849.96	65,527.94	
5	61,843.27	65,482.40	
6	61,824.42	65,500.93	



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C-4

SATISFACTORY TO \_\_\_\_\_ DATE \_\_\_\_\_

TITLE \_\_\_\_\_

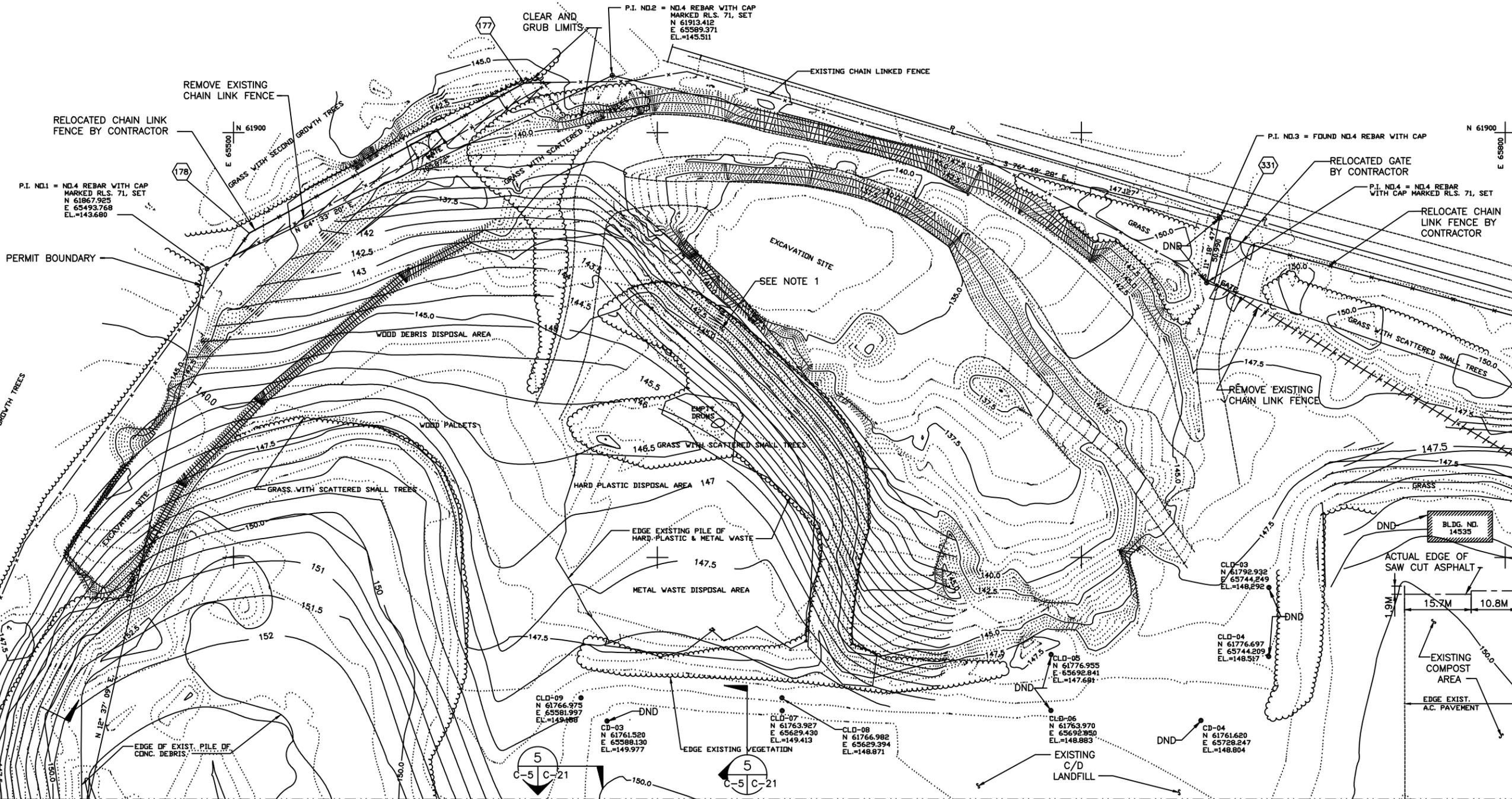
# RECORD DRAWING

DATE OF ISSUE 06-08-01

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED

		DEPARTMENT OF THE NAVY NAVY FACILITIES ENGINEERING COMMAND <b>PACIFIC DIVISION</b> MAKALAPA, HAWAII	
DES MWS	DR KAP	CHK WRW	ANDERSEN AFB
SUPV DHS	CH ENG HMF		FY00 MILCON AJJY971614
SUBMITTED BY HENRY M. FOOTE		DATE 7-15-99	GUAM, MI
FIRM MEMBER (TITLE)			LANDFILL CAP
PACDIV NFEC: RVD_KWH BR MGR MIT			
DFPE JRC PDE_KWH INSM MIT			
DIR M. TSUTAHARA			
APPROVED		DATE	
CLYDE T. MORTA		7-23-99	
FOR COMMANDER NAVFAC			
SIZE D	CODE IDENT NO 80091	NAVFAC DRAWING NO 7941669	
SCALE 1:50	SPEC 41-98-0204	CONSTR CONTR NO N62766-98-C-0204	
		SHEET 6 OF 32	



MATCH LINE FOR CONTINUATION SEE SHEET C-6

MATCH LINE FOR CONTINUATION SEE SHEET C-8

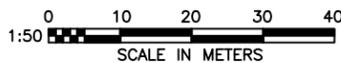
**NOTE:**

- EXISTING TOE OF SLOPE WAS RETAINED. THE WASTE IN THIS AREA WAS EXCAVATED TO ESTABLISH A 3H:1V SLOPE. ONE FOOT OF CLEAN FILL WAS PLACED PRIOR TO PLACING THE GEOSYNTHETIC COVER.



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**RECORD DRAWING**

DATE OF ISSUE 04-20-01

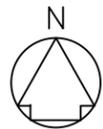
REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED
	AS-BUILT CONDITIONS SHOWN	4-20-01	

<b>BLACK &amp; VEATCH</b> SPECIAL PROJECTS CORP.		DEPARTMENT OF THE NAVY NAVY FACILITIES ENGINEERING COMMAND <b>PACIFIC DIVISION</b> MAKALAPA, HAWAII	
DES MWS	DR KAP	CHK WRW	
SUPV DHS	CH ENG HMF		
SUBMITTED BY <b>HENRY M. FOOTE</b>		DATE 7-15-99	
FIRM MEMBER (TITLE)			
PACDIV NFEC: RVD_KWH BR MGR MIT		DFPE JRC PDE_KWH INSM MIT	
DIR M. TSUTAHARA			
APPROVED <b>CLYDE T. MORTA</b>		DATE 7-23-99	
FOR COMMANDER NAVFAC			
SIZE	CODE IDENT NO	NAVFAC DRAWING NO	
D	80091	7941670	
		CONSTR CONTR NO N62766-98-C-0204	
SCALE 1:50	SPEC 41-98-0204	SHEET 7 OF 32	

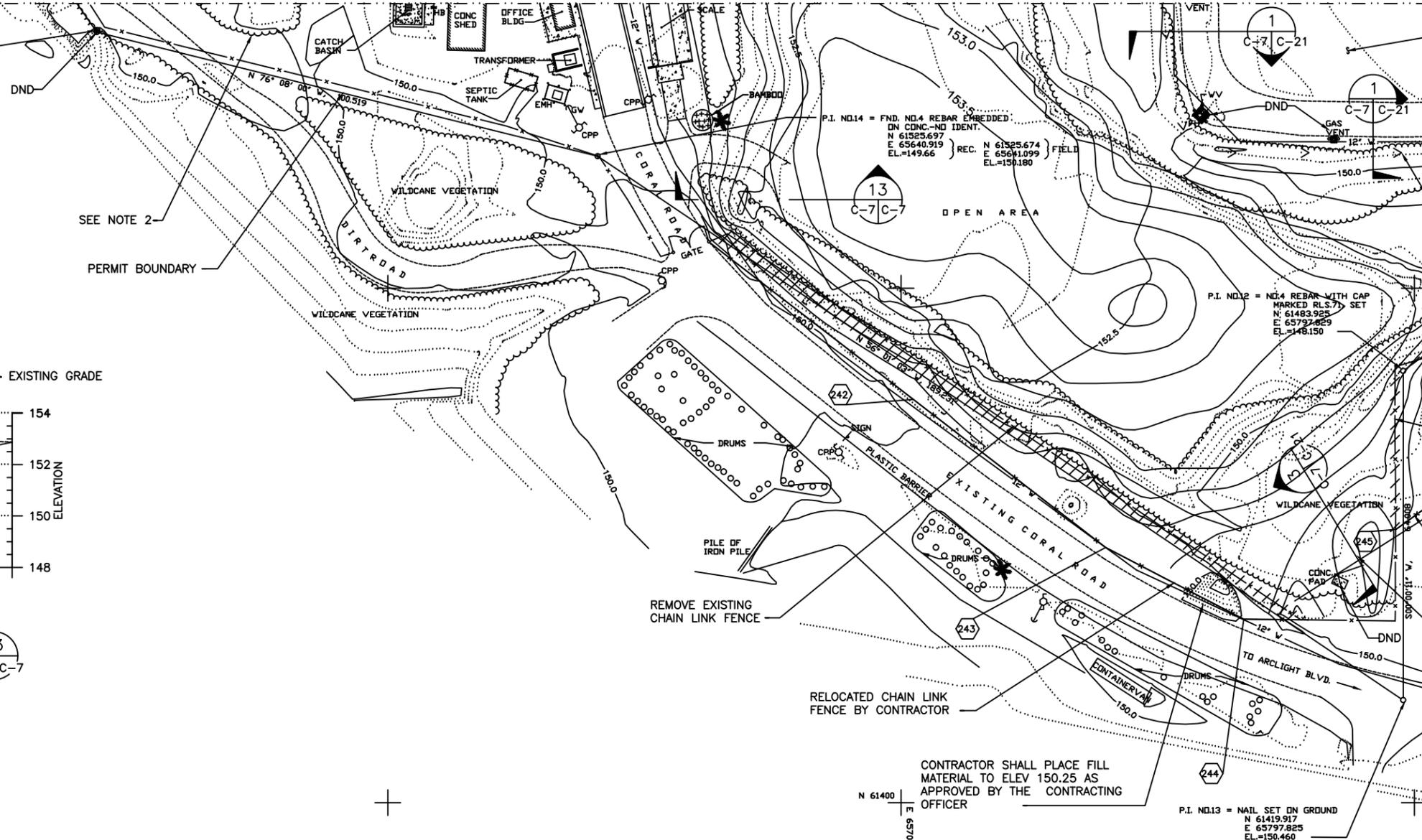
C-5 SATISFACTORY TO DATE





MATCH LINE FOR CONTINUATION SEE SHEET C-6

P.I. NO.15 = NO.4 REBAR W/ PLASTIC CAP  
MARKED RLS. 71 SET  
N 61549.787  
E 65543.329  
EL.=149.66



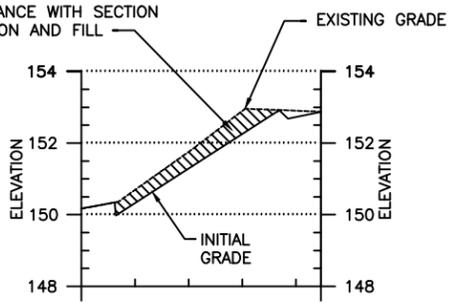
EXISTING MSW LANDFILL

DRAINAGE SWALE

SEE NOTE 2

PERMIT BOUNDARY

REQUIRED EXCAVATION OF EARTH AND POTENTIAL MUNICIPAL SOLID WASTE, IN ACCORDANCE WITH SECTION 02315 - EXCAVATION AND FILL



SECTION 13  
HORZ: 1:20  
VERT: 1:5

MATCH LINE FOR CONTINUATION SEE SHEET C-10

REMOVE EXISTING CHAIN LINK FENCE

RELOCATED CHAIN LINK FENCE BY CONTRACTOR

CLEAR AND GRUB LIMITS

REMOVE EXISTING CHAIN LINK FENCE

RELOCATED CHAIN LINK FENCE BY CONTRACTOR

CONTRACTOR SHALL PLACE FILL MATERIAL TO ELEV 150.25 AS APPROVED BY THE CONTRACTING OFFICER

P.I. NO.13 = NAIL SET ON GROUND  
N 61419.917  
E 65797.825  
EL.=150.460

- NOTES:  
1. CONTRACTOR TO VERIFY LOCATION AND DEPTH OF ALL UTILITIES PRIOR TO CONSTRUCTION



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C-7 SATISFACTORY TO DATE

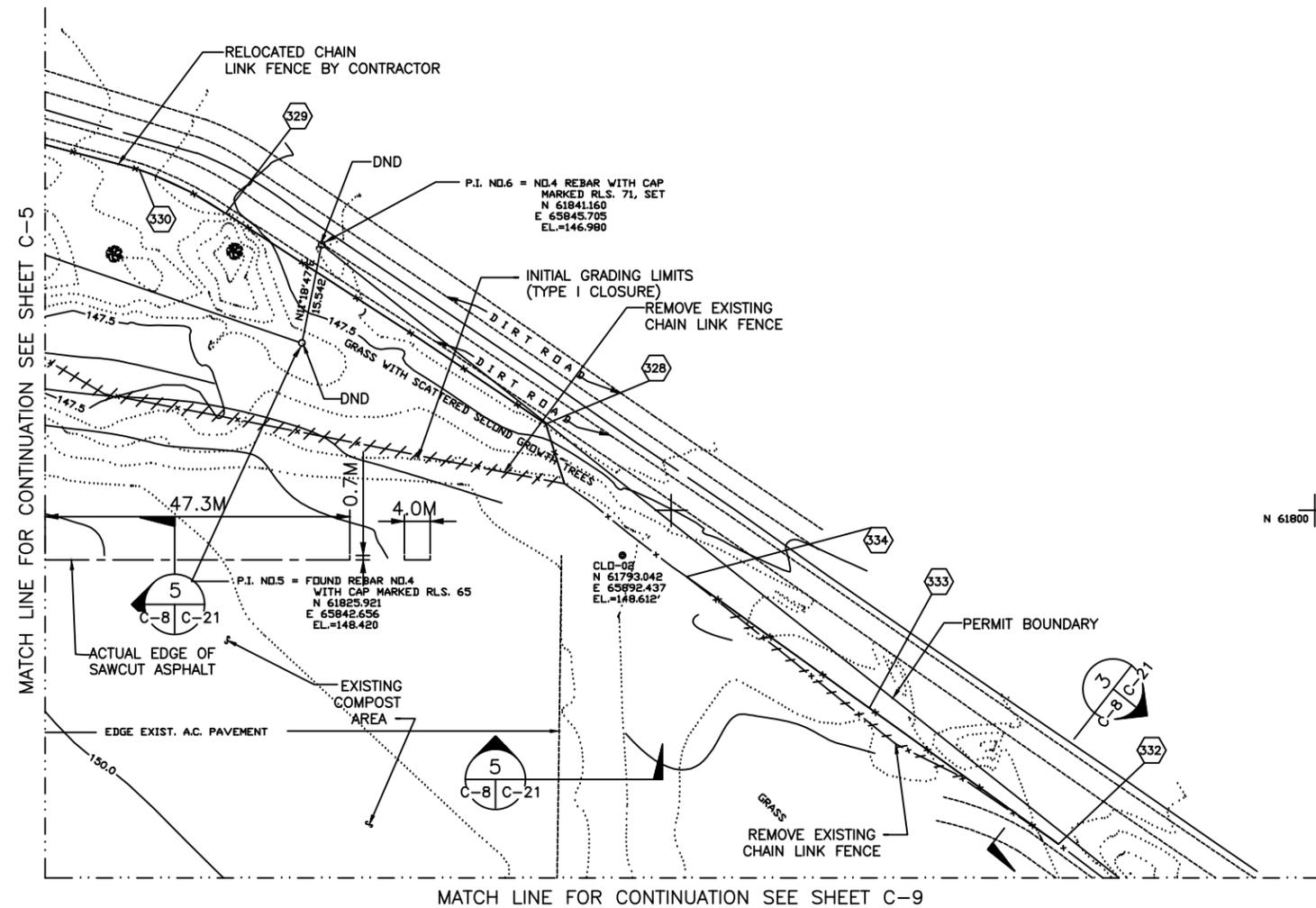
# RECORD DRAWING

DATE OF ISSUE 06-08-01

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED
	AS-BUILT CONDITIONS SHOWN	4-20-01	

		DEPARTMENT OF THE NAVY NAVY FACILITIES ENGINEERING COMMAND <b>PACIFIC DIVISION</b> MAKALAPA, HAWAII	
DES REF	DR KAP	CHK WRW	
SUPV DHS	CH ENG HMF		
SUBMITTED BY HENRY M. FOOTE		DATE 7-15-99	
FIRM MEMBER (TITLE)			
PACDIV NFEC: RVD_KWH BR MGR MIT			
DFPE JRC PDE KWH INBM MIT			
DIR M. TSUTAHARA			
APPROVED	DATE	NAVFAC DRAWING NO	
Clyde T. Morta	7-23-99	7941672	
FOR COMMANDER NAVFAC		SIZE D	CODE IDENT NO 80091
		CONSTR CONTR NO N62766-98-C-0204	
		SCALE 1:50	SPEC 41-98-0204
		SHEET 9 OF 32	



N 61800  
E 66000

# RECORD DRAWING

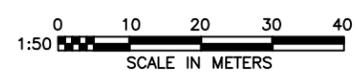
DATE OF ISSUE 06-08-01



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C-8	SATISFACTORY TO	DATE
	TITLE	

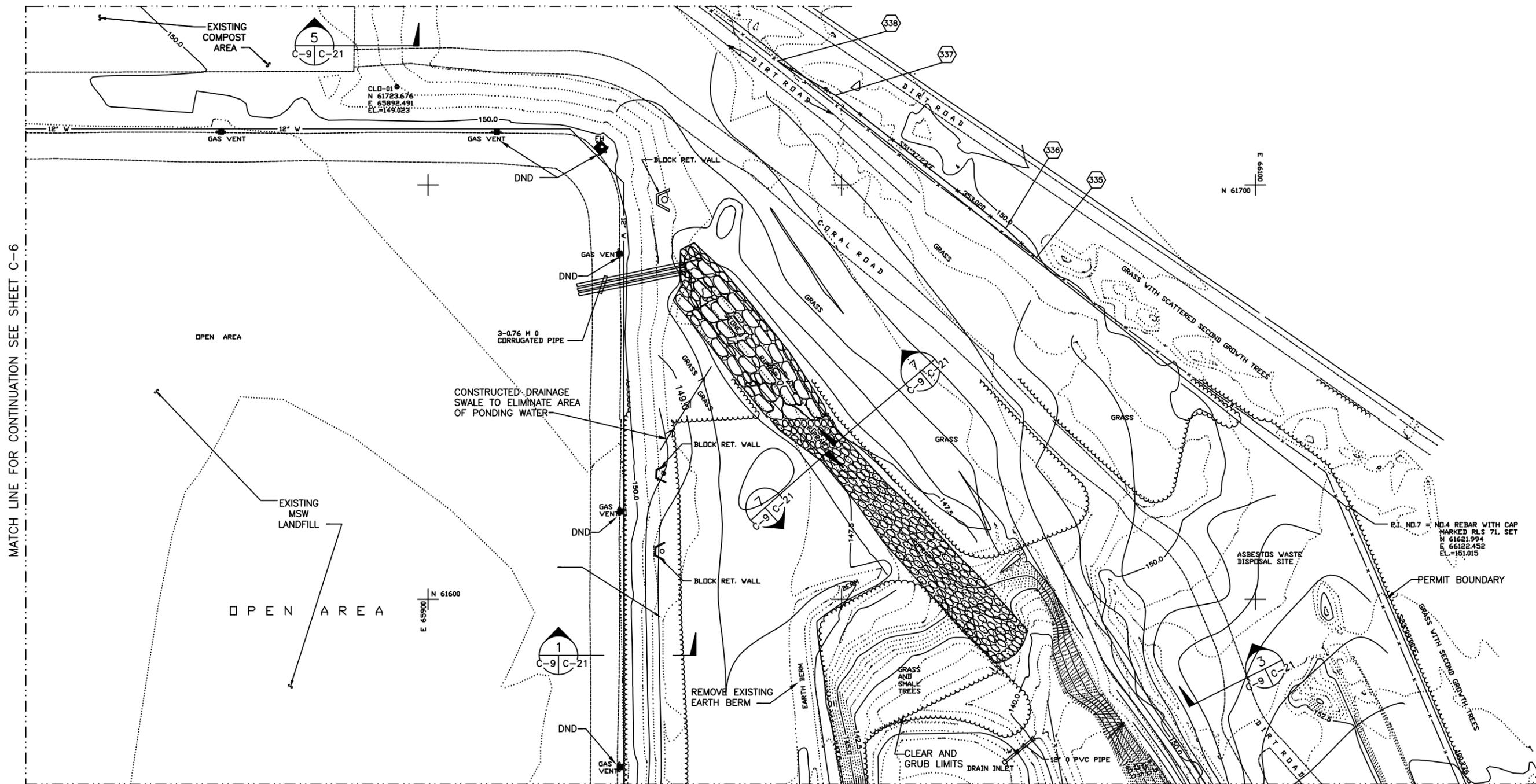
REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED
	AS-BUILT CONDITIONS SHOWN	4-20-01	

		DEPARTMENT OF THE NAVY NAVY FACILITIES ENGINEERING COMMAND <b>PACIFIC DIVISION</b> MAKALAPA, HAWAII	
DES REF	DR KAP	CHK WRW	ANDERSEN AFB
SUPV DHS	CH ENG HMF		FY00 MILCON AJY971614
SUBMITTED BY HENRY M. FOOTE		DATE 7-15-99	GUAM, HI
FIRM MEMBER (TITLE)			
PACDV NFEC: RVD_KWH_BR_MGR_MTT			
DFPE_JRC_PDE_KWH_INBM_MTT			
DIR M. TSUTAHARA			
APPROVED	DATE	NAVFAC DRAWING NO. 7941673	
Clyde T. Morita	7-23-99	D	80091
FOR COMMANDER NAVFAC		CONSTR CONTR NO N62766-98-C-0204	
SCALE 1:50	SPEC 41-98-0204	SHEET 10 OF 32	



MATCH LINE FOR CONTINUATION SEE SHEET C-8



MATCH LINE FOR CONTINUATION SEE SHEET C-6

MATCH LINE FOR CONTINUATION SEE SHEET C-10

# RECORD DRAWING

DATE OF ISSUE 06-08-01

### NOTES:

- CONTRACTOR TO VERIFY LOCATION AND DEPTH OF ALL UTILITIES PRIOR TO CONSTRUCTION



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C-9

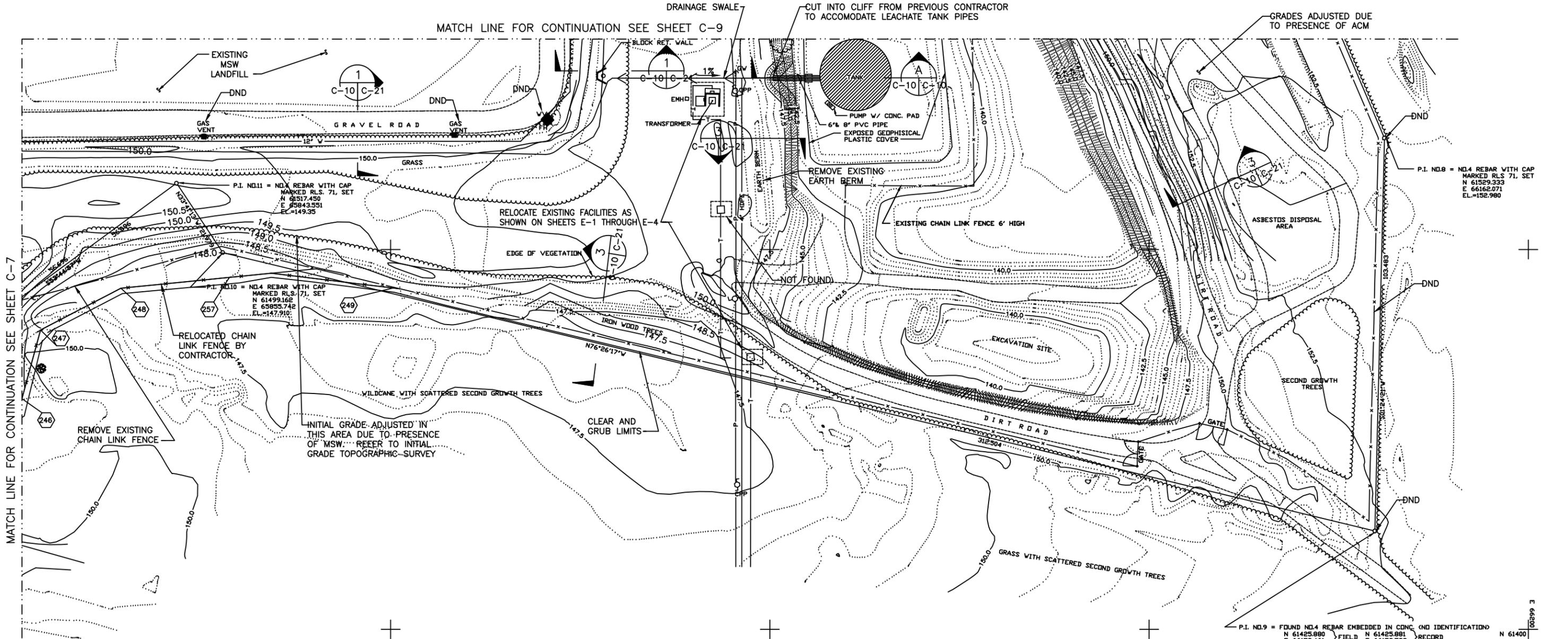
SATISFACTORY TO \_\_\_\_\_ DATE \_\_\_\_\_

TITLE \_\_\_\_\_

### REVISIONS

LTR	DESCRIPTION	DATE	APPROVED
	AS-BUILT CONDITIONS SHOWN	4-20-01	

<b>BLACK &amp; VEATCH</b> SPECIAL PROJECTS CORP.		DEPARTMENT OF THE NAVY NAVY FACILITIES ENGINEERING COMMAND	
DES REF DR KAP CHK WRW		PACIFIC DIVISION MAKALAPA, HAWAII	
SUPV DHS	CH ENG HMF	ANDERSEN AFB	FY00 MILCON AJJY971614 LANDFILL CAP
SUBMITTED BY HENRY M. FOOTE		DATE 7-15-99	GUAM, MI
FIRM MEMBER (TITLE)		INITIAL GRADING PLAN 5	
PACDIV NFEC: RVD_KWH BR MGR_MIT	DFPE JRC PDE_KWH INBM_MIT	DIR M. TSUTAHARA	SIZE CODE IDENT NO
APPROVED	DATE	NAVAC DRAWING NO	7941674
Clyde T. Morta	7-23-99	CONSTR CONTR NO	N62766-98-C-0204
FOR COMMANDER NAVAC	SCALE 1:50	SPEC	41-98-0204
		SHEET	11 OF 32



MATCH LINE FOR CONTINUATION SEE SHEET C-7

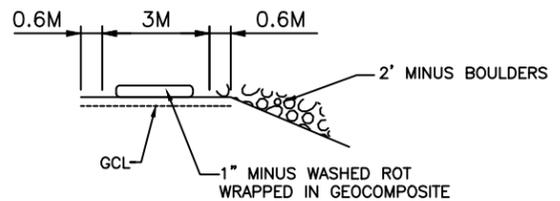
MATCH LINE FOR CONTINUATION SEE SHEET C-9

# RECORD DRAWING

DATE OF ISSUE 06-08-01

**NOTES:**

- CONTRACTOR TO VERIFY LOCATION AND DEPTH OF ALL UTILITIES PRIOR TO CONSTRUCTION



SECTION A  
SCALE: NTS  
C-10 | C-10



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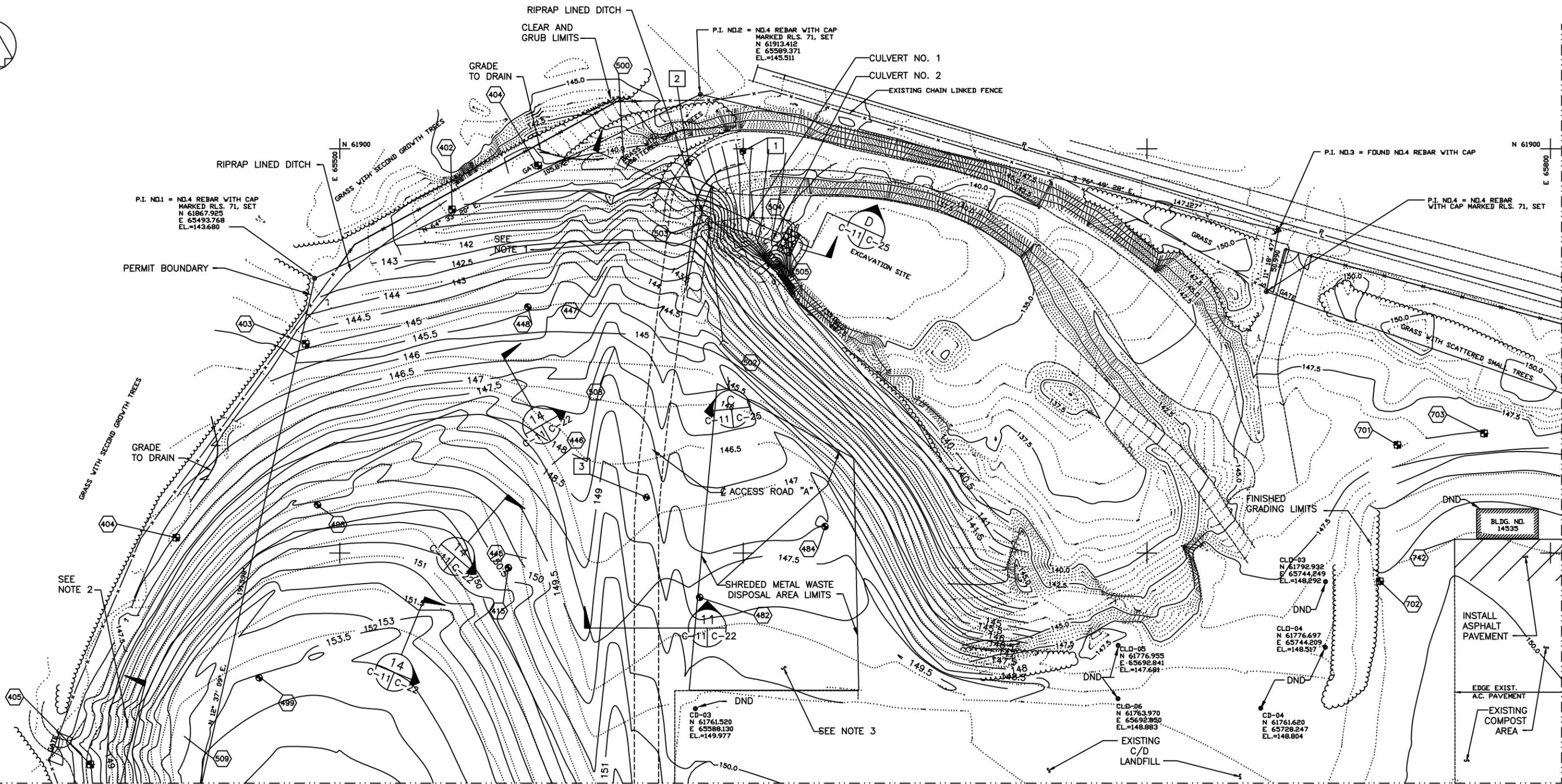
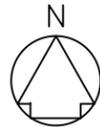
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C-10  
SATISFACTORY TO \_\_\_\_\_ DATE \_\_\_\_\_  
TITLE \_\_\_\_\_

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED
	AS-BUILT CONDITIONS SHOWN	4-20-01	

		DEPARTMENT OF THE NAVY NAVY FACILITIES ENGINEERING COMMAND <b>PACIFIC DIVISION</b> MAKALAPA, HAWAII	
DES REF	DR KAP	CHK WRW	
SUPV DHS	CH ENG HMF		
SUBMITTED BY HENRY M. FOOTE		DATE 7-15-99	
FIRM MEMBER (TITLE)			
PACDIV NFEC: RVD_KWH BR MGR MIT			
DFPE JRC PDE_KWH INBM MIT			
DIR M. TSUTAHARA			
APPROVED	DATE		
Clyde T. Morta	7-23-99		
FOR COMMANDER NAVFAC		SIZE D	CODE IDENT NO 80091
		NAVFAC DRAWING NO 7941675	
		CONSTR CONTR NO N62766-98-C-0204	
		SCALE 1:50	SPEC 41-98-0204
		SHEET 12 OF 32	



MATCH LINE FOR CONTINUATION SEE SHEET C-14

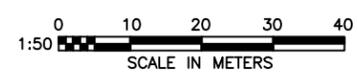
MATCH LINE FOR CONTINUATION SEE SHEET C-12

# RECORD DRAWING

DATE OF ISSUE 06-08-01

- NOTES:**
- TYPE I RIPRAP IN CHANNEL NOT SHOWN FOR CLARITY. CONTINUE RIPRAP TO TERMINATE AT FIELD BOX.
  - TYPE I RIPRAP IN CHANNEL NOT SHOWN FOR CLARITY.
  - FINAL GRADE ADJUSTED TO 0.6M ABOVE INITIAL GRADE PLUS BERMS AND ROADS.

P.I. NO.	COORDINATES		CURVE DATA AND STATIONING						
	NORTHING	EASTING	R	T	L	Δ	PC	PI	PT
1	61899.37	65599.87	-	-	-	-	-	-	-
2	61896.68	65586.44							
3	61813.78	65575.98							



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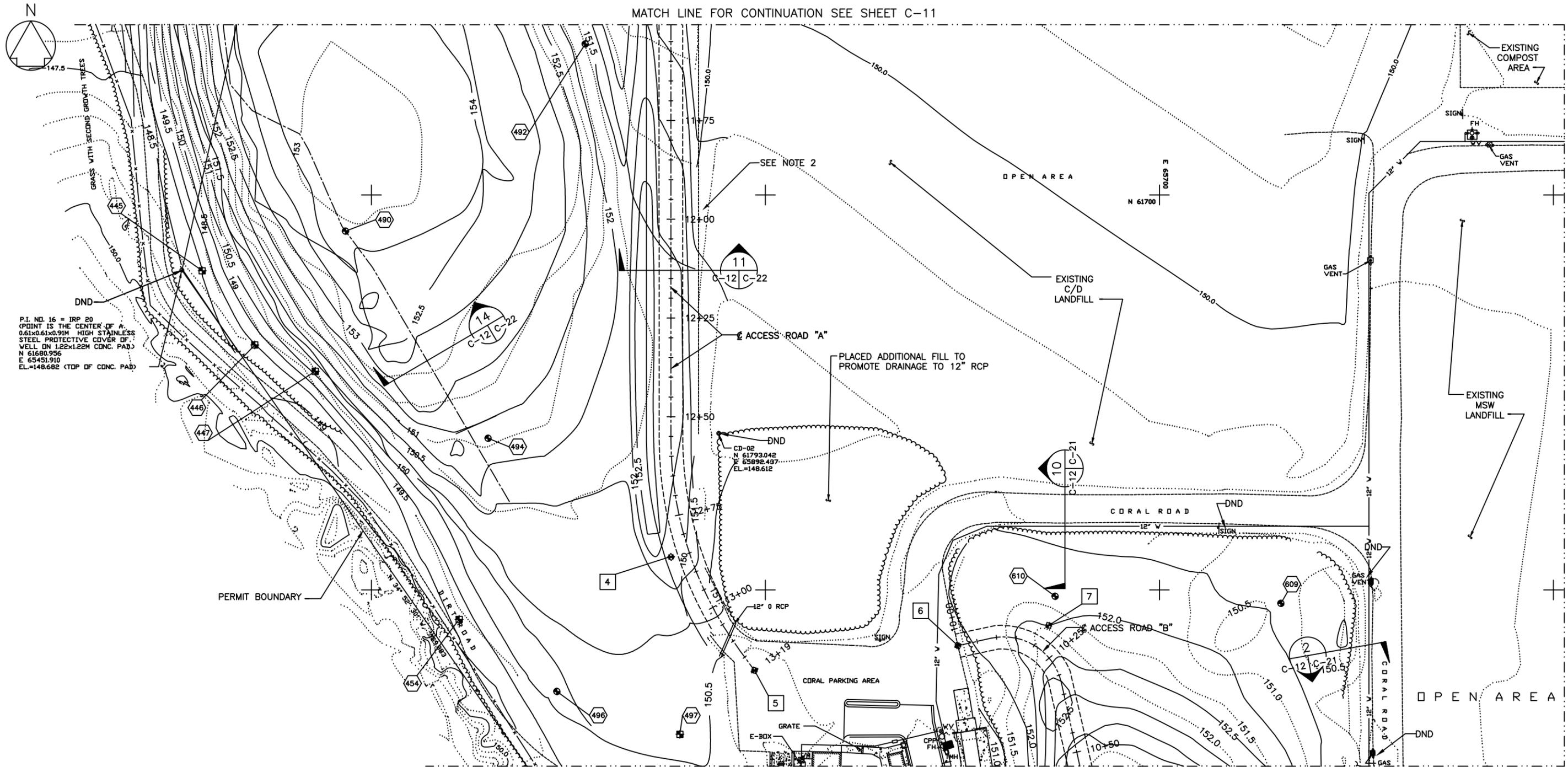
C-11 SATISFACTORY TO DATE TITLE

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED
	AS-BUILT CONDITIONS SHOWN	4-20-01	

<b>BLACK &amp; VEATCH</b> SPECIAL PROJECTS CORP.		DEPARTMENT OF THE NAVY NAVY FACILITIES ENGINEERING COMMAND <b>PACIFIC DIVISION</b> MAKALAPA, HAWAII	
DES MWS	DR KAP	CHK WRW	
SUPV DHS	CH ENG HMF		
SUBMITTED BY <b>HENRY M. FOOTE</b>		DATE	
FIRM MEMBER (TITLE)		7-15-99	
PACDIV NFEC: RVD_KWH BR MGR_MIT			
DFPE JRC PDE_KWH INSM_MIT			
DIR M. TSUTAHARA			
APPROVED <b>CLYDE T. MORTA</b>		DATE	
FOR COMMANDER NAVFAC		7-23-99	
SIZE	CODE IDENT NO	NAVFAC DRAWING NO	
D	80091	7941676	
SCALE	SPEC	CONSTR CONTR NO	
1:50	41-98-0204	N62766-98-C-0204	
		SHEET	13 OF 32

MATCH LINE FOR CONTINUATION SEE SHEET C-11



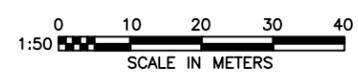
MATCH LINE FOR CONTINUATION SEE SHEET C-13

# RECORD DRAWING

DATE OF ISSUE 06-08-01

- NOTES:**
- CONTRACTOR TO VERIFY LOCATION AND DEPTH OF ALL UTILITIES PRIOR TO CONSTRUCTION.
  - FINAL GRADE ADJUSTED TO 0.6M ABOVE INITIAL GRADE PLUS BERMS AND ROADS.

P.I. NO.	COORDINATES		CURVE DATA AND STATIONING						
	NORTHING	EASTING	R	T	L	Δ	PC	PI	PT
4	61608.35	65576.05	-	-	-	-	-	-	-
5	61579.60	65597.25	-	-	-	-	-	-	-
6	61586.32	65655.95	-	-	-	-	-	10+00.00	-
7	61591.03	56671.22	15	16.06	23.84	91°03'03.58"	10+20.08	10+36.14	10+43.92



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C-12 SATISFACTORY TO DATE

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED
	AS-BUILT CONDITIONS SHOWN	4-20-01	

<b>BLACK &amp; VEATCH</b> SPECIAL PROJECTS CORP.		DEPARTMENT OF THE NAVY NAVY FACILITIES ENGINEERING COMMAND <b>PACIFIC DIVISION</b> MAKALAPA, HAWAII	
DES MWS	DR KAP	CHK WRW	
SUPV DHS	CH ENG HMF		
SUBMITTED BY <b>HENRY M. FOOTE</b>		DATE 7-15-99	
FIRM MEMBER (TITLE)			
PACDIV NFEC: RVD_KWH BR MGR_MIT		NAVFAC DRAWING NO 7941677	
DPPE JRC PDE_KWH INBM_MIT		CONSTR CONTR NO N62766-98-C-0204	
DIR M. TSUTAHARA		SHEET 14 OF 32	
APPROVED <b>CLYDE T. MORTA</b>		DATE 7-23-99	
FOR COMMANDER NAVFAC		SPEC 41-98-0204	

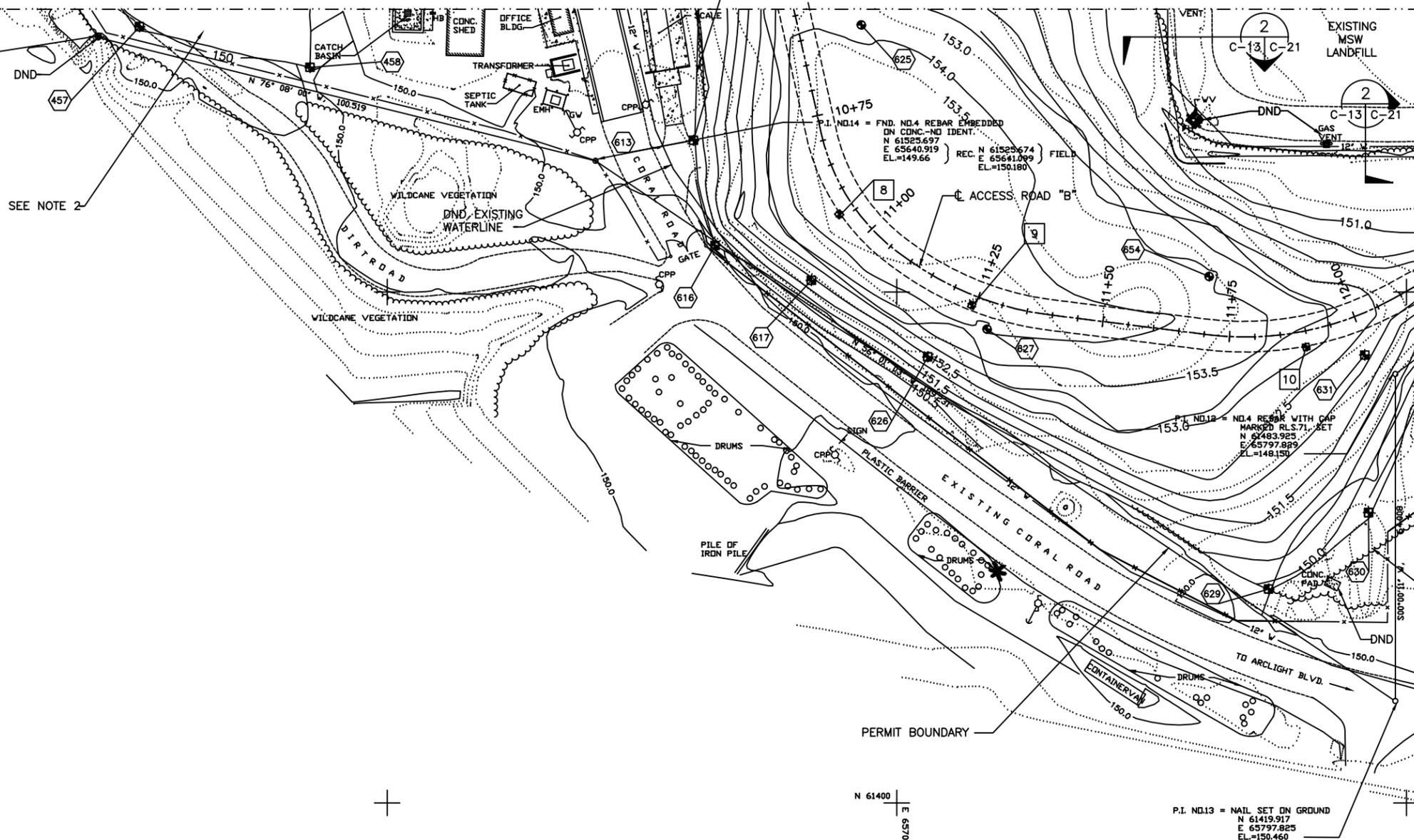


MATCH LINE FOR CONTINUATION SEE SHEET C-12

NEW EDGE OF COVER

P.I. NO.15 = NO.4 REBAR W/ PLASTIC CAP  
 MARKED RLS. 71 SET  
 N 61549.787  
 E 65543.329  
 EL.=149.66

SEE NOTE 2



MATCH LINE FOR CONTINUATION SEE SHEET C-16

CLEAR AND GRUB LIMITS

N 61400  
 E 65700

P.I. NO.13 = NAIL SET ON GROUND  
 N 61419.917  
 E 65797.825  
 EL.=150.460

- NOTES:**
- CONTRACTOR TO VERIFY LOCATION AND DEPTH OF ALL UTILITIES PRIOR TO CONSTRUCTION.
  - FINAL GRADE ADJUSTED TO 0.6M ABOVE INITIAL GRADE PLUS BERMS AND ROADS.

P.I. NO.	COORDINATES		CURVE DATA AND STATIONING						
	NORTHING	EASTING	R	T	L	$\Delta$	PC	PI	PT
8	61576.46	65674.95	40	18.60	34.87	49°57'13.29"	10+92.58	11+11.38	11+27.45
9	61500.14	65714.26	60	9.19	20.58	19°38'55.43"	11+34.23	11+43.92	11+54.81
10	61494.50	65733.95	60	6.70	13.30	12°42'03.55"	11+70.92	11+77.62	11+84.22
10A	61493.21	65781.54	60	10.81	21.34	20°22'29.90"	11+91.89	12+02.70	12+13.23

# RECORD DRAWING

DATE OF ISSUE 06-08-01



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IF SHEET IS LESS THAN (22" X 34") IT IS A REDUCED PRINT - SCALE REDUCED ACCORDINGLY

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED
	AS-BUILT CONDITIONS SHOWN	4-20-01	

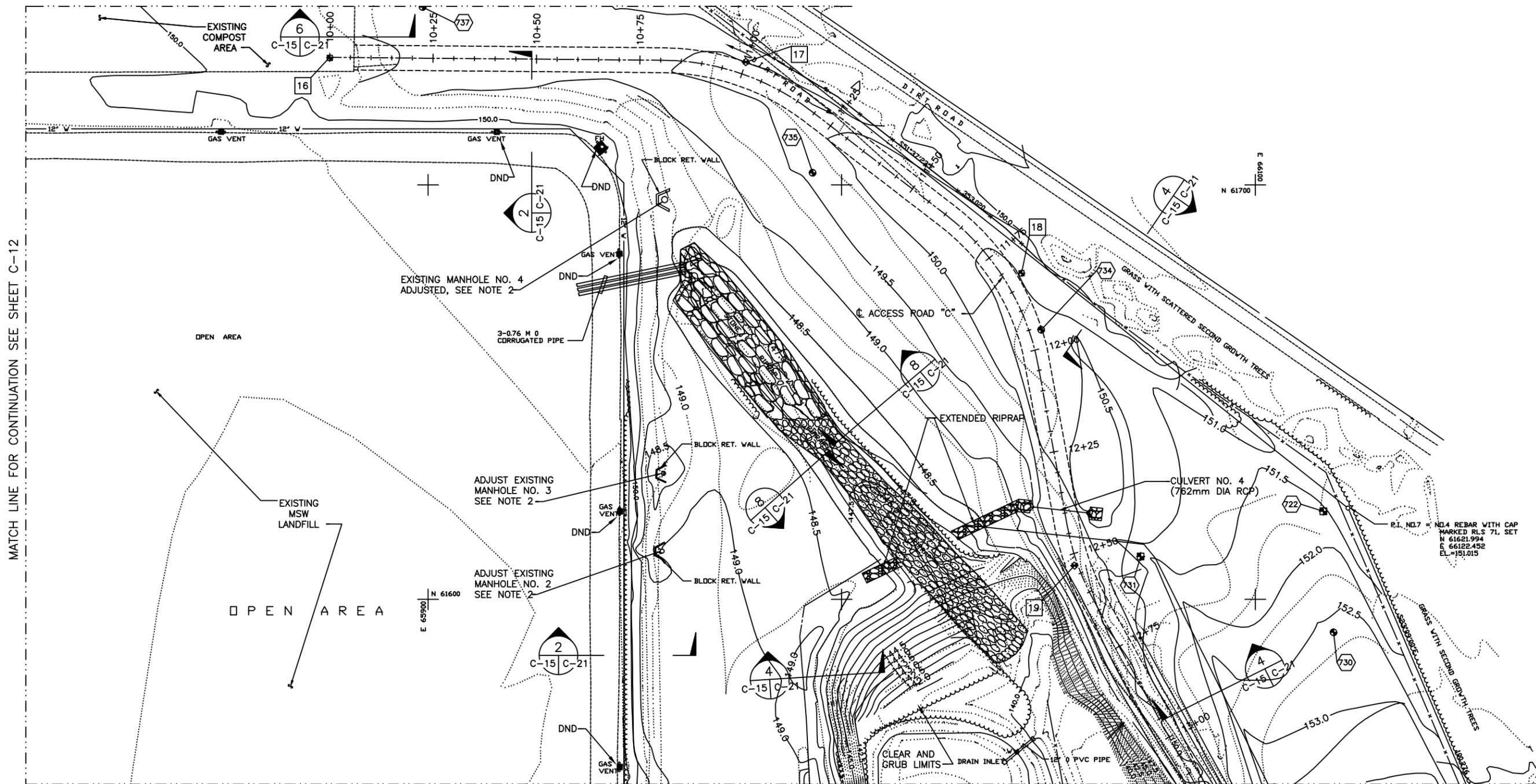
<b>BLACK &amp; VEATCH</b> SPECIAL PROJECTS CORP.		DEPARTMENT OF THE NAVY NAVY FACILITIES ENGINEERING COMMAND <b>MAKALAPA DIVISION</b> MAKALAPA, HAWAII	
DES REF	DR KAP	CHK WRW	
SUPV DHS	CH ENG HMF		
SUBMITTED BY HENRY M. FOOTE		DATE 7-15-99	
FIRM MEMBER (TITLE)			
PACDIV NFEC: RVD_KWH BR MGR MIT			
DFPE JRC PDE KWH INBW MIT			
DIR M. TSUTAHARA			
APPROVED	DATE 7-23-99		
CLYDE T. MORTA			
FOR COMMANDER NAVFAC			
SIZE D	CODE IDENT NO 80091	NAVFAC DRAWING NO 7941678	
		CONSTR CONTR NO N62766-98-C-0204	
SCALE 1:50	SPEC 41-98-0204	SHEET 15 OF 32	

C-13 SATISFACTORY TO DATE TITLE





MATCH LINE FOR CONTINUATION SEE SHEET C-14



MATCH LINE FOR CONTINUATION SEE SHEET C-16

# RECORD DRAWING

DATE OF ISSUE 06-08-01

### NOTES:

- CONTRACTOR TO VERIFY LOCATION AND DEPTH OF ALL UTILITIES PRIOR TO CONSTRUCTION.
- BLOCK RETAINING WALLS AROUND ALL MANHOLES THAT WERE ADJUSTED, WERE DEMOLISHED.

P.I. NO.	COORDINATES		CURVE DATA AND STATIONING						
	NORTHING	EASTING	R	T	L	Δ	PC	PI	PT
16	61730.76	65876.23	-	-	-	-	-	-	-
17	61729.90	65976.96	-	-	-	-	-	-	-
18	61678.68	66043.51	-	-	-	-	-	-	-
19	61608.15	66056.28	-	-	-	-	-	-	-



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IF SHEET IS LESS THAN (22" X 34") IT IS A REDUCED PRINT - SCALE REDUCED ACCORDINGLY

C-15

SATISFACTORY TO DATE TITLE

### REVISIONS

LTR	DESCRIPTION	DATE	APPROVED
	AS-BUILT CONDITIONS SHOWN	4-20-01	

DEPARTMENT OF THE NAVY NAVY FACILITIES ENGINEERING COMMAND  
**PACIFIC DIVISION**  
 MAKALAPA, HAWAII

ANDERSEN AFB FY00 MILCON AJJ971614 LANDFILL CAP GUAM, MI

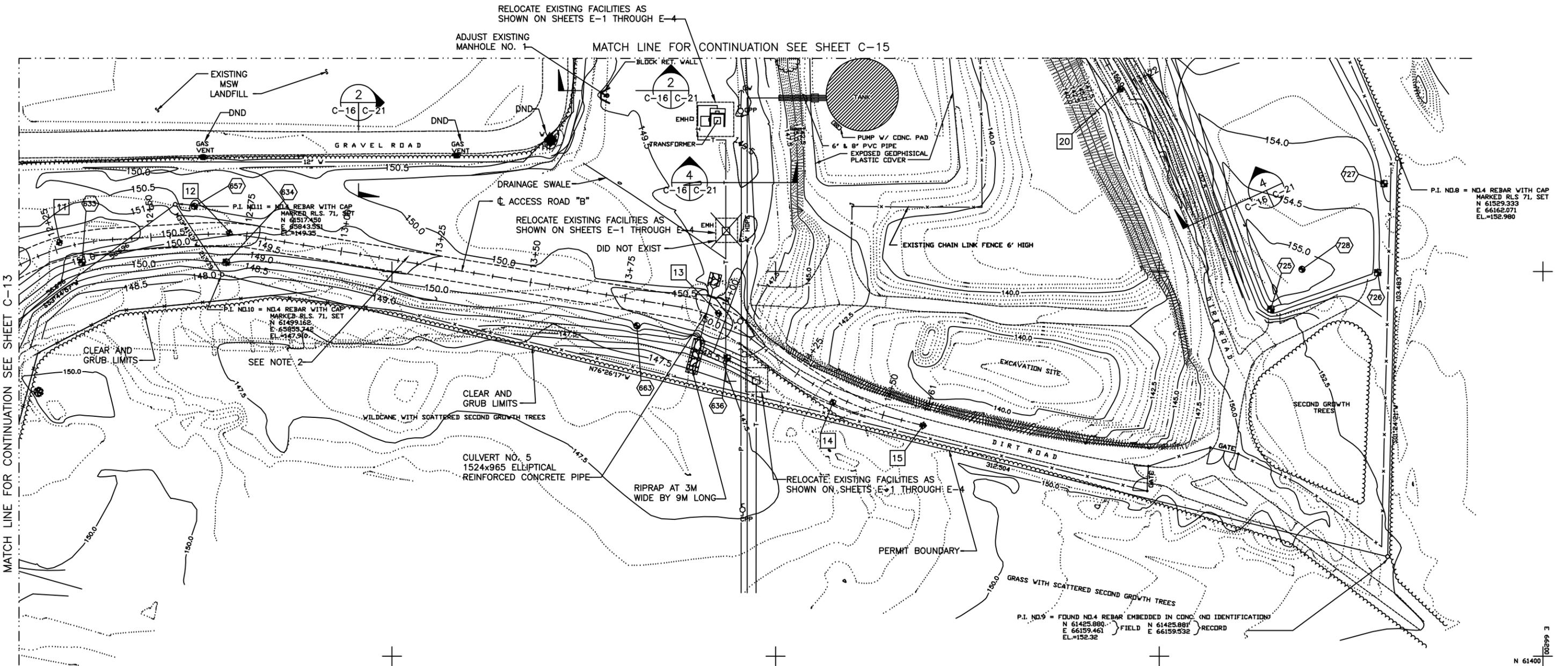
FINISH GRADING PLAN 5

SIZE CODE IDENT NO NAVFAC DRAWING NO  
 D 80091 7941680

CONSTR CONTR NO N62766-98-C-0204

APPROVED DATE  
 CLYDE T. MORTA 7-23-99  
 FOR COMMANDER NAVFAC

SCALE 1:50 SPEC 41-98-0204 SHEET 17 OF 32

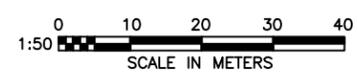


MATCH LINE FOR CONTINUATION SEE SHEET C-13

E 668200  
N 61400

- NOTES:**
- CONTRACTOR TO VERIFY LOCATION AND DEPTH OF ALL UTILITIES PRIOR TO CONSTRUCTION.
  - FINAL GRADE ADJUSTED TO 0.6M ABOVE INITIAL GRADE PLUS BERMS AND ROADS.

P.I. NO.	COORDINATES		CURVE DATA AND STATIONING						
	NORTHING	EASTING	R	T	L	$\Delta$	PC	PI	PT
11	61506.86	65810.95	60	6.63	13.31	12°42'35.83"	12+28.28	12+34.91	12+41.59
12	61512.55	65837.21	90	14.33	30.83	19°37'39.06"	12+42.69	12+57.02	12+73.52
13	61489.23	65980.54	60	13.85	25.93	24°45'56.42"	12+97.78	14+06.63	14+18.71
14	61469.22	66008.73	60	7.35	11.30	10°48'15.00"	14+33.87	14+41.22	14+45.17
15	61461.19	66033.22	-	-	-	-	-	14+66.89	-
20	61547.36	66089.93	-	-	-	-	-	13+22.17	-



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C-16

SATISFACTORY TO \_\_\_\_\_ DATE \_\_\_\_\_

TITLE \_\_\_\_\_

# RECORD DRAWING

DATE OF ISSUE 06-08-01

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED
	AS-BUILT CONDITIONS SHOWN	4-20-01	

DEPARTMENT OF THE NAVY NAVY FACILITIES ENGINEERING COMMAND  
PACIFIC DIVISION  
MAKALAPA, HAWAII

ANDERSEN AFB FY00 MILCON AJY971614 LANDFILL CAP GUAM, MI

FINISH GRADING PLAN 6

SIZE CODE IDENT NO NAVFAC DRAWING NO  
D 80091 7941681

CONSTR CONTR NO N62766-98-C-0204

APPROVED DATE  
CLYDE T. MORTA 7-23-99  
FOR COMMANDER NAVFAC

SCALE 1:50 SPEC 41-98-0204 SHEET 18 OF 32



WEST FINISHED GRADE SURVEY CONTROL POINTS				
POINT	NORTHING	EASTING	ELEVATION	REMARKS
401	61895.83	65549.17	140.53	MONUMENT ASSEMBLY, X=13
402	61885.02	65527.83	142.11	MONUMENT ASSEMBLY, X=14
403	61851.75	65491.57	145.02	MONUMENT ASSEMBLY, X=15
404	61803.82	65459.48	147.17	MONUMENT ASSEMBLY, X=16
405	61747.73	65438.22	147.69	MONUMENT ASSEMBLY, X=17
415	61796.37	65541.79	150.41	VENT ASSEMBLY
418	61872.05	65553.68	145.61	VENT ASSEMBLY
445	61680.79	65457.07	149.01	MONUMENT ASSEMBLY, X=18
446	61662.02	65470.41	149.49	MONUMENT ASSEMBLY, X=19
447	61655.35	65485.75	150.65	MONUMENT ASSEMBLY, X=20
448	61860.84	65546.63	145.45	VENT ASSEMBLY
454	61592.55	65522.28	149.31	MONUMENT ASSEMBLY, X=21
457	61551.95	65551.40	150.13	MONUMENT ASSEMBLY, X=22
458	61543.98	65584.87	150.34	MONUMENT ASSEMBLY, X=23
471	61783.00	65474.50	152.94	BERM CENTERLINE
481	61822.13	65613.89	147.83	VENT ASSEMBLY
482	61789.04	65589.21	149.75	VENT ASSEMBLY
484	61806.56	65620.24	148.60	VENT ASSEMBLY
490	61690.82	65493.43	154.18	VENT ASSEMBLY
492	61738.19	65554.27	151.70	VENT ASSEMBLY
494	61638.39	65529.63	152.33	VENT ASSEMBLY
496	61574.29	65547.09	150.71	VENT ASSEMBLY
497	61563.46	65578.30	150.73	MONUMENT ASSEMBLY, X=24
498	61811.94	65488.03	150.85	VENT ASSEMBLY
499	61769.41	65473.54	153.17	VENT ASSEMBLY
500	61896.58	65570.39	-	FIELD BOX LOCATION POINT
502	61886.27	65588.21	-	CULVERT LOCATION POINT
503	61881.86	65590.43	-	MANHOLE LOCATION POINT
504	61881.04	65611.88	-	CULVERT LOCATION POINT
505	61877.05	65610.56	-	CULVERT LOCATION POINT
508	61850.81	65568.15	146.75	BEGIN TYPE I RIPRAP IN DITCH, SEE SHEET C-22 SECTION 12
509	61754.7	65461.45	152.00	BEGIN TYPE I RIPRAP IN DITCH, SEE SHEET C-22 SECTION 12
510	61760.61	65437.46	146.82	END TYPE I RIPRAP IN DITCH, SEE SHEET C-22 SECTION 12

SOUTH FINISHED GRADE SURVEY CONTROL POINTS				
POINT	NORTHING	EASTING	ELEVATION	REMARKS
609	61596.60	65730.83	151.46	VENT ASSEMBLY
610	61598.40	65673.53	151.80	VENT ASSEMBLY
613	61529.71	65660.12	150.64	MONUMENT ASSEMBLY, X=26
616	61509.12	65664.34	150.21	MONUMENT ASSEMBLY, X=27
617	61502.28	65683.24	152.33	MONUMENT ASSEMBLY, X=28
625	61552.29	65693.06	153.91	VENT ASSEMBLY
626	61487.31	65706.09	152.34	MONUMENT ASSEMBLY, X=29
627	61492.71	65717.73	154.01	VENT ASSEMBLY
629	61441.87	65772.98	149.79	MONUMENT ASSEMBLY, X=30
630	61456.82	65792.58	149.50	MONUMENT ASSEMBLY, X=31
631	61487.68	65791.84	152.03	MONUMENT ASSEMBLY, X=32
633	61502.40	65819.23	150.59	MONUMENT ASSEMBLY, X=33
634	61502.13	65856.81	149.76	MONUMENT ASSEMBLY, X=34
636	61477.49	65987.36	149.14	MONUMENT ASSEMBLY, X=35
654	61503.02	65761.30	153.56	VENT ASSEMBLY
657	61516.91	65848.51	150.55	VENT ASSEMBLY
663	61485.87	65963.87	150.04	VENT ASSEMBLY

EAST FINISHED GRADE SURVEY CONTROL POINTS				
POINT	NORTHING	EASTING	ELEVATION	REMARKS
701	61826.75	65762.08	147.93	MONUMENT ASSEMBLY
702	61793.03	65757.74	149.36	MONUMENT ASSEMBLY
703	61829.60	65783.57	147.71	
704	61827.28	65809.98	148.24	MONUMENT ASSEMBLY, X=36
705	61796.90	65886.91	148.78	MONUMENT ASSEMBLY, X=37
707	61792.90	65892.24	148.69	MONUMENT ASSEMBLY, X=38
722	61621.25	66116.46	151.71	MONUMENT ASSEMBLY, X=39
725	61490.20	66129.08	154.19	MONUMENT ASSEMBLY, X=40
726	61499.72	66156.94	154.96	MONUMENT ASSEMBLY, X=41
727	61522.83	66158.58	153.39	MONUMENT ASSEMBLY, X=42
728	61500.54	66137.20	155.31	VENT ASSEMBLY
730	61592.04	66118.93	152.77	VENT ASSEMBLY
731	61609.93	66069.36	150.97	MONUMENT ASSEMBLY, X=43
734	61665.02	66048.24	150.88	VENT ASSEMBLY
735	61702.90	65992.98	149.69	VENT ASSEMBLY
737	61742.90	65898.70	149.19	VENT ASSEMBLY
741	61803.43	65883.11	-	PAVEMENT CORNER
742	61803.43	65776.23	-	PAVEMENT CORNER

# RECORD DRAWING

DATE OF ISSUE 06-08-01



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C-18

SATISFACTORY TO DATE TITLE

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED
	AS-BUILT CONDITIONS SHOWN	4-20-01	

		DEPARTMENT OF THE NAVY NAVY FACILITIES ENGINEERING COMMAND <b>PACIFIC DIVISION</b> MAKALAPA, HAWAII	
DES KAP	DR KAP	CHK WRW	
SUPV DHS	CH ENG HMF		
SUBMITTED BY HENRY M. FOOTE DATE 7-15-99 FIRM MEMBER (TITLE)		ANDERSEN AFB FY00 MILCON AJJY971614 LANDFILL CAP GUAM, MI	
PACDIV NFEC: RVD_KWH BR MGR_MIT DFPE JRC PDE_KWH INBM_MIT DIR M. TSUTAHARA		<b>FINISHED GRADE SURVEY CONTROL POINTS</b>	
APPROVED	DATE	SIZE	CODE IDENT NO
Clyde T. Morta	7-23-99	D	80091
FOR COMMANDER NAVFAC		SCALE	NONE
		SPEC	41-98-0204
		NAVFAC DRAWING NO 7941683 CONSTR CONTR NO N62766-98-C-0204 SHEET 20 OF 32	



**NOTES:**

1. MINIMUM REQUIRED TURFING LIMITS SHOWN ARE BASED ON FINISHED GRADING LIMITS PLUS 3 HORIZONTAL METERS WHERE APPLICABLE.
2. TURFING NOT REQUIRED IN RIPRAP AREAS. RIPRAP NOT SHOWN ON THIS SHEET.

**LEGEND:**



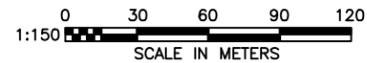
# RECORD DRAWING

DATE OF ISSUE 06-08-01



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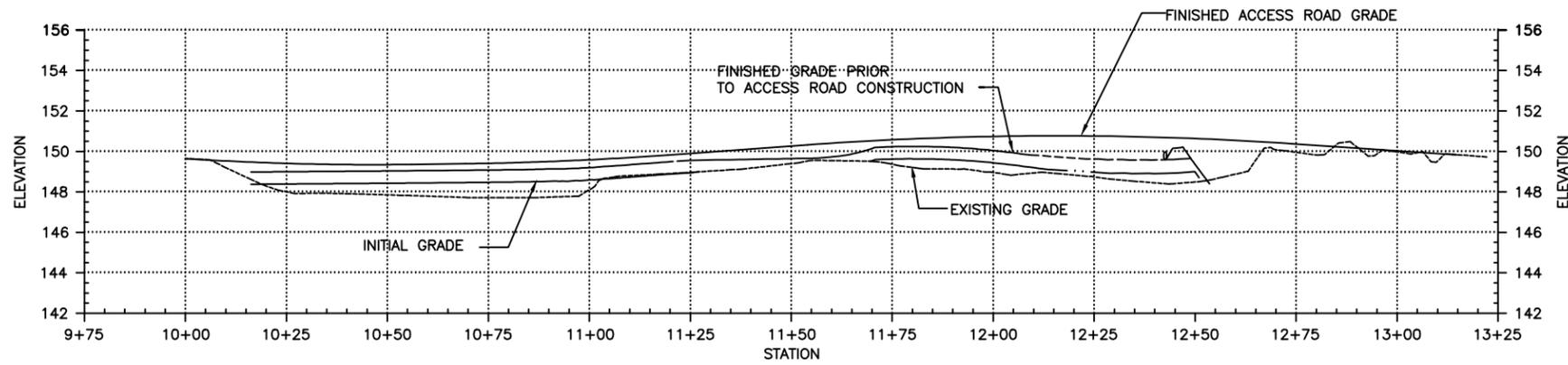
C-19

SATISFACTORY TO \_\_\_\_\_ DATE \_\_\_\_\_  
TITLE \_\_\_\_\_

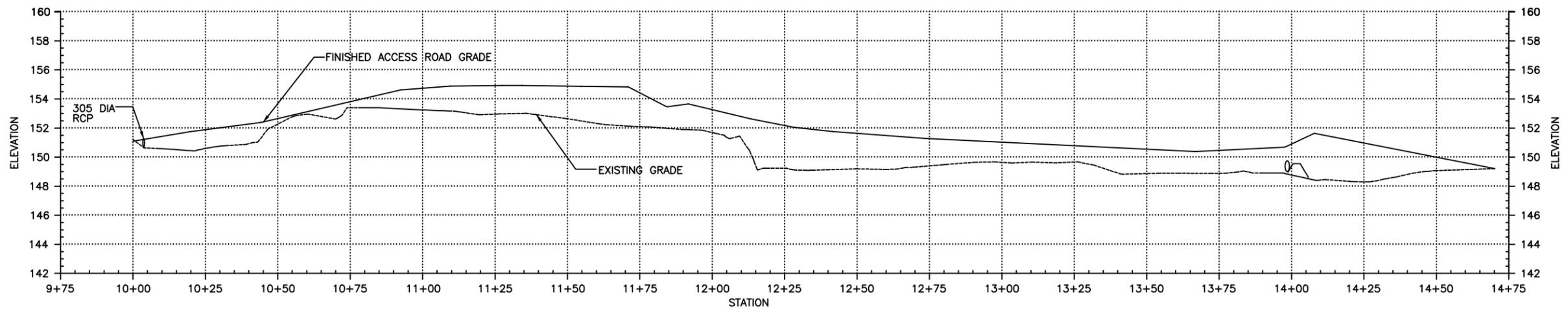
REVISIONS

LTR	DESCRIPTION	DATE	APPROVED
	AS-BUILT CONDITIONS SHOWN	4-20-01	

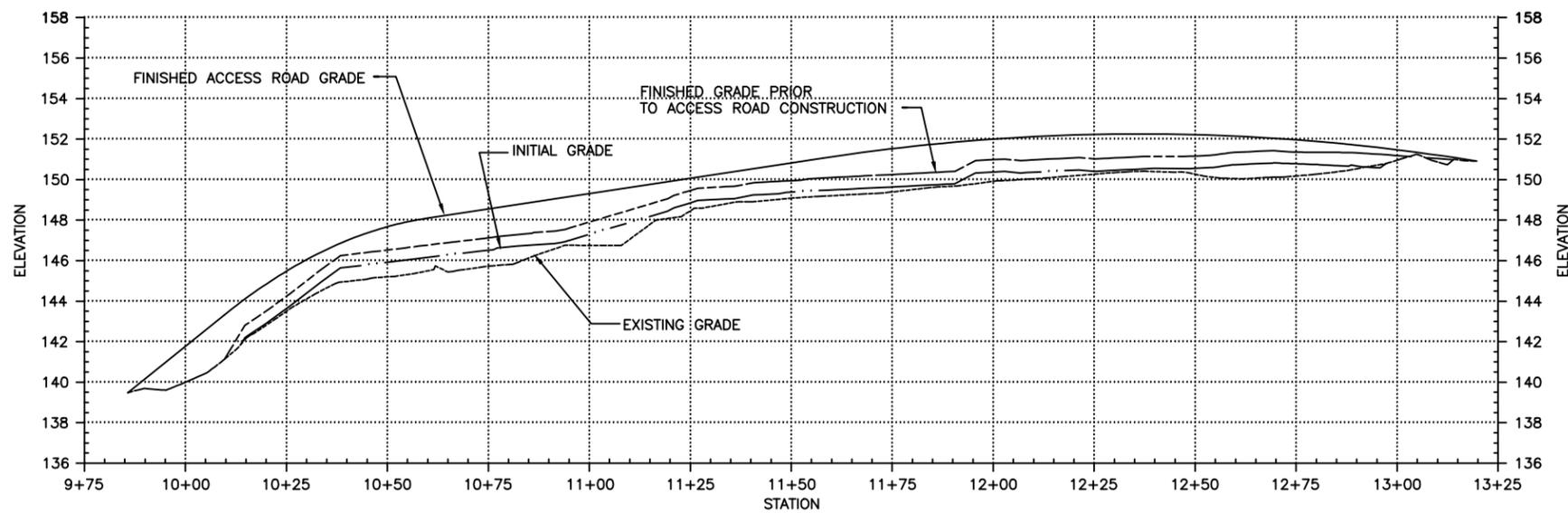
<b>BLACK &amp; VEATCH</b> SPECIAL PROJECTS CORP.		DEPARTMENT OF THE NAVY NAVY FACILITIES ENGINEERING COMMAND PACIFIC DIVISION MAKALAPA, HAWAII	
DES KAP	DR KAP	CHK WRW	
SUPV DHS	CH ENG HMF		
SUBMITTED BY HENRY M. FOOTE		DATE 7-15-99	
FIRM MEMBER (TITLE)			
PACDIV NFEC: RVD_KWH BR MGR_MIT			
DFPE JRC PDE_KWH INSM_MIT			
DIR M. TSUTAHARA			
APPROVED		DATE	
CLYDE T. MORTA		7-23-99	
FOR COMMANDER NAVFAC			
SIZE D	CODE IDENT NO 80091	NAVFAC DRAWING NO 7941684	CONSTR CONTR NO N62766-98-C-0204
SCALE 1:150	SPEC 41-98-0204	SHEET 21 OF 32	



ACCESS ROAD "C" PROFILE



ACCESS ROAD "B" PROFILE



ACCESS ROAD "A" PROFILE



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C-20

SATISFACTORY TO DATE TITLE

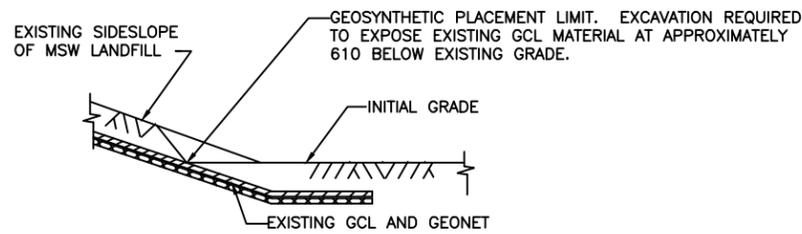
# RECORD DRAWING

DATE OF ISSUE 06-08-01

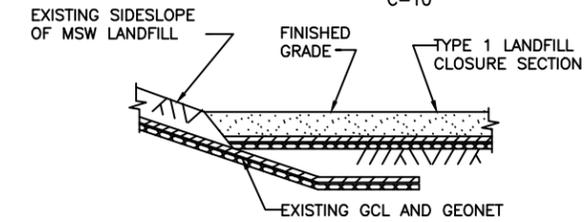
REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED
	AS-BUILT	4-20-01	

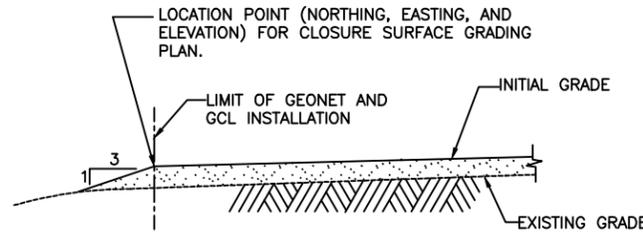
		DEPARTMENT OF THE NAVY NAVY FACILITIES ENGINEERING COMMAND <b>PACIFIC DIVISION</b> MAKALAPA, HAWAII	
DES MWS	DR KAP	CHK WRW	
SUPV DHS	CH ENG HMF		
SUBMITTED BY HENRY M. FOOTE FIRM MEMBER (TITLE)		DATE 7-15-99	
PACDIV NFEC: RVD_KWH BR MGR_MTT DFPE JRC PDE_KWH INBW_MTT DIR M. TSUTAHARA			
APPROVED CLYDE T. MORTA FOR COMMANDER NAVFAC		DATE 7-23-99	
SIZE D	CODE IDENT NO 80091	NAVFAC DRAWING NO 7941685 CONSTR CONTR NO N62766-98-C-0204	
SCALE 1:80	SPEC 41-98-0204	SHEET 22 OF 32	



SECTION 1  
SCALE: NTS  
C-6 C-21  
C-7  
C-9  
C-10

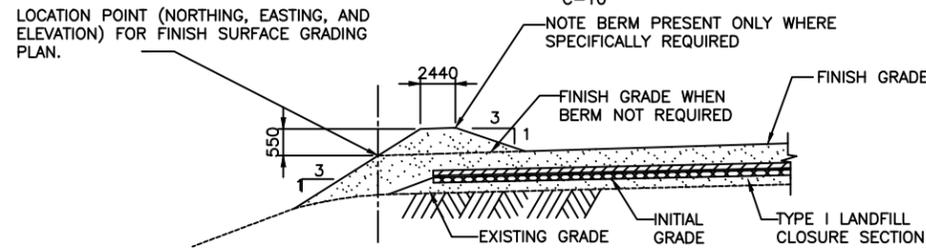


SECTION 2  
SCALE: NTS  
C-12 C-21  
C-13  
C-15  
C-16



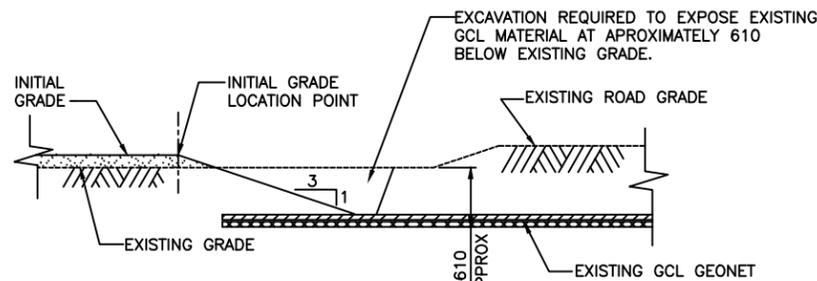
INITIAL GRADE SURVEY CONTROL DETAIL

SECTION 3  
SCALE: NTS  
C-5 C-21  
C-6  
C-7  
C-8  
C-9  
C-10

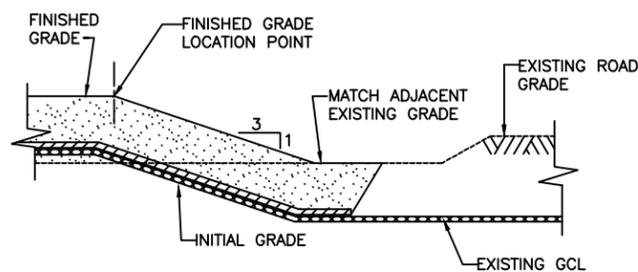


FINISHED GRADE SURVEY CONTROL DETAIL

SECTION 4  
SCALE: NTS  
C-14 C-21  
C-15  
C-16



SECTION 9  
SCALE: NTS  
C-6 C-21

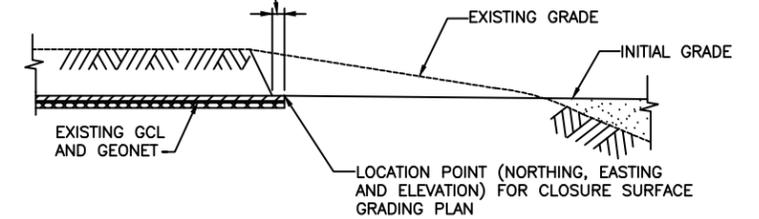


SECTION 10  
SCALE: NTS  
C-12 C-21

NOTES:

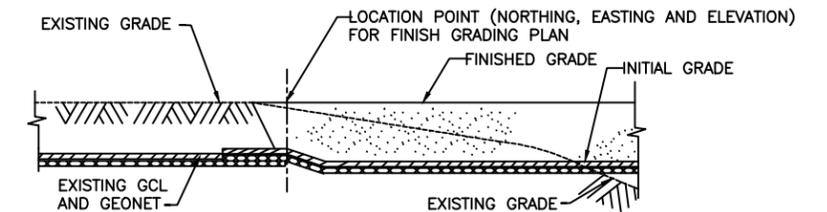
1. UNLESS NOTED OTHERWISE, DIMENSIONS ON THIS SHEET ARE IN MILLIMETERS.

EXCAVATION REQUIRED TO EXPOSE EXISTING GCL AND GEONET FOR OVERLAP WITH NEW GCL AND GEONET AT APPROXIMATELY 0.61 METER BELOW EXISTING GRADE.



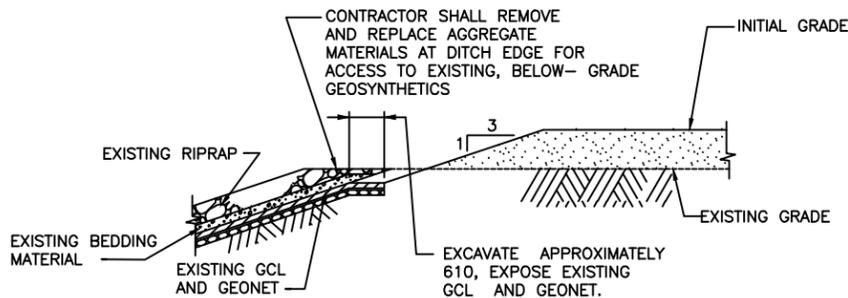
INITIAL GRADE SURVEY CONTROL DETAIL

SECTION 5  
SCALE: NTS  
C-5 C-21  
C-6  
C-8  
C-9



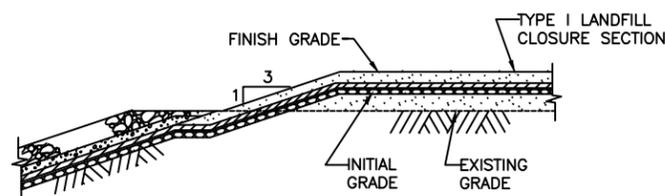
FINISHED GRADE SURVEY CONTROL DETAIL

SECTION 6  
SCALE: NTS  
C-14 C-21  
C-15



TYPICAL DITCH EDGE INITIAL GRADING

SECTION 7  
SCALE: NTS  
C-9 C-21



TYPICAL DITCH EDGE FINISH GRADING

SECTION 8  
SCALE: NTS  
C-15 C-21

RECORD DRAWING

DATE OF ISSUE 06-08-01



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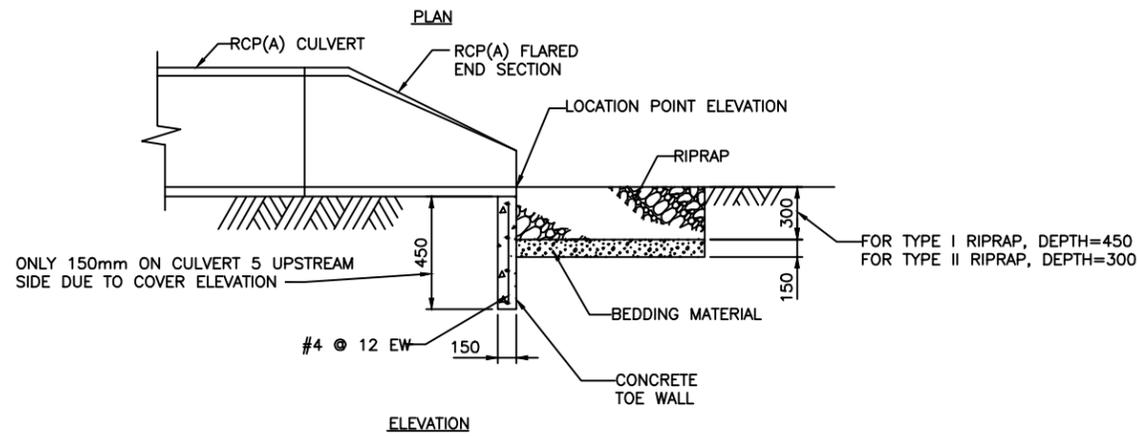
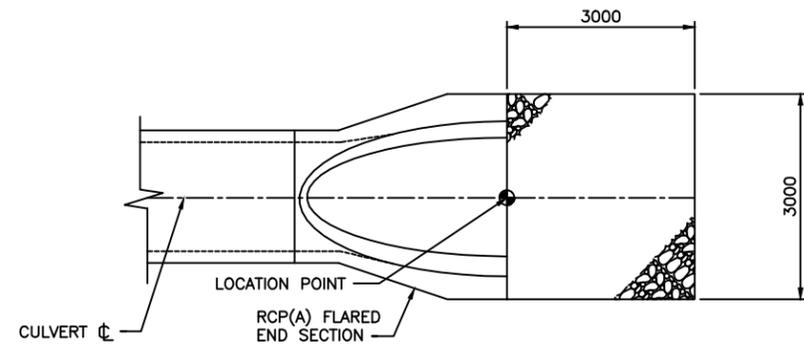
IF SHEET IS LESS THAN (22" X 34") IT IS A REDUCED PRINT - SCALE REDUCED ACCORDINGLY

C-21 SATISFACTORY TO DATE TITLE

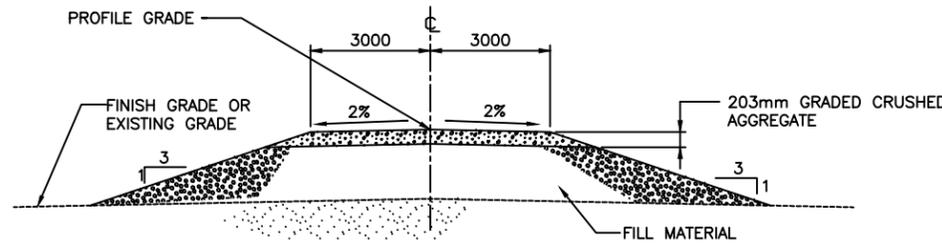
REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED
AS-BUILT		4-20-01	

<b>BLACK &amp; VEATCH</b> SPECIAL PROJECTS CORP.		DEPARTMENT OF THE NAVY NAVY FACILITIES ENGINEERING COMMAND PACIFIC DIVISION MAKALAPA, HAWAII	
DES DHS	DR SLB	CHK WRW	
SUPV DHS	CH ENG HMF		
SUBMITTED BY HENRY M. FOOTE		DATE 7-15-99	
FIRM MEMBER (TITLE)			
PACDIV NFEC: RVD_KWH BR MGR MIT			
DFPE JRC PDE_KWH INBM MIT			
DIR M. TSUTAHARA			
APPROVED	DATE	NAVFAC DRAWING NO 7941686	
CLYDE T. MORTA	7-23-99	CONSTR CONTR NO N62766-98-C-0204	
FOR COMMANDER NAVFAC		SCALE AS NOTED	SPEC 41-98-0204
		SHEET 23 OF 32	

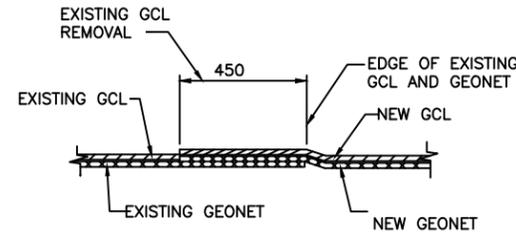
NOTES:  
1. UNLESS NOTED OTHERWISE, DIMENSIONS ON THIS SHEET ARE IN MILLIMETERS.



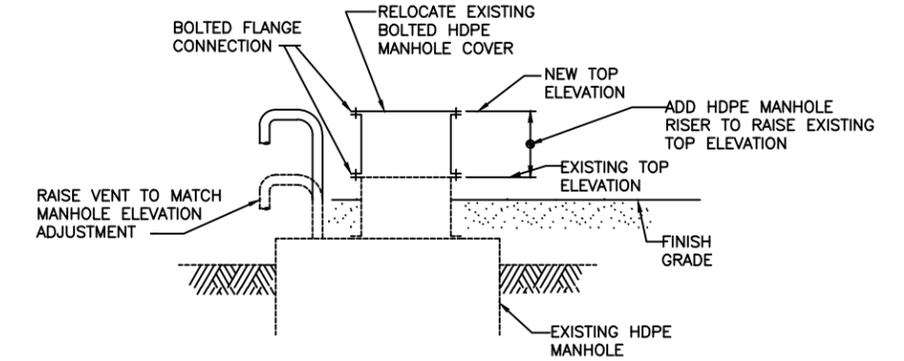
TYPICAL CULVERT LAYOUT DETAIL



TYPICAL ACCESS ROAD CROSS SECTION



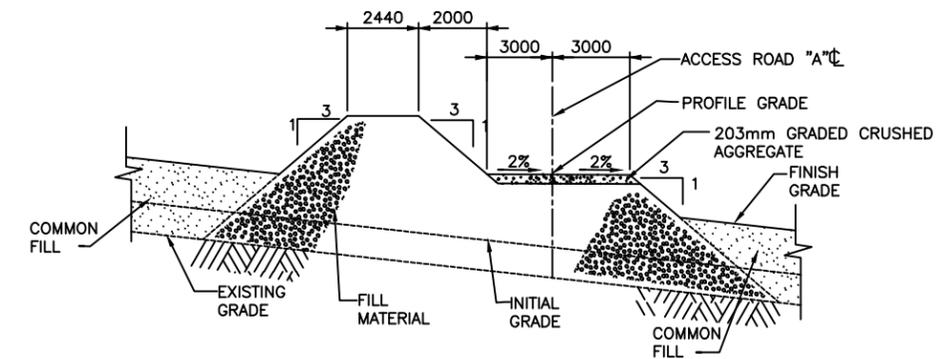
TYPICAL EXISTING/NEW GCL AND GEONET OVERLAP DETAIL



TYPICAL HDPE LEACHATE COLLECTION MANHOLE ADJUSTMENT DETAIL

MANHOLE ADJUSTMENT SCHEDULE		
NO.	EXIST. TOP ELEV.	NEW TOP ELEV.
1	148.89	149.55
2	148.87	149.30
3	149.02	149.25
4	148.05	148.20

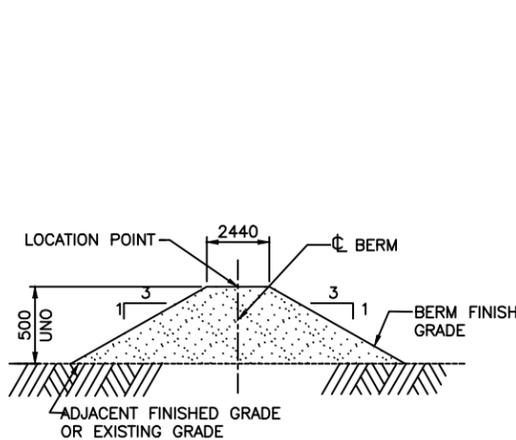
CULVERT SCHEDULE								
NO.	UPSTREAM LOCATION POINT			DOWNSTREAM LOCATION POINT			L	REMARKS
	NORTHING	EASTING	ELEVATION	NORTHING	EASTING	ELEVATION		
1	—	—	—	—	—	—	—	PROFILE ON SHEET C-25, SECTION D. HORIZONTAL CONTROL POINTS ON SHEET C-18.
2	—	—	—	—	—	—	—	PROFILE ON SHEET C-25, SECTION C. HORIZONTAL CONTROL POINTS ON SHEET C-18.
3	61592.20	65650.60	150.63	61581.10	65653.20	150.57	11.40	NO RIPRAP REQUIRED.
4	61620.98	66059.29	149.89	61622.11	66042.14	148.04	17.19	
5	61493.54	65983.46	149.36	61483.08	65979.30	148.89	16.14	



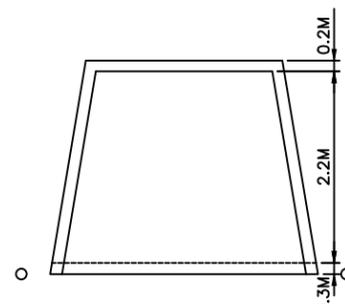
SECTION 11  
SCALE: NTS

**RECORD DRAWING**

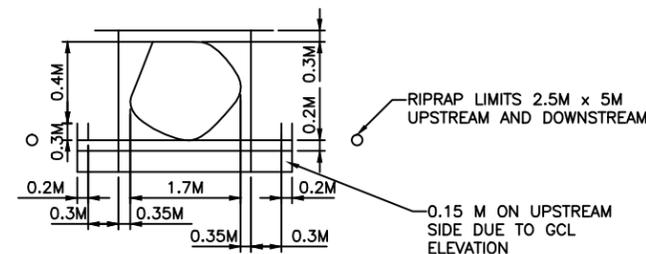
DATE OF ISSUE 06-08-01



SECTION 14  
SCALE: NTS



SECTION 12  
SCALE: NTS



RIPRAP LIMITS 2.5M x 5M  
UPSTREAM AND DOWNSTREAM  
0.15 M ON UPSTREAM  
SIDE DUE TO GCL  
ELEVATION



THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

THE CONTRACTOR WILL BE RESPONSIBLE FOR COORDINATING THE WORK AMONG THE VARIOUS TRADES AND TO INSURE THE INSTALLATION OF ALL WORK WITHIN THE AVAILABLE SPACE.

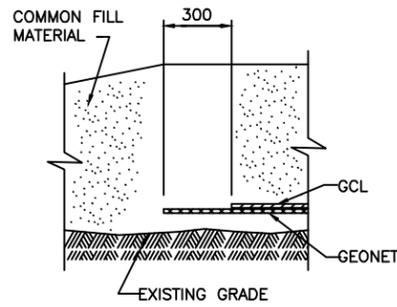
IF SHEET IS LESS THAN (22" x 34") IT IS A REDUCED PRINT - SCALE REDUCED ACCORDINGLY

C-22

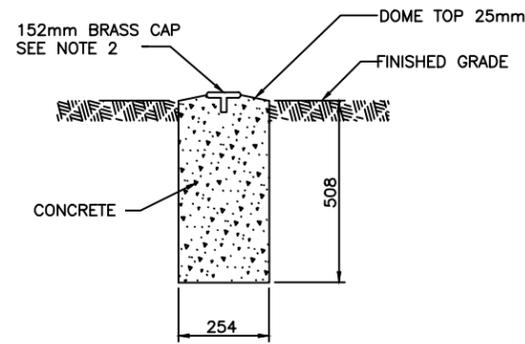
SATISFACTORY TO DATE TITLE

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED
	AS-BUILT CONDITIONS SHOWN	4-20-01	

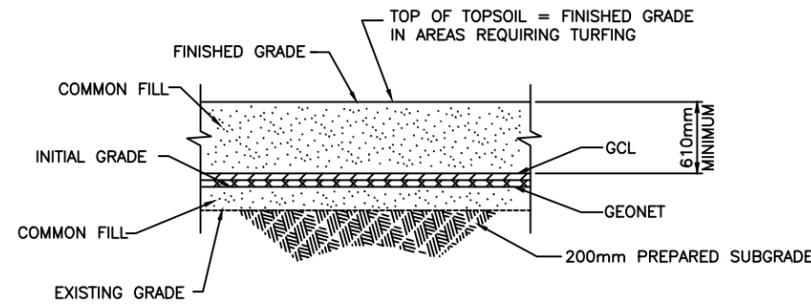
BLACK & VEATCH SPECIAL PROJECTS CORP.		DEPARTMENT OF THE NAVY NAVY FACILITIES ENGINEERING COMMAND	
SUBMITTED BY HENRY M. FOOTE DATE 7-15-99		PACIFIC DIVISION MAKALAPA, HAWAII	
FIRM MEMBER (TITLE)		ANDERSEN AFB FY00 MILCON AJJY971614 LANDFILL CAP	
PACDIV NPEC: RVD_KWH BR MGR_MIT		MISCELLANEOUS EARTHWORK DETAILS SHEET 2 OF 3	
DPE JRC PDE_KWH INBW_MIT		SIZE D	CODE IDENT NO 80091
DIR M. TSUTAHARA		NAVFAC DRAWING NO 7941687	
APPROVED	DATE 7-23-99	CONSTR CONTR NO N62766-98-C-0204	
Clyde T. Morta	FOR COMMANDER NAVFAC	SCALE AS NOTED	SPEC 41-98-0204
		SHEET 24 OF 32	



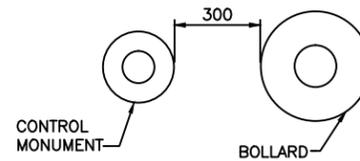
TYPICAL GEOSYNTHETIC TERMINATION DETAIL  
SCALE: NTS



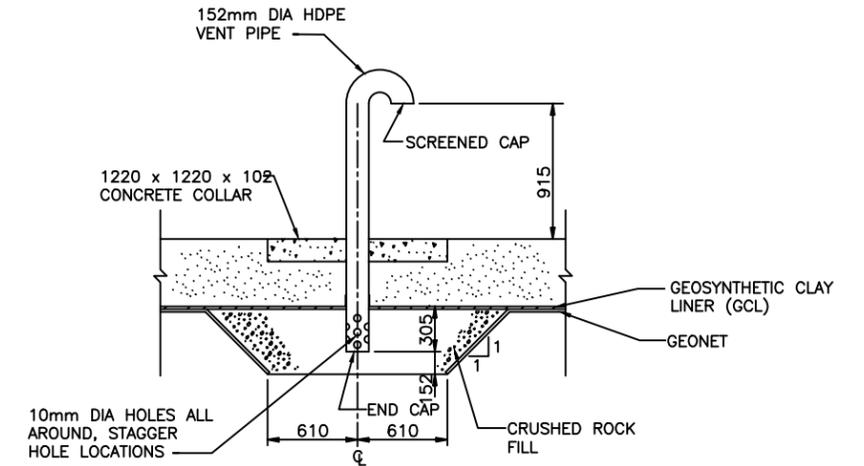
CONTROL MONUMENT TYPICAL DETAIL  
SCALE: NTS



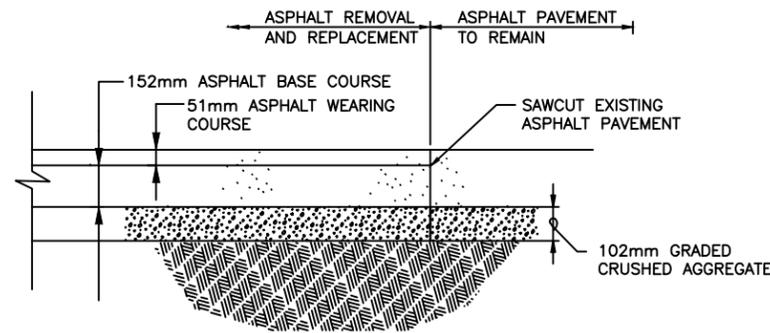
TYPICAL TYPE I CLOSURE SECTION  
SCALE: NTS



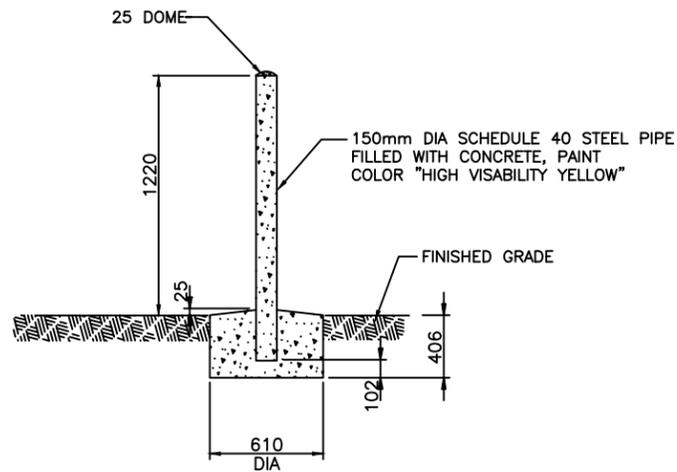
TYPICAL MONUMENT ASSEMBLY SITE PLAN  
SCALE: NTS



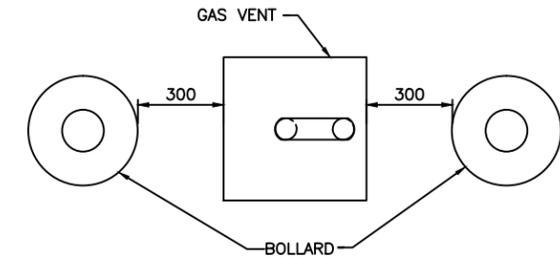
TYPICAL GAS VENT DETAIL  
SCALE: NTS



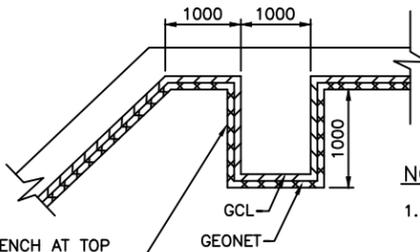
TYPICAL ASPHALT REMOVAL AND REPLACEMENT DETAIL  
SCALE: NTS



TYPICAL BOLLARD DETAIL  
SCALE: NTS



TYPICAL VENT ASSEMBLY SITE PLAN  
SCALE: NTS



TYPICAL ANCHOR TRENCH FOR TYPE I CLOSURE SLOPES  
SCALE: NTS

NOTES:

1. DIMENSIONS WERE REDUCED TO 0.5M DEEP BY 0.67 WIDE IF MSW WAS ENCOUNTERED.
2. ANCHOR TRENCHES NOT REQUIRED WHEN SLOPE HEIGHT IS LESS THAN 2 METERS.

PROVIDE ANCHOR TRENCH AT TOP OF ALL SLOPES GREATER THAN 6:1 THAT RECEIVE TYPE I CLOSURE

IF SHEET IS LESS THAN (22' X 34') IT IS A REDUCED PRINT - SCALE REDUCED ACCORDINGLY



THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

THE CONTRACTOR WILL BE RESPONSIBLE FOR COORDINATING THE WORK AMONG THE VARIOUS TRADES AS NECESSARY TO AVOID CONFLICTS AND TO INSURE THE INSTALLATION OF ALL WORK WITHIN THE AVAILABLE SPACE.

NOTES:

1. UNLESS NOTED OTHERWISE, DIMENSIONS ON THIS SHEET ARE IN MILLIMETERS.
2. INSCRIPTION ON EACH BRASS CAP SHALL BE "ANDERSEN AFB LANDFILL CLOSURE CORNER NO. CLO-X", WHERE X IS AS LISTED IN THE "REMARKS" COLUMN, SHEET C-18.

RECORD DRAWING

DATE OF ISSUE 06-08-01

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED
	AS-BUILT CONDITIONS SHOWN	4-20-01	

DESIGN: DHS		DR: SLB	CHK: WRW	DEPARTMENT OF THE NAVY NAVY FACILITIES ENGINEERING COMMAND	
SUPERVISOR: DHS		CH: ENG	HMF	PACIFIC DIVISION	
SUBMITTED BY: HENRY M. FOOTE		DATE: 7-15-99	ANDERSEN AFB		
FIRM MEMBER (TITLE):		FY00 MILCON AJJY971614 LANDFILL CAP			
PACDIV NFEC: RVD_KWH_BR_MGR_MIT		MISCELLANEOUS EARTHWORK DETAILS SHEET 3 OF 3			
DFPE: JRC_PDE_KWH_INBM_MIT		DIR: M. TSUTAHARA	SIZE: D	CODE IDENT NO: 80091	NAVFAC DRAWING NO: 7941688
APPROVED: CLYDE T. MORTA		DATE: 7-23-99	CONSTR CONTR NO: N62766-98-C-0204		FOR COMMANDER NAVFAC
SCHEDULES NOTED		SPEC: 41-98-0204	SHEET 25 OF 32		

C-23

SATISFACTORY TO DATE TITLE

REQUEST FOR PROPOSAL – PART D  
OTHER PERTINENT DOCUMENTS

**D.4 1999 Record Drawings - Leachate Collection System**

REVISIONS				
LTR	DESCRIPTION	PREP BY	DATE	APPROVED
	AS-BUILT CONDITION SHOWN	DHS	3/19/99	

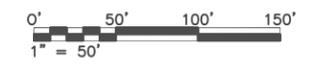
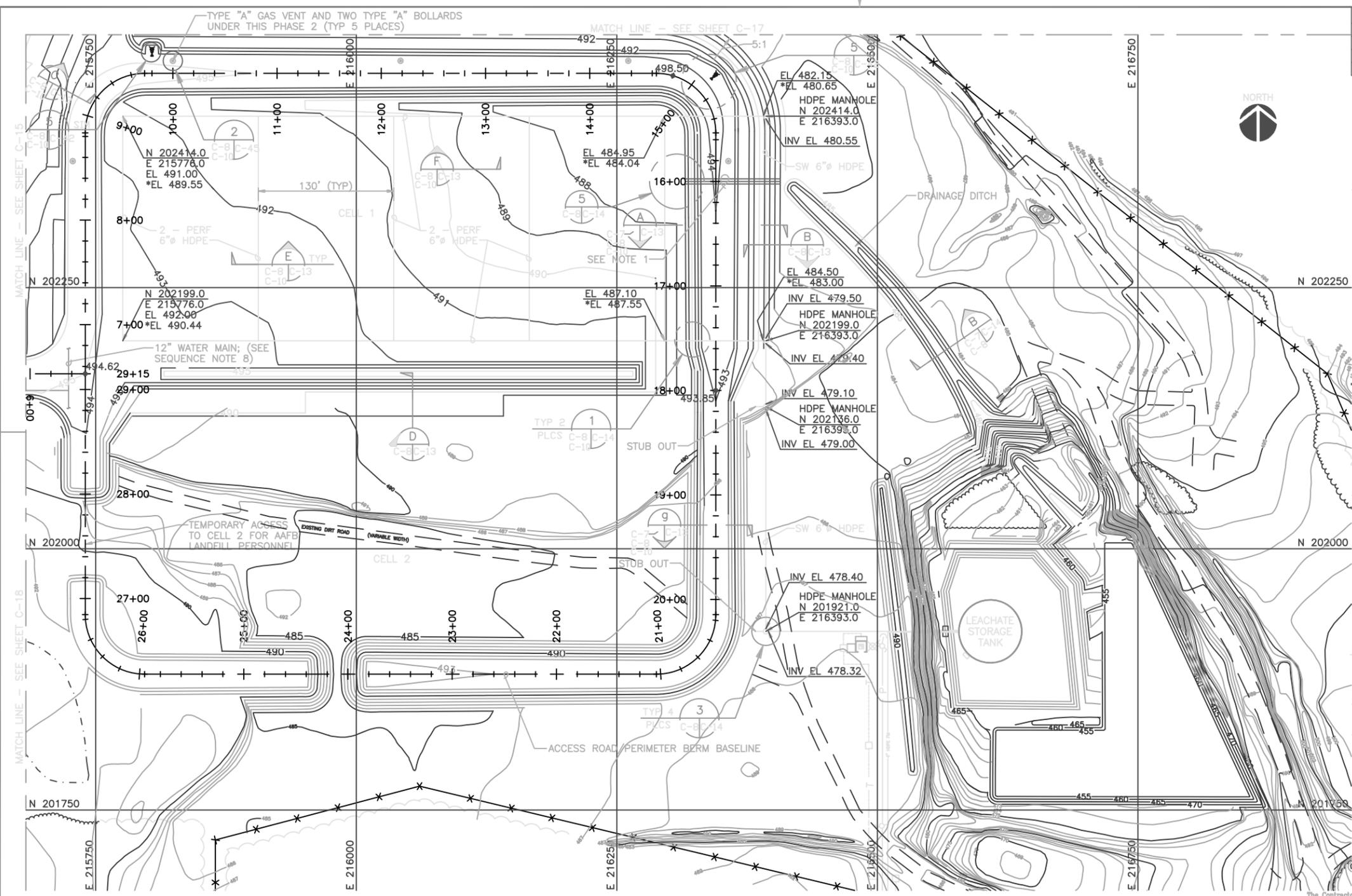
- CELL 1 LINER PLAN  
REQUIRED CONSTRUCTION SEQUENCE  
PHASE 2
- CONTRACTOR SHALL INSTALL LINER SYSTEMS AND GEOGRID PLACEMENT FOR CELL 1, AND COMPLETE LEACHATE COLLECTION SYSTEM AND RUNOFF CONTROL GRADING TO BORROW PIT.
  - CONTRACTOR SHALL COMPLETE WATER MAIN IMPROVEMENTS AROUND CELL 1 ONLY, PRIOR TO THE COMPLETION OF THE LEACHATE STORAGE TANK IN ORDER TO SUPPLY THE LEACHATE STORAGE TANK WITH ADEQUATE WATER TO CONDUCT TANK LEAK TESTING.  
  
WATER MAIN INSTALLATION FROM APPROXIMATELY WATERLINE STATIONS 73+85.7 TO 85+60.0 SHALL BE MADE DURING THIS PHASE 2. WATER MAIN IS NOT SHOWN ON THIS SHEET FOR CLARITY. SEE SHEET C-3B FOR WATER MAIN LAYOUT. CONTRACTOR SHALL PROVIDE RESTRAINED JOINTS BETWEEN STATIONS 84+60 AND 85+60, AND VALVE NEAR STATION 85+60. THIS WATER MAIN INSTALLATION IS REQUIRED IN ORDER TO PROVIDE OPERATIONAL FIRE HYDRANTS ADJACENT TO CELL 1, DURING PHASE 3 AND 4 CONSTRUCTION.
  - CONTRACTOR SHALL CONSTRUCT CELL 1 LINER SYSTEM, LEACHATE COLLECTION SYSTEM, LEACHATE STORAGE TANK (INCLUDING LEAK TESTING), APPROPRIATE ELECTRICAL SERVICE, PUMPS, LIFT STATIONS, AND FORCE MAIN COMPLETE TO THE DISCHARGE POINT AT THE EXISTING SANITARY MANHOLE NEAR THE AAFB MAIN GATE COMPLETE AND FULLY OPERATIONAL UNDER THIS PHASE 2. COMPLETE AND FULLY OPERATIONAL STATUS OF THESE ELEMENTS SHALL BE DETERMINED AND APPROVED BY THE CONTRACTING OFFICER.
  - CELL 1 AS SHOWN INDICATES FINISHED LINER PLACEMENT AND FINISHED ROAD SURFACING MATERIALS AROUND CELL 1 ONLY.
  - DURING THIS PHASE 2, THE INTERIOR OF CELL 2 WILL BE FILLED WITH WASTE BY AAFB PERSONNEL, NOT TO EXCEED THE ELEVATIONS INDICATED ON SHEET C-9, UNLESS APPROVED BY THE CONTRACTING OFFICER.
  - DITCH CONTOURS INDICATE FINISHED GRADE.
  - \* INDICATES PIPE INVERT ELEVATION IN SECONDARY LINER SYSTEM.

- NOTES:
- CONTRACTOR SHALL INSTALL 3 - 30"Ø CMP (90 FEET LONG), AT STATION 16+00. INLET INV EL 487.8, OUTLET INV EL 486.7.
  - SEE SHEET C-7 FOR ACCESS ROAD/PERIMETER BERM BASELINE HORIZONTAL CONTROL DATA.
  - SEE SHEET C-21 FOR LEACHATE STORAGE TANK SITE PLAN.

**RECORD DRAWING**  
DATE: 03/19/99  
INITIALS: DHS.

The Contractor will be responsible for coordinating the work among the various trades as necessary to avoid conflicts and to insure the installation of all work within the available space.

IF SHEET IS LESS THAN (22" X 34") IT IS A REDUCED PRINT—SCALE REDUCED ACCORDINGLY



C-8	SATISFACTORY TO _____ DATE _____		DEPARTMENT OF THE NAVY NAVY FACILITIES ENGINEERING COMMAND		
	TITLE _____		PACIFIC DIVISION MAKALAPA, HAWAII		
FOR COMMANDER NAVFAC		DES KWD DR GAS CHK TAH SUPV DHS CH ENG CLH SUBMITTED BY _____ DATE _____ FIRM MEMBER (TITLE) _____ PACDIV NPEC: RVD _____ BR MGR _____ DPPE _____ PDE _____ INSM _____ DIR _____ APPROVED _____ DATE _____		F993 MCAF AJY953109 SOLID WASTE MANAGEMENT COMPLEX PHASE II - LANDFILL COMPLEX MSW AREA CELL 1 LINER PLAN	
SCALE 1" = 50'		SIZE D	CODE IDENT NO 80091	NAVFAC DRAWING NO 7921147	
		CONSTR CONTR NO N62766-96-C-0383		SHEET 11 OF 92	

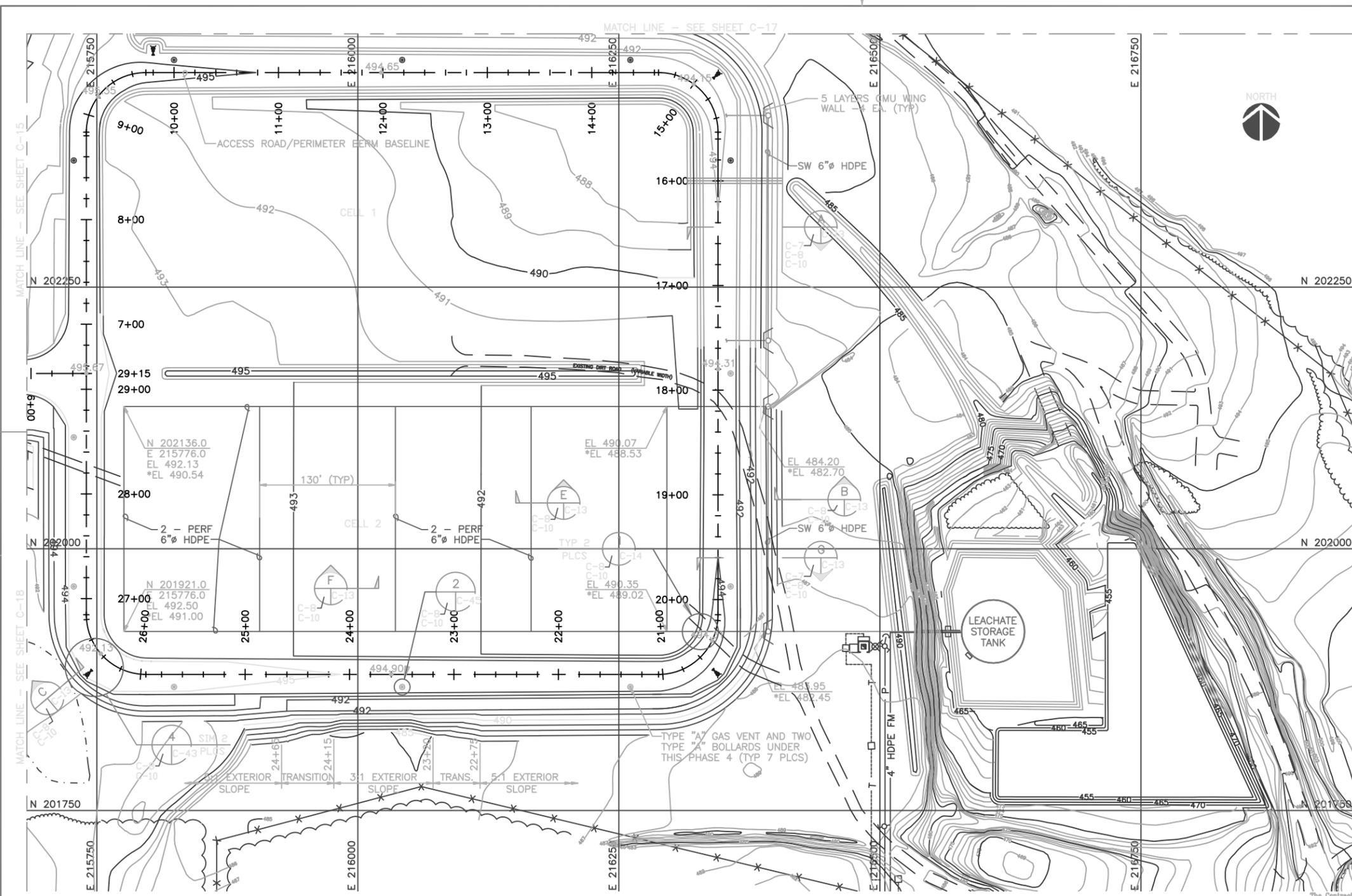
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REVISIONS				
LTR	DESCRIPTION	PREPD BY	DATE	APPROVED
1	NEW ELEVATION PER RF1 #16-#17 APPROVED	DHS	10/17/97	
	AS-BUILT CONDITION SHOWN	DHS	3/19/99	

- CELL 2 LINER PLAN  
REQUIRED CONSTRUCTION SEQUENCE  
PHASE 4
- CONTRACTOR SHALL INSTALL ALL CELL 2 LINER SYSTEMS AND GEOGRID PLACEMENT IN ACCORDANCE WITH THIS DRAWING. ALONG THE "CELL 1/ CELL 2" BOUNDARY, THE CONTRACTOR SHALL CONNECT EACH CELL 2 GEOSYNTHETIC AND AGGREGATE LAYER TO THE CORRESPONDING CELL 1 GEOSYNTHETIC AND AGGREGATE LAYER PLACED UNDER PHASE 2.
  - CONTRACTOR SHALL COMPLETE THE CELL 2 LEACHATE COLLECTION SYSTEM, INCLUDING CONNECTIONS TO THE HDPE MANHOLE STUB-OUTS INSTALLED DURING PHASE 2.
  - CELL 2 GRADES AS SHOWN INDICATE FINISHED LINER PLACEMENT AND FINISHED ROAD SURFACING MATERIALS AROUND CELL 2.
  - \* INDICATES PIPE INVERT ELEVATION IN SECONDARY LINER SYSTEM.
  - WATER MAIN INSTALLATION FROM APPROXIMATELY WATERLINE STATIONS 85+60 TO 97+73 SHALL BE MADE DURING THIS PHASE 4. WATER MAIN IS NOT SHOWN ON THIS SHEET FOR CLARITY. SEE SHEET C-38 FOR WATER MAIN LAYOUT.

- NOTES:
- SEE SHEET C-7 FOR ACCESS ROAD/PERIMETER BERM BASELINE HORIZONTAL CONTROL DATA.
  - SEE SHEET C-21 FOR LEACHATE STORAGE TANK SITE PLAN.



**RECORD DRAWING**  
DATE: 03/19/99  
INITIALS: D.H.S.

The Contractor will be responsible for coordinating the work among the various trades as necessary to avoid conflicts and to insure the installation of all work within the available space.

IF SHEET IS LESS THAN (22" X 34") IT IS A REDUCED PRINT-SCALE REDUCED ACCORDINGLY



C-10

		DEPARTMENT OF THE NAVY NAVY FACILITIES ENGINEERING COMMAND	
		PACIFIC DIVISION MAKALAPA, HAWAII	
DES KWD DR GAS CHK TAH		FY93 MCAF AJY953109	
SUPV DHS CH ENG CLH		SOLID WASTE MANAGEMENT COMPLEX	
SUBMITTED BY DATE		PHASE II - LANDFILL COMPLEX	
FIRM MEMBER (TITLE)		MSW AREA	
PACDIV NFOC: RVD BR MGR		CELL 2 LINER PLAN	
DPPE PDE INSM		SIZE	NAVFAO DRAWING NO
DR		D	7921149
APPROVED DATE		CONSTR CONTR NO	N62766-96-C-0383
FOR COMMANDER NAVFAC		SCALE 1" = 50'	SPEC 41-96-0383 SHEET 13 OF 92

REVISIONS				
LTR	DESCRIPTION	PREP BY	DATE	APPROVED
	AS-BUILT CONDITION SHOWN	DHS	3/19/99	

NOTES:

1. SEE SHEET S-10 FOR STORAGE TANK FOUNDATION, PIPE BRIDGE, AND PUMP PAD DETAILS.
2. SEE SHEETS M-2 AND M-3 FOR STORAGE TANK, PIPING AND PUMP DETAILS.
3. SEE SHEET C-8 FOR 6" LEACHATE COLLECTION PIPING INFORMATION.
4. SEE SHEET C-35 FOR 4" FORCE MAIN PIPING PLAN AND PROFILE.

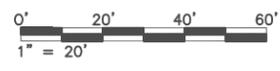
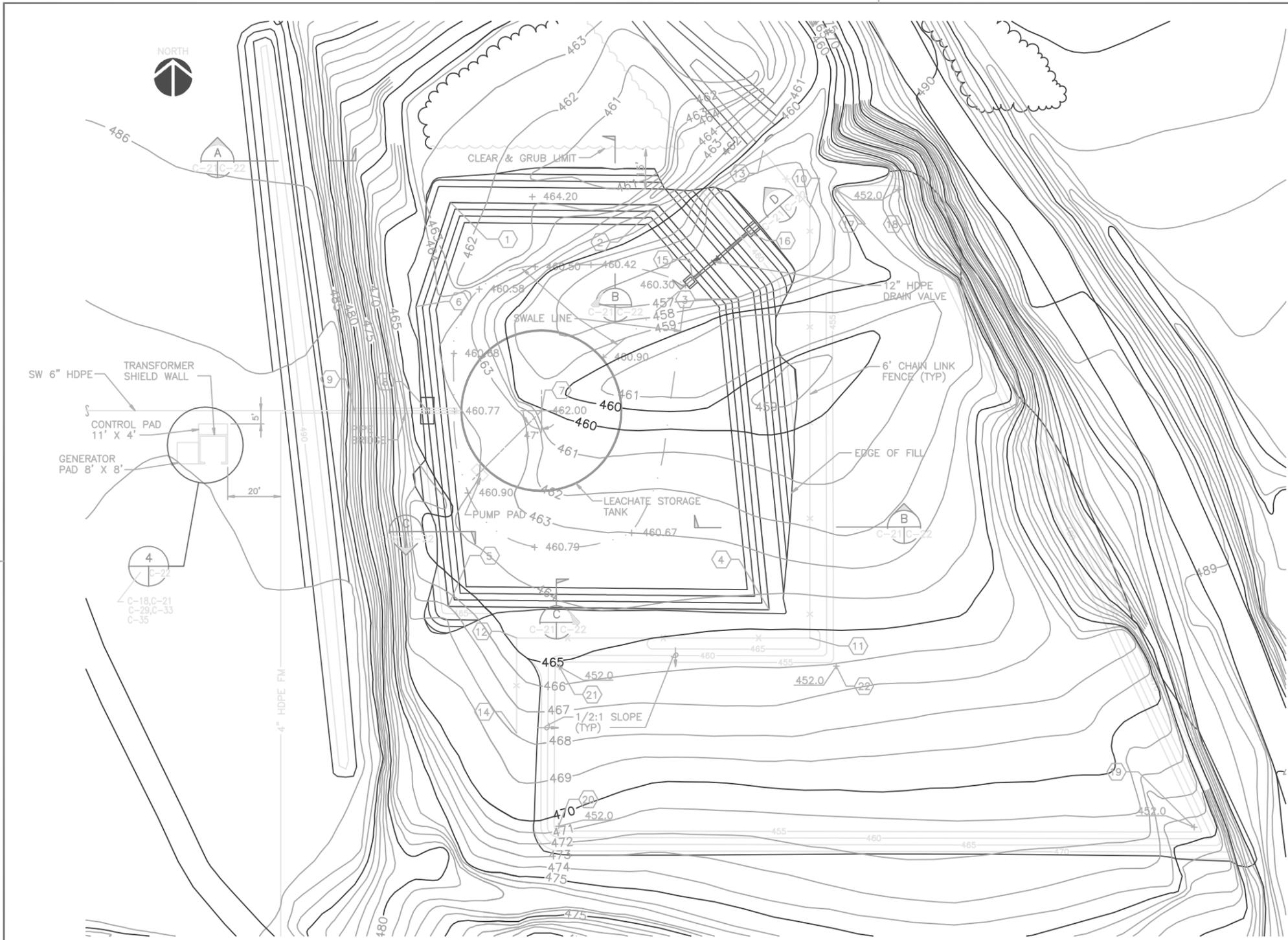
POINT NUMBER	NORTHING	EASTING	REMARKS
1	201999.2	216573.9	EDGE OF BERM
2	201998.4	216652.2	EDGE OF BERM
3	201963.1	216682.6	EDGE OF BERM
4	201846.1	216694.3	EDGE OF BERM
5	201847.4	216573.3	EDGE OF BERM
6	201960.1	216561.0	EDGE OF BERM
7	201921.0	216608.34	CENTER OF TANK
8	201921.0	216565.4	CENTER OF BRIDGE PIER
9	201921.0	216537.9	END OF BRIDGE
10	201997.4	216709.6	FENCE CORNER
11	201835.5	216709.6	FENCE CORNER
12	201835.6	216599.0	FENCE CORNER
13	202018.8	216691.9	END OF FENCE
14	201799.8	216599.0	END OF FENCE
15	201970.4	216665.4	DRAIN PIPE INLET INV EL 459.63
16	201988.2	216686.4	DRAIN PIPE OUTLET INV EL 457.00
17	202004.1	216719.6	BOTTOM CORNER BORROW PIT
18	202004.1	216742.9	BOTTOM CORNER BORROW PIT
19	201764.3	216854.6	BOTTOM CORNER BORROW PIT
20	201764.7	216615.0	BOTTOM CORNER BORROW PIT
21	201824.6	216615.0	BOTTOM CORNER BORROW PIT
22	201824.6	216719.6	BOTTOM CORNER BORROW PIT

**RECORD DRAWING**

DATE: 03/19/99  
INITIALS: D.H.S.

The Contractor will be responsible for coordinating the work among the various trades as necessary to avoid conflicts and to insure the installation of all work within the available space.

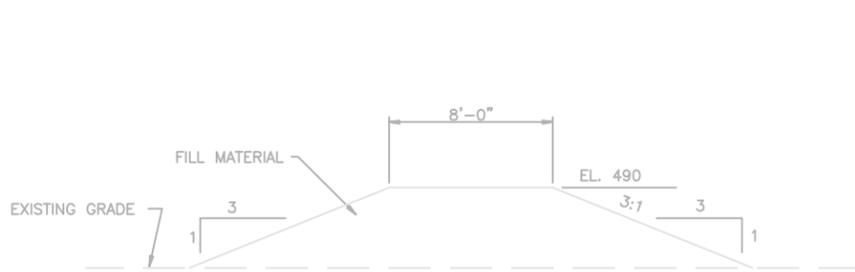
IF SHEET IS LESS THAN (22" X 34") IT IS A REDUCED PRINT—SCALE REDUCED ACCORDINGLY



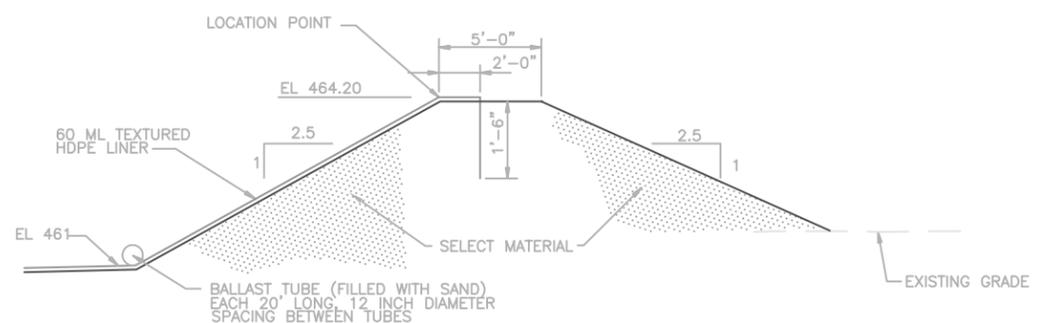
C-21

		DEPARTMENT OF THE NAVY NAVY FACILITIES ENGINEERING COMMAND <b>PACIFIC DIVISION</b> MAKALAPA, HAWAII	
DES MWS	DR KLL	CHK TAH	ANDERSEN AFB GUAM, HI
SUPV DHS	CH ENG CLJ	DATE	FY93 MCAF A1JY953109
FIRM MEMBER (TITLE)		SOLID WASTE MANAGEMENT COMPLEX	
PACDVF NPEC: RVD OR MOR		PHASE II - LANDFILL COMPLEX	
DFPE PDE INBM		LEACHATE STORAGE TANK	
DIR		SITE PLAN	
APPROVED	DATE	SIZE	CODE IDENT NO
		D	80091
SATSFACTORY TO DATE		NAVAFAC DRAWING NO	
TITLE		7921160	
FOR COMMANDER NAVFAC		CONSTR CONTR NO N62766-96-C-0383	
		SCALE NOTED	SPEC 41-96-0383
		SHEET 24 OF 92	

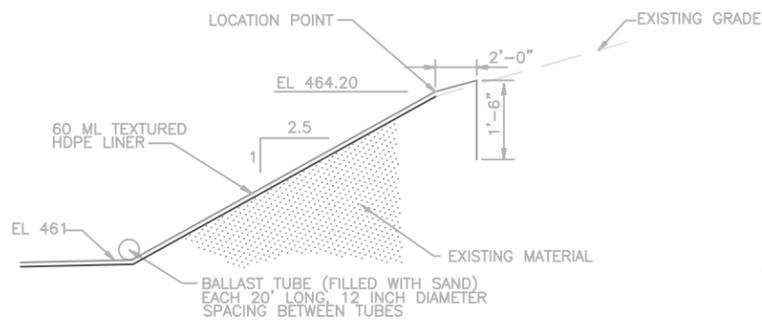
REVISIONS				
LTR	DESCRIPTION	PREP BY	DATE	APPROVED
AS-BUILT		DHS	3/19/99	



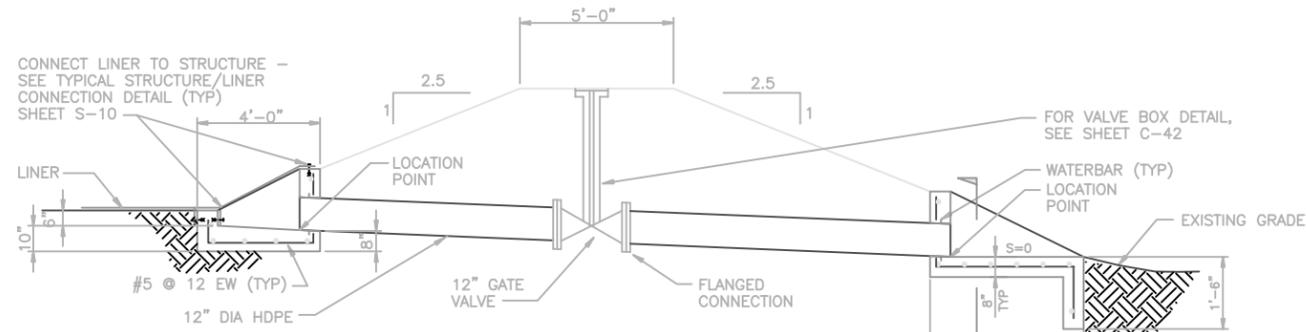
**A SECTION**  
C-21/C-22 SCALE: NO SCALE



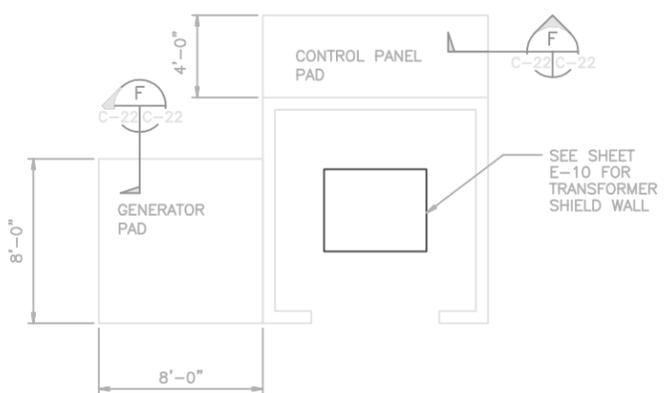
**B SECTION**  
C-21/C-22 SCALE: NO SCALE



**C SECTION**  
C-21/C-22 SCALE: NO SCALE

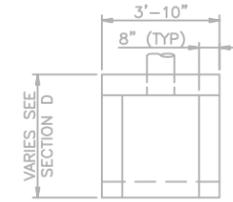


**D SECTION**  
C-21/C-22 SCALE: NO SCALE

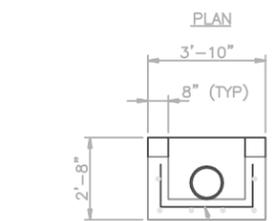


NOTE: MAINTAIN MINIMUM 3'-0" CLEARANCE FROM LIFT STATIONS.

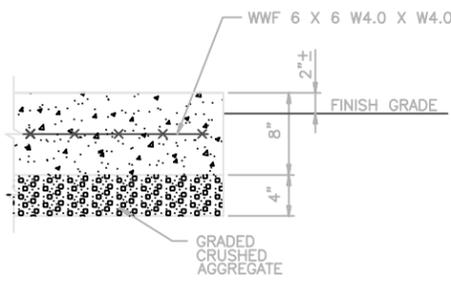
**4 DETAIL**  
C-18/C-22 SCALE: NO SCALE



NOTE: INLET STRUCTURE SHALL HAVE 8" WIDE LIP AT FRONT EDGE AS SHOWN IN SECTION D, THIS SHEET.



**E TYPICAL HEADWALL**  
C-22/C-22 SCALE: NO SCALE



**F SECTION**  
C-22/C-22 SCALE: NO SCALE

**RECORD DRAWING**  
DATE: 03/19/99  
INITIALS: D.H.S.

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IF SHEET IS LESS THAN (22" X 34") IT IS A REDUCED PRINT-SCALE REDUCED ACCORDINGLY

<b>BLACK &amp; VEATCH</b> SPECIAL PROJECTS CORP.		DEPARTMENT OF THE NAVY NAVY FACILITIES ENGINEERING COMMAND PACIFIC DIVISION MAKALAPA, HAWAII	
DES WRW	DR HFM	CHK TAH	ANDERSEN AFB
SUPV DHS	CH ENG CLJ		GUAM, HI
SUBMITTED BY		DATE	
FIRM MEMBER (TITLE)		FY93 MCAF AJY953109	
PACIFY NPEC: RVD BR MGR		SOLID WASTE MANAGEMENT COMPLEX	
DFPE PDE INEM		PHASE II - LANDFILL COMPLEX	
DIR		LEACHATE STORAGE TANK	
APPROVED		DATE	
DATE		DATE	
SATISFACTORY TO		DATE	
TITLE		FOR COMMANDER NAVFAC	
C-22		SCALE NOTED	
		SPEC 41-96-0383	
		SHEET 25 OF 92	

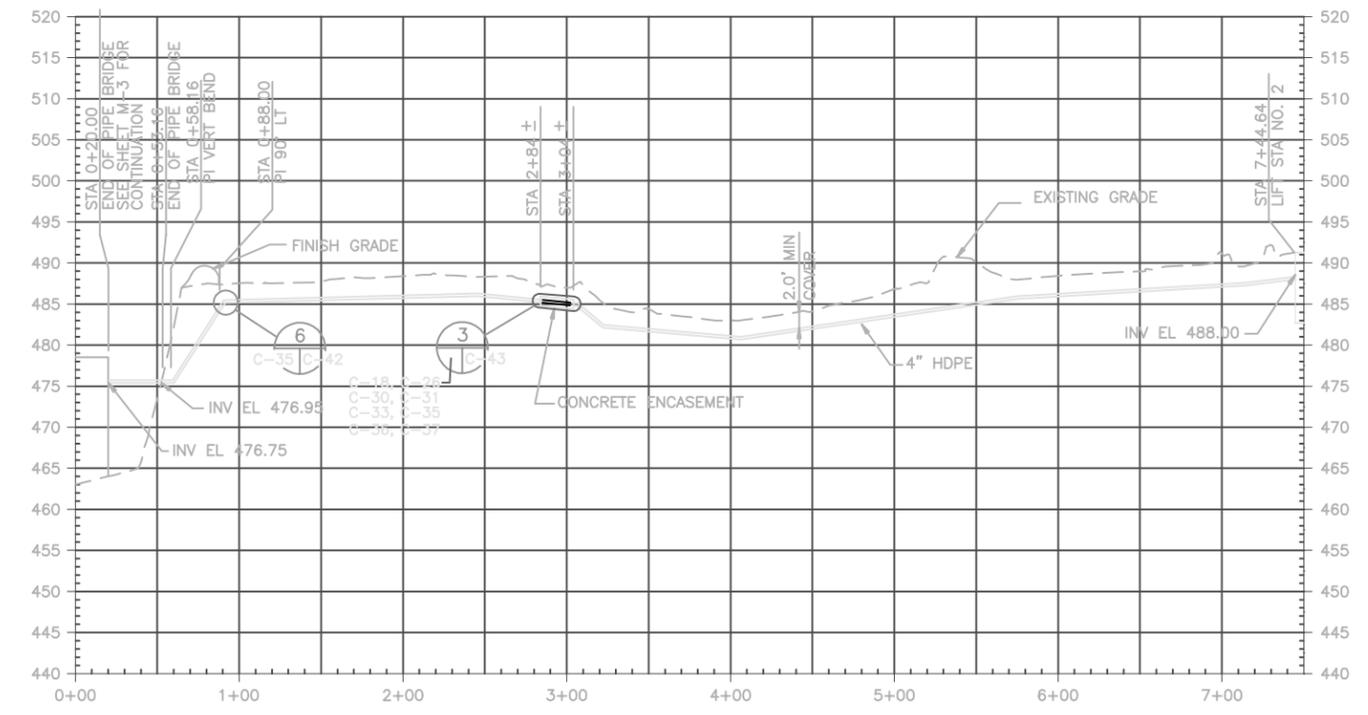
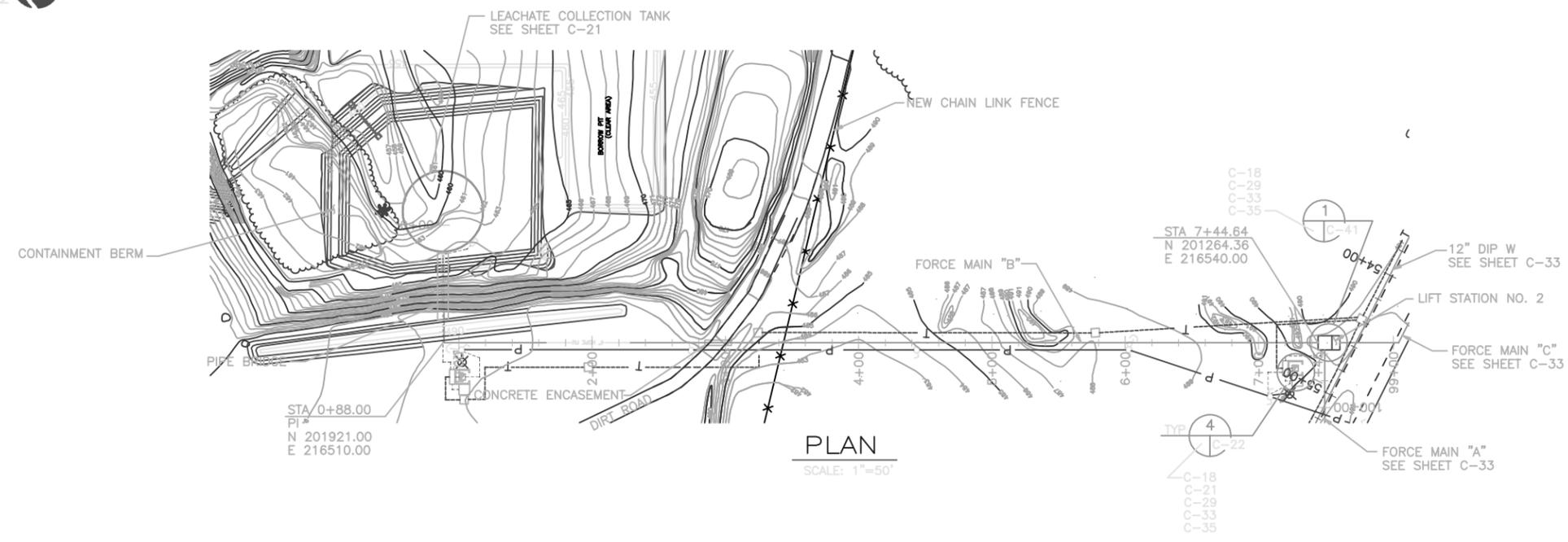
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REVISIONS				
LTR	DESCRIPTION	PREP BY	DATE	APPROVED
AS-BUILT		DHS	3/19/99	

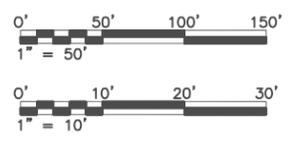
NOTES:  
1. TURFING NOT REQUIRED, THIS SHEET.



**RECORD DRAWING**  
DATE: 03/19/99  
INITIALS: D.H.S.

The Contractor will be responsible for coordinating the work among the various trades as necessary to avoid conflicts and to insure the installation of all work within the available space.

IF SHEET IS LESS THAN (22" X 34") IT IS A REDUCED PRINT—SCALE REDUCED ACCORDINGLY

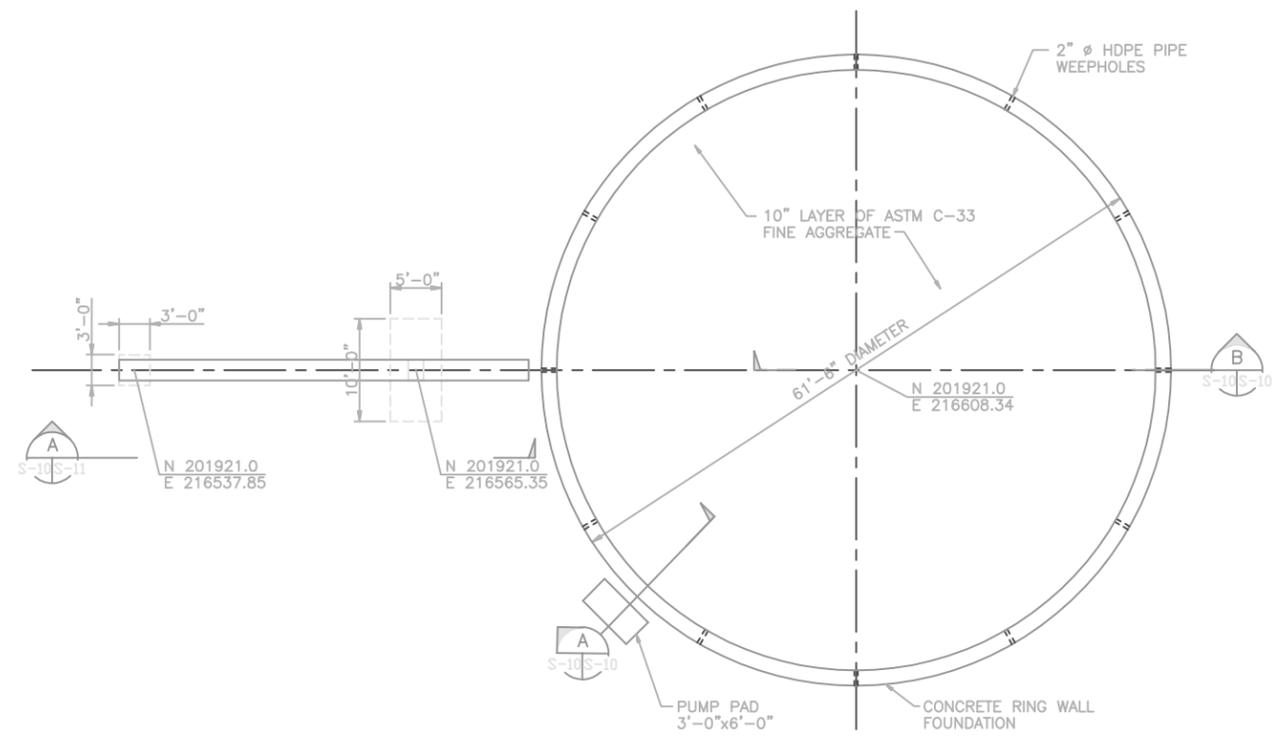


BLACK & VEATCH SPECIAL PROJECTS CORP.		DEPARTMENT OF THE NAVY NAVY FACILITIES ENGINEERING COMMAND PACIFIC DIVISION MAKALAPA, HAWAII	
DES TFP	DR LEN	CHK TAH	ANDERSEN AFB GUAM, HI
SUPV DHS	CH ENG CLJ	DATE	FY93 MCAF AJY953109 SOLID WASTE MANAGEMENT COMPLEX PHASE II - LANDFILL COMPLEX
SUBMITTED BY		DATE	FORCE MAIN "B" PLAN AND PROFILE 10
FIRM MEMBER (TITLE)		DATE	NAVIFAC DRAWING NO. 7921174
PACDVI NPEC: RVD	BR MGR	DATE	CONSTR CONTR NO N62766-96-C-0383
DFPE	PDE	INEM	SCALE NOTED SPEC 41-96-0383 SHEET 38 OF 92
DIR	APPROVED	DATE	
SATSFACTORY TO		DATE	
TITLE		FOR COMMANDER NAVIFAC	

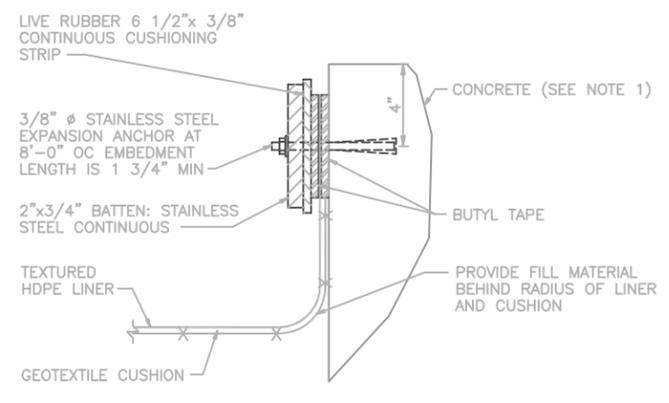
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R.F. JULLINS  
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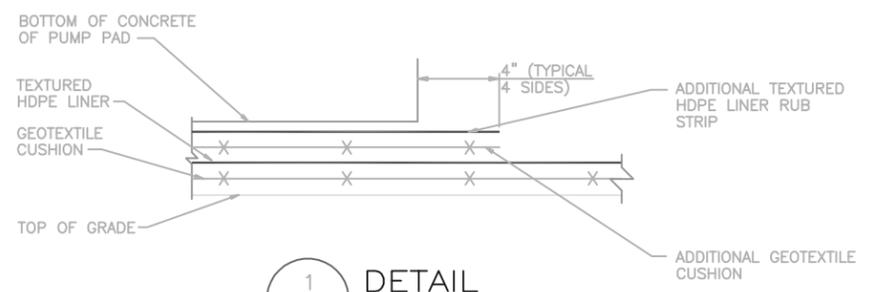
REVISIONS				
LTR	DESCRIPTION	PREP BY	DATE	APPROVED
	AS-BUILT CONDITION SHOWN	DHS	3/19/99	



**LEACHATE STORAGE TANK FOUNDATION PLAN**  
SCALE: 1/8"=1'-0"

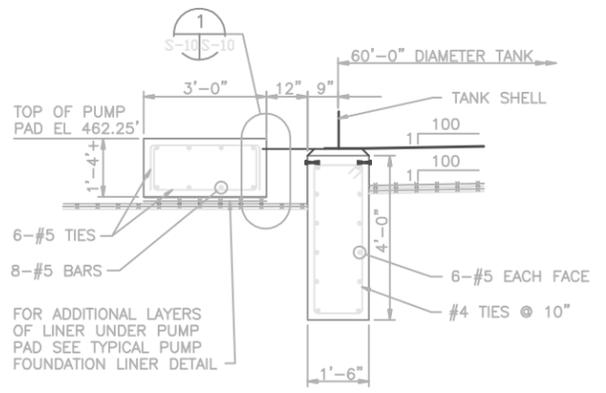


**TYPICAL FOUNDATION/LINER CONNECTION DETAIL**  
SCALE: 3"=1'-0"

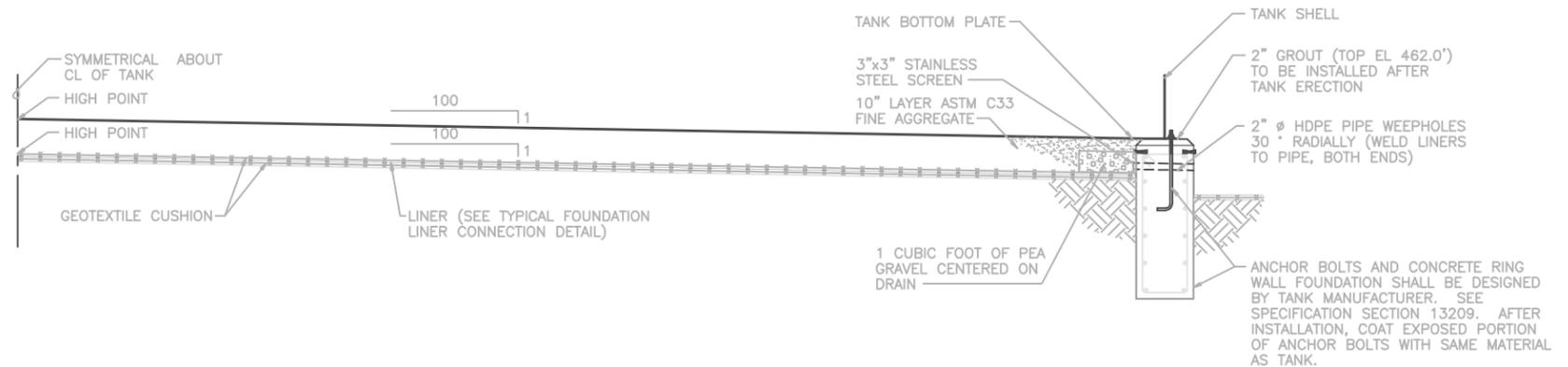


**1 DETAIL**  
SCALE: NONE

**RECORD DRAWING**  
DATE: 03/19/99  
INITIALS: DHS



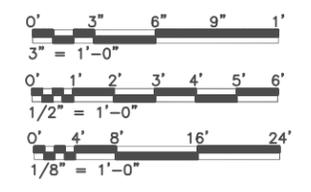
**A SECTION**  
SCALE: 1/2"=1'-0"



**B SECTION**  
SCALE: 1/2"=1'-0"

The Contractor will be responsible for coordinating the work among the various trades as necessary to avoid conflicts and to insure the installation of all work within the available space.

IF SHEET IS LESS THAN (22" X 34") IT IS A REDUCED PRINT-SCALE REDUCED ACCORDINGLY

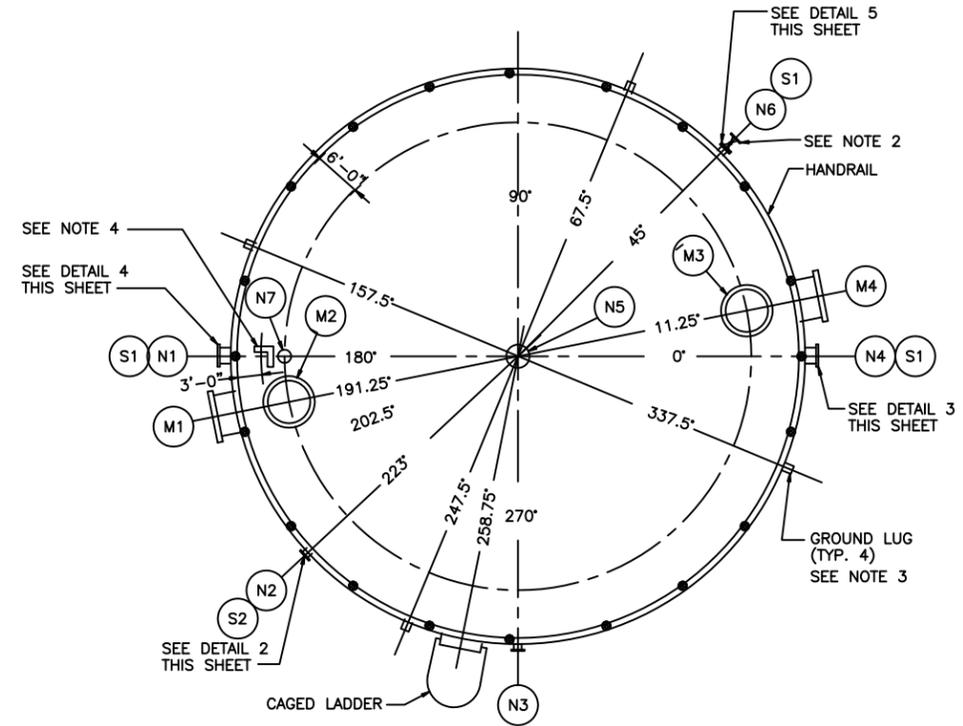


<b>BLACK &amp; VEATCH</b> SPECIAL PROJECTS CORP.		DEPARTMENT OF THE NAVY NAVY FACILITIES ENGINEERING COMMAND PACIFIC DIVISION MAKALAPA, HAWAII	
DES AFR	DR RJR	CHK DAP	ANDERSEN AFB GUAM, HI
SUPV DHS	CH ENG CLJH	DATE	FY93 MCAF AJY953109 SOLID WASTE MANAGEMENT COMPLEX PHASE II - LANDFILL COMPLEX
SUBMITTED BY		DATE	LEACHATE STORAGE TANK FOUNDATION PLAN, SECTIONS AND DETAILS
FIRM MEMBER (TITLE)		DATE	NAVAFAC DRAWING NO 7921204
PACIFY NPED: RVD, BR MGR		DATE	CONSTR CONTR NO N62766-96-C-0383
DFPE PDE INBM		DATE	SIZE CODE IDENT NO D 80091
DIR		DATE	NAVAFAC DRAWING NO 7921204
APPROVED		DATE	CONSTR CONTR NO N62766-96-C-0383
S-10		DATE	SCALE NOTED SPEC 41-96-0383 SHEET 59 OF 92
TITLE		DATE	FOR COMMANDER NAVFAC

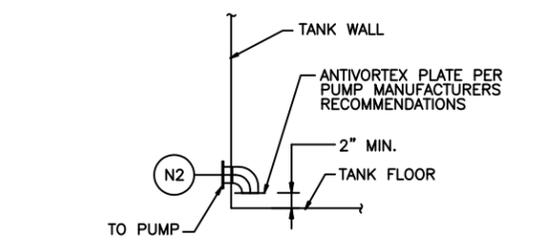
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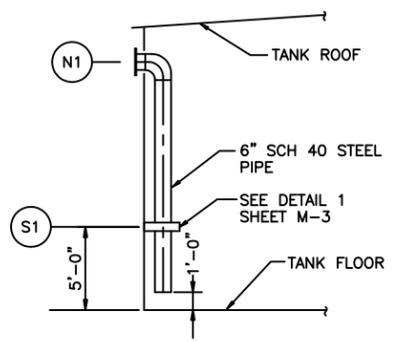
REVISIONS				
LTR	DESCRIPTION	PREP BY	DATE	APPROVED
AS-BUILT		DHS	3/19/99	



**1 LEACHATE STORAGE TANK PLAN VIEW**  
 NOT TO SCALE  
 NOTE: THIS VIEW FOR NOZZLE ORIENTATION ONLY



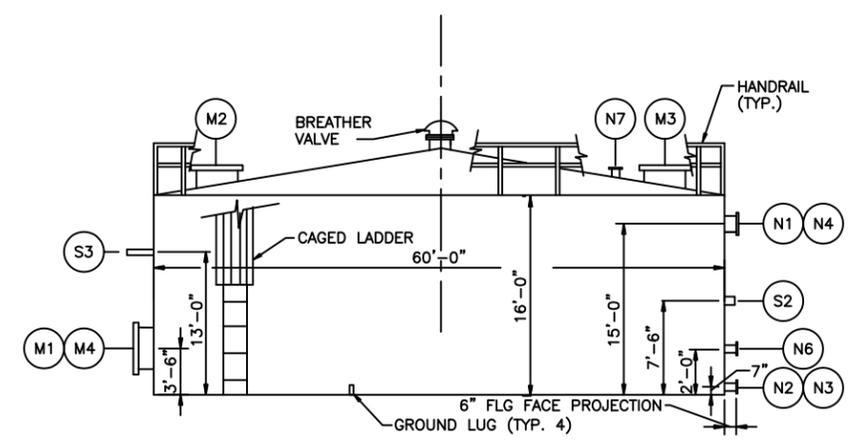
**2 TANK OUTLET NOZZLE DETAIL**  
 SCALE: 1/4"=1'-0"



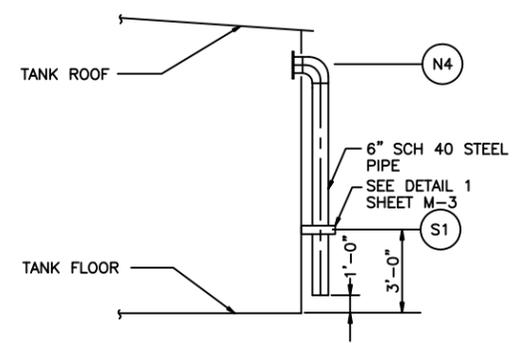
**4 INLET PIPE DROP DETAIL**  
 NOT TO SCALE

LEACHATE STORAGE TANK NOZZLE AND PIPE ATTACHMENT SCHEDULE					
TAG	SIZE	RATING	FACING	DESCRIPTION	REMARKS
N1	6"	150#	FF	LIQUID INLET	SEE NOTE 1
N2	3"	150#	RF	LIQUID OUTLET	
N3	4"	150#	RF	TANK DRAIN	
N4	6"	150#	RF	LIQUID OVERFLOW	SEE DETAIL 1
N5	8"	150#	RF	VENT	
N6	4"	150#	RF	CONN FOR PUMP TRUCK	
N7	8"	150#	RF	FLOAT ACCESS	PROVIDE BLIND FLANGE SEE DETAIL SHEET M-3
M1	24"			SIDE MANWAY	
M2	24"			TOP MANWAY	
M3	24"			TOP MANWAY	
M4	24"			SIDE MANWAY	
S1				PIPE SUPPORT ATTACHMENT	SEE DETAIL 1 SHT M-3
S2				PIPE SUPPORT ATTACHMENT	SEE SECT. A SHT M-3
S3				PIPE SUPPORT ATTACHMENT	SEE DETAIL 1 SHT M-3
S4				CORD SUPPORT BRACKET	SEE DETAIL 2 SHT M-3

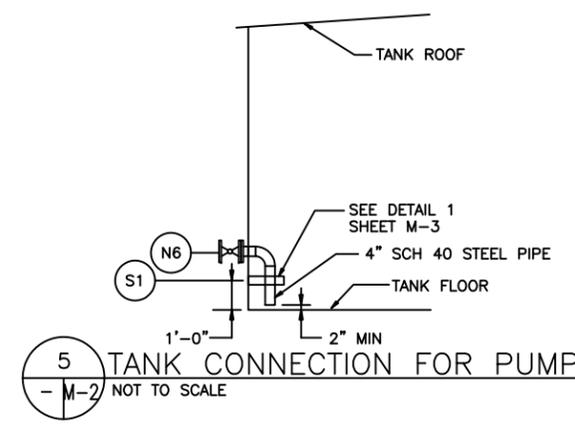
- NOTE:
- IN ADDITION TO NORMAL DESIGN LOADS, THE NOZZLE SHALL BE DESIGNED TO SUPPORT A VERTICAL LOAD OF 250LBS.
  - FOR BALL VALVE SEE SPECIFICATION SECTION 15400
  - FOR GROUND LUG MOUNTING DETAILS SEE SHEET E-23.
  - FLOAT JUNCTION BOX SUPPORT. SEE ELEVATION ON SHEET M-3



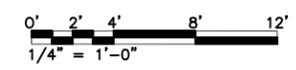
**6 LEACHATE STORAGE TANK ELEVATION**  
 NOT TO SCALE  
 NOTE: THIS VIEW FOR NOZZLE ELEVATIONS ONLY



**3 TANK OVERFLOW DETAIL**  
 NOT TO SCALE



**5 TANK CONNECTION FOR PUMP TRUCK DETAIL**  
 NOT TO SCALE



**RECORD DRAWING**  
 DATE: 03/19/99  
 INITIALS: D.H.S.

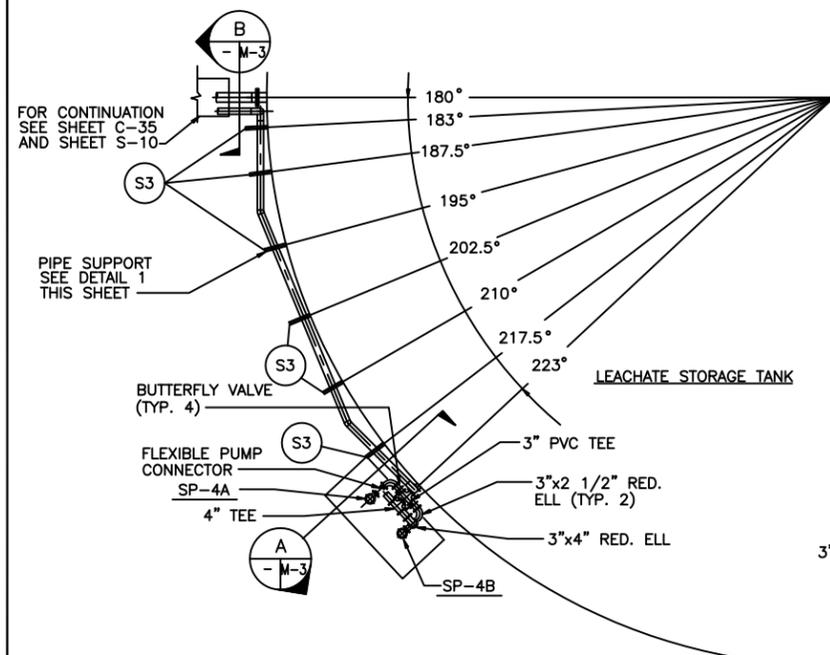
The Contractor will be responsible for coordinating the work among the various trades as necessary to avoid conflicts and to insure the installation of all work within the available space.

IF SHEET IS LESS THAN (22" x 34") IT IS A REDUCED PRINT-SCALE REDUCED ACCORDINGLY

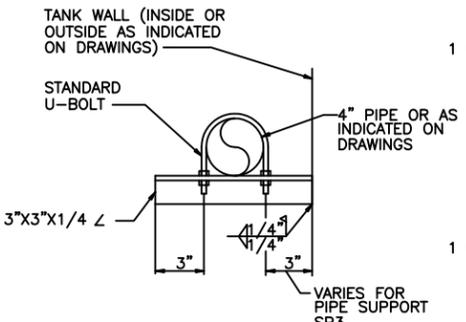
M-2	SATISFACTORY TO	DATE	FOR COMMANDER NAVFAC	<b>BLACK &amp; VEATCH</b> SPECIAL PROJECTS CORP. DES RAP DR TLJ CHK HD SUPV DHS CH ENG CLH SUBMITTED BY DATE FIRM MEMBER (TITLE) PACDIV INFC: RVD BR MGR DPPE PDE INBM DIR APPROVED DATE	DEPARTMENT OF THE NAVY NAVY FACILITIES ENGINEERING COMMAND <b>PACIFIC DIVISION</b> MAKALAPA, HAWAII ANDERSEN AFB FY 93 MCAF AJY953109 SOLID WASTE MANAGEMENT COMPLEX PHASE II - LANDFILL COMPLEX <b>LEACHATE STORAGE TANK</b>
	TITLE				SIZE CODE IDENT NO <b>D 80091</b> NAVFAC DRAWING NO 7921221 CONSTR CONTR NO N62766-96-C-0383
SCALE AS NOTED SPEC 41-96-0383				SHEET 68 OF 92	

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 RA PERKINS ACAD 12  
 PLOT SCALE 1/4"=1'-0"  
 10/17/98 20:55

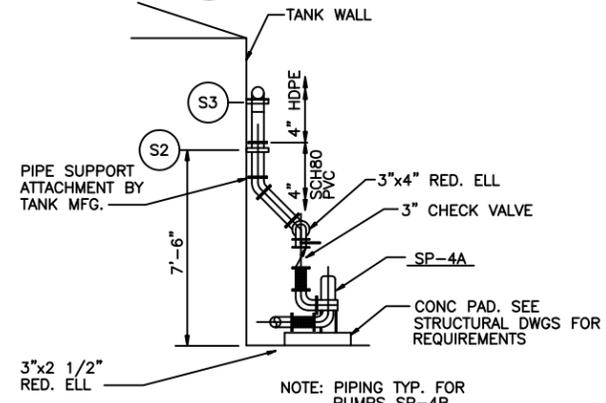
REVISIONS				
LTR	DESCRIPTION	PREP BY	DATE	APPROVED
AS-BUILT		DHS	3/19/99	



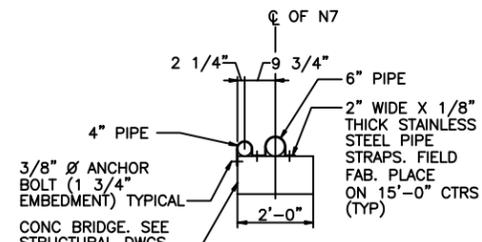
1 PUMPS SP-4A & SP-4B PLAN  
- M-3 NOT TO SCALE



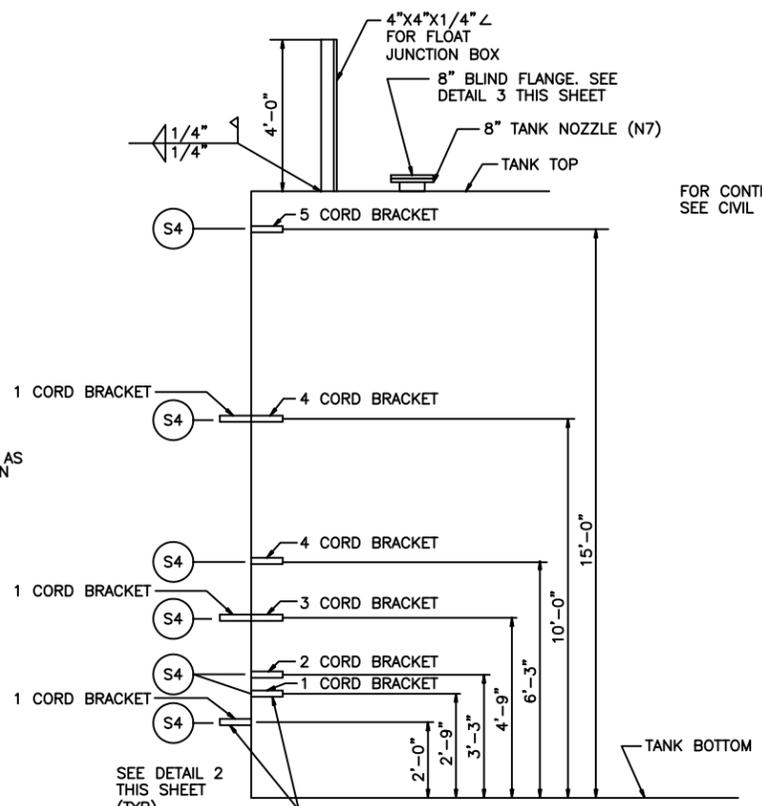
1 DETAIL  
- M-3 NOT TO SCALE



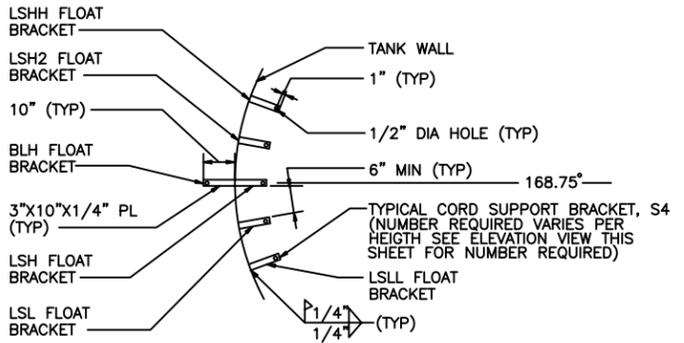
A SECTION  
- M-3 NOT TO SCALE



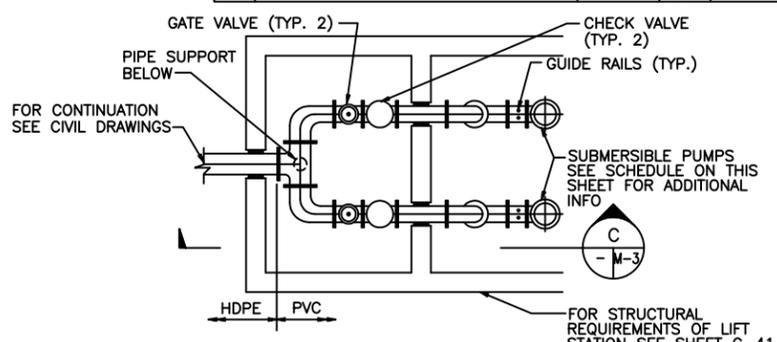
B SECTION  
- M-3 NOT TO SCALE



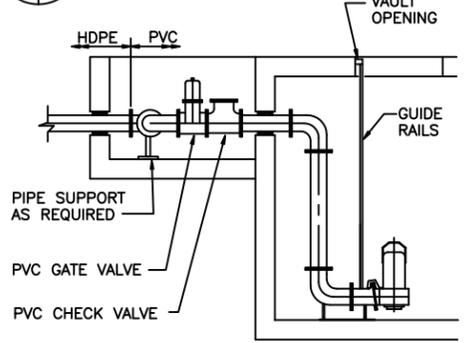
LEACHATE STORAGE TANK ELEVATION OF FLOAT CORD SUPPORT BRACKETS  
NOT TO SCALE



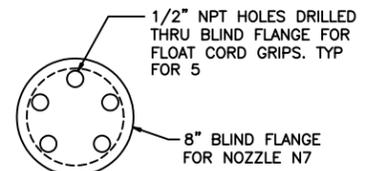
2 CORD SUPPORT BRACKET DETAIL  
- M-3 NOT TO SCALE



3 TYP. LIFT STATION PIPING  
- M-2 NOT TO SCALE

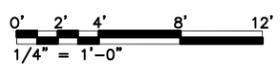


C SECTION  
- M-3 NOT TO SCALE



3 BLIND FLANGE DETAIL  
- M-3 NOT TO SCALE

SUBMERSIBLE PUMP SCHEDULE									
EQUIP. NUMBER	SERVICE	TYPE	DISCHARGE SIZE (INCHES)	FLOW (GPM)	TOTAL HEAD (FEET)	MINIMUM HORSEPOWER	VOLTS\PH\HZ	RPM	REMARKS
SP-1A & B	SANITARY SEWER	SUBMERSIBLE CENTRIFUGAL	3	160	40.0	3.7	460/3/60	3350	LIFT STATION NO. 1
SP-2A & B	LEACHATE	SUBMERSIBLE CENTRIFUGAL	4	340	76.5	11.0	460/3/60	1750	LIFT STATION NO. 2
SP-3A & B	LEACHATE	SUBMERSIBLE CENTRIFUGAL	6	375	104.3	30.0	460/3/60	1750	LIFT STATION NO. 3
SP-4A & B	LEACHATE	SUBMERSIBLE CENTRIFUGAL	3	100	40.8	3.7	460/3/60	3350	TANK PUMP STATION



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**RECORD DRAWING**  
DATE: 03/19/99  
INITIALS: D.H.S.

BLACK & VEATCH SPECIAL PROJECTS CORP.		DEPARTMENT OF THE NAVY NAVY FACILITIES ENGINEERING COMMAND PACIFIC DIVISION MAKALAPA, HAWAII	
DES: RAP	DR: TLJ	CHK: HD	ANDERSEN AFB
SUPV: DHS	CH: ENG	CLH	FY 93 MCAF AJJY953109
SUBMITTED BY: _____		DATE: _____	
FIRM MEMBER (TITLE): _____		NAVAC DRAWING NO. 7921222	
PACDIV NFGC: RVD		BR: MGR	
DFPE: PDE		INM	
DIR: _____		DATE: _____	
APPROVED: _____		DATE: _____	
FOR COMMANDER NAVFAC		SCALE AS NOTED SPEC 41-96-0383	
SHEET 69 OF 92		CONSTR CONTR NO N62766-96-C-0383	

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RAV PERKINS  
10/17/98 2:00