Department of Energy
Ohio Field Office
Fernald Area Office
P. O. Box 538705
Cincinnati, Ohio 45253-8705
(513) 648-3155

1657

AUG 20 1998

Mr. James A. Saric, Remedial Project Manager
U.S. Environmental Protection Agency
Region V-SRF-5J
77 West Jackson Boulevard
Chicago, Illinois 60604-3590

DOE-1112-98

Mr. Tom Schneider, Project Manager
Ohio Environmental Protection Agency
401 East 5th Street
Dayton, Ohio 45402-2911

Dear Mr. Saric and Mr. Schneider:

SILOS PROJECT INFRASTRUCTURE DOCUMENT SUBMITTAL

As per the teleconference call on August 12, 1998, enclosed for your review are the following: Part 6 of the Invitation for Bid which includes the scope of work, submittal register and pay item schedule design drawings, technical specifications, waste management requirements for the contractor, Design Change Notice (DCN) 40110-50 showing details of K-65 trench bridge widening, and DCN 40315-004 showing domestic water and fire protection tie-in points. Also, included is the scope of work for monitoring the well plugging and abandonment consistent with the sitewide drilling procedure. Please note that the stormwater runoff controls are defined on Drawing 94X6100-G-02221 and Technical Specifications 02270 and 02900.

The current plan for the Infrastructure project is, upon approval of the Project Specific Plan (PSP) currently under your review, the contract can be awarded in this Fiscal Year (FY) with limited approval on long lead procurement items. However, the Notice to Proceed (NTP) to the contractor will not be issued until your review of this submittal is complete. The Infrastructure field work supports the future Accelerated Waste Retrieval (AWR) project and the Silo 3 Project mobilization.

If you have any questions, please contact Nina Akgündüz at (513) 648-3110.

Sincerely,

Johnny Reising

FEMP:Akgündüz

Johnny W. Reising
Fernald Remedial Action
Project Manager

Enclosure:

cc w/enclosure:

J. Saric, USEPA-V, SRF-5J
T. Schneider, OEPA-Dayton (total 3 copies of enc.)
M. Schupe, HSI GeoTrans
F. Barker, Tetra Tech
AR Coordinator, FDF/78

cc w/o enclosure:

N. Hallein, EM-42/CLOV
R. Beaumier, TPSS/DERR, OEPA-Columbus
A. Tanner, DOE-FEMP
F. Bell, ATSDR
R. Vandegrift, ODH
T. Hagen, FDF/65-2
J. Harmon, FDF/90
R. Heck, FDF/2
S. Hinnefeld, FDF/2
D. Paine, FDF/52-4
EDC, FDF/52-7

FLUOR DANIEL FERNALD

IFB NO. F98B157563

CONTRACT NO. FSC 631

SILOS INFRASTRUCTURE PROJECT

PART 6
STATEMENT OF WORK

August 11, 1998
Rev.1

PART 6
CONTRACT NO. FSC 631
STATEMENT OF WORK
SILOS INFRASTRUCTURE

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PART 6
CONTRACT NO. FSC 631
STATEMENT OF WORK
SILOS INFRASTRUCTURE

1.0 GENERAL SCOPE OF WORK

Furnish all labor, supervision, administration, material, tools and equipment for construction of the Silos Infrastructure Project. Work shall be performed in accordance with the provisions of this Statement of Work and the drawings and specifications listed in ***Part 7 - Technical Specifications and Drawings, Part 8 - Environmental Health and Safety/Training Requirements; and Part 9 - Quality Assurance Requirements***. The work shall include, but not be limited to, the civil/structural, electrical, and mechanical work to provide roadways, related drainage system, electrical system modifications to support access needs around Operable Unit 4 (OU4).

2.0 SPECIFIC DESCRIPTION OF WORK

2.1 Initial Survey

Initial survey control points have been provided by FDF. These include monuments with coordinates and elevation bench marks. The locations are indicated on the drawings. Reference points that are damaged or destroyed by the Contractor will be reestablished by FDF at the Contractor's expense. The Contractor shall furnish, place, and maintain construction layout stakes necessary for proper execution of work.

The Contractor shall locate and reference the centerline of the road and intersects and streets, and shall be responsible for having the finished work conform to the lines, grades, elevations and dimensions called for in the drawings.

2.2 Road Construction

Road construction of approximately 3,500 feet includes all labor, materials, and equipment to perform the following:

- Mobilization - erection of temporary fencing, and maintenance of pedestrian access and access to the Vitrification Pilot Plant and associated trailers.
- Site clearing - removal of surface debris, topsoil, excavation, and fencing.
- Installation of erosion control.
- Installation of used or new fencing.

- Earthwork - excavation, backfill and compaction, sampling and testing, trenching for utilities, and site grading.
- Stabilization of the creek bank south of Silo 1.
- Installation of culvert and catch basins, backfill, compaction, and rough and finish grading.
- Paving (base course and surface course placement) roadway in accordance with the drawings and specifications.
- Painting of roadway lines and crosswalks.
- Installation of traffic signs.
- Installation of guard rails and bollards.
- Seeding and stabilization of the disturbed soil.
- Relocation of the existing survey monument 101 to the foundation of the relocated camera tower.

2.3 Electrical

Electrical construction includes all labor, materials, and equipment to perform the following:

- Installation of new wood poles for power, and lighting.
- Removal of existing poles and electrical wiring.
- Removal of existing transformer and poles on 34.5KV line.
- Relocation of electrical feeders.
- Rerouting of overhead 480V lines.
- Installation of a new 480V feeder from the Vitrification Pilot Plant.
- Rerouting of overhead lines to cameras and radon monitors.
- Installation of a new 34.5KV/480V 1000KVA XFMR and 480V SWGR with breakers.

- Installation of feeder and embedded conduits as shown on drawings.

- Installation of new road way lighting.
- Installation of fence grounding and other grounding in accordance with the drawings and specifications.
- Relocation of 2 light poles.
- Removal of a 480V generator, panels, and wiring as shown on drawings and specifications.

2.4 Camera Tower

Camera tower relocation includes all labor, materials, and equipment to perform the following:

- Concrete foundation pouring.
- Disconnection of electrical power and signal cable.
- Relocation of the tower to new location.
- Connection of electric power and signal cable.

3.0 GENERAL REQUIREMENTS

The following general requirements shall be applicable to all phases of the project.

3.1 General Construction Requirements

3.1.1 Safe Work Plans

The Contractor shall develop and issue Safe Work Plans for each task associated with construction. The Safe Work Plan will provide instructions and provide documentation/records to document construction activities, including in-process testing (reference ***ACR-002 in Part 7 - Section 2.1)***.

Safe Work Plans are documentation packages assembled for each task. These packages shall contain all related documentation/records, material receipt inspections, drawings, specifications, and manufacturer instructions, as required for construction.

Each Safe Work Plan not in use in the field shall be returned to the designated, secured, and controlled storage location. These documentation files shall be maintained current by the Contractor.

FDF shall review and concur with each Safe Work Plan prior to implementation. Prior to the issuance of the Safe Work Plan, FDF has the option to note FDF hold points for inspections, Quality Assurance oversight, or confirmation of work performed on the documentation/records. The Contractor shall provide FDF with copies of the approved Safe Work Plans.

Submittal of the Safe Work Plan(s) shall be in accordance with the Contractor's Submittal Register (***Exhibit 6.2***).

The Contractor shall provide daily instruction to his supervision, craft personnel, and appropriate FDF personnel on the specifics of the Safe Work Plans being used to perform work that day.

3.1.2 Construction Waste Management

The Contractor shall be responsible for the proper disposal of all waste materials generated from construction activities. Material disposition shall be in accordance with the ***Waste Management Requirements and ACR-007 (Part 7 - Section 2.1).***

3.1.3 Construction Acceptance Testing (CAT)

The Contractor shall develop a Construction Acceptance Test Plan (CAT) in accordance with the requirements identified below, and submit the CAT Plan for FDF concurrence review. The Contractor shall utilize the Safe Work Plans to perform and document the CAT activities.

The CAT Plan shall describe:

- Test Planning
- Testing Execution
- Documentation of activities and testing to ensure that construction is in accordance with:
  - Design Requirements;
  - Regulations;
  - Codes;
  - Standards; and
  - Components, systems, and structures are installed and constructed correctly, and operate as intended.

3.1.4 Special Requirements

The Contractor shall schedule the start of work on the road at the K-65 Trench Crossing and proceed in a northerly direction.

All soil removed during construction of the roadway shall be maintained and stored according to requirements listed in the ***Waste Management Requirements***.

The Contractor shall be aware that during construction of the roadway, other contractors will require access to the area. The area of concern is the existing 2nd Street, north of the Vitrification Pilot Plant. The Contractor shall allow access on a scheduled basis for the projects listed below:

- AWWT Project
- ARASA Project
- SWP Project (Access to Waste Pit # 2)

3.1.5 Fugitive Dust Control

The Contractor shall perform fugitive dust control and submit a Fugitive Dust Control Plan in accordance with ***Exhibit 6.4***.

4.0 MATERIAL, OR EQUIPMENT FURNISHED BY THE CONTRACTOR

The Contractor shall furnish material and/or equipment required to perform the work as specified in this document.

5.0 INTERFACES AND RESTRAINTS

The Contractor will interface with FDF and other organizations through the Construction Contracts Manager (CCM) as required, and must allow for resulting delays as identified in ***Table 6-1***.

The Soils and Water Project shall have construction activities require access from the Haul Road along 2nd Street to the northwest corner of the Bio Surge Lagoon. Construction activities are scheduled to occur from March 1999 to October 1999.

The OU2 Haul Road, shown on ***94X-5500-G-5000X, Space Allocation Site Plan OU4***, which is used for across site soil transport is forecast to be in use during the Silos Infrastructure Project activities as follows: June 1998 to November 1998, March 1999 to November 1999, and March 2000 to November 2000 (approximate periods subject to change).

Section 5.0
(continued)

TABLE 6-1
FDF TURN AROUND TIME

TASK	FREQUENCY	APPROXIMATE DURATION	RESPONSIBLE GROUP
Respirator Issue	As Required	5 min.	Rad Safety
Tool & Equipment Entry Inspection	Per Delivery	1.5 hrs.	FDF Health and Safety
Delivery Truck Inspections	Per Delivery	0.5 hrs.	FDF Health and Safety
Confined Space Monitoring	Daily	0.5 hrs.	FDF Health and Safety
Exit Monitoring	As Required	1.5 hrs.	FDF Rad Safety
Removal of Tools & Equipment from Site	As Required	Up to 5 Days	FDF Rad Safety
Container Prep Material	As Required	10 Days	FDF Waste Management
Delivery of Washable PPE	Daily	10 Days	FDF Construction Coordinator
Permits	As Required	10 Days	FDF Construction Coordinator
Container Delivery	As Required	10 Days After Notification	FDF Waste Management
Swipe Test for Equipment and Material Release	As Required	2 hrs	FDF Rad Safety
Haul Road Crossings	As Required	*Up to .5 hr	FDF Rad Safety

* Note: The Haul Road shall provide crossing access for 5 minutes on each half hour between the hours of 6:30 AM to 5:00 PM five days a week. All other times, the Haul Road crossing shall remain open.

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5.1 Delivery of Contractor Furnished Material and Equipment

All shipments to the Contractor shall be marked with the Contractor's name and FDF Contract number.

Upon arrival of common carrier or Contractor delivery shipments, FDF will notify the Contractor by radio or phone.

For all shipments, the Contractor shall provide a qualified escort (refer to note below) and escort the carrier to the Contractor's unloading point for unloading by the Contractor.

Deliveries by the Contractor's truck shall be made at the main gate. FDF will contact the Contractor who is required to send an escort within one-half hour. The Contractor shall escort his truck to the Contractor's unloading point for unloading by the Contractor.

The Contractor shall provide trained personnel to serve as escorts and coordinate the dates and times that escorts will be required. Escorts are to be RAD I trained to enter Controlled Areas and RAD II trained to enter Contamination Areas.

NOTE: The Contractor is responsible for the following:

1. All drivers must be escorted unless they are trained in accordance with the site requirements.

2. The driver must be issued a TLD badge.

6.0 TEMPORARY FACILITIES AND UTILITIES

6.1 Utilities

The Contractor will be given access, without charge, to limited electrical, and water services in the vicinity of their work site. The quantities and characteristics of these utilities will be limited to that which is available from existing outlets in the following locations:

- Power: 100 Amp 3 Phase 480 V at Pole #681, a 200 Amp 1 Phase 240 V, for an office/break trailer at Pole #673. The location of the panels are identified on ***drawing 94X-6100-E-02230.***

Non-Potable Water: Water line availability is identified on project ***Sketch 94X-5500-X-SK-1033***. The Contractor shall be responsible for maintaining this line during the project, including cold weather protection during the winter.

6.2 Telephone Lines

FDF will provide two telephone lines and a facsimile line to the Contractor's office trailer. This service includes two telephones and telephone service. Only FDF telephone equipment shall be used on the site, additional telephone equipment will be made available, upon request, at the Contractor's cost. Communications services may be suspended if misused.

6.3 Drinking Water

The Contractor shall be required to furnish all drinking water. Locations for drinking water will be submitted to FDF in accordance with ***Part 8 - Section B.3.3.***

6.4 Temporary Buildings

The Contractor may bring temporary field offices, break trailers, tool trailers, etc., onto site for use during performance of the Contract. A general location of these facilities is shown on ***Sketch 94X-5500-X-SK-1033***. The Contractor shall submit the number, type, size and a sketch of the proposed location of each facility for approval by FDF prior to mobilization. These temporary facilities shall meet the requirements outlined in ***ACR-006*** (reference ***Part 7 - Section 2.1***).

6.5 Protection of Utilities

The Contractor shall install barricades, bollards, steel plates, signage, etc. as required to protect utilities from damage.

7.0 SITE LOCATION, ACCESS, LAY DOWN AREAS AND LIMITS OF CONSTRUCTION AREA

7.1 Job-Site Location

- The exact job-site location and access to the job-site are shown on ***Drawing 94X-6100-X-02208.***

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7.2 FDF Address

Mailing	Shipping
Fluor Daniel Fernald Attn.: John Eckford Mail Stop 44 P. O. Box 398704 Cincinnati, OH 45239-8704	Fluor Daniel Fernald Attn.:_____ 7400 Willey Road Fernald, OH 45030

7.3 Contractor Activities

- Contractor activities shall be limited to the construction boundaries shown on ***Drawing 94X-6100-X-02208.***

7.4 Contractor Storage Areas

- Contractor storage areas are shown on ***Sketch 94X-5500-X-SK-1033***. All Contractor storage areas are to be restored to original conditions prior to contract completion.

7.5 Construction Zone Fencing

- The Contractor shall install construction zone fencing (orange snow fencing) around the work area as identified by ***Sketch 94X-5500-X-SK-1034.***

8.0 PAY ITEM DESCRIPTIONS

8.1 Pay Item Descriptions

- The Pay Item Descriptions, defined in ***Exhibit 6.1,*** list the activities for which the Contractor shall report progress and use for invoicing.

8.2 Proposed Value Submission

Within ten calendar days after Notice to Proceed, the Contractor shall submit a proposed value for each pay item (reference ***Part 4 - Pay Item Schedule Invoice***). The values shall correspond to the descriptions of the activities in the Pay Item Description; including profit, overhead, insurance, and training. Submittal documents not specifically listed as a pay item shall be allocated to each pay item proportional to its value. FDF will review each pay item value to ensure that the value is consistent with the work to be performed. Pay item values not found acceptable, shall be revised and resubmitted. Payments cannot be made until FDF approves the pay item values.

9.0 CONTRACTOR'S PROJECT SCHEDULE

The Contractor's Project Schedule shall be a Critical Path Method Schedule (CPM) with two levels that clearly identify all logic ties, and project critical path from Notice to Proceed through project completion. The first level being at the Pay Item level (Pay Item Layout) and the second level being at the activity level (Detailed Layout). Activities will roll up to support the Pay Items.

The schedule shall be submitted for compliance review within 10 days after Notice to Proceed. The initial Contractor's Project Schedule, once approved by FDF, will be known as the Baseline Schedule. This schedule will be used for comparison with the updated monthly project schedule and shall not be revised without concurrence from FDF.

9.1 Schedule Layouts

- Pay Item Layout

  The Pay Item Layout is a roll up of the Contractor's Detailed Layout by pay item. This layout will only contain pay item activities sorted by early start dates. The percent complete of these pay items will be the basis for determining percent complete and dollar value earned on the monthly submitted invoice.

- Detailed Layout

  This schedule layout will show activities and provide the ability to: analyze schedule performance, analyze trends, identify recovery/corrective action plans, identify opportunities for improvement, and forecast future achievements. Activities are defined as schedule elements of sufficient detail to adequately evaluate percent of activity completion on a weekly basis. Activities shall, at a minimum, be grouped by *Pay Items* and sorted by *Early Start Dates*. The activity may be a pay item when it is of sufficient detail to meet the definition of the activity. The schedule activities shall also be coded with their corresponding Pay Item ID code.

  The Detailed Layout shall be resource loaded by activity to show man-hours by craft (carpenters, laborers, operators, etc.) expected to be utilized for each activity. Activities will also be resource loaded with a breakdown of pay item values.

9.2 Monthly Updates

The Project Schedule shall be updated monthly with the baseline schedule shown as target in each layout.

Approximately 5 working days prior to the monthly invoice cut-off dates (reference ***Part 4 - Exhibit 5***), the Contractor shall schedule a "progress review meeting" with FDF. The percent complete for each activity will be summarized by Pay Item in the Contractor's Project Schedule and shall be the basis for the amount invoiced for that pay item. A final copy of the updated Project Schedule shall be submitted to FDF by the month end cut-off date.

Monthly Project Schedule Update shall include:

- Actual or projected start and finish dates;
- Activity percent complete and remaining duration;
- Bar Chart Schedule comparing the current schedule to the baseline schedule; and
- Revisions to the craft resource, actual to date and estimate to complete in man-hours.

9.3 Four Week Rolling Schedule

The Contractor shall develop a rolling schedule which windows four (4) weeks of the Contractor Detailed Layout. This schedule will consist of the past week, present week and the next two weeks to come. The Contractor shall meet with the FDF Construction Scheduler to review/prepare the weekly Four Week Schedule prior to the Weekly Contractor Coordination Meeting throughout the duration of the project. The format is shown in ***Exhibit 6.3***.

9.4 Contractor's Schedule Software

The Contractor is required to use the latest version of *Primavera's P3* software to prepare the required project schedules. A computer disk containing the updated project schedule shall be submitted along with the schedule update.

10.0 SUBMITTALS

10.1 Contractor Submittal Register

- The Contractor shall make all submittals as listed on ***Exhibit 6.2*** or as otherwise specified by this document.
- The Contractor shall provide submittals in accordance with ***ACR-001***, listed in ***Part 7 - Section 2.1***.
- The Contractor is responsible for making all submittals required to perform the work as specified in this Contract.

EXHIBIT 6.1
PAY ITEMS

PAY ITEM NO.	PAY ITEM DESCRIPTION	DETAILED PAY ITEM DESCRIPTION
1.0	Performance and Payment Bond and Insurance	The Contractor shall procure and provide performance and payment bond and insurance certificates on self and sub-tiered contractors.
2.0	Mobilize	• The Contractor shall develop a Health and Safety Plan. • The Contractor shall submit for approval, subcontractor list. • The Contractor shall submit Quality Plan, proposed value for each pay item, and a Safe Work Plan to include dust control. • The Contractor shall submit a Detailed Construction Schedule. • The Contractor shall place office trailers, deliver necessary equipment, tools, and materials. • The Contractor shall provide protection for the abandoned and active wells, install perimeter fencing, and submit Traffic Control Plan.
3.0	Roadwork	
3.1	Clearing and Grubbing	• The Contractor shall remove and stockpile 6" of topsoil. • The Contractor shall remove and reinstall fencing.
3.2	Prepare Grade for Road	• The Contractor shall excavate for the road and ditches. • The Contractor shall place fill material and compact. • The Contractor shall proof roll and subgrade.
3.3	Temporary Erosion and Sediment Controls	• Filter fabric fence.
3.4	Install Culvert Piping	The Contractor shall excavate for piping; backfill for piping; place bedding material for piping; dispose of on site, excess excavated material; install piping and flared ends; install outfall protection; and, compact subgrade.
3.5	Asphalt Paving	The Contractor shall install asphalt paving.
4.0	ELECTRICAL	
4.1	Demolition of existing poles, wiring, and transformers	• Removal of existing electrical poles, electrical wiring, and transformers as shown on drawings and specifications.
4.2	Installation of electrical poles, wiring, and transformers	• Installation of new wood poles for power and lighting. • Relocation of electrical feeders, rerouting of overhead 480V lines. • Installation of embedded conduits, grounding per drawings and specification.

4.3	Installation of 34.5KV/480V 1000KVA XFMR and 480V SWGR with breaker	• Installation of 34.5KV/480V 1000KVA XFMR and 480V SWGR with breakers per drawings and specification.

EXHIBIT 6.1
PAY ITEMS
(continued)

PAY ITEM NO.	PAY ITEM DESCRIPTION	DETAILED PAY ITEM DESCRIPTION
4.4	Camera and Radon Monitors	• Relocation of existing camera, new camera tower foundation, connection of electrical and signal cables, electrical and signal cables to radon monitors per drawings and specification.
4.5	Roadway Lighting	• Installation of new roadway lighting and relocation of existing roadway lighting per drawings and specification.
4.6	480V Generator	• Removal of existing 480V generator and associated hardware per drawings and specification.
5.0	Installation of Traffic Signs	The Contractor shall install curve signs and posts, speed signs and posts, stop signs and posts.
6 .0	Asphalt Striping	The Contractor shall perform asphalt striping of edge line, center line, channeling line, stop line, and transverse line.
7 .0	Final Seeding and Mulching	The Contractor shall be responsible for seeding, mulching, and fertilizing.
8 .0	Dust Control	Per Contractor's Dust Control Plan.
9.0	Excess Soil Disposal	
9.1	Option 1	The Contractor shall load RCRA contaminated soil into boxes for FDF disposal. The volume of each box is 3.7 cubic yards. The estimated volume of RCRA material is 250 cubic yards.
9.2	Option 2	Soil that exceeds the OSDF WAC for Technetium 99 and/or total uranium shall be staged north of the high nitrate tank as shown on drawing 94X-5500-X-SK-1035. The Contractor shall then load the soil into trucks provided by a current site Contractor. The estimated volume is 1500 cubic yards.
10.0	Demobilize	The Contractor shall complete the execution of the final punchlist items, provide as-built drawings, decontaminate equipment (final) and remove all equipment from the jobsite.

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EXHIBIT 6.2
CONTRACTOR SUBMITTAL REGISTER

Contract No. _____

Contract Title _____

Contractor _____

* Submitted directly to the FDF CCM

Submittal Due Dates

A = 15 days prior to notice to proceed
B = 30 days from notice to proceed
C = 90 days from notice to proceed
D = 30 days prior to start of the activity
E = Prior to start of activity
F = Prior to purchase
G = 30 days after preliminary design
H = 90 days prior to start of construction
I = 30 days prior to start of construction
J = 5 days prior to site access
K = 2 days prior to entry

L = 10 days prior to bringing on site
M = 10 days after completion of activity
N = 20 days after completion of activity
O = 60 days prior to turnover to start-up
P = 30 days prior to turnover to start-up
Q = 20 days prior to readiness review
R = Upon completion of project
S = 2 days prior to site access
T = 10 days after notice to proceed
U = 60 days prior to scheduled use
V = Prior to leaving FEMP

Submittal No. (1)	Submittal Type (2)	Document Family (3)	Document Description (4)	Submittal Due Date (5)	FDF Review (6)
40315-631-P2-001	INF	Procurement	Performance Bond	A	N/A
40315-631-P2-002	INF	Procurement	Payment Bond	A	N/A
40315-631-P2-003	INF	Procurement	PLA Letter of Assent	A	N/A
40315-631-P2-004	INF	Procurement	Statement of Acknowledgment	A	N/A
40315-631-P2-005	CFC	Procurement	Subcontracting Plan/Subcontract List	A	30 days
40315-631-P3-001	INF	Procurement	Certified Payrolls	Monthly	N/A
40315-631-P4-001	INF	Construction	*Entry Check List	J	N/A
40315-631-P4-002	CFC	Engineering	Red Line Drawings	N	30 days
40315-631-P4-003	INF	Construction	List of Contractor's Tools and Equipment	L	N/A
40315-631-P4-004	INF	Procurement	Invoices	Monthly	N/A
40315-631-P4-005	INF	Construction	*Daily Reports	Daily	N/A
40315-631-P4-006	INF	Construction	*Contractor Termination Check List	V	N/A
40315-631-P4-007	INF	Construction	Fuel Storage Tank	K	N/A
40315-631-P4-008	INF	Construction	Fastener Quality Act	R	N/A

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EXHIBIT 6.2
CONTRACTOR SUBMITTAL REGISTER
(continued)

Contract No. _____

Contract Title _____

Contractor _____

* Submitted directly to the FDF CCM

Submittal Due Dates

A = 15 days prior to notice to proceed
B = 30 days from notice to proceed
C = 90 days from notice to proceed
D = 30 days prior to start of the activity
E = Prior to start of activity
F = Prior to Purchase
G = 30 days after preliminary design
H = 90 days prior to start of construction
I = 30 days prior to start of construction
J = 5 days prior to site access
K = 2 days prior to entry
L = 10 days prior to bringing on site
M = 10 days after completion of activity
N = 20 days after completion of activity
O = 60 days prior to turnover to start-up
P = 30 days prior to turnover to start-up
Q = 20 days prior to readiness review
R = Upon completion of project
S = 2 days prior to site access
T = 10 days after notice to proceed
U = 60 days prior to scheduled use
V = Prior to leaving FEMP

Submittal No. (1)	Submittal Type (2)	Document Family (3)	Document Description (4)	Submittal Due Date (5)	FDF Review (6)
40315-631-P6-001	INF	Procurement	*Project Schedule Updates	Monthly	N/A
40315-631-P6-002	INF	Procurement	Baseline Schedule	T	10 Days
40315-631-P6-003	INF	Construction	Submittal Register	T	N/A
40315-631-P6-004	CFC	Construction	Fugitive Dust Control Plan	I	30 Days
40315-631-P6-005	CFC	Construction	Safe Work Plan(s)	D	30 Days
40315-631-P6-006	INF	Construction	4 Week Rolling Schedule	Weekly	N/A
40315-631-P6-007	CFC	Construction	Pay Item Schedule	T	30 Days
40315-631-P7-001	CFC	Engineering	Technical Submittals	F	10 Days
40315-631-P8-001	INF	Health and Safety	Substance Abuse Plan	E	N/A
40315-631-P8-002	INF	Health and Safety	Daily Safety Briefing	Daily	N/A
40315-631-P8-003	CFC	Health and Safety	Contractor's Health and Safety Program	A	30 Days
40315-631-P8-004	INF	Health and Safety	Certification of Training	E	N/A
40315-631-P8-005	INF	Health and Safety	Request for Access	J	N/A
40315-631-P8-006	CFC	Health and Safety	Project Specific Health and Safety Plan	I	30 days
40315-631-P8-007	INF	Health and Safety	Monthly Manpower Report	Monthly	N/A

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EXHIBIT 6.2
CONTRACTOR SUBMITTAL REGISTER
(continued)

Contract No. _____

Contract Title _____

Contractor _____

* Submitted directly to the FDF CCM

Submittal Due Dates

A = 15 days prior to notice to proceed
B = 30 days from notice to proceed
C = 90 days from notice to proceed
D = 30 days prior to start of the activity
E = Prior to start of activity
F = Prior to Purchase
G = 30 days after preliminary design
H = 90 days prior to start of construction
I = 30 days prior to start of construction
J = 5 days prior to site access
K = 2 days prior to entry
L = 10 days prior to bringing on site
M = 10 days after completion of activity
N = 20 days after completion of activity
O = 60 days prior to turnover to start-up
P = 30 days prior to turnover to start-up
Q = 20 days prior to readiness review
R = Upon completion of project
S = 2 days prior to site access
T = 10 days after notice to proceed
U = 60 days prior to scheduled use
V = Prior to leaving FEMP

Submittal No. (1)	Submittal Type (2)	Document Family (3)	Document Description (4)	Submittal Due Date (5)	FDF Review (6)
40315-631-P8-008	CFC	Health and Safety	Hazardous Chemical List	I	30 Days
40315-631-P8-009	CFC	Health and Safety	Lifting Plan	E	10 Days
40315-631-P8-010	INF	Health and Safety	Mobile Cranes/Boom Truck Inspection Report	R	N/A
40315-631-P8-011	INF	Health and Safety	Form FS-F-5077 Scaffold Inspection Check List	R	N/A
40313-631-P8-012	INF	Health and Safety	Form FS-F-4932 Full Body Harness & Lanyard Inspection Sheet	R	N/A
40315-631-P8-013	CFC	Health and Safety	Fall Protection Equipment Training Certificates	D	30 Days
40315-631-P8-014	INF	Health and Safety	Aerial Lifts, Vehicular Mounted Elevating and Rotating Platforms, etc. Operators Safety Instruction Documentation	R	N/A
40315-631-P8-015	INF	Health and Safety	Motorized Equipment Daily Inspection Documents	R	N/A
40315-631-P8-016	INF	Health and Safety	Excavation Entry and Daily Inspection Records	R	N/A
40315-631-P9-001	CFC	Quality	Quality Assurance Plan	B	30 days

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EXHIBIT 6.3
FOUR WEEK SCHEDULE

SILOS INFRASTRUCTURE PROJECT
Contractor _____ MONTH _____ YEAR 19_____

ACTIVITY NUMBER	ACTIVITY DESCRIPTION	FOREMAN	WEEK	LAST WEEK							THIS WEEK							NEXT WEEK							SECOND WEEK							REMARKS
			DATE																													
			DAY	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	
			SCH. BAR																													
			CRAFT QTY.																													
			SCH. BAR																													
			CRAFT QTY.																													
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			SCH. BAR																													

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EXHIBIT 6.3
FOUR WEEK SCHEDULE

SILOS INFRASTRUCTURE PROJECT
Contractor _____ MONTH _____ YEAR 19____

ACTIVITY NUMBER	ACTIVITY DESCRIPTION	FOREMAN	WEEK	LAST WEEK							THIS WEEK							NEXT WEEK							SECOND WEEK							REMARKS
			DATE																													
			DAY	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	
			CRAFT QTY.																													
			SCH. BAR																													
			CRAFT QTY.																													
			SCH. BAR																													
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			CRAFT QTY.																													

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EXHIBIT 6.4
FUGITIVE DUST CONTROL REQUIREMENTS

1.0 FUGITIVE DUST CONTROL PLAN

1.1 The Contractor shall develop a Dust Control plan based on the requirements stated in this document for controlling fugitive dust emissions and ensuring compliance with standards and site-specific limits defined in this document.

1.2 The Contractor shall submit the Dust Control Plan to Fluor Daniel Fernald for compliance review. This plan shall be part of the "Safe Work Plan" (reference ***ACR-002*** listed in ***Part 7 - Section 2.1***). The Dust Control Plan shall demonstrate the Contractor's understanding of the importance of dust suppression on this project. It shall be adequate for all work areas. FDF's compliance review of this plan does not relieve the Contractor of any responsibilities regarding the suppression of dust under the terms of this subcontract. This plan shall include but not be limited to the following:

- A listing of specific types and quantities of equipment to be used to suppress dust.
- A listing of proposed methods and materials that will be used to proactively suppress dust and the frequency that routine dust suppression is to take place.
- A narrative description of how the Contractor field personnel will implement the Dust Control Plan and how they will monitor for excessive or visible dust, including how records will be kept and where they will be maintained
- A description of the notification process that the Contractor intends for FDF to utilize during non-work periods to inform the Contractor of a Dust Alert.

2.0 FUGITIVE DUST CONTROL REQUIREMENTS

2.1 The Contractor shall proactively suppress dust releases from each field activity by applying Best Available Technology (BAT) dust control, such as the application of water, dust suppression agents, or other appropriate methods approved by appropriate FDF personnel and/or implementing BAT work practices at the beginning and during each field activity.

- Project field activities shall be continuously monitored by the Contractor for visible emissions.

EXHIBIT 6.4
FUGITIVE DUST CONTROL REQUIREMENTS
(continued)

- FDF will provide Opacity monitoring for each project and forward the information to the Contractor.

- All dust-generating field activities in an observed area shall cease immediately if a fugitive dust limit is exceeded. An increase in BAT dust controls and/or work practices shall be implemented to bring the fugitive dust emissions below the limit during dust-generating activities (including wind erosion). Work shall not be restarted until FDF is completely satisfied that the method to suppress the fugitive dust has been executed by the Contractor.

2.2 The Contractor shall have personnel on-call as defined in the plan during non-work periods seven (7) days per week (including holidays) to respond to an off hours dust alert. The Contractor shall provide a list of his personnel that will be on-call during non-work periods. Dust suppression is to begin no more than two (2) hours after notification by FDF during non-work periods.

- The Contractor shall apply enough BAT dust control material to bring the fugitive dust emissions below the standard or site-specific limit during dust-generating activities (e.g. wind erosion).

- The Contractor shall not leave the site without FDF concurrence that sufficient controls are in place.

2.3 Activities May Include

Some of the activities which may require dust suppression are as follows:

- Hauling material and equipment;
- Vehicle and equipment traffic;
- Excavation;
- Trenching;
- Loading/Unloading;
- Transportation to Defined Roadway (paved or unpaved);
- Load-in/Load-out on Storage Piles;
- Materials Placement into Onsite Disposal Cell;
- Vehicle Traffic on Storage Piles; and
- Wind Erosion from Working Faces.

EXHIBIT 6.4
FUGITIVE DUST CONTROL REQUIREMENTS
(continued)

2.4 Definitions

Paved Roadway or Paved Parking Area: a predetermined area designed and improved specifically for vehicle traffic. Improvements to the predetermined area are the application of materials such as asphalt or concrete that forms a firm level surface for travel.

Unpaved Roadway or Unpaved Parking Area: a predetermined area designed and improved specifically for vehicle traffic. Improvements to the predetermined area include the application of gravel, shredded shingles, cinders, compaction, etc. to the delineated area.

Wind Erosion of Storage Piles: fugitive emissions from storage piles strictly created by the wind (and not by material handling equipment or vehicle traffic).

Visible Particulate (Fugitive) Emissions: visible airborne particulate that are generated from the operation of heavy equipment, equipment wheels or tracks, any tools, or vehicle wheels. Visible particulate emissions are also those generated by wind erosion. [Regulatory methods that will be used for visual determination of fugitive emissions are 40 CFR 60 Appendix A, Method 9 (used by FDF); "Visual Determination of Opacity of Emissions from Stationary Sources;" and, Method 22 (used by the Contractor) "Visual Determination of Fugitive Emissions from Materials Sources and Smoke Emission from Flares".]

Material Handling/Vehicle Traffic on Storage Piles: includes activities such as loading in and loading out of materials, excavation, and vehicle traffic on storage piles. Fugitive emissions created by the above activities on storage piles shall be subjected to the standard defined in this section. Fugitive emissions that can not be distinguished between material handling activities and wind erosion will be also subjected to the standard defined in this section.

2.5 Site-Specific Limit

The Contractor shall apply the following site-specific limits:

- Visible particulate emissions from any paved roadway or paved parking area shall not exceed one minute during any sixty-minute observation period.

EXHIBIT 6.4
FUGITIVE DUST CONTROL REQUIREMENTS
(continued)

- Visible particulate emissions from any unpaved roadway, unpaved parking area, project field activities, or wind erosion from storage piles shall not exceed three minutes during any sixty-minute observation period.

- Verification of compliance with this limit shall be performed using 40 CFR Part 60 Appendix A, Method 22 "Visual Determination of Fugitive Emissions from Materials Sources and Smoke Emissions from Flares."

2.6 Actions

The Contractor shall apply the following:

- At the start of each day and periodically during the day, project personnel (FDF and Contractor) shall tour paved and unpaved roads, paved and unpaved parking areas, storage piles, and project field activities taking place and proactively apply BAT fugitive dust controls and/or work practices to minimize dust generation.

- Before fugitive emissions are visible, BAT dust controls and/or work practices must be implemented or increased.

- If the limit is exceeded, all mechanical dust-generating activities such as traffic on roadway in the observed area must cease immediately. An increase of BAT dust controls and/or work practices shall be implemented to bring the fugitive emissions to, at a minimum, below the limit during dust-generating activities (including wind erosion).

2.7 BAT Dust Controls/Work Practices

The Contractor shall implement the following BAT Dust Control/Work Practices as applicable:

- Seal off work areas, stock piles, working piles, etc. before the end of each shift.

EXHIBIT 6.4
FUGITIVE DUST CONTROL REQUIREMENTS
(continued)

- In dry conditions, initiate dust control before each work shift and during lunch breaks.

- Wet sweep or otherwise remove any clods, clumps, tracks, or visible deposits of soil or mud from paved roadways or paved parking areas, applying appropriate dust control measures to suppress the generation of visible dust that may result from the sweeping or removal process.

- Remove, as practical, any clods, clumps, tracks, or visible deposits of soil or mud from unpaved roadways or unpaved parking areas, applying appropriate dust control measures to suppress the generation of visible dust that may result from the removal process.

- Repair or resurface roadways/parking areas as needed or use an alternative road surface as a last resort for unpaved roadways and parking areas.

- Maintain roadway shoulders.

- Minimize the amount of unnecessary traffic on roadways, parking areas and areas around field activities.

- Limit speed to 15 miles per hour operation of vehicles or equipment.

- Reduce the seed limit as required to minimize dust generation.

- Apply appropriate dust suppression agents such as water or surfactant to the materials being transported by truck load beds to ensure the transported materials will not become airborne. Soil and soil like material shall not be visible above the vehicle body.

EXHIBIT 6.4
FUGITIVE DUST CONTROL REQUIREMENTS
(continued)

- Cover truck load beds when transported materials are still likely to become airborne.
- Change configuration of material being transported (e.g. place less in truck).
- Minimize the height of drop during loading and unloading.
- Apply dust suppression materials approved by FDF such as water, resin, or equivalent combination of surfactant or crusting agents.
- Cover storage piles with a tarpaulin, plastic, etc., if practical.
- Roll soils in work areas and placed in stockpiles at the end of each work day.
- For extended periods of planned inactivity, vegetate as a last resort if protective cover or periodic application of surfactant or crusting agents proves ineffective.
- Change method of excavation/transport (e.g., from a front-end loader dumping into a truck to a self-propelled pan) when feasible.
- Wheel Washing.

3.0 TRAINING

3.1 Contractor personnel shall review and understand the information contained in this document and shall be trained in the plan pertaining to an individual's responsibilities.

3.2 The Contractor shall designate individuals that will require the appropriate training.

3.3 Personnel involved in performing compliance surveillance to ensure fugitive dust emissions from project field activities are meeting fugitive dust standards or limits, must have the following FDF provided training:

- 40 CFR 60, Appendix A, Method 22 "Visual Determination of Fugitive Emissions from Material Sources and Smoke Emission from Flares."

EXHIBIT 6.4
FUGITIVE DUST CONTROL REQUIREMENTS
(continued)

4.0 RECORDS

4.1 The Contractor shall complete a ***Control of Fugitive Dust Daily Record Form (Attachment 1)*** each time an application of dust suppression material is performed and submit the completed form(s) to FDF weekly.

Provide the following information:

- Identification of area that was treated and/or cleaned. Record using sketch on back of the form, or by attaching similar diagram at appropriate scale.
- The date the designated area was treated and/or cleaned.
- The manner in which the designated area was treated and/or cleaned.
- The application rate of dust suppression material; at a minimum, the tank truck load capacity and number of truckloads applied per unit of time per area (or segment) to which applied.
- The equipment operator (at a minimum, the name of the Contractor).

4.2 The Contractor shall document the "Visual Determination of Fugitive Emission" on the ***'Contractor Daily Activity Report,' Part 4 - Exhibit 1*** when performing visible emission monitoring for paved and unpaved roadways, paved and unpaved parking areas, and wind erosion from storage piles and submit the completed forms to FDF daily.

EXHIBIT 6.4
ATTACHMENT 1

Control of Fugitive Dust
Daily Record

Date:_____

TIME	AREA TREATED (see sketch)	TREATMENT METHOD	APPLICATION RATE	EQUIPMENT OPERATOR

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Silos Infrastructure Project
Technical Specifications
No. 40315-TS-0001

Operable Unit 4
WBS 2.1.3.G.R
DOE Project No. 40315
August 3, 1998
Rev.0

FLUOR DANIEL FERNALD

acting under Contract No. DE-AC24-920R21972 with
the United States Department of Energy

Construction work located at The Department of Energy's
Fernald Environmental Management Project
Fernald, Hamilton County, Ohio

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U.S. DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

DOE Project No. 40315

Silos Infrastructure Project
Technical Specifications No. 40315-TS-0001

APPROVAL SHEET

Prepared by: John Smets by RB 7-31-98
Date

Approved by: J S Strauch Date 7/31/98

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U.S. DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

WBS NO. 2.1.3.G.R
TECHNICAL SPECIFICATIONS

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II	Approval Sheet	0	06/02/98
III	Table of Contents	0	06/02/98
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01012	Schedule of Drawings	0	06/02/98
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02200	Earthwork	0	05/06/98
02220	Roadway Excavation and Embankment	0	06/02/98
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02270	Erosion and Sediment Control	0	06/02/98
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SECTION 01010
GENERAL REQUIREMENTS

PART 1 GENERAL

1.1 SCOPE

A. These general requirements form a part of the technical divisions of these specifications. For all other requirements, reference ***Part 6, Statement of Work.***

B. In all cases where the words "A/E Subcontractor" appear in these specifications, it shall be understood to refer to Fluor Daniel Fernald (FDF) or to such other individuals or organizations acting within the scope of the specific duties entrusted to them.

C. In all cases where the term "Vendor," "Seller," "Manufacturer," "Offeror," or similar term appears in these specifications or in the appendices to these specifications, they shall be understood to refer to an individual of firm(s) providing materials, equipment, and services, as noted, under a subcontract to FDF.

D. In all cases where the words "Owner's Agent" or "Construction Manager" appear, they shall be understood to refer to FDF.

E. All work shall be accomplished in accordance with the following code requirements:

1. Ohio Basic Building Code (OBBC) 1995.
2. Uniform Building Code (UBC) 1994.
3. Code for Safety to Life from Fire in Buildings and Structures (NFPA 101, Life Safety Code) 1994.

1.2 SITE AND SCOPE

A. The intent of these specifications is to provide the technical information required and to perform and complete the work required by the Contractor.

B. The Contractor shall provide all labor, services, materials, and equipment, and perform the work necessary to accomplish this within the limits of work as defined in the Contract.

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C. Environmental Conditions

1. Environment
   a. Outdoor, low-level radioactive, contaminated area.
2. Plant Condition
   a. Location: Fernald, Ohio.
   b. Elevation: 578 feet above Mean Sea Level (MSL).
   c. Ambient Temperature: -10 to 110 degrees Fahrenheit (F).
   d. Barometric Pressure: 29.31 inches Hg. Absolute (mean at 70 degrees F).
   e. Relative humidity: 20 to 90 percent.

1.3 LIST OF MATERIALS, MANUFACTURERS, OR EQUIPMENT SUPPLIERS

A. The listing of materials, equipment, manufacturers, or equipment suppliers in these specifications in no way precludes the Offeror from proposing alternate materials, equipment, manufacturers, or equipment suppliers for any of the items to be furnished within the scope of these specifications, except where specifically precluded by these specifications. These lists are intended to identify the types and general quality of those items that shall be included in the Offeror's proposal. The Offeror shall be responsible for proposing the materials, manufacturers, or equipment which is best suited for this project in terms of quality and price.

1.4 SUBMITTAL

A. Reference ***Part 6, Section 10.0*** for submittals and ***ACR-001*** for procedures.

1.5 REFERENCE DRAWINGS

A. Each publication listed in the technical specifications shall be the latest revision and addendum in effect at the time of Contract and specification issuance unless notified otherwise. Except as modified herein or on drawing details, work included in this specification shall conform to the applicable provisions of these publications.

1.6 SPECIFICATION EXPLANATION

A. General

The technical specifications are the abbreviated, simplified, or streamlined type and include incomplete sentences. Omissions of words or phrases such as "the Contractor shall," "in conformity therewith," "shall be," "as noted on the drawings," "according to the plans," "a," "the," and "all" are intentional. Omitted words or phrases are supplied by inference in the same manner as they are when a "note" occurs on the drawings.

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The Contractor shall provide all items, articles, materials, operations, or methods listed, mentioned, or scheduled either on the drawings, or specified herein, or both, including all labor, materials, equipment, and incidentals necessary and required for their completion and installation.

For convenience of reference and to facilitate the letting of contracts, the specifications may be separated into titled divisions. Such separations, however, shall not operate to make the A/E Subcontractor an arbitrator to establish the limits of subcontracts in any manner. The following defines the separations referred to in the specifications:

1.	Division	Divisions (broad) of specifications (e.g., Div.16);
2.	Section	Sections (specific) of a division (e.g., Sec. 16020); and
3.	Article	Articles of a subsection (e.g., Article 2.1).

B. Definitions

Certain terms and words as used throughout the specifications shall be defined as follows, unless otherwise particularly specified:

1.	*Provide*	Furnish and install complete, in place;
2.	*Indicated*	As shown on the drawings and/or specified;
3.	*Directed* Authorized *Permitted*	Shall be as directed, authorized, or permitted by FDF;
4.	*Selected*	Shall be as selected by FDF;
5.	*Satisfactory* *Acceptable*	Satisfactory or acceptable to FDF;
6.	*Necessary* *Required* *Suitable*	As necessary, required, or suitable for the intended purpose as determined by FDF; and
7.	*Submit*	Submit to FDF unless otherwise specified.

1.7 QUALITY ASSURANCE

A. Testing

1. Use instruments which bear valid calibration stamps showing dates of calibration and expiration dates of stamps. Calibration and accuracy of test instruments shall be certified by an independent testing laboratory, having standards traceable to National Institute of Standards and Technology.

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B. Perform work in accordance with ODOT Standard Specifications, except as modified specifically otherwise herein.

- Maintain a copy of the ODOT Standard Specifications in the field office of the Contractor for use by FDF, as well as by the Contractor and the Contractor's employees. Do not remove from the field office.

C. The Contractor shall notify FDF at least 24 hours prior to date of anticipated inspection.

D. The Contractor shall identify Section 7 Division inspection, testing, and documentation requirements as required by ***Part 9, Quality Assurance*** Requirements.

1.8 ABBREVIATIONS OF REFERENCED STANDARDS AND SPECIFICATIONS

A. The following list denotes abbreviations used in the technical portions of these specifications:

Abbreviation	Authority
AASHTO	American Associations of State Highway & Transport.
ACI	American Concrete Institute
AGC	Associated General Contractors of America
AISC	American Institute of Steel Construction
AISI	American Iron And Steel Institute
ANSI	American National Standards Institute
APA	American Plywood Association
API	American Petroleum Institute
ASCE	American Society of Civil Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
AWPA	American Wood Preserver's Association
AWS	American Welding Society
AWWA	American Water Works Association
CAT	Construction Acceptance Test
CESH	Contractor Environmental Safety and Health Program
CFC	Certified for Construction
CFR	Code of Federal Regulations
FM	Factory Mutual System
FS	Federal Specifications
IEEE	Institute of Electrical and Electronics Engineers
IFB	Invitation for Bid

IMIAC	International Masonry Industry All-Weather Council
MSL	Mean Sea Level
NCMA	National Concrete Masonry Association
NEC	National Electrical Code
NEMA	National Electrical Manufacturers Association
NESC	National Electrical Safety Code
NETA	International Electrical Testing Association
NFPA	National Fire Protection Association
NIST	National Institute of Science and Technology
ODNR	Ohio Department of Natural Resources
ODOT	Ohio Department of Transportation
OMUTCD	Ohio Manual of Uniform Traffic Control Devices
PCA	Portland Cement Association
PCI	Prestressed Concrete Institute
UL	Underwriters Laboratories
USQ	Unreviewed Safety Question

END OF SECTION

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SECTION 01012
SCHEDULE OF DRAWINGS

1.1 DRAWINGS

A. Procurement and construction of the infrastructure road, and electrical power transmission and signal distribution may be conducted through multiple contracts. The following drawings constitute the overall design and will be made part of individual contracts, as appropriate.

	Drawing Number	Drawing Title
1)	94X-6100-X-02208	Title Sheet (vicinity map and drawing list)
2)	94X-6100-G-02209	Site Plan & Gen. Notes
3)	94X-6100-G-02210	Plan & Profile
4)	94X-6100-G-02211	Plan & Profile
5)	94X-6100-G-02212	Plan & Profile
6)	94X-6100-G-02213	X-Sections
7)	94X-6100-G-02214	X-Sections
8)	94X-6100-G-02215	X-Sections
7)	94X-6100-G-02216	X-Sections
8)	94X-6100-G-02217	X-Sections
9)	94X-6100-G-02218	Typical Roadway Section and Drainage Details
10)	94X-6100-G-02219	Intersection Details
11)	94X-6100-G-02220	Signing and Pavement Marking
12)	94X-6100-G-02221	Temporary Erosion Control
13)	94X-6100-E-02222	Existing Overhead Utilities - Silo Infrastructure - Feeder Modifications
14)	94X-6100-E-02223	Existing Overhead Utilities - Silo Infrastructure - Site Plan (Demolition)
15)	94X-6100-E-02224	Existing Overhead Utilities - Silo Infrastructure - Site Plan (Modifications)
16)	94X-6100-E-02225	Existing Overhead Utilities - Silo Infrastructure - Enlarge Plan (Plan and Details)
17)	94X-6100-E-02226	Existing Overhead Utilities - Silo Infrastructure - Pole Elevations
18)	94X-6100-E-02227	Existing Overhead Utilities - Silo Infrastructure - Pole Elevations

19)	94X-6100-E-02228	Existing Overhead Utilities - Silo Infrastructure - Pole Elevations
20)	94X-6100-E-02229	Existing Overhead Utilities - Silo Infrastructure - Site Plan (Demolition)
21)	94X-6100-E-02230	Existing Overhead Utilities - Silo Infrastructure - Site Plan (Modifications)
22)	94X-6100-E-02231	Existing Overhead Utilities - Silo Infrastructure - Pole Elevations
23)	94X-6100-E-02232	Existing Overhead Utilities - Silo Infrastructure - Pole Elevations
24)	94X-6100-E-02233	Existing Overhead Utilities - Silo Infrastructure - Pole Elevations
25)	94X-6100-E-02234	Existing Overhead Utilities - Silo Infrastructure - Pole Elevations
26)	94X-6100-E-02235	Existing Overhead Utilities - Silo Infrastructure - Miscellaneous Details
27)	94X-6100-E-02236	Existing Overhead Utilities - Silo Infrastructure - Below Grade Duct Banks (Miscellaneous Details)
28)	94X-6100-E-02237	Existing Overhead Utilities - Silo Infrastructure - Below Grade Duct Banks (Miscellaneous Details)
29)	94X-6100-E-02238	Existing Overhead Utilities - Silo Infrastructure - 34.5KV Overhead Utilities (Pole & 1000 KVA Xfmr Details)
30)	94X-6100-E-02239	Existing Overhead Utilities - Silo Infrastructure - Below Grade Duct Banks (Typical Details)
31)	94X-6100-E-02240	Existing Overhead Utilities - Silo Infrastructure - Roadway Lighting (Plan)
32)	94X-6100-E-02241	Existing Overhead Utilities - Silo Infrastructure - Roadway Lighting (Details)
33)	94X-6100-E-02242	Existing Overhead Utilities - Silo Infrastructure - Vitrification Pilot Plant (Aerial Cable Connection)
34)	94X-6100-G-02243	Miscellaneous Details

END OF SECTION

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SECTION 02050
DEMOLITION

PART 1 GENERAL

1.1 REFERENCES

Not Used

1.2 SUBMITTALS

A. Approval Required

Demolition and Salvage Plans

- Before demolition, submit Safe Work Plans for accomplishment of work. Procedures shall provide for safe conduct of work; careful removal and disposition of materials specified to be salvaged; handling of recyclable materials in accordance with ***Part 6, Safe Work Plans 3.1.1.*** and the Waste Management Plan; protection of property to remain undisturbed; coordination with other work in progress; and, timely disconnection of affected services. Include detailed descriptions of methods and equipment to be used for each operation, and sequence of operations.

C. Approval Not Required

None

1.3 PERMITS

A. Obtain permits from FDF. Post before starting the work within this section:

B. See Part 8, B.2.7 for permit listing and requirements.

C. See Part 6, Table 6-1 for turn around time.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.1 EXAMINATION

A. Before beginning cutting or demolition, survey existing work and examine the drawings and specifications to determine extent of work. Coordinate work within this section with other work.

3.2 PREPARATION

A. Personnel Protection
- Personnel protection is provided per the Work Permit in accordance with SPR 2-8. It designates safeguards, including warning signs, barricades, temporary closures, and personnel equipment required for protection of construction personnel and others during demolition and removal operations.

B. Property Protection
- Take precautions to prevent damage to existing work that will remain in place, be reused, or remain U.S. Government property.

C. Ensure that structural elements are not overloaded as a result of cutting, removal, or demolition. Construct and maintain shoring, bracing, and supports as required.

D. Disconnect existing affected services as directed by FDF and in compliance with the Lockout/Tagout Permit and procedures.

3.3 PERFORMANCE

A. Perform demolition work in accordance with approved procedures.

B. Drainage Structures, Fences and Misc. Items
- Remove existing structures, curbs, gutters and other items indicated.

C. Remove portions of existing facilities as shown on the drawings and, subject to approval by FDF, as necessary to facilitate new or re-construction.

D. Notify FDF before oxy-fuel cutting in accordance with the Open Flame and Welding Permit.

E. Removal of Utilities

- Remove existing utilities shown on the drawings. If utility lines not shown on the drawings are encountered, proceed as directed by FDF.

F. Control amount of dust resulting from demolition to prevent spread of dust and avoid creation of dust in surrounding area in accordance with Part 6, Exhibit 6.4.

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G. Prevent the spread of dust from contaminated areas.

H. Salvage

1. Title to salvageable materials and equipment to be demolished is vested in the U.S. Government. Remove salvageable materials and equipment as directed by FDF.

2. Store reusable salvage (material and equipment) as directed by FDF. If salvaged material is to be reused in work covered by specifications, repair and refinish, as required, before reuse.

3. Salvage the following materials:
   a. Structural steel;
   b. Gratings; and
   c. Electrical panels.

4. Unsalvageable Materials
   - Dispose of nonrecyclable concrete, masonry, and other combustible and noncombustible materials (other than concrete permitted to remain in place), in accordance with the Waste Management Plan.

3.4 CLEANING

A. Dispose of debris in accordance with ***ACR-007 and the Waste Management Plan.***

END OF SECTION

SECTION 02110
SITE CLEARING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Removal of surface debris.

B. Clearing of site plant life and grass, where it affects construction only.

C. Removal of fencing.

D. Removal of only designated underground and aboveground utilities.

1.2 RELATED SECTIONS

A. ***Section 02200 - Earthworks.***

B. ***Section 02900 - Seeding.***

1.3 REFERENCE DRAWINGS

A. Reference ***Section 01012*** for the Schedule of Drawings.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

3.1 PREPARATION

A. Verify that existing utilities designated to remain are staked, flagged, and identified.

B. Verify that existing utilities have been properly isolated and deenergized prior to commencement of work on that system. FDF will verify with Contractor that the system has been properly isolated and deenergized.

C. Where possible, prior to any site clearing activities, erosion control measures (silt fences, check dams, matting, etc.) shall be in place

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3.2 ERECTION/INSTALLATION/APPLICATION

A. Clearing

1. Clear only areas required for access to site and execution of work. Obtain written approval of clearing limits from FDF;
2. Clear undergrowth and dead wood without disturbing subsoil; and
3. Provide dust control using clean, potable water to the satisfaction of FDF. (Reference Part 6 - Dust Control Plan)

B. Removal

1. Remove debris, rock, and extracted plant life;
2. Remove existing fence as necessary for construction, as directed by FDF. Stockpile fence in a tied roll, and stack posts in a neat pile at location on site determined by FDF; and
3. All excess debris, waste generated, surplus soil, and contaminated material encountered as a result of the work shall be containerized or stockpiled by the Contractor as described in the ***Waste Management Plan.***

C. Utilities

1. All utilities identified on plans are to be removed. This is to include all excavation, line removal including valves, and backfill;
2. At the end of all utility lines removed, the pipe remaining is to be properly end plugged with similar pipe materials in accordance with drawing details; and
3. Excavation is to be backfilled and compacted to grade in accordance with ***Section 02200.*** Soil material from other excavations may be used if suitable (as per ***Section 02200*** and the Waste Management Requirements).

D. Topsoil Excavation

1. Excavate topsoil separately from areas to be graded; and
2. Stockpile in area designated on site to a height not exceeding 8 feet. Protect and cover from erosion. Remove excess topsoil, not re-used from the stockpile, to a site designated by FDF.

3.3 PROTECTION

A. Locate, identify, and protect from damage all utilities that remain.

B. Protect trees, plant growth, and features designated to remain as final landscaping.

C. Protect survey benchmarks, monitoring wells, and existing structures from damage or displacement.

D. Construct temporary roads and maintain existing roadways at the construction site, including dust control.

END OF SECTION

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SECTION 02200
EARTHWORK

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Site grading.

B. Excavating.

C. Backfilling and compacting.

D. Landscape grading.

E. Redistribution of topsoil.

F. Sampling and testing.

G. Trenching for utilities.

H. Soil and aggregate materials.

I. Remove surface debris and paving.

J. Clear and grub site affected by construction.

K. Dust Control.

1.2 RELATED SECTIONS

A. ***Section 02110 - Site Clearing.***

B. ***Section 02900 - Seeding.***

1.3 REFERENCE

A. American Society for Testing and Materials (ASTM)

- ASTM C136-92 Standard Method for Sieve Analysis of Fine and Coarse Aggregates.
- ASTM D422-63 Standard Test Method for Particle-Size Analysis of Soils (reapproved 1990).

- ASTM D698-91 — Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft^3) (600 kN-m/m^3).
- ASTM D1556-90 — Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method.
- ASTM D2487-92 — Standard Classification of Soils for Engineering Purposes (Unified Soil Classification System).
- ASTM D2922-91 — Standard Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).
- ASTM D3017-88 — Standard Test Methods for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth).

B. Ohio Department of Transportation (ODOT), Construction and Materials Specifications, January 1, 1995:

- ODOT 200 Earthwork;
- ODOT 203 Roadway Excavation and Embankment;
- ODOT 207 Temporary Soil Erosion and Sediment Control; and
- ODOT 304 Aggregate Base.

1.4 SUBMITTALS

A. Reference ***Part 6, Section 10.0*** for submittals and ***ACR-001*** for procedures.

B. Material suppliers shall be required to certify that supplied materials meet specifications prior to use.

C. Submit name and address of soil testing laboratory for approval.

D. Dewatering plan, if needed, shall be submitted for review prior to dewatering activities.

E. Traffic control plan with details of the type of barricades, signs, and other material to be used.

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1.5 QUALITY ASSURANCE

A. Unless noted otherwise, all work shall be performed in accordance with ODOT Section 200.

PART 2 PRODUCTS

2.1 MATERIALS

A. Every effort shall be made to re-use surplus materials generated by the project before importing material from off site.

B. Subsoil Type S1: Excavated and re-used material; graded; free of lumps larger than 3 inches, rocks larger than 2 inches and debris; and, conforming to ASTM D2487 Group Symbol CL, ML, CH.

C. Subsoil Type S2: Imported material; graded; free of lumps larger than 3 inches, rocks larger than 2 inches and debris; and, conforming to ASTM D2487 Group Symbol CL, ML, SC.

D. Subsoil Type S3: Excavated and re-used material; graded; free of roots, rocks larger than ½ inch, subsoil, debris, weeds, and foreign matter not suitable for subsequent seeding operations and maintenance; conforming to ASTM D2487 Group Symbol OH.

E. Coarse Aggregate Type A2/Conforming to ODOT Item 304:

The aggregate shall be crushed carbonated, crushed gravel, crushed air-cooled slag, granulated slag, admixture of crushed and granulated slag, or other type of suitable material meeting the requirements of this item. Crushed carbonate stone or mixtures of crushed and granulated slags shall meet the following gradation requirements:

Sieve	Percent Passing
2 inches	100
1 inch	70-100
3/4 inch	50-90
No. 4	30-60
No. 30	7-30
No. 200	0-13

F. Fine Aggregate Type A3: Sand - natural river or bank sand; washed; free of silt, clay, loam, friable or soluble materials, and organic matter; graded in accordance with ASTM C136 and D2487; within the following limits:

Sieve Size	Percent Passing
No. 4	90-100
No. 30	7-40
No. 200	0-10

G. Dust control materials shall be nonhazardous; domestic water or other materials shall be used.

PART 3 EXECUTION

3.1 PREPARATION

A. The Contractor shall be responsible for all earthwork layout.

B. No backfill shall be placed around or upon any structure/foundation until it is shown that the concrete has attained satisfactory strength.

C. Erosion and sediment control measures shall be installed in accordance with ***Section 02270.***

D. Traffic control measures shall be installed in accordance to the traffic control plan.

E. Contractor shall clear only areas required for site access and execution of work.

F. Removal

1. Remove debris, rock, and extracted plant life;
2. Saw cut and remove existing pavement as indicated on drawings;
3. Do not interfere with 45-degree bearing splay of foundations;
4. Stockpile excess soil in the area designated on contract drawings;
5. Perform grading and other operations to maintain site drainage. No water shall be permitted to accumulate in excavations under paving areas or equipment pads. Control water by means of ditches, dams, temporary pumps and piping, plastic coverings, tarps, or other methods. Construct temporary storm water basin first; and

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6. Areas that are disturbed or that lose firmness before concrete is poured shall be undercut, backfilled, and compacted as specified in Article 3.3, Paragraph E. At the Contractor's option, a lean concrete (2,500 psi at 28 days) may be installed.

G. Topsoil Excavation

1. Excavate topsoil from area to be excavated or to a height not exceeding 8 feet in the area designated on contract drawings; and
2. Protect stockpile from erosion.

H. Trenching

1. Cut trenches sufficiently wide to enable installation of utilities and allow inspection;
2. Hand-trim excavation and leave free of loose matter;
3. Support pipe during placement and compaction of bedding fill; and
4. Backfill trenches to required contours and elevations.

I. Tracing Wire Installation

1. Install trace wire continuous over top of pipe, buried 6 inches below finish grade, above pipe line; in accordance with ***Section 02220.***

J. Filling and Backfilling for all Excavations

1. Prepare subgrade as follows:

   a. Compact exposed subgrade to density requirements for subsequent backfill materials; and
   b. Cut out soft areas of subgrade not capable of in situ compaction. Backfill with Type A3 fill and compact to density equal to or greater than requirement for subsequent fill material.

2. Backfill areas to contours and elevations shown. Use unfrozen and unsaturated materials as follows:

   a. Backfill with fill material required for specific area. Compact to density required for the area.

3. Do not backfill over porous, wet, frozen, or spongy subgrade surfaces.

4. Unless noted otherwise, place and compact fill materials in continuous layers not exceeding 8 inches loose depth.

5. Employ a placement method so as not to disturb or damage foundations or utilities in trenches.

6. Maintain moisture content within ±3 percent of optimum moisture as determined by ASTM D698.

7. Backfill against foundations and pads as specified in Article 3.2, Paragraph E.

8. Slope grade away from foundations and pads a minimum 1/4 inch per foot, unless noted otherwise.

9. Backfill simultaneously on each side of unsupported foundation walls.

10. No organic fill is to be placed below the top foot in any fill or embankment.

K. Backfill Over Underground Utilities

1. Initial backfill from top of bedding to 1 foot minimum above pipe, Type A3 material compacted in 6-inch layers, minimum density 95 percent Standard Proctor (ASTM D698); and
2. Final backfill Type S1 or S2, A2, or A3 from top of initial backfill to subgrade, compacted to 95 percent Standard Proctor (ASTM D968).

L. Placing Topsoil

1. Clean up and restore areas disturbed by construction operations and/or previously occupied by the Contractor. Place a minimum of 4 inches to a maximum of 12 inches of compacted topsoil on all such areas for final acceptance of the project by FDF;
2. Prepare subsoil to eliminate uneven areas and low spots. Maintain lines, levels, profiles, and contours. Make changes in grade gradual. Blend slope into level areas;
3. Remove large stones, roots, grass, weeds, debris, and foreign material while spreading;
4. Roll placed topsoil; and
5. Leave stockpile area and site clean, raked, and with positive drainage, ready to be seeded.

M. Material Stockpiles

1. Separate differing materials with dividers, or stockpile apart to prevent mixing;
2. Direct surface water away from stockpile site to prevent erosion or deterioration of materials; and
3. Provide storm water runoff controls at pile to prevent sediment from leaving stockpile area.

N. Dust Control

- Provide dust control using potable water or other approved materials as per ***Part 6, Exhibit 6.4***.

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O. Dewatering

1. Should dewatering be required, a written plan of drainage procedures shall be submitted for review; and
2. Dewatering shall be achieved by gravity or by pumps. All methods shall be of sufficient capacity to keep excavations/trenches sufficiently dewatered.

P. Except as supplemented or otherwise modified herein and/or shown on the construction drawings, the entire work under this section shall be in compliance with the provision of ODOT Items 203 and 207.

3.2 FIELD QUALITY ASSURANCE

A. Proof rolling: The existing subgrade shall be proof rolled to identify soft areas. Proof rolling shall be by a pneumatic-tired vehicle with a minimum loaded weight of 20 tons.

B. Compaction testing will be performed in accordance with ASTM D422.

C. Frequency of Tests

1. Frequency of in-place density testing shall be derived from the following list, utilizing whichever of the following results in the greatest number of tests:

   a. Once each day of work filling;
   b. Once every layer of filling;
   c. Once every 100 cubic yards of fill;
   d. Every 2,000 square feet under paving, slab on grade; and
   e. Under each foundation at subgrade.

D. Minimum Compaction Requirements

Location	Required Compaction
Under Slabs and Buildings (Fill Type A3)	100 percent Standard Proctor (ASTM D698)
Trenches	95 percent Standard Proctor (ASTM D698)
All other fill (Fill Type S1 or S2)	95 percent Standard Proctor (ASTM D698)

3.3 ADJUSTING

A. Grading and filling shall be performed in accordance with the following table:

Structural Subgrade	± 1 inch
Pavement Repair	± ½ inch
General Site	± 3 inches*

* Graded to drain

B. Tip of Topsoil
- Plus or minus 3 inches of required elevation or plane.

3.4 CLEANING

A. Leave the area in a clean and neat condition. Grade and stabilize site surface to prevent freestanding surface water.

3.5 PROTECTION

A. Grade excavation top perimeter to prevent surface water runoff from entering into excavation or to adjacent properties.

B. Protect finished work and existing features, and landscaping which will remain.

C. Reshape and recompact fills subjected to vehicular traffic to final grade and to the compaction requirements in Article 3.2.

D. Protect excavations by methods required to prevent cave-in or loose soil from falling into excavation.

E. Protect bottom of excavations and soil adjacent to and beneath foundation from freezing.

F. Provide erosion and sediment control.

END OF SECTION

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SECTION 02220
ROADWAY EXCAVATION AND EMBANKMENT

PART 1 GENERAL

1.1 REFERENCES

A. The following documents and others referenced therein form part of this Contract to the extent designated in this section:

1. American Society for Testing and Materials (ASTM):

• ASTM D 653 - 97	Terminology Relating to Soil, Rock, and Contained Fluids.
• ASTM D 1556 - 90	Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method.
• ASTM D 1557 - 91	Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort.
• ASTM D 2922 - 91	Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).
• ASTM D 3017 - 88	Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth).
• ASTM D 4253 - 93	Test Methods for Maximum Index Density and Unit Weight of Soils Using a Vibratory Table.

2. Code of Federal Regulations (CFR)

• Title 29	Labor
• Part 1926	Safety and Health Regulations for Construction

3. Fluor Daniel Fernald (FDF)

- "Contractor Environmental Safety and Health Program (CESH)"

4. Ohio Department of Transportation (ODOT)

- Construction and Material Specifications (1997)

1.2 SUBMITTAL

A. **Reference *Part 6, Section 10.0*** for submittals ***and ACR-001*** for **procedures.**

B. Approval Required

Damage Prevention Procedure

- Before excavation, submit procedure to prevent over stressing existing structures, and interrupting existing services.

C. Approval Not Required

Competent Person

- Before excavation and in writing, submit identity of individual designated Competent Person as defined in 29 CFR 1926.650 and required by [CESH 20].

1.3 QUALITY ASSURANCE

A. Deliverable Documentation

The following documents and records, required by this section, shall be retained by FDF for documentation:

<u>Document</u>
Work Permit

Radiological Work Permit

Excavation/Trenching/Penetration Permit

Confined Space/Evaluation Permit

Lockout/Tagout Permit

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1.4 **PERMITS**

A. Obtain permits from FDF. Post before starting work under this section.

B. See Part 8 B.2.7 for permit listing and requirements.

C. See Part 6, Table 6-1 for turn around time.

1.5 **SITE CONDITIONS**

A. Do not place backfill and/or embankment on frozen or muddy ground. Secure subgrade approval from FDF prior to placement of embankment or backfill.

PART 2 PRODUCTS

2.1 **MATERIALS**

A. Use materials free of frozen particles, lumps, organic matter and trash for backfill, embankment, and bedding. Materials used as backfill, embankment and bedding shall conform to ODOT 203.08.

B. Backfill and embankment shall be obtained from excavation or locations designated or approved by FDF.

1. Backfill and embankment materials and associated items shall be defined in accordance with ODOT 203.02;
2. Borrowed material shall conform to the requirements of ODOT 203.03; and
3. Controlled Density Fill (CDF) may be used as common and structural backfill if approved by FDF. Reference ***Section 02237***.

C. Bedding for Utility Lines
- Sand as defined in ASTM D 653 or excavated sandy material having less than 20% gravel particles. Gravel particles shall have a maximum dimension of 12 mm (½ inch).

D. Location Marker
- 75-mm (3-inch) wide, detectable plastic tape imprinted at maximum 1, 220-mm (4-foot) intervals with warning such as "CAUTION - BURIED INSTALLATION BELOW." "Terra Tape Sentry Line 620" with "Terra Clips," both by Reef Industries, or approved substitute.

E. Stabilization
- Seeding and mulching materials shall be in accordance with ***ODOT Item 659, Section 02900***.

PART 3 EXECUTION

3.1 EXCAVATION

A. This item shall consist of all earthwork activities as described in ODOT 203.01 including excavation and backfill of utility crossings and culvert construction. Notify FDF before excavating.

B. Locate and expose underground utilities by hand tools.

C. If cultural properties (e.g., bones and artifacts) are encountered, stop excavation and notify FDF. Obtain approval before resuming excavation.

D. If unexpected debris is encountered, stop excavation, clear personnel to 9.1 m (30 feet) from debris, and notify FDF. Obtain approval before resuming excavation.

E. Excavation, embankment and backfill work shall conform to the applicable portions of ODOT 203, regardless of whether directly referenced by subsection number. Where conflict exists between this specification and ODOT then this specification shall control.

F. Tolerances

1. Roadway Excavation and Embankment
   - Construct excavation and embankments to the contours and elevations shown on the drawings within the tolerances called for in ODOT 203.06. The top 12 inches of rock embankment shall consist of Granular Material as defined in ODOT 203.02.

2. Excavation for Utility Trenches
   - Excavate deep enough to allow laying utility lines at line and grade shown on the drawings after placement and compaction of bedding. If excavation will be in undisturbed sand or if utility lines will be encased in concrete, excavate to line and grade shown on the drawings. Make trench wide enough to permit connection of utility lines. Excavate with near vertical sides from bottom of trench up to 300 mm (12 inches) above top of utility lines. Correct over-excavation by placing and compacting backfill. Pare holes in trench bottoms for pipe couplings so pipe will bear full length of pipe barrel or pipe section.

G. Construction methods shall conform with ODOT 203.09. Allow concrete to achieve specified strength before placing backfill or embankment against concrete.

1. Salvage excavated soil for use as backfill and fill material. Contaminated soil can be used as backfill as long as it is in accordance with Waste Management procedures and practices;

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2. FDF will conduct in-place density tests using a nuclear density gage. Conduct operations in manner which will facilitate tests; and
3. Dispose of contaminated soil, not used for backfill, and unearthed material/debris in accordance with the ***Waste Management Requirements*** and ACR-007.

3.2 BACKFILL AND EMBANKMENT

A. Prepare subgrade and construct embankment in accordance with ODOT 203.10 through 203.13.

B. Remove debris and organic material from area to be backfilled. Reference ***Part 6, Statement of Work and the Waste Management Requirements.***

C. Do not backfill by sluicing or flooding unless written approval is obtained from FDF.

3.3 BACKFILL AND FILL - NONSTRUCTURAL

A. Place specified common backfill and fill in even, loose layers not more than 300 mm (12 inches).

B. Compact uniformly over full width of each layer by at least 1 pass of a vibratory-type or rammer-type compactor, pneumatic-tired roller, loader scrapper wheel, grader wheel, or power roller.

C. Mound over top layer to 25 mm (1 inch) for each 300 mm (12 inches) of backfill and fill to maximum mound height of 150 mm (6 inches).

3.4 BACKFILL AND FILL - UTILITY LINES

A. Before laying utility lines, place specified bedding in a 100-mm (4-inch) layer. Compact layer uniformly to 95% of maximum density as determined by specified compaction tests.

B. Keep trenches free of standing water during laying of utility lines.

C. After laying utility lines, ensure that lines have been pressure tested before backfilling and filling. Place loose 200-mm (8-inch) layers of specified bedding under haunches, around sides and up to 300 mm (12 inches) above top of utility line. Compact each layer uniformly to 95% of maximum density as determined by specified compaction tests. During compaction, exercise care to avoid pipe misalignment and to provide uniform bearing along pipe barrel.

D. Place loose 100-mm (4-inch) layers of backfill and fill in remaining trench depth. Use specified structural backfill and fill under foundations. Use specified common backfill and fill at other locations. Compact each layer uniformly to 95% of maximum density as determined by specified compaction tests.

E. Place specified location marker continuously and directly over buried utility lines at depth of 300 mm (12 inches) below finish grade. Place marker continuously and directly over each outside line of multiple lines and if spacing between outside line markers exceeds 1200 mm (4 feet), place sufficient intermediate markers to maintain 1200 mm (4 feet) maximum spacing between adjacent markers.

F. Prohibit passage of heavy construction equipment over buried utility lines until at least 600 mm (24 inches) of backfill and fill have been placed over lines and compacted or until bridging approved by FDF has been placed across trenching.

3.5 FINISH GRADING AND STABILIZATION

A. Grade each area to contours and elevations shown on the drawings.

B. Remove surface cobbles larger than 150 mm (6 inches). Dispose of excess material and debris in accordance with the ***Waste Management Requirements*** and ***ACR-007***.

C. Stabilize area with a 75-mm (3-inch) course of specified stabilization material. Finish stabilization course to elevations shown on the drawings.

D. After finishing grading and stabilization, remove surface markers and flags.

E. All slopes and disturbed areas shall be permanently seeded and mulched in accordance with ***ODOT Item 659, Section 02900***.

F. The Contractor shall be required to place erosion control measures as directed by FDF. The type and location as shown on the drawings is subject to adjustment by FDF depending on field conditions. Hay or straw bales shall be placed around new and existing catch basins and culvert inlets within 50 feet of road centerline and as shown on the drawings.

3.6 FIELD QUALITY CONTROL

A. Compaction Testing

1. Test compacted bedding, backfill, and fill at the following intervals; which, FDF will also use for testing. Conduct operations in manner conducive to sampling and testing by FDF.

   a. Bedding: For each 76 m (250 feet) of trench or portion thereof, 1 test of each layer.
   b. Backfill and fill: 1 test of each layer.

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2. Perform compaction testing in accordance with the following standards. Provide report required by each standard.

   a. Compaction control: ASTM D 1557.
   b. In-place density: ASTM D 2922.
   c. Water content: ASTM D 3017.

END OF SECTION

SECTION 02237
CONTROLLED DENSITY FILL

PART 1 GENERAL

1.1 REFERENCES

A. The following documents and others referenced therein form part of this Contract to the extent designated in this section:

1. American Society for Testing and Materials (ASTM:)

• ASTM C 33 - 93	Concrete Aggregates.
• ASTM C 94 - 96	Ready-Mixed Concrete.
• ASTM C 150 - 96	Portland Cement.
• ASTM C 260 - 95	Air-Entraining Admixtures for Concrete.
• ASTM C 618 - REV. A-96	Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Concrete.

2. Code of Federal Regulations (CFR)

• Title 40	Protection of Environment
• Part 249	Guideline for Federal Procurement of Cement and Concrete Containing Fly Ash

3. Ohio State Department of Transportation (ODOT)

- Construction and Material Specification (1997)

1.2 SUBMITTAL

A. Approval Required

1. Fill Mix
   - Before ordering, submit fill materials, mix design, and mix proportions. Identify each material to be used in fill, including amount, by weight, to be utilized in each m^3 (yd^3) of plastic mix.

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2. Test Data
   - Before mixing, submit laboratory trial batches, or field trial data, to verify mix compressive strength.

B. Approval Not Required

None

1.3 **DELIVERY, STORAGE, AND HANDLING**

A. Reference ***Part 6, Section 5.1, Delivery of Contractor Furnished Material and Equipment*** for all delivery, storage, and handling requirements and procedures.

1.4 **SITE CONDITIONS**

A. Do not place fill mix on frozen ground or during rain.

B. Start and maintain placement when ambient temperature is at least 1 °C (34 °F) and rising. Stop placement when ambient temperature is 3 °C (38 °F) and falling.

PART 2 **PRODUCTS**

2.1 **MATERIALS**

A. Cement
   - ASTM C 150, Type II, low alkali.

B. Fly Ash
   - ASTM C 618, Class F in accordance with recommendations of 40 CFR 249.12 and 249.13.

C. Aggregates
   - ASTM C 33, 10 mm (3/8 inch) maximum.

D. Air-entraining admixtures
   - ASTM C 260.

E. Mixes
   - Measure and mix specified materials and deliver mixture in accordance with ASTM C 94 or WSDOT M 41-10, Section 6-02.3. Provide fill compressive strength of 345 to 690 kPa (50 to 100 psi) at 28 days.

PART 3 EXECUTION

3.1 PLACEMENT

A. Place mixture in accordance with ASTM C 94. Discharge directly from truck by pumping or another approved method.

B. Place mixture on or against firm, damp surfaces which are free of frost, ice and water. Obtain required compaction of earth subsurfaces before placement. Dampen earth surfaces to receive fresh fill.

C. To maximum extent practicable, perform placement continuously.

3.2 PROTECTION

A. After placement, protect mixture from construction activities for 24 hours minimum.

END OF SECTION

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SECTION 02270
EROSION AND SEDIMENT CONTROL

PART 1 GENERAL

1.1 SCOPE

A. Soil erosion and sedimentation control for areas of the Subcontractor's work area which are graded or disturbed as a part of the contract work. For all other requirements, reference ***Part 6, Statement of Work.***

B. Installation, maintenance, and removal of all temporary erosion control facilities.

C. Installation of erosion control blankets.

D. Dumped rock for storm drain lines.

1.2 RELATED SECTIONS

A. Section 01010 - General Requirements.

B. Section 02110 - Site Clearing.

C. Section 02200 - Earthwork.

D. Section 02720 - Storm Sewerage.

1.3 REFERENCE DRAWINGS

A. See Section 01012 for the Schedule of Drawings.

1.4 REFERENCES

A. State of Ohio, Department of Transportation (ODOT):
   1. Construction and Material Specifications, January 1, 1997. Except as supplemented or otherwise modified herein and/or shown on the construction drawings, the entire work under this section shall be in compliance with the provisions of ODOT.

B. State of Ohio, Department of Natural Resources (ODNR):
   1. Rainwater and Land Development, Ohio's Standard Urban Stream Protection - 1996.

C. American Society for Testing and Materials (ASTM):

1.	ASTM D1777-96	Standard Test Method for Thickness of Textile Materials.
2.	ASTM D3776-96	Standard Test Method for Mass Per Unit Area (Weight) of Woven Fabric.
3.	ASTM D3786-87	Standard Test Method for Hydraulic Bursting Strength of Knitted Goods and Nonwoven Fabrics - Diaphragm Bursting.
4.	ASTM D4491-95	Standard Test Method for Water Permeability of Geotextiles by Permissivity.
5.	ASTM D4533-91	Standard Test Method for Trapezoid Tearing Strength of Geotextiles.
6.	ASTM D4632-91	Standard Test Method for Grab Breaking Load and Elongation of Textiles.
7.	ASTM D4751-95	Standard Test Method for Determining Apparent Opening Size of Geotextile.
8.	ASTM D4833-88	Standard Test Method for Index Geotextiles, Geomembranes, and Related Products.

1.5 SUBMITTALS

A. Reference ***ACR-001*** for all submittal general requirements and procedures.

B. Material suppliers shall be required to certify that supplied materials meet specifications prior to use.

1.6 QUALITY ASSURANCE PROGRAM

A. Subcontractor shall inspect sediment control measures periodically and after each rain exceeding 0.5 inches to evaluate the effectiveness of the control measures. Records of inspections shall be kept on file at Subcontractor's site office.

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PART 2 PRODUCTS

2.1 MATERIALS

A. Stakes: Stakes shall be a minimum of 2 feet, 8 inches in height and 2 inches by 2 inches or more in depth and width and made from hardwood.

B. Silt Fence: Materials shall be as specified in ODNR's Rainwater and Land Development and the construction drawings.

C. Dumped Rock Fill: Dumped rock fill shall meet the requirements of ODOT Item 601.07 for type specified on drawings.

D. Non-woven geotechnical fabric for dumped rock fill bedding similar to Trevira No. 1125™ as per the following table:

Minimum Physical Properties (Minimum Average Roll Values)			
Property	**Test Method**	**Units**	**Material**
Unit Weight	ASTM D3776	oz/yd^2	7.1
Grab Tensile	ASTM D4632	lbs	210
Grab Elongation	ASTM D4632	percent	60
Mullen Burst	ASTM D3786	psi	360
Puncture	ASTM D4833	lbs	95
Trapezoid Tear	ASTM D4533	lbs	75
Apparent Opening Size	ASTM D4751	US sieve number	70
Permissivity	ASTM D4491	$gal/min/ft^2/sec^{-1}$	110 1.47
Permeability	ASTM D4491	cm/sec	.35
Thickness	ASTM D1777	mils	95

E. Erosion Control Blankets (Matting): Similar to North American Green Type C125. Erosion Control Turf Reinforcement Mat shall be constructed of 100 percent coconut fiber stitch bonded between a heavy duty UV stabilized bottom net and a heavy duty UV stabilized top net. The cuspated (crimped) netting shall form closely spaced ridges across the entire width of the mat. The netting shall be stitched together on 1.5 inch centers with UV stabilized polyester thread to form a permanent three dimensional structure. The mat shall have the following physical properties and rated for 3 years service life for use on slopes of 1:1 or greater.

1. Material Content
   a. Coconut fiber: 100 percent; 0.5 lb/yd^2.
   b. Netting: Top - Heavy UV stabilized; polypropylene; 3 lbs per 1,000 ft^2.
   c. Thread: UV stabilized polyester.
2. Physical Specifications (Roll)
   a. Width: 6.5 feet
   b. Length: 83.5 feet
   c. Weight: 30 lbs $\pm$ 10 percent
   d. Area: 60 yd^2

PART 3 EXECUTION

3.1 FIELD CONDITIONS

A. Protective Measures

1. Construct protective devices as specified herein, and as required on the contract drawings.

2. Silt Fence: Conform to requirements on the construction drawings.

3. Stockpile areas for soil materials shall also be protected form erosion. If pile is not used for 45 days, it shall be covered with tarps or seeded. Slopes on pile shall not exceed 2:1 in steepness and shall be less than 15 feet in height. Pile shall be shaped with a drainage pitch of at least 2 per cent on all areas. The perimeter of the pile shall have proper sediment controls (i.e., silt fence). Tarps or other coverings placed on pile shall be properly anchored to withstand wind and full cover all of the pile. The subcontractors is responsible for maintaining the controls on the piles until final acceptance or disposition.

4. Pipeline installation (trenching, pipe laying, and backfill) is to be kept to 500 feet or less in length of exposed, denuded conditions. Completed, backfilled sections can be covered with mulch, temporary seed, erosion fabric, or other method as approved by FDF, prior to final cover. Proper sediment controls (i.e., silt fence, matting) shall be sued at denuded trench areas. Sediment controls can be re-used, if not in disrepair.

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5. In storm water ditches where the water velocity is between 2 and 3 fps erosion control blankets (matting) shall be used. Where the velocity is above 3 fps check dams shall be installed to slow the velocity and to prevent erosion. Where the velocity exceeds 4 fps, the ditch shall be lined with rock.

6. Straw bales are prohibited as primary sediment control devices.

B. Silt Fences

1. Install in accordance ODNR and manufacturer's recommendations. Place at locations shown on drawings prior to start of earthwork.

2. Silt fence shall be constructed before up slope land disturbance begins.

3. All silt fence shall be placed as close to the contour as possible so that water will not concentrate as low points in the fence and so that small swalles or depressions which may carry small concentrated flows to the silt fence are dissipated along its length.

4. To prevent water ponded by the silt fence from flowing around the ends, each end shall be constructed up slope so that the ends are at a higher elevation.

5. The minimum height of the silt fence shall be a 16 inches above the original ground surface.

C. Erosion Control Blankets (Matting)

1. Install in accordance with manufacturer's recommendations. All blankets shall be properly anchored with wire staples in patterns and sizes recommended by manufacturer. Bury edges in 6 inches deep trench, rake area smooth, and seed.

2. Erosion control blanket shall be used on all slopes steeper that 4H:1V and at all ditch inverts, to a ditch depth of 1 foot.

D. Check Dam

1. The check dam shall be constructed of 4-8 inch diameter stone, place so that it completely covers the width of the channel.

2. The top of the check dam shall be constructed so that the center is approximately 6 inches lower than the outer edges, so water will flow across the center and not around the ends.

3. The maximum height of the check dam at the center of the weir shall not exceed 3 feet.

4. Spacing between dams shall be as shown on the drawings or as directed by FDF.

3.2 ADJUSTING

A. Removal of Sediment Accumulation

1. Removal accumulated sediments, debris, and obstructions as necessary. In no case shall sediment build up to a depth greater than ½ the height of the protective device. Respread on site in a manner not to adversely affect protective procedures and consistent with site regulations and Subcontract ***Part 6 Scope of Work***. Seed areas.

B. Removal of Temporary Erosion Control Facilities

1. Erosion control facilities shall be removed at the direction of FDF after the disturbed areas are stabilized with grass or other measures approved by FDF.

END OF SECTION

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SECTION 02512
HOT-LAID ASPHALTIC CONCRETE PAVING

PART 1 GENERAL

1.1 REFERENCES

A. The following documents and others referenced therein form part of this Contract to the extent designated in this section:

1. Ohio Department of Transportation (ODOT)

   - Ohio Manual of Uniform Traffic Control Devices (OMUTCD)

2. Ohio Department of Transportation (ODOT)

   - Construction and Material Specification (1997)

1.2 SUBMITTALS

A. Reference ***Part 6, Section 10.0*** for submittals and ***ACR-001*** for procedures.

B. Approval Required

Laboratory Test Reports

- Before delivery, submit test reports demonstrating that asphalt and mix meet requirements. Contractor shall provide mix design and quality control in accordance with ODOT Item 441. Reference to the "Department" or the "Engineer" shall be interpreted as FDF.

C. Approval Not Required

None

PART 2 PRODUCTS

2.1 MATERIALS

A. Asphalt

1. Asphalt cement for use in asphaltic concrete surfacing shall conform to ODOT 702.01;
2. Prime coat shall conform to ODOT Item 408.02; and
3. Tac coat shall conform to ODOT Item 407.02.

B. Aggregate for asphalt concrete shall conform to the applicable portions of ODOT Item 703.

2.2 MIXES

A. Proportioning of Asphalt Concrete Materials: ODOT Item 404 ASPHALT CONCRETE. Gradation shall conform to ODOT Item 441, Type 1 Surface Course, Medium Traffic (Reference ODOT 441, Table A).

PART 3 EXECUTION

3.1 APPLICATION

A. Perform work in accordance with the applicable portions of ODOT Item 400 FLEXIBLE PAVEMENT.

B. Permanent signage and pavement striping shall be in accordance with OMUTCD.

3.2 FIELD QUALITY CONTROL

A. The Contractor is required to sample, test, and document results of testing in accordance with ODOT Section 401.

END OF SECTION

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PART 1 GENERAL

1.1 REFERENCES

A. The following documents and others referenced therein form part of this Contract to the extent designated in this section:

1. Ohio Department of Transportation (ODOT)
   - Construction and Material Specifications (1997)

1.2 SUBMITTAL

Not Used

PART 2 PRODUCTS

2.1 MATERIALS

A. Storm Sewer Pipe
- ODOT, Item 707.33, corrugated polyethylene smooth lined pipe.

B. Culvert Pipe
- ODOT, Item 707.01 OR 707.02, corrugated steel conduit.

C. Trace Wire
- Magnetic detectable conductor, brightly colored plastic covering, imprinted with "water service" in large letters.

D. Drainage Structures

1. Precast Concrete Manholes
   - ODOT Item 604 shall conform to precast reinforced concrete manhole riser sections in ODOT 706 and ASTM C478. High density polyethylene (HDPE) manholes can be substituted for precast concrete. HDPE manholes shall be in accordance with ASTM D3350. Pipe resin is cell classification 3454-34C and a plastic pipe Institute Rating of PE 3408. The cylinder and outlet shall be fabricated from HDPE pipe with SDR, same as pipe, as indicated on drawings. All components shall be joined by butt fusion, saddle fusion, socket fusion, or extrusion welding. Hot air welding is not acceptable. The manhole shall have lifting lugs capable of supporting manhole during placement and shipping. HDPE molded pipe stubs and ductile iron flanged backup rings in manholes shall be installed in manhole by shop fabrication.

2. Precast Concrete Catch Basins
   - ODOT Item 604 shall conform to precast reinforced concrete catch basins in ODOT 706 and ASTM C478. HDPE catch basins can be substituted for precast concrete with approval by FDF. The outlet shall be fabricated from HDPE pipe with SDR, same as pipe, as indicated on drawings. All components shall be joined by butt fusion, saddle fusion, socket fusion, or extrusion welding. Hot air welding is not acceptable. HDPE molded pipe stubs and ductile iron flanged backup rings in catch basins shall be installed in catch basin by shop fabrication.

3. Manhole and catch basin frames and lids shall be heavy-duty (H-20 load) cast iron as noted on the drawings.

PART 3 EXECUTION

3.1 INSTALLATION

A. Storm sewers and culverts shall be installed in accordance with ODOT Item 603.

1. Excavations shall be constructed in accordance with ODOT 603.03;
2. Bedding shall conform to ODOT 603.04 Class B unless otherwise approved by FDF;
3. Pipe shall be laid in accordance with ODOT 603.05. Pipe shall be joined in accordance with ODOT 603.06;
4. Backfill shall in accordance with ODOT 603.08. Compact backfill in accordance with ODOT 603.081; and
5. Work site shall be cleaned/restored in accordance with ODOT 603.09.

B. Drainage Structures

1. Construct manholes, inlets, and catch basins in accordance with ODOT 604.03. Concrete for drainage structures shall conform to ODOT 604.06 and ODOT 604.08 as applicable; and
2. Excavation and backfill shall be performed in accordance with ODOT 604.04.

END OF SECTION

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SECTION 02831
CHAIN LINK FENCE

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Fence framework, fabric, and accessories.

B. Excavation for post bases; concrete foundation for posts and center drop for gates.

C. Manual gates and related hardware.

D. Specification applies to fence repair needed as a result of relocation or of Contractor's construction or site clearing activities.

1.2 RELATED SECTIONS

A. ***Section 01010 - General Requirements.***

B. ***Section 02110 - Site Clearing.***

C. ***Section 02200 - Earthwork.***

D. ***Section 16170 - Grounding and Bonding***

1.3 REFERENCE DRAWINGS

A. Reference ***Section 01012*** for the Schedule of Drawings.

1.4 REFERENCES

A. American Society for Testing and Materials (ASTM):

- ASTM A121 Rev. A-92 — Standard Specification for Zinc-Coated (Galvanized) Steel Barbed Wire.
- ASTM A123 Rev. A-89 — Standard Specification for Zinc (Hot Dip Galvanized) coatings on Iron and Steel Products.

•	ASTM A153 A153M-95	Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
•	ASTM A392-96	Standard Specification for Zinc- Coated Steel Chain-Link Fence Fabric.
•	ASTM A570 A570M-95	Standard Specification for Steel, Sheet and Strip, Carbon, Hot-Rolled, Structural Quality.
•	ASTM C94-96	Standard Specification for Ready-mixed Concrete.
•	ASTM F567-93	Standard Practice for Installation of Chain Link Fence.
•	ASTM F669-92	Standard Specification for Strength Requirements of Metal Posts and Rails for Industrial Chain Link Fence.

1.5 SYSTEM DESCRIPTION

A. Fence Height
- 6 feet nominal (with tree strands of barbed wire 1 foot high on extension arms, if applicable) as indicated on drawings.

B. Line Post Spacing
- At intervals not exceeding 10 feet.

C. Fence Post and Rail Strength
- Conform to ASTM F669.

D. Gate Sizes
- As shown on drawings.

1.6 SUBMITTALS

A. Reference ***Part 6, Section 10.0,*** and ***ACR-001*** for all submittal requirements and procedures.

B. Shop Drawings
- Indicate plan layout, spacing of components, post foundation dimensions, hardware anchorage, and schedule of components.

C. As-Built Drawings
- Indicate plan layout, size, type, and swing of gates.

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PART 2 PRODUCTS

2.1 MATERIALS

A. Posts (Steel)
- ASTM A570; hot rolled steel strip, cold formed to pipe configuration, longitudinally welded construction, minimum yield strength of 50 ksi.

B. Fabric Wire (Steel)
- ASTM A392 zinc-coated, 9-gage wire fabric. Fabric wire on-site can be re-used if approved by FDF.

C. Barbed Wire
- ASTM A121 galvanized steel; 12-gage wire, three strands, four points at 5 inches on center.

D. Concrete
- FDF mix FMPC #2, ASTM C94; normal Portland cement, 3,000 psi strength at 28 days, 4 inch slump, ±1 inch.

E. Gates
- Swing gates internally braced to prevent sag. Fabric equivalent to that of fence; secure to frame with tension bars and hook bolts. Extend top frame of gates vertically to provide three rows of barbed wire, if applicable. Fence fabric and rails may be re-used if in sound condition. Posts and fence accessories shall be new materials.

F. Components

1. Corner and Terminal Posts - 2-7/8 inch, outside diameter.
2. Top and Brace Rail - 1-5/8 inch, outside diameter, plain end, sleeve coupled.
3. Tension Wire - 6-gage galvanized steel, single strand.
4. Tie Wire - 6-gage galvanized steel wire.
5. Line Posts - 2-3/8 inch outside diameter.
6. Gate Posts - 2-3/8 inch outside diameter
7. Gate Frame - 1-7/8 inch diameter for welded fabrication.

2.2 ACCESSORIES

A. Caps
- Cast steel galvanized; sized to post diameter, screw retainer.

B. Fittings
- Sleeves, bands, clips, rail ends, tension bars, fasteners and fittings; galvanized steel.

C. Extension Arms
- Cast steel galvanized, to accommodate three strands of barbed wire, single arm, sloped to 45 degrees up from horizontal.

D. Gate Hardware

- Hinges shall be galvanized, malleable iron hinges. Ball and socket bottom hinge to sustain device and padlocking capabilities and double gates with center lunger rod catches. Secure gates in open position with semiautomatic outer catches to secure gates in open position.

E. Drive Anchor

- Two angles, 36 inch length, 1-1/4 inches by 1-1/4 inches by 1/4 inch.

2.3 FINISHES

A. Components and Fabric

- Galvanized to ASTM A123; 2.0 ounces/square feet coating.

B. Hardware

- Galvanized to ASTM A153, 2.0 ounces/square feet coating.

C. Accessories

- Same finish as framing.

PART 3 EXECUTION

3.1 ERECTION/INSTALLATION/APPLICATION

A. Remove existing fence as shown on the drawings and as otherwise required to perform the work. Stockpile fence fabric in tied rolls and stack posts in a neat pile. Stockpile location shall be on site as designated by FDF.

B. Install framework, fabric, accessories, and gates in accordance with the manufacturer's instructions and ASTM F567.

C. Set all posts plumb in accordance with drawing details. Where concrete footings are used, top of footing shall be 2 inches above finish grade. Slope top of concrete for water runoff. Concrete used for fence posts does not require concrete tests. Allow posts to be driven when not corner of gate posts.

D. Brace gate and corner post to adjacent line post with horizontal center brace rail and diagonal truss rods. Install brace rail, one bay form end.

E. Provide top rail through line post tops and splice with 6 inch long rail sleeves.

F. Stretch fabric between terminal posts or at intervals of 100 feet maximum, whichever is less, per manufacturer's recommendations.

G. Position bottom of fabric 1 inch above finished grade.

H. Fasten fabric to top rail, line posts, braces, and bottom tension wire with tie wire at maximum 15 inches on centers.

I. Attach fabric to end and corner posts with tension bars and tension bar clips.

J. Install bottom tension wire stretched taut between terminal posts, as per manufacturer's recommendations.

K. Install support arms sloped outward and attach barbed wire; tension and secure.

L. Install gates plumb, level, and secure for full opening without interference. Adjust and lubricate hardware for smooth operation.

M. Coat areas where the galvanized finish has been damaged, using zinc-enriched paint.

N. Install grounding as noted on drawing details, in accordance with ***Section 16170***.

3.2 ADJUSTING

A. Erection Tolerances

1. Maximum Variation from Plumb - 1/4 inch.
2. Maximum Offset from True Position - 1 inch.

B. Patch, repair, or replace any material damaged by the Contractor to match undamaged material.

END OF SECTION

SECTION 02851
STEEL GUARD RAIL AND GUARD POSTS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Supply and installation of steel guardrails and steel posts.

1.2 RELATED SECTIONS

A. ***Section 02200 - Earthwork.***

B. ***Section 02900 - Seeding.***

C. ***Section 03001 - Concrete.***

1.3 REFERENCE DRAWINGS

A. Reference ***Section 01012*** for the Schedule of Drawings.

1.4 REFERENCES

A. Ohio Department of Transportation (ODOT)
- Construction and Material Specifications, January 1, 1995. Except as supplemented or otherwise modified herein and/or shown on the construction drawings, the entire work under this section shall be in compliance with the provisions of ODOT.

1.5 SYSTEM DESCRIPTION

A. This work shall consist of the construction of guardrail and guard posts in accordance with these specifications and conformity with the lines and grades shown on the plans.

1.6 SUBMITTALS

A. Reference ***Part 6, Section 10.0*** for submittals and ***ACR-001*** for procedures.

PART 2 PRODUCTS

2.1 MATERIALS

A. Guardrail shall be deep beam rail, type 4, single face. Steel posts, rails, bolts, fittings, and other accessories shall be galvanized. Specific materials shall be as follows:

Subject	ODOT Item No.
Deep beam rail and hardware	710.06
Galvanizing	711.02
Steel guardrail posts	710.15

B. Guard Posts: Steel pipe, ASTM A53, Schedule 40.

PART 3 EXECUTION

3.1 GENERAL

A. Guardrail shall be installed in accordance with ODOT Item 606.

3.2 ERECTION/INSTALLATION/APPLICATION

A. Setting Guard Rail Posts

1. A power auger shall be used to drill post holes;
2. Posts shall be set plumb in holes;
3. After posts are set, the holes shall be backfilled in 4-inch layers and well tamped; and
4. Posts shall be spaced 12 feet, 6 inches on centers measured along the centerline of the rail. Guardrail shall be constructed with flared end section at each end.

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B. Erecting Rail Elements

- Rail elements shall be erected in a manner resulting in a smooth, continuous installation. All bolts shall be drawn tight. Bolts shall be sufficiently long to extend at least 1.4 inch beyond the nuts. All metal shall be fabricated in the shop. No burning or welding shall be done in the field. Field punching, cutting, and drilling may be permitted if approved by FDF after it has been demonstrated that it will not result in damage to the surrounding metal. Galvanized surfaces which have been abraded so that the base metal is exposed, threaded portions of all fittings and fasteners, and cut ends of bolts shall be given a field coat of compatible galvanizing compound.

C. Installation guard post

1. Excavate for post and concrete in accordance with ***Section 02200***;
2. Hand trim and remove loose material in excavation;
3. Position pipe in hole, maintaining clearances as specified on drawings;
4. Place concrete around and in pipe in accordance with ***Section 03001;*** and
5. Paint post after concrete cures in accordance with ODOT Item 514.

END OF SECTION

SECTION 02900
SEEDING

PART 1 GENERAL

1.1 SCOPE

This section includes but is not limited to:

A. Soil preparation;

B. Interim seeding;

C. Permanent seeding;

D. Summer seeding;

E. Application of fertilizer; and

F. Application of mulch and mulch binder.

G. Application of crusting agent.

1.2 RELATED SECTIONS AND PLANS

A. ***Section 02270 - Erosion and Sediment Control***;

B. ***Part 6 - Statement of Work***; and

C. ***Part 8 - Environmental Health and Safety/Training Requirements***.

1.3 REFERENCES

A. State of Ohio, Department of Natural Resources (ODNR): Rainwater and Land Development, Ohio's Standard for Storm Water Management, Land Development, and Urban Stream Protection - 1996.

B. Title 40, Code of Federal Regulations (CFR), Part 161, Identification and Listing of Hazardous Waste.

C. Sitewide Excavation Plan, current revision.

D. Land Use Authority, Master Plot, Overall Plan, current plan.

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1.4 SUBMITTALS

A. Provide submittals as required in ***Part 6, Section 10.0.***. Unless specified otherwise, submittals shall be made to the Construction Manager for review and approval.

B. Submit the following within thirty (30) calendar days from Notice to Proceed:

1. Proposed seed mixes and application rates for seed, mulch, mulch binder, and fertilizers.
2. Manufacturer's product data and recommended methods of application for seed, mulches, mulch binder, and fertilizer. Product data for fertilizer shall also include chemical analysis including uranium analysis to assure there is no resultant or derived uranium from fertilizer use.
3. Material Safety Data Sheet (MSDS) for fertilizer and mulch binder.

C. Provide a plan showing seeding type by area (interim or permanent) and a written statement of proposed changes to seed mix and application rate of seed mix and/or associated materials (i.e., fertilizer, mulch, and mulch binder) a minimum of ten (10) calendar days before seeding. Choice of seeding type shall follow the Land Use Authority, Master Plot, Overall Plan and other pertinent project information according to when areas will be redisturbed.

D. Submit certificate of compliance for the following within fifteen (15) calendar days before the seeding. Do not sow seed until the Construction Manager has reviewed and approved the certificates.

1. Certificate stating seed mixture, guaranteed percentages of purity, weed content, germination of seed, name of seller, the test date for the seed, and the net weight and date of shipment;
2. Manufacturer's certificate stating the available nutrients contained in the proposed fertilizer;
3. Manufacturer's certificate stating the wood cellulose mulch meets the requirements of this section; and
4. Manufacturer's certificate stating the mulch binder meets the requirements of this section.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver containerized materials in uniform packages bearing the name of the manufacturer, the net weight, and a statement of content. Deliver containerized materials to the site in original, properly labeled, unopened, clean containers each showing the manufacturer's guaranteed analysis conforming to applicable regulations and standards.

B. Store materials in a dry area in a manner to prevent physical damage from the elements.

1.6 **HEALTH AND SAFETY REQUIREMENTS**

A. Environmental Health and Safety/Training Requirements shall be as specified in ***Part 8.***

PART 2 PRODUCTS

2.1 **MATERIALS**

A. Furnish seed labeled in accordance with the U.S. Department of Agriculture (USDA) Rules and Regulations under the Federal Seed Act and applicable state seed laws. Furnish seed in sealed bags or containers bearing the date of expiration. Do not use seed after its expiration date. Each variety of seed shall: have a purity of not less than 90 percent, have a percentage of germination not less than 80 percent, have a weed to seed content of not more than 0.75 percent, and contain no noxious weeds. The above percentages are by weight.

B. For interim seeding, the seed mixture shall be:

1. Annual Rye - 60 pounds pure live seed (pls)/acre
2. Perennial Rye - 60 pounds pls/acre

C. For permanent seeding, the seed mixture shall be (all measures are pounds pls/acre):

		April 15 - May 31	October 1 - February 28
1.	Canada Wild Rye	2	3
2.	Little Bluestem	2	3

		April 15 - May 31	October 1 - February 28
3.	Big Bluestem	3	4
4.	Indian Grass	2	3
5.	Switch Grass	½	1
6.	Side Oats Gramma	½	1
7.	Live Oats	20	25

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D. For summer (June - September) seeding, the seeding mixture shall be:

1. Buckwheat - 60 pounds pls/acre.

E. Obtain water from the on-site sources shown on the construction drawings or specified in ***Part 6, Section 6.0***, unless otherwise approved by the Construction Manager.

F. Fertilizer

1. Use fertilizer that is dry or liquid commercial grade fertilizer, uniform in composition, that meets the requirements of all state and federal regulations and standards of the Association of Agricultural Chemists.
2. Fertilizer for interim seeding shall be VCOTE 34-4-14 as manufactured by George W. Hill or equal.
3. Fertilizer for permanent seeding shall be 0-12-12.

G. Furnish mulch meeting the following requirements:

1. Mulch shall be straw or wood cellulose fiber, free of clay, stone, foreign substances, and reasonably free of weeds.
2. Furnish straw that does not contain sticks larger than 1/4-inch diameter or other materials that may prevent matting down during application. Use straw that is free from mold and other objectionable material and in an air-dry condition suitable for placing with mulch blower equipment or other equipment as approved by the Construction Manager. Straw shall be generally 6 inches or more in length.

3. Mulch applied by hydrospraying shall be a wood cellulose processed into a uniform fibrous physical state. Use wood cellulose fiber containing a green dye that will provide for easy visual inspection for uniformity of slurry spread. The wood cellulose fiber including dye, shall contain no growth or germination inhibiting properties. The wood cellulose fiber shall be manufactured in such a manner that, after addition and agitation in slurry tanks with water, the fibers in the material become uniformly suspended to form a homogeneous material. When sprayed on the ground, the material shall allow absorption and percolation of moisture. The wood cellulose fiber shall meet the following requirements:

Item	Specification Limit
Particle Length	0.375 inch (maximum)
Particle Thickness	0.047 inch (maximum)
pH	4.0 to 8.5
Ash Content	1.6 percent (maximum)

Item	Specification Limit
Water Holding Capacity (based on fiber dry weight)	500 percent (minimum)

H. Mulch binder agent shall be as approved by the FDF Construction Manager and shall meet the following requirements:

1. The mulch binder shall be a pine sap emulsion comprised of a 100% organic emulsion produced from naturally occurring resins (pine sap) and be nontoxic to plants. The mulch binder shall not be comprised of chloride, lingosulfonate, petroleum, or asphaltic type emulsions. The mulch binder shall be compatible with application via a hydro seeder, and must not require intense cleaning of equipment after application. Once cured, the mulch binder shall be non-tracking (i.e., will not stick to boots or tires).
2. The mulch binder shall not have hazardous characteristics of ignitability, corrosiveness, reactivity, or toxicity as defined in 40 CFR Part 261, Subpart C, for a hazardous waste in either its pre-applied or cured state.
3. The mulch binder shall have a flash point greater than 200°F. The mulch binder shall be neither a flammable nor combustible liquid per DOT definition. The mulch binder must not be susceptible to significant deterioration from exposure to the elements, including sunlight.
4. The pine sap emulsion shall be provided in concentrated solution and prepared so that it will not change in transportation or storage.

I. Erosion Control Blanket and Crusting Agent shall be in accordance with ***Section 02270.***

2.2 EQUIPMENT

A. Provide equipment of size and type to perform work specified in this section.

PART 3 EXECUTION

3.1 GENERAL

A. Stabilization of disturbed areas by seeding or by use of a crusting agent shall be performed at completion of excavation or within seven (7) calendar days of knowing a disturbed area will be idle for more than forty-five (45) calendar days, whichever is sooner.

B. Interim seeding is required for disturbed areas and soil piles which are scheduled to or may be further disturbed within two (2) years, but do not have significant potential of spreading contamination.

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C. Permanent seeding is required for disturbed areas and soil piles which will not be disturbed for more than two (2) years.

D. Disturbed areas and soil piles which are scheduled to be significantly disturbed within two (2) years, are destined for the On-Site Disposal Facility (OSDF), and/or need effective erosion control immediately, are to be stabilized with use of a crusting agent as specified in ***Section 02270.***

E. Stabilization of permanent slopes exceeding 2H:1V shall utilize an erosion control blanket as specified in ***Section 02270*** after application of seed mixture. This does not include slopes within the STP excavation that will be backfilled upon certification.

F. Area(s) to be seeded shall be generally free of debris, rock, root material, and other objects which may impede soil preparation and seeding activities. Perform soil preparation by tilling/cultivating, to a depth of approximately 2 inches, to eliminate uneven areas and low spots. Maintain lines, levels and contours.

G. Repeat cultivation in areas where equipment used for hauling and spreading has compacted subgrade.

3.2 APPLICATION

A. Seeding seasons are as follow:

1. For interim seeding, October 15 through March 15.
2. For permanent seeding, April 15 through May 31, and October 1 through February 28, each with a corresponding application rate.
3. Seeding that must be done outside of the above seeding seasons shall be completed with the summer seeding mixture specified in this section. Application of summer seeding shall be followed during the next seeding season by the application of either interim or permanent seeding, as appropriate, in accordance with the general execution requirements specified in this section.

B. Apply fertilizer, seed, mulch, and mulch binder to disturbed areas and areas excavated and graded in this Contract requiring seeding unless otherwise indicated or directed by the Construction Manager. All seeding seasons and all application rates for seed and related materials are subject to adjustment as directed or approved by the Construction Manager.

C. Application of Fertilizer:

1. Apply fertilizer at a uniform rate of 1 pound per 1000 square feet.
2. Disc fertilizer thoroughly into upper 2 inches.
3. Lightly water to aid the distribution of fertilizer.

D. Sequence of application of seeding mixture, mulch and mulch binder.

1. Apply seed mixture at the minimum rate as specified in this section. Seeding shall be done by hydroseeding, broadcasting, or by drilling to a depth of 1/4 inch followed by cultipacking. When hydroseeding, the mixture tank shall be cleaned prior to use to ensure that remnant seed is not introduced to the proposed seed mixture.
2. Do not seed areas in excess of that which can be mulched within 24 hours.
3. Apply mulch within 24 hours of seeding.
4. Spread straw mulch in a uniformly thick layer.
5. Apply water with a fine spray immediately after each area has been straw mulched. Wet soil at an approximate rate of 120 gallons per 1,000 square feet.
6. Apply mulch binder at the rate specified in this section.

E. Spread straw mulch, either by hand or by blowing method, at the rate of 2 air-dried tons per acre. During June through September, increase straw mulch application rate to 3 air-dried tons per acre. Application of straw mulch by the blowing method is exempt from the dust control requirements specified in ***Part 6 - Exhibit 6.4***.

F. Apply sprayed wood cellulose fiber at a net dry weight of 2,000 pounds per acre. Mix the wood cellulose fiber with water at a ratio of 50 pounds of wood cellulose fiber per 100 gallons of water.

G. Maintain mulching material in place with a pine sap emulsion binder. Apply mulch binder according to manufacturer's directions. Unless specified otherwise by the manufacturer, dilute concentrated pine sap emulsion to ratio of four (4) parts water to one (1) part concentrate. Apply diluted pine emulsion at a rate of 2,500 gallons per acre.

3.3 MAINTENANCE

A. Maintain the seeded areas in satisfactory condition until acceptance of the seeding by the Construction Manager. Maintenance of the seeded areas includes repairing eroded areas, revegetating when necessary, watering and mowing (if applicable). A satisfactory condition of the vegetated area is defined as follows:

1. An area shall have a predominant stand of the seeded vegetation.
2. Within 3 weeks, germination must occur over 95 percent of the area with no single bare area greater than 3 square feet.
3. Within 3 months, 95 percent of the area must be covered with mature vegetation.

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B. Areas that fail to meet these requirements shall be repaired or reseeded as necessary to produce an acceptable stand of vegetation, as specified in this section. Areas that become bare during June through September shall be reseeded with the summer seeding mix specified in this section.

C. Maintain areas applied with a crusting agent to ensure proper erosion control. The crusting agent shall be reapplied to eroded and bare areas as necessary.

3.4 WARRANTY

A. Seeded areas shall be subject to a warranty period of not less than 12 months from initial establishment of vegetation over 100 percent of the seeded areas.

B. At the end of the warranty period, the Construction Manager will perform an inspection upon written request by the Contractor. Seeded areas not demonstrating satisfactory condition of vegetation as specified herein, shall be repaired, reseeded and maintained to meet all requirements as specified herein at the Contractor's expense.

3.5 ACCEPTANCE

A. The seeded areas shall be accepted at the end of the warranty period if a satisfactory condition exists as defined in this section.

B. After all disturbed areas are stabilized and all necessary corrective work has been completed, the Construction Manager will certify in writing the final acceptance of the seeded areas.

END OF SECTION

SECTION 03001
CONCRETE

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Concrete work for foundations, slabs, equipment supports, and other miscellaneous concrete.

B. Formwork and accessories.

C. Reinforcement and accessories.

D. Cast-in-place concrete, grout, and accessories.

E. Finishing and curing.

F. Sampling and testing of concrete work by an independent testing laboratory.

1.2 RELATED SECTIONS

A. ***Section 01010 - General Requirements.***

B. ***Section 02200 - Earthwork.***

C. ***Section 02831 - Chain Link Fence.***

D. ***Section 16170 - Grounding and Bonding.***

1.3 REFERENCE DRAWINGS

A. Reference ***Section 01012*** for the Schedule of Drawings.

1.4 REFERENCES

A. American Concrete Institute (ACI):

- ACI 301-96 Standard Specifications for Structural Concrete.
- ACI 305R-91 Hot Weather Concreting.
- ACI 306R-88 Cold Weather Concreting.

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- ACI 318/318R Rev. 95 — Building code Requirements for Structural Concrete.
- ACI SP-66-94 — ACI Detailing Manual.
- ACI 117-90/ 117R90 — Standard Tolerances for Concrete Construction and Materials and Commentary.

B. American Society for Testing and Materials (ASTM)

- ASTM A615/ A615M Rev. A-96 — Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
- ASTM C31/ C31M-96 — Standard Practice for Making and Curing Concrete Test Specimens in the Field.
- ASTM C33-93 — Concrete Aggregates.
- ASTM C39-96 — Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.
- ASTM C94-96 — Ready Mixed Concrete.
- ASTM C109/ C109M-95 — Standard Test Method for Compressive Strength of Hydraulic Cement Mortars.
- ASTM C143 Rev. A-90 — Standard Test Method for Slump of Hydraulic Cement Concrete.
- ASTM C150-96 — Portland Cement.
- ASTM C157-93 — Standard Test Method for Length Change of Hardened Hydraulic Cement Mortar and Concrete.
- ASTM C231 Rev. B-91 — Standard Test Method for Air Concrete by the Pressure Method.
- ASTM C260-95 — Air-Entraining Admixtures for Concrete.
- ASTM C309-95 — Liquid Membrane-Forming Compounds for Curing Concrete.

- ASTM C311 Rev. B-96 — Standard Test Methods for Sampling and Testing Fly Ash or Natural Pozzolans for Use as a Mineral Admixture in Portland Cement Concrete.
- ASTM C494-92 — Chemical Admixtures for Concrete.
- ASTM C618 Rev. A-96 — Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Concrete.
- ASTM C827 Rev. A-95 — Standard Test Method for Change in Height at Early Ages of Cylindrical Specimens form Cementitious Mixtures.
- ASTM C882-91 — Standard Test for Bond Strength of Epoxy-Resin Systems Used with Concrete by Slant Shear.
- ASTM C920-95 — Elastomeric Joint Sealants.

C. U. S. Department of Commerce, Voluntary Products Standards (PS):

- PS 1-83 — Plywood

1.5 SUBMITTALS

A. Reference ***Part 6, Section 10.0*** for submittals and ***ACR-001*** for procedures.

B. Shop Drawings
- Indicate reinforcing bar sizes, spacings, locations, quantities, bending and cutting schedules, placing drawings, and supporting and spacing devices.

C. Product Data
- Concrete mix designs, including documentation of aggregate sources and most recent sieve analysis. Sieve analyses must not be older than 1 year.

D. Concrete Supplier
- Name and address of the transit-mix concrete supplier. Supply typical batch ticket and history per ASTM C94.
- Submit concrete test reports per 3.3.

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E. Test Reports
- Submit test reports to FDF for all tests required under field quality assurance.

1.6 QUALITY ASSURANCE PROGRAM

A.

ACI 301	Change to Read
Architect/Engineer	FDF
Owner	FDF

B. Formwork shall be in accordance with Section 2 of ACI 301, unless specified otherwise in this section.

C. Perform concrete reinforcing work in accordance with Section 3 of ACI 301, unless specified otherwise in this specification.

D. Perform cast-in-place concrete work in accordance with Sections 4 and 5 of ACI 301, unless specified otherwise in this section.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Reference ***Part 6, Section 5.1*** for all delivery, storage, and handling requirements and procedures.

B. Reinforcing bars shall be delivered to meet the construction schedule and stored as directed by the Construction Manager.

C. Reinforcing bar tags shall be made of durable material and marked in a legible manner with waterproof markings; not less than one tag per bundle, attached by wire. Identification tags shall show the grade, number of pieces, size, and mark or length of bars.

PART 2 PRODUCTS

2.1 MATERIALS

A. Plywood Forms
- Not less than 5/8 inch-thick, 5-ply Douglas fir plywood conforming to PS1, and as manufactured by a member of the American Plywood Association; B-B Plyform, Class I, Exterior-APA, with plyform faces sanded and oiled.

B. Prefabricated Type Forms
- Matched, tight fitting, stiffened to support weight of concrete.

C. Form Release Agent
- Colorless mineral oil which will not stain concrete nor impair natural bonding characteristics of subsequent coatings.

D. Reinforcing Steel
- ASTM A615, 60 ksi yield grade; deformed billet steel bars; plain finish.

E. Tie Wire
- Minimum 16-gage annealed type wire.

F. Chairs, Bolsters, Bar Supports, Spacers
- Sized and shaped for strength and support of reinforcement during concrete placement conditions.

G. Fabrication
- Fabricate concrete reinforcing in accordance with ACI SP-66 and Chapters 7 and 12 of ACI 318.

H. Cement
- Normal, Portland cement, conforming to requirements of ASTM C150, Type I.

I. Fly Ash
- Class F, conforming to requirements of ASTM C618 and ASTM C311.

J. Admixtures
1. Air Entrainment - conforming to ASTM C260; and
2. Water Reducing and Retarding - Conforming to requirements of ASTM C494.

K. Aggregates
1. Normal Weight Concrete - Conforming to requirements of ASTM C33; and
2. Maximum aggregate size - 1 inch.

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2.2 ACCESSORIES

A. Chamfer Strips
- Chamfered, wood strip type; 3/4 by 3/4 inch size.

B. Nails, Spikes, and Anchorages
- Sized as required and of sufficient strength and character to maintain formwork in place while placing concrete.

C. Form Ties
- Removable or snap-off type; designed to prevent form deflection; of adjustable length, cone type, with waterproofing washer; and free of defects that could leave holes larger than 1 inch in concrete surface.

D. Joint Sealer - Elastomeric joint sealant conforming to ASTM C920; Type S or Type M, Grade P, Class 25.

1. Acceptable products and suppliers (or equal)
   a. Sikadur 51 SL, by Sika Corp.; and
   b. Sonolastic SI-1, by Sonneborn Building Products.

E. Nonshrink Grout Under Equipment - Premixed compound consisting of nonmetallic aggregate, cement, water reducing and plasticizing agent; capable of developing minimum compressive strength of 7,000 psi in 28 days; conforming to ASTM C109 and ASTM C827.

1. Acceptable products and suppliers (or equal)
   a. Masterflow 713, by Master Builders;
   b. SikaGrout 212, by Sika Corp.; and
   c. Sealtight 588, by W.R. Meadows.

F. Patching Grout - Premixed, nonshrink epoxy grout, capable of developing minimum compressive strength of 3,000 psi in 24 hours, conforming to ASTM C109. The grout must not shrink or expand more than 5 percent when tested in accordance with ASTM C157 and achieve a minimum bond strength of 1,200 psi in 24 hours when tested in accordance with ASTM C882.

G. Bonding Agent
- Polyvinyl acetate polymer or acrylic polymer, water resistant when cured.

H. Curing Compound
- Conforming to the requirements of ASTM C309, clear; must not impair natural bonding characteristics of subsequent coatings.

2.3 FABRICATION

A. General

- All concrete used in the work shall be composed of Portland cement, fine and coarse aggregate, and the specified admixtures. Design mixes shall be submitted to FDF for approval before any concrete is placed. Concrete for every part of the work shall be of homogeneous structure which, when hardened, will have the required strength and resistance to weathering. The proportions for all concrete shall be such as to produce a mixture which will work readily into the forms and around reinforcement with the method of placing employed on the work, but without permitting the materials to segregate.

B. Mix Proportions

1. The following mix designs shall be used for cast-in-place concrete.

   a. Slabs

      Specified Strength (28 days) 4,000 psi
      Total Air Content: 5 ± 1-1/2 percent
      Specified Slump: 4 inches ± 1 inch
      Maximum Aggregate Size: 1 inch
      Maximum Water/Cement Ratio: 0.35
      Water Reducing and retarding admixtures as required per ASTM C494.

   b. Foundations

      Specified Strength (28 days) 3,000 psi
      Total Air Content: 5 ± 1-1/2 percent
      Specified Slump: 4 inches ± 1 inch
      Maximum Aggregate Size: 1 inch
      Maximum Water/Cement Ratio: 0.46
      Water Reducing and retarding admixtures as required per ASTM C494.

2. The work has been designed for concrete having minimum compressive strength at 28 days as determined by ASTM C39. The water/cement ratio shall be determined by consideration of the specified strength, the water reducing admixtures, the slump required for proper placement, air entraining requirements, the maximum allowable fineness modulus of the fine aggregate and its specific gravity, and the amount of water carried on the aggregates. The mix designs shall be on the aggregates. The mix designs shall be proportioned in accordance with ACI 318, Section 5.3 or Section 5.4.

3. The proportions of all materials in the concrete shall be subject to review by FDF. The Contractor shall provide all plant and equipment necessary to determine and control the actual proportions of materials entering the batch. Slumps shall be recorded for each trial batch.

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C. Water Content

- In calculating the total water content in any mix, the amount of water carried on the aggregate shall be included. The water on the aggregate shall be determined periodically by test, and the amount of free water on the aggregate shall be subtracted from the water allowed in the mix. In all cases, the amount of water to be used shall be the minimum amount required to produce a plastic mixture of the specified strength and slump.

D. Mixing and Delivery

- Mixing and delivery of concrete shall be scheduled so that all concrete placing operations can be completed within 1-1/2 hours or before the drum has revolved 300 revolutions, whichever comes first, after introduction of mixing water to cement and aggregates, in accordance with Section 11 of ASTM C94. When air temperature has fallen to or is expected to fall below 40 degrees F, the recommendations for cold weather concreting contained in ACI 306R shall be followed. When the air temperature exceeds 90 degrees F, the recommendations for hot weather concreting contained in ACI 305R shall be followed.

PART 3 EXECUTION

3.1 PREPARATION

A. Erect formwork and bracing to achieve design requirements in accordance with requirements of Section 2 of ACI 301.

1. Provide bracing to ensure stability of formwork;
2. Align joints and make watertight. Keep number of form joints to a minimum;
3. Provide chamfer strips on external corners of permanently exposed edges; and
4. Shore or strengthen formwork subject to over stressing by construction loads.

B. Application - Form Release Agent: Apply form release agent on formwork in accordance with manufacturer's instructions.

1. Apply prior to placement of reinforcing steel, anchoring devices, and embedded items; and
2. Keep surfaces coated prior to placement of concrete.

C. Form cleaning: Clean and remove foreign matter within forms as erection proceeds.

1. Clean formed cavities of debris prior to placing concrete;
2. Flush with water or use compressed air to remove remaining foreign matter;
3. Ensure that water and debris drain to exterior; and
4. During cold weather, remove ice and snow from within forms. Do not use de-icing salts or water to clean out forms.

D. Tolerances: Construct formwork to maintain tolerances required by Section 2.3.

E. Form Removal: Forms or bracing shall not be removed until concrete has gained sufficient strength to carry its own weight and imposed loads.

1. Loosen forms carefully; and
2. Do not sedge with pry bars, hammers, or tools against finished concrete surfaces.

F. Preparation for Grouting:

1. To ensure proper bond to concrete, all grease, oil, dirt, and other deleterious materials shall be completely removed;
2. Roughen the surfaces by chipping, sandblasting, or another mechanical means to ensure bond of the grout to the existing concrete;
3. After concrete surfaces have been washed clean, they shall then be saturated with water for 24 hours prior to placement of cement-based grout; and
4. Upon completion of saturation period, excess water shall be removed prior to grouting.

3.2 ERECTION/INSTALLATION/APPLICATION

A. Place, support, and secure reinforcement against displacement. Do not deviate from required position. Make electrical ground system connection where required by ***Section 16170.***

B. Maintain concrete cover around reinforcing according to the requirements of Section 3.3.2.3 of ACI 301 and Section 7.7 of ACI 318, and as shown on construction drawings.

C. Provide formed openings where required for work to be embedded in concrete members.

D. Coordinate work of other sections in forming and setting openings, slots, recesses, sleeves, bolts, anchors, and other inserts.

E. Install concrete accessories straight, level, and plumb or as called out on the construction drawings.

F. Place concrete continuously between forms or other limits indicated on the construction drawings.

1. Place concrete in accordance with Section 5 of ACI 301 and Chapter 5 of ACI 318;
2. Notify FDF a minimum of 24 hours prior to commencement of operations; and
3. Ensure that reinforcement and forms are not disturbed during concrete placement.

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G. Maintain records of concrete placement. Record date, location, quantity, air temperature, and test samples taken.

H. Installation of Grout:

1. Follow the manufacturer's instruction for mixing, placing, and curing grout.

3.3 QUALITY CONTROL

A. Testing: The Contractor shall pay and provide for services of an independent testing agency. The Contractor shall deliver test specimens to the testing agency. The agency shall perform field tests (take slumps, air, and cylinders) and shall perform laboratory test on the specimens. Concrete testing shall be performed in accordance with Section 1 of ACI 301 for each 50 cubic yards, or fraction thereof, of each mix design placed in any 1 day.

1. Slump Tests: ASTM C143. One sample for each strength test;
2. Air Content Tests: ASTM C231. One sample for each strength test;
3. Test Cylinders: ASTM C31. One set of three cylinders for above quantities; and
4. Compressive Strength: ASTM C39. One specimen tested at 7 days and two specimens tested at 28 days.

3.4 PROTECTION

A. Provide concrete curing and protection in accordance with Section 5 of ACI 301.
- Apply floor slab curing compound, where used, in accordance with the approved manufacturer's recommendations.

B. Provide finishes for formed concrete surfaces as defined in Section 5 of ACI 301.

C. Provide finishes and tolerances for slabs in accordance with Section 5 of ACI 301 and ACI 117.
- Provide troweled finish with Class A tolerance on all exposed slabs.

END OF SECTION

SECTION 09900
PAINTING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Surface preparation and field application of paints and coatings.

1.2 REFERENCES

A. ASTM D16 - Definitions of Terms Relating to Paint, Varnish, Lacquer, and Related Products.

B. NPCA (National Paint and Coatings Association) - Guide to U.S. Government Paint Specifications.

C. OSHA (Occupational Safety and Health Administration) - 29 CFR 1910

D. Ohio Department of Transportation (ODOT)

- Pavement Markings and Material (1997)

1.3 SUBMITTALS

A. Product Data: Provide data on all finishing products and special coatings.

B. Manufacturer's Instructions: Indicate special surface preparation procedures, substrate conditions requiring special attention.

C. Material Safety Data Sheet (MSDS): Submit for primers, finish paints, thinners and solvents.

1.4 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum three years experience.

1.5 REGULATORY REQUIREMENTS

A. Conform to applicable code for flame and smoke rating requirements for finishes.

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1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, protect and handle products to site.

B. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.

C. Container label to include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.

D. Store paint materials at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F in ventilated area, and as required by manufacturer's instructions.

1.7 ENVIRONMENTAL REQUIREMENTS

A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.

B. Do not apply exterior coatings during rain or snow, or when relative humidity is outside the humidity ranges required by the paint product manufacturer.

C. Noise, dust, fumes and fire hazard due to painting and sandblasting shall comply with OSHA 29 CFR 1910 regulations.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers - Paint
1. Carboline
2. Coronada
3. Devoe
4. Glidden
5. Porter
6. Sherwin-Williams
7. Approved equal.

2.2 MATERIALS - GENERAL

A. Coatings: Ready mixed, except field catalyzed coatings. Process pigments to a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating; good flow and brushing properties; capable of drying or curing free of streaks or sags.

B. Accessory Materials: Paint thinners and other materials not specifically indicated but required to achieve the finishes specified, of commercial quality.

C. Materials shall be free of lead and other RCRA metals.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that surfaces are ready to receive work as instructed by the product manufacturer.

B. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.

C. Test shop applied primer for compatibility with subsequent cover materials.

3.2 PREPARATION

A. Asphalt, Creosote, or Bituminous Surfaces Scheduled for Paint Finish: Remove foreign particles to permit adhesion of finishing materials. Apply compatible sealer or primer.

3.3 APPLICATION

A. Apply products in accordance with manufacturer's instructions.

B. Do not apply finishes to surfaces that are not dry.

C. Apply each coat to uniform finish.

D. Apply each coat of paint slightly darker than preceding coat unless otherwise approved.

E. Allow applied coat to dry before next coat is applied.

3.4 CLEANING

A. Collect waste material which may constitute a fire hazard, place in closed metal containers and remove from site.

END OF SECTION

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SECTION 16170
GROUNDING AND BONDING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Grounding electrodes and conductors.

B. Equipment grounding conductors.

C. Bonding.

D. Fence grounding.

1.2 RELATED SECTIONS

A. ***Section 01010 - General Requirements.***

B. ***Section 02831 - Chain Link Fence.***

C. ***Section 16400 - Service and Distribution.***

1.3 REFERENCE DRAWINGS

A. Reference ***Section 01012*** for the Schedule of Drawings.

1.4 REFERENCES

A. InterNational Electrical Testing Association (NETA)
- NETA ATS-95 Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems.

B. National Fire Protection Association (NFPA)
- NFPA 70 National Electrical code, 1996 Edition.

C. Underwriters Laboratories, Inc. (UL)
- UL 467-93 UL Standard for Safety Grounding and Bonding.
- Electrical Construction Materials Directory-96.

1.5 **SYSTEM DESCRIPTION**

A. Rod electrode and grounding connections.

B. Grounding System Resistance: 5 ohms maximum.

1.6 **SUBMITTALS**

A. Reference ***Part 6, Section 10.0*** for submittals and ***ACR-001*** for procedures.

B. Provide certification or record of calibration of ground testing instrumentation.

C. Provide record of as-built locations of grounding electrodes, if grounding electrodes are required.

1.7 **QUALITY ASSURANCE PROGRAM**

A. Conform to requirements of NFPA 70.

B. Furnish products listed in the UL Electrical Construction Materials Directory as suitable for the purpose specified and indicated.

C. Provide certification of ground testing instrumentation according to NETA ATS.

PART 2 PRODUCTS

2.1 **MANUFACTURES**

A. Acceptable Manufacturers

1. Mechanical Connectors
   a. Burndy;
   b. Ideal; and
   c. Ilsco.

2. Exothermic Connections
   a. Cadweld; and
   b. Thermoweld.

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2.2 MATERIALS

A. Rod Electrode
- Copper-clad steel, 3/4 inch diameter, 10 foot length.

B. Mechanical Connectors
- Bronze.

C. Wire

1. Stranded copper.
   a. Grounding Conductor: Size to meet NFPA 70 requirements.

D. Grounding and bonding materials shall conform to UL 467.

PART 3 EXECUTION

3.1 SITE CONDITIONS

A. Verify that final backfill and compaction have been completed before driving rod electrodes.

B. Verify that underground utilities will not interfere with the proposed rod locations prior to driving rod electrodes.

3.2 ERECTION/INSTALLATION/APPLICATION

A. Install products in accordance with manufacturer's instruction.

B. Install additional rod electrodes as required to achieve specified resistance to ground.

C. Equipment Grounding Conductor
- Provide separate, insulated conductor with each feeder and branch circuit raceway. Terminate each end on suitable lug, bus, or bushing.

D. Connect ground conductors to reinforcing bars in foundation before pouring concrete. Tie to structural steel members when they are installed, by exothermic connection.

E. Ground all metal equipment enclosures by attachment to ground rod system, the building steel, or existing periphery grounding system.

F. Ground pole-mounted equipment and static line conductors as indicated on the drawings.

G. Fence Grounding - Fences shall be grounded with a ground rod at each fixed gate post and at each corner post:

1. Drive ground rods until the top is 12 inches below grade;
2. Attach a No. 4 AWG copper conductor, by fusion weld process, to the ground rods and extend it underground to the immediate vicinity of the fence post; and
3. Lace the conductor vertically into 12 inches of fence mesh and fasten it by two approved bronze compression fittings, one to bond the wire to the post and the other to bond the wire to the fence. Each gate section shall be bonded to its gatepost by a 1/8 inch by 1 inch flexible braided copper strap and ground post clamps. Clamps shall be of the anti-electrolysis type.

3.3 QUALITY CONTROL

A. Inspect grounding and bonding system conductors and connections for tightness and proper installation as defined by contract documents and manufacturer's instructions. Accurately record as-built locations of grounding electrodes if required, and submit to FDF. Test instrumentation shall conform to NEA ATS. Provide certification for instrumentation.

B. Measure the system's resistance to the ground; perform testing in accordance with instrument manufacturer's recommendation using the fall-of-potential method. Provide written test reports indicating overall resistance to ground and resistance of each electrode to ground.

END OF SECTION

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SECTION 16320
PAD MOUNTED TRANSFORMER

PART 1 GENERAL

1.1 SUMMARY

A. Scope of Specification

This specification describes the general requirements for pad mounted transformers. The specific requirements for each transformer shall be given on individual transformer data sheets. Requirements left blank on the data sheets are to be determined by the supplier. The supplier shall submit completed data sheet with submittals for FDF concurrence.

1.2 REFERENCES

The publications listed below form part of this specification. Each publication shall be the latest revision and addendum in effect on the date this specification is issued for construction unless noted otherwise. Except as modified by the requirements specified herein or the drawing details, work included in this specification shall conform to the applicable provisions of these publications.

A. ANSI (American National Standards Institute)

- ASTM C57.92-91 — Guide for Loading Mineral Oil - Immersed Power Transformers Up to & Including 100 MVA with 55° C or 65° Ave Winding Rise.
- ASTM C57.12.26-87 — A Standard for Transformers - Pad - Mounted Compartmental - Type, Self-Cooled, 3- Phase Distribution Transformers for use with Separable Insulated High-Voltage Connectors, High-Voltage, 34,500 GRD Wye/19200 Volts & Below: 2500 KVA & Smaller.

B. NEMA (National Electrical Manufacturers Association)

- NEMA LA-1 1992 Surge Arrestors.

C. NFPA (National Fire Protection Association)

- NFPA 70 1996 National Electrical Code.

D. UL (Underwriters Laboratories, Inc.)

- 1997 Electrical Materials & Construction Directory.

1.3 SYSTEM DESCRIPTION

A. Liquid filled pad mounted distribution transformer shall have nominal primary voltage of 34.5 kV, and secondary voltage 480 V and capacity rating of 1000 KVA.

B. The transformer shall be for use in a 3 phase, 60 Hertz system. Ratings, voltages, winding connections, and impedances shall be as indicated on the data sheets.

C. The equipment shall consist of the transformer with all auxiliary equipment and accessories described in this specification and the data sheets.

1.4 SUBMITTALS

The manufacturer shall furnish all data and other documentation as indicated on the Vendor Data Requirements Sheets. A drawing of the transformer shall be submitted to FDF showing overall dimensions, center of gravity, lifting lugs, jacking pad locations, and cable entry locations. Cable termination locations (bushings) shall be shown on the drawing. Manufacturer shall furnish completed data sheet with documentation for the transformer.

1.5 SERVICE CONDITIONS

Unusual service conditions such as the following are possible for this transformer:

A. Load involving abnormal harmonic or DC current such as those which may result where appreciable load currents are controlled by solid state or similar devices (such as rectifiers or adjustable speed drives).

B. Unusual frequency of impact loading such as may occur when supplying welding apparatus, electric arc furnaces, or motors with cyclical loads.

PART 2 PRODUCTS

2.1 GENERAL

The pad mounted transformer shall consist of the following:

A. Transformer Tank

B. High Voltage Cable Terminating Compartment

C. Low Voltage Cable Terminating Compartment

D. Primary Disconnect (if specified on the data sheet)

E. Primary Fuses (if specified on the data sheet)

F. Secondary Circuit Breaker (if specified on the data sheet)

G. Accessories (as specified on the data sheet)

2.2 DESIGN SUMMARY

A. General

1. The transformer shall be compartment type, self-cooled, tamper proof, and weatherproof for mounting on a pad. Color shall be outdoor green, Munsell No. 7GY3.29/1.5
2. The average temperature rise of the windings, measured by the resistance method, shall be as indicated on the data sheet when the transformer is operated at rated kVA output in a 40 degree Celsius maximum (30 degree Celsius average) ambient temperature in any 24 hour period.
3. Coolant and insulating fluid shall be as indicated on the data sheet. The fluid shall contain less than 1 ppm of PCB. A Material Safety Data Sheet (MSDS) shall be submitted for the coolant.

4. The high and low voltage compartments shall be located side by side, separated by a steel barrier. If you face the transformer, the low voltage compartment shall be on the right. Terminal compartments shall be full height, air-filled, with individual doors. The high voltage door fastenings shall not be accessible until the low voltage door has been opened. The low voltage door shall have a three-point latching mechanism with provisions for a single padlock. The doors shall be equipped with lift-off stainless steel hinges to allow removal of the doors and door stops to hold the doors in the open position.
5. The following accessories shall be provided as standard on all transformers:
   - One-inch filling provision;
   - One-inch drain provision; and
   - Tap changer, for de-energized operation only, which is externally operable and padlockable.
6. The front of both high voltage and low voltage compartments shall be removable to permit rolling or skidding of unit into place over conduit stubs in foundation.
7. ANSI tank grounding provisions shall be furnished in both compartments.

B. Ratings

1. Transformer ratings of the following parameters shall be as indicated on the data sheet:
   - kVA;
   - Primary voltage (Delta);
   - Secondary voltage (Wye);
   - Impedance; and
   - Basic impulse level.
2. Transformer shall have two 2½ percent full capacity above normal and two 2½ percent below normal taps.

2.3 DESIGN REQUIREMENTS

A. Tank

1. The transformer shall be of sealed-tank construction of sufficient strength to withstand a pressure of 7 psi without permanent distortion. The cover shall be welded and the fastenings tamper proof.
2. The transformer shall remain effectively sealed for a top oil temperature range of minus 30 to 105 degrees Celsius.
3. If required, cooling panels will be provided on the back and sides. Lifting and packing pads will be provided.

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B. Coils

Coils shall be wound with copper or aluminum conductor; copper is preferred.

C. Core

1. Core/coil assembly shall be the 5 legged wound core type, using high grade, grain oriented silicon steel laminations carefully annealed after fabrication to restore high magnetic permeability.
2. Magnetic flux is to be kept well below the saturation point.

D. HIGH VOLTAGE COMPARTMENT

1. The high voltage terminations and equipment shall be dead front and conform to ANSI C57.12.26 requirements.
2. Dead front bushings shall be universal wells or one-piece integrated type for use with separable connectors. Bushings shall be externally clamped and front removable.
3. Provide 3 distribution class Metal Oxide Varistor Elbow (MOVE) lightning arresters for surge protection.
4. A ground pad shall be provided.

E. LOW VOLTAGE COMPARTMENT

1. The low voltage bushings shall be molded epoxy, and provided with blade-type spade terminals with NEMA standard hole spacing arranged for vertical take-off.
2. The low voltage neutral shall be an insulated bushing, grounded to the tank by a removable strap.
3. Wye-wye transformers shall have the high and low voltage neutrals internally tied, with a removable strap.
4. A ground pad shall be provided.
5. Barrier type terminal blocks shall be provided in the cabinet for all external control and alarm wiring. Current transformer wiring shall terminate in shorting type terminal blocks. Terminal blocks shall be rated 600 V AC 30 amps minimum and shall be capable of accepting a minimum of 2 Number 12 AWG field wires.
6. All devices mounted on transformer, including current transformers, shall be wired to terminal blocks.

2.4 INSPECTION AND TESTS

A. Transformer shall be tested in accordance with applicable ANSI, IEEE, and NEMA standards.

B. Requirements for additional testing shall be identified on the data sheet.

C. Certified test report for all transformer tests shall be submitted for each transformer.

2.5 IDENTIFICATION AND TAGGING

A. Each transformer shall be furnished with a permanent stainless steel nameplate in low voltage compartment.

B. The nameplate shall contain the equipment tag number, as well as all connection, rating and weight information as required per ANSI and NEMA standards.

PART 3 EXECUTION

Not applicable.

PART 4 ATTACHMENTS

FDF Data sheet - Power Transformer

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FDF DATA SHEET - POWER TRANSFORMER

DATE: 4/8/98 REV.: A

CONTRACT NO.: 40315 PO NO.: BY: jd REVIEWED: JT

ITEM NO.: QUANTITY: 1

Type

[ ] Power [ ] Distribution [ ] Pole Mounted [ ] Substation
[x] Pad
Mounted [ ] _____

Characteristics

1000 kVA 3 Phase 60 Hertz

34.5KV PRI 3 Wire [ ] Grd Wye

2 FC Taps 2 ½ % ARV PRI BIL 150 kV

2 FC Taps 2 ½ % BRV

[x] No Load Changer [ ] Load Changer [ ] Manual [ ] Auto
[ ] Remote

SEC 480 Volts 4 Wire

[ ] Wye [x] Grd Wye [ ] Delta

30 % Impedance SEC BIL 30 kV

[ ] Aluminum Winding

Connection Data

Primary:
[ ] From Above [x] From Below

Cable 1/0 MCM/AWG 1 Per Phase

Type EPR [x] Cable Lug Required

[ ] Conduit: Size 4" No. 1 [ ] Bus Duct

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Connection Data (continued)

Secondary:
[ ] From Above [x] From Below

[ ] Cable 600 to 750 MCM/AWG 3 Per Phase

Type THWN [x] Cable Lug Required

[ ] Conduit: Size 4" No. 3 [ ] Bus Duct

Secondary Connection is to be "loop feed."

Neutral: [x] On Cover [ ] In Throat

[ ] Cable 600 to 750 MCM/AWG

Type THWN [x] Cable Lug Required

Cooling

[ ] Oil Type Ambient Cooling (OA) 65° C Rise above 40° C ambient

[ ] ANV [ ] ANV/FA [ ] 150° F] 115° C

[ ] Provisions for Future Cooling Only

[ ] 55° C [ ] 65° F [ ] Ventilated Dry Type

[ ] AA [ ] AA/FA [ ] AFA [ ] 150° C [ ] 115° C

[ ] 80° C Rise Abv 30°C Average, 40° C Max Ambient

[ ] Weather Resistant Ventilated Dry Type

[ ] AA [ ] AA/FA [ ] 150° C [ ] 115° C

[ ] 80° C Rise Abv 30° C Average, 40° C Max Ambient

[ ] Sealed Dry Type [ ] Freon [ ] GA [ ] Nitrogen

[ ] 150° C [ ] 120° C Rise Abv 30° C Average, 40°C Max Ambient

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Bushings

Primary: [ ] Top [ ] Side [ ] Terminal Box [ ] Air [x] Oil
[ ] Throat [ ] Flange

[ ] Bushing CT (Phase) Multi Ratio: Qty_____ R atio _____

[ ] Bushing CT (Neut) Multi Ratio: Qty _____ Ratio _____

Secondary: [ ] Top [ ] Side [ ] Terminal Box [X] Air [ ] Oil
[ ] Throat [ ] Flange

[ ] Bushing CT (Phase) Multi Ratio: Qty_____ R atio _____

[ ] Bushing CT (Neut) Multi Ratio: Qty _____ Ratio _____

Tests

[x] Standard Tests According to ANSI C37.12.90

[ ] Optional Tests

[ ] Impulse Test (NEMA/ANSI)

[ ] Audio Test According to NEMA TRI _____

[ ] Zero Sequence Impedance Test

Lightning Arrestors

[ ] Substation Class [ ] Intermediate Class

[x] Distribution Class [ ] Primary 27 kV

[ ] Bracket Only [ ] Counter

[ ] Leakage Current Indicator [ ] Secondary _____kV

[ ] Bracket Only [x] Elbow Type

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Accessories

[x] Temp Indicator [ ] Alarm Cont [ ] Winding Temp Indicator

[ ] Alarm Cont [x] Ground Pads [x] Lifting Lugs

[ ] Jack Bosses [ ] Hand or Manholes

[x] Rating and Diagram Nameplate

Grounding Reactor

Neutral Ratings: _____A _____V (Line to Neutral) _____sec / min

Material: [ ] Stainless steel [ ] Cast Iron [ ] _____

Enclosure: [ ] Screened [ ] _____

Current Transformer: Qty _____ Ratio _____ Accuracy _____

Mounting:

[ ] On Transformer [ ] Ground Level [ ] On Elevated Structure (By Others)

Oil Type

[x] Mineral Oil

Installation Conditions

Service: [x] Outdoor [ ] Indoor [ ] Damaging Fumes or Vapors

[ ] Steam or Excessive Moisture [ ] Salt Air or Spray

[ ] Excessively Conductive, Thermally Insulating, or Abrasive Dust or Sand

[ ] Oil Vapor [ ] Hot and Humid [ ] Nuclear Radiation

[ ] Other _____

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Installation Conditions (continued)

[ ] Elevation <1000'

Temperature: -20 ° F Min / 120 ° F Max / _____ ° F Ave

Seismic Requirements: _____

Area Classification: Non class

Auto Ignition Temp: _____ ° F

Paint Finish

[x] Manufacturer's Standard _____

[ ] _____

[ ] ANSI 61 [x] A quart of touch-up paint shall be furnished

Loss Evaluation Data

[ ] Not to be considered. [ ] $_____ per kW.

Percent of full load at which the transformer will be evaluated: _____ %

Parallel Operation

[ ] Yes [x] No

Other Transformer: KNA _____ IMP _____%

Voltage: _____

Manufacturer: _____

Serial No.: _____

Other Requirements

1. Compartment doors & hood shall be removable to facilitate cable pulling.
2. A permanent & conspicuous warning sign shall be mounted to outside of high voltage door in accordance with NFPA 70, NEC.
3. Estimated efficiency (losses) shall be submitted.

END OF SECTION

SECTION 16370
ELECTRIC POWER TRANSMISSION

PART 1 GENERAL

1.1 REFERENCES

A. The following documents and others referenced therein form part of this Contract to the extent designated in this section:

1. American National Standards Institute (ANSI)

   - C2-1997 National Electrical Safety Code
   - 05.1-1992 Wood Poles -- Specifications and Dimensions

2. American Wood Preservers Association (AWPA)

   - AWPA C4-89 Poles - Pressure Process
   - AWPA C25-89 Preservative Treatment of Crossarms by the Pressure Process.
   - C7-1992 Western Red Cedar, Northern White Cedar and Alaska Yellow Cedar Poles, Southern Pine - Preservative Treatment of Incised Pole Butts by the Thermal Process
   - P1-1992 Coal Tar Creosote for Land, Fresh Water and Marine (Coastal Water Use)
   - P8-1992 Oil-Borne Preservatives
   - P9-1992 Solvents and Formulations for Organic Preservative Systems

3. Institute of Electrical and Electronics Engineers (IEEE)

   - C62.1-1989 Surge Arresters for AC Power Circuits

4. National Electrical Manufacturers Association (NEMA)

   - WC 8-1988 Ethylene-Propylene-Rubber-Insulated Wire and Cable for the Transmission and Distribution of Electrical Energy

5. National Fire Protection Association (NFPA)

   - 70-1996 National Electrical Code

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1.2 SUBMITTAL

A. Reference ***Part 6, Section 10.0*** for submittals and ***ACR-001*** for procedures.

B. Approval Required

Approval Data

- Before delivery, submit the information listed in the ***Vendor Information Submittals*** in this section.

C. Approval Not Required

Vendor Information

- Before installation, submit the information listed in the Vendor Information List in this section.

1.3 QUALITY ASSURANCE

A. Contractor's Quality Assurance Program

B. Electrical/Electronic Product Acceptability

- Reference ***ACR-001*** for required use of products listed and labeled by national testing and evaluation agencies.

C. Misrepresented Products

- Reference ***ACR-001*** for the required measures to prevent use of misrepresented products.

D. Deliverable Documentation

The following document and record, required by this section, shall be delivered to FDF:

Document	Paragraph
Electrical Test Results	3.3.1

1.4 DELIVERY, STORAGE, AND HANDLING

A. Reference ***Part 6, Section 5.1*** for all delivery, storage, and handling requirements and procedures.

B. Cable Inspection - Upon delivery to worksite, inspect cable and reels for shipping damage such as:

1. Marks caused by improper lifting equipment or techniques;
2. Breaks or cuts in outer covering;
3. Damaged jacket or insulation; and
4. Reel damage from mishandling.

C. Cable Testing - Upon delivery to worksite, Operating Contractor will perform dc over potential tests on new cable. Acceptance criteria are given in ***3.3, B*** of this section.

D. Cable Reel Storage

1. Store reels with flanges resting on hard surface or pallet to prevent sinking into ground;
2. Do not allow reel flanges to touch cable on other reels;
3. Do not store reels on sides. Store with reel axis horizontal; and
4. Cap or tape cable ends to prevent entrance of moisture.

E. Pole Line Material Storage

1. Stack poles that will be stored longer than 2 weeks on supports at least 1 foot above ground. Strength and spacing of supports, and manner of stacking shall produce no noticeable distortion in poles; and
2. Locate material stored at worksite to prevent damage from weather and adjacent construction operations.

F. Cable Reel Handling

1. Slings and forklifts shall not contact cable or protective covering;
2. Use spreader bar when lifting reel with bar and sling; and
3. Do not drop reels.

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G. Pole Line Material Handling

The Contractor shall comply with the following Hoisting and Rigging requirements, and the requirements of FDF Hoisting and Rigging Manual Section 15, which meets the requirements of the DOE Hoisting and Rigging Manual and will be issued to the Contractor after award.

1. Handle poles, fittings, insulators, and miscellaneous hardware with care to prevent damage. Unload carefully from truck and do not drop. Do not drag poles; and
2. Do not use construction hooks, tongs, or other sharp tools on treated portion of poles.

PART 2 PRODUCTS

2.1 MATERIALS

A. Solder less Terminals for Insulated Aerial Conductors
- Circumferential compression type; Burndy Corp HYLUG Type YA for copper conductors and Type YA-A for aluminum conductors.

B. Cable - 35 kV Type MV-105 shielded power cable, single conductor No. #1/0 AWG cable in accordance with NEMA WC 8 for both wet and dry conditions at normal operating temperature of 90 °C maximum, sunlight rated.

1. Conductor - Copper, annealed, Class B compact stranding.
2. Conductor shield - Extruded semi-conducting thermosetting compound, 15 mils thick, minimum.
3. Insulation- Ethylene-propylene-rubber, 420 mils thick, minimum.
4. Insulation shield - Extruded nonmetallic covering over insulation, with nonmagnetic metal component directly over or embedded in covering.
5. Jacket - Black polyethylene or polyvinyl chloride.
6. Cable shall have continuous permanent printing on jacket showing manufacturer's name, trade name, type, size, rated voltage, and footage markings. Cable reels shall be marked to show above information and length of each cable. Ends of cable shall have weatherproof seals and both ends exposed on reel, accessible for testing.
7. Manufacture's recommended stress cones and load break elbows shall be utilized to match the cable.

C. The 600 Volt power communication and signal cable shall be as specified on the drawings.

D. Tape

1. Plastic insulating tape: 3M Company "Scotch No. 33+"; and
2. Silicon rubber termination tape: 3M Company "Scotch No. 70."

E. Insulating Putty

- 3M Company "Scotchfil," General Electric Company No. 8389, or Kearney Company "Airseal."

F. Wood Poles

- ANSI 05.1, southern pine, class 2, cut from live timber. Poles shall be butt-treated by manufacturer in accordance with AWPA C7, using AWPA P8 and P9 or P1 preservatives, confirm approval by local authorities. Each pole shall be given single top cut at 30 degree angle with normal to axis of pole and at right angles to sweep. Roofs shall be brush-treated by manufacturer with ANSI 05.1 and AWPA C4, Pentachlorophenol preservative. Bolt holes shall not be more than 1/16-inch oversize.

G. Armor Rods

- Aluminum alloy, preformed type, similar to ones made by Preformed Line Products Company, for pin insulator supports. Rod diameter and length shall meet recommendations of aerial line conductor manufacturer.

2.2 EQUIPMENT

A. Street Lighting Fixtures

- Fixture shall be 400 watt High pressure sodium with lamp, cut off optics, flat glass lens and ANSI type II distribution provide complete with a 4 foot roadway bracket. Ballast shall be a lag type regulating unit for 480 Volt line and shall be capable of reliably starting the lamp in ambient temperatures down to -40°F. Each fixture shall be equipped with a photoelectric control.

B. Lightning Arresters

- IEEE C62.1, distribution valve type, rated 35 kV, 150 BIL, for use on 34.5 kV delta system. Porcelain bodies shall be wet porcelain, with uniform color glaze. Galvanized cap and base hardware shall have bolted clamps for both line and ground connections. Mounting bolts shall be galvanized. Reuse existing units on pole WP# 129, if field inspection shows them to be in serviceable condition and FDF agrees.

C. Fused Cutouts

- Reuse existing units on Pole WP# 129, if field inspection shows them to be in serviceable condition and FDF agrees. If they are replaced, then match existing units. Replace fuse links as noted on the drawing.

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PART 3 EXECUTION

3.1 PREPARATION

A. Field Measurements

- Scale dimensions on the Drawings show desired and approximate location of equipment, actual locations, distances, and levels shall be governed by field conditions.

3.2 INSTALLATION

A. General

1. Perform work in accordance with NFPA 70 and ANSI C2; and
2. Install products as shown on the Drawings and specified.

B. Splices, Taps, and Cable Terminations

1. Make splices and taps with Solder less connectors specified in 2.2, A. Use connectors in accordance with manufacturer's instructions.
2. Use plastic insulating tape for uninsulated splices and taps to thickness at least equal to conductor insulation. Where bolted splice or connection presents irregular surface, apply insulating putty to joints before taping.
3. Follow manufacturer's instructions and directions for splices, stress cones and cable terminations.
4. Wrap terminations for stranded insulated conductors on aerial equipment with 2 half-lapped layers of plastic insulating tape from 2 inches back on cable insulation to cover barrel of terminal. Taping shall effect moisture barrier so moisture cannot penetrate between conductor and insulation or interstices of stranded conductor. Overlay 1 half-lapped layer of silicon rubber termination tape over plastic insulating taping.
5. Use heat or termination kits for 34-5KV terminations.

C. Setting Poles

1. Excavate holes large enough to admit tamping bar around pole at butt. Do not use explosives to excavate holes.
2. Use backfill materials which can be solidly compacted by power tamping in 6-inch lifts. Compact surplus earth around pole in cone 1 foot high above grade. Add additional backfill where backfill has settled, and tamp before completion of work.
3. Set 30-foot poles 6'-0" in earth and 50-foot poles 7'-0" in earth. Measure depth from lowest side, on moderately sloping ground and from point 2'-6" from center of pole toward low side on steep slopes, cuts, embankments, or where soil is likely to be washed away from pole.

4. Set poles plumb and in line, except that corners and other strain points which are guyed shall have butts displaced to keep tops in line where feasible. At such locations, rake against strain shall be approximately 3 inches for each 10 feet of height.
5. Backfill holes created by removal of poles and other underground structures to finish grade and solidly compact by power tamping. Where backfill has settled, place additional backfill and tamp before completion of work.
6. Identify each pole using aluminum marker stamped with characters 2-½" (60 mm) high, minimum. Obtain identifying numbers from FDF.

D. Guys and Anchors

1. Install anchors to bear against undisturbed earth. Tamp backfill around anchors entire depth of hole. Provide temporary guying required during stringing of conductors. Remove at completion of work.
2. Set guy rods in earth in line with strand and install at least 6 inches above grade.

E. Aerial Conductors

1. Clearances shall be maintained for cables and conductors in accordance with the drawings and ANSI C2.
2. String conductors from rotating reels and do not drag along ground nor permit conductors to lie where they may be run over by vehicles. Pull conductors through stringing sheaves or stringing blocks hung on messenger cable, but do not pull around sharp corners. Inspect conductors as they leave reels and cut out weak or damaged sections and splice ends. Do not make splices in adjacent spans, dead end spans, or within 4 feet of support. Install conductors to proper stringing tensions in accordance with manufacturer's recommendations.
3. Make splices under tension mechanically and electrically secure by compression fittings. Do not use self-gripping or automatic tension splicing sleeves. Make taps between primary wires, jumpers, etc., with mechanical connector.
4. Install hot line stirrups on existing conductors where new feeder taps are made.
5. Sag conductors in accordance with ANSI C2 for medium loading districts and manufacturer's specification.

F. Aerial Equipment Grounding: Ground fused switches and lightning arresters in accordance with the drawings. Bond together pole line hardware separated by less than 2 inches. Ground messenger cable of each aerial cable. Connect grounding conductor to messenger with split-bolt connector.

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3.3 FIELD QUALITY CONTROL

A. Testing

1. Use instruments which bear valid calibration stamps showing dates of calibration and expiration dates of stamps. Calibration and accuracy of test instruments shall be certified by an independent testing laboratory, having standards traceable to National Institute of Standards and Technology.
2. Test equipment and wiring for continuity and unintentional grounds, and verify proper phase sequence and voltage at equipment served before attempt is made to operate equipment. Notify Quality Control Inspector before start of tests. Correct items found, during testing or examination by Quality Control Inspector, to be at variance with the Drawings and Specifications. Record results.

B. Acceptance Testing

1. Upon receipt of new cable, Contractor will perform the following tests:

   a. Visual inspection of cables to insure there is no visible signs of damage;
   b. Megger between the conductor and shield with a 1000 volt unit. Ensure the test value exceeds 36 megohm after 1 minute of test; and
   c. Continuity test of the conductor and cable shield, test measurements shall be less than 1 ohm.

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Project No. 40315-TS-0001

Project Title: Silos Infrastructure Project

Specification Section: 16400

APPROVAL DATA LIST
("X" Indicates Required Data)

[1] EPN Identification	[2] Description	[3] Reference Drawing	[4] Specification Paragraph	[5] DATA Dimen. Drwgs.	Equip. Wghts.	Specs.	Material Descrpt.	Perf. Data	Circuit or Control	Data Sheets	Illus. Cuts	Install. Instruct.
	Cable 35 kV	94X-6100-E-02241	2.3, A			X				X	X	X

Remarks:

Project No. 40315-TS-0001

Project Title: Silos Infrastructure Project

Specification Section: 16400

VENDOR INFORMATION LIST
("X" Indicates Required Data)

[1] EPN Identification	[2] Description	[3] Reference Drawing	[4] Spec. Paragraph	[5] Vendor Information: Dimen. Drwgs.	Equip. Wghts.	Specs.	Cert. Test	Circuit or Control	Install. Instruct.	Ops. Instruct.	Mnt. Instruct.	Spare Parts	Data Shts.	Illus. Cuts
	Street Light Fixtures	94X-6100-E-02241	2.3, A							X	X		X	X
	Cable 35 kV	94X-6100-E-02238	2.2, B							X	X			

Remarks:

END OF SECTION

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SECTION 16400
SERVICE AND DISTRIBUTION

PART 1 GENERAL

1.1 REFERENCES

A. The following documents and others referenced therein form part of this Contract to the extent designated in this section.

1. American National Standards Institute (ANSI)

   - C80.1 (1993) Rigid Steel Conduit--Zinc Coated

2. Code of Federal Regulations (CFR)

   - Title 29 Labor
   - Part 1910 Occupational Safety and Health Standards

3. Factory Mutual System (FM)

   - Approval Guide 1995 Edition

4. Federal Specifications (FS)

   - TT-S-00230 Sealing Compound: Elastomeric Type, Single Component (For Calking, Sealing, And Glazing In Buildings And Other Structures)

5. National Electrical Manufacturer's Association (NEMA)

   - AB 1 (1993) Molded Case Circuit Breakers and Molded Case Switches
   - FB 1 (1993) Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit and Cable Assemblies
   - FU 1 (1986) Low Voltage Cartridge Fuses
   - ICS 2 (1993) Industrial Control and Systems Controllers, Contractors, and Overload Relays Rated Not More Than 2000 Volts AC or 750 Volts DC

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- ICS 4 (1993) Industrial Control and Systems Terminal Blocks
- ICS 6 (1993) Industrial Control and Systems Enclosures
- KS 1 (1990) Enclosed and Miscellaneous Distribution Equipment Switches (600 Volts Maximum)
- TC 2 (1990) Electrical Plastic Tubing (EPT) and Conduit (EPC-40 and EPC-80)
- WD 1 (1989) General Requirements for Wiring Devices

6. National Fire Protection Association (NFPA)

- 70 (1996) National Electrical Code

7. Underwriters Laboratories (UL)

- Electrical Appliance 1995 and Utilization Equipment Directory
- Electrical Construction 1995 Materials Directory
- 6 (1993) Rigid Metal Conduit
- 50 (1994) Enclosures for Electrical Equipment
- 83 (1994) Thermoplastic-Insulated Wires and Cables
- 198E (1988) Class R Fuses
- 467 (1994) Grounding and Bonding Equipment
- 486A (1992) Wire Connectors and Soldering Lugs for Use with Copper Conductors
- 486C (1992) Splicing Wire Connectors
- 489 (1994) Molded-Case Circuit Breakers and Circuit-Breaker Enclosures.
- 498 (1994) Attachment Plugs and Receptacles
- 510 (1994) Polyvinyl Chloride, Polyethylene, and Rubber Insulating Tape
- 514A (1993) Metallic Outlet Boxes

- 514B (1993) Fittings for Conduit and Outlet Boxes
- 651 (1995) Schedule 40 and 80 Rigid PVC Conduit
- 651A (1996) Type EB and A Rigid PVC Conduit and HDPE Conduit
- 1059 (1993) Terminal Blocks

1.2 SUBMITTAL

A. Reference ***Part 6, Section 10.0*** for submittals and ***ACR-001*** for procedures.

B. Approval Required

1. Approval data: Before delivery, submit information listed in ***Approval Data List*** in this section.
2. Constructure Acceptance Test (CAT) Plan: Before starting construction acceptance test, submit CAT plan described in Part 6 - Section 3.1.3.

C. Approval Not Required

1. Electrical contractor's license: Before installation, submit a copy of license required by local authority.
2. Vendor information: Before installation, submit information listed in Vendor Information List in this section.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Reference ***Part 6, Section 5.1*** for delivery, storage, and handling requirements and procedures.

PART 2 PRODUCTS

2.1 MATERIALS

A. Box, outlet: UL 514A or NEMA OS 1 and the following.

1. For exterior lighting fixture: Cast metal with threaded hubs; and
2. For exterior receptacle: Cast metal, Type FD.

B. Conductor: UL 83, copper with Type THWN/THHN or XHHW insulation, 600 volt, of type and AWG size specified on the drawings. Sizes No. 8 AWG and larger shall be stranded.

C. Conduit and Tubing

1. Rigid metal conduit: UL 6 or ANSI C80.1; and
2. Rigid plastic conduit: UL 651, UL 651A, or NEMA TC 2.

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D. Connector, Wire: UL 486A or UL 486C and the following.

1. Terminal lugs: Crimp type with ring or spade lug with turned up tips, nylon or vinyl insulated; and
2. Twist-on wire joints: Nylon insulated with tapered spring grip.

E. Fittings, Conduit

1. For rigid steel conduit: UL 514B or NEMA FB 1. Use compression-type, threadless fittings with EMT;
2. For flexible metal conduit: UL 514B;
3. For rigid plastic conduit: UL 514B;
4. For entries into sides and tops of UL 50 or NEMA ICS 6, Type 3 or 3R enclosures: Myers-type watertight fittings or sealing-type locknuts; and
5. Couplings: Erickson type.

F. Identification Materials and Plates

1. Equipment nameplates: Laminated plastic, 2 mm (1/16 inch) thick with white surface and black core, sized to meet legend requirements.

G. Insulating Putty: 3M Company "Scotchfil," General Electric Company No. 8389, or Kearney Company "Airseal."

H. Lubricant and Sealant for Conduit Thread: Conductive compound providing anti-seize and corrosion protection. Thomas & Betts "KOPR-SHIELD" or approved substitute.

I. Marker for Buried Cable and Conduit: Reference ***Section 02220.***

J. Penetration Sealant

1. Nonfirestopping: FS TT-S-00230, Type II, Class A, 1-component polyurethane, nonsag type, light-colored.

K. Sealing Compound for Conduit: Porcelain Products Company "Sealex" or Gardner-Bender "Duct Seal."

L. Supports

1. Individual conduit hangers: Factory-made, spring able, wrought-steel clamps, or malleable-iron split and hinged rings. For suspended conduit, clamps or rings shall bolt to, or interlock with, threaded suspension rod.
2. Conduit supports: 1-hole clamps with clamp backs, or Unistrut with clamps.
3. Expansion anchors: HILTI anchors, suitable application per manufacturer's recommendation.

M. Tape

1. Plastic insulating tape: UL 510;
2. Conduit protection tape: UL 510; and
3. Electrical color-coding tape: UL 510.

N. Wire Pulling Compound: Electro Compound Company "Y-er Eas," American Polywater Corporation "Polywater," or Ideal Co. "Yellow 77."

O. Wireway: Steel, UL 50 or NEMA ICS 6,-Type 3R surface lay-in wireway with hinged covers, sized as shown on the drawings, provided with fittings, adapters, and end plates necessary for a complete installation.

2.2 EQUIPMENT

A. Switchgear: Free standing, bottom fed, NEMA 3R distribution panel rated 1200 amperes at 480Y/277 V, 3 phase, 4 wire rated 35 KAIC with cable pull section for incoming cables. Unit shall be equipped with a 1200 ampere, 3 pole main circuit breaker with integral ground fault protection. The unit shall be provided with 1 each 600 A, 3 pole circuit breaker. There shall be space for 2 additional 400 A, 3 pole circuit breakers. There shall be kwh/demand metering on the 1200 ampere circuit breakers.

B. Automatic Transfer Switch: Consisting of an enclosure, contacts, control transfer hardware and logic.

1. Contacts: 3 pole, double-throw, single-coil electrically operated, mechanically held, with break before make ungrounded and neutral switching. A manual operator shall be provided for maintenance purposes that will allow the contacts to be manually operated to any point in their travel.
2. Rating: 600 amperes, 600 volt, short circuit withstand 65 kA symmetrical.
3. Enclosure: NEMA Std. 250 Type 1.
4. Control: Microprocessor based with the following functions; three phase voltage sensing of normal source and single phase sensing of emergency source both with adjustable pickup and drop out. Provide time delay on transferring, time delay after transfer to normal power to allow for diesel generator cool down before stopping, adjustable from 1-60 minutes. A 10 ampere pilot contact to initiate generator starting controls. Switch to select manual or automatic transfer and retransfer. Momentary test switch to simulate loss of normal power. Terminals for remote connections. Pilot light and auxiliary contacts to indicate switch position, and normal and emergency source availability.
5. Manufacture: Automatic Transfer Switch shall be ASCO brand Model 940 as manufactured by Automatic Switch Co. or equal.

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6. Nameplate: Engraved plastic nameplates with black characters on white background shall be provided. Character height shall be 5/16 inch minimum. Information depicted shall include normal and emergency source identifiers, load identifier at a minimum.

C. Plates

1. For receptacle: Cast metal weatherproof.

D. Receptacle: UL 498 or NEMA WD 1 Designation 5-15R, duplex, brown, specification grade, rated 15 A, 120 V, 3-wire, grounding type, with screw terminals arranged for side wiring. Self-grounding receptacles may be used instead of ground requirements specified.

E. Transformer: in accordance with specification 16320.

PART 3 EXECUTION

3.1 PREPARATION

A. Field Measurements: Scale dimensions on the drawings show desired and approximate locations of equipment. Actual locations, distances, and levels shall be governed by field conditions.

3.2 INSTALLATION

A. General

1. Perform work in accordance with NFPA 70, the specifications, and the drawings.

2. Fasten equipment to structural members of building or metal supports attached to structure, or to concrete surfaces.

a. Use clamping devices for attachments to structural steel. When clamping is impractical, obtain approval from FDF Construction Engineer before drilling, punching, cutting, or welding to building structural steel members for support attachments;
b. Fasten equipment to concrete or masonry with expansion anchors; and
c. Fasten equipment to drywall with screws driven into studs, and to metal wall panels with weld studs, bolts or self-tapping metal screws.

3. Locate equipment, boxes, and conduit approximately where shown on the drawings in relation to equipment served.

4. Do not install conduit, raceways, and boxes in positions that interfere with work done by other trades.

5. Identify components with nameplates bearing legends shown on the drawings.

6. Attach nameplate on or near equipment, with clear RTV silicone sealant.

7. For excavation and backfill of soil, reference ***Section 02220.***

B. Grounding Systems

1. Underground conductors, electrodes, and connections: Install in accordance with NFPA 70 and the drawings. Make joints connecting copper and galvanized steel conductors above grade and in dry locations.
2. System grounding: Solidly connect neutral conductor of each separately derived system to ground in accordance with NFPA 70 and the drawings.
3. Equipment grounding: Connect metal equipment to ground in accordance with NFPA 70 and the drawings.

C. Conduit

1. Use rigid steel where subject to mechanical damage or when located 1.2 m (4 feet) or less above floors.
2. Install 3-mm (1/8-inch) polyethylene rope in spare conduits.
3. Install concealed conduits as directly as possible, with bend radii as long as possible. Install exposed conduit parallel with or at right angles to building lines. Where conditions permit, maintain continuous exposed horizontal runs along walls at 2.7 m (9 feet) minimum above floor level or grade.
4. Make elbows, offsets, and bends uniform and symmetrical. Bend conduit with approved bending devices.
5. Cut ends square, ream, and remove burrs. Conduit shall be clean, dry, and free of debris. Immediately after installation, plug or cap exposed ends with standard accessories until wires are installed.
6. Use specified fittings for conduit except that threaded hubs and sealing type locknuts shall be used outdoors and in locations where moisture is present. Use couplings where required. Do not use running threads.

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7. Install without moisture traps wherever possible. Where practicable, provide drain holes in pullboxes or fittings at low points in raceway systems and remove burrs from drilled holes.
8. Set up joints in conduit installed in concrete, underground, or exposed to weather, with high-temperature, antiseize, conductive thread lubricant and sealant.
9. Verify stub-up locations with final equipment arrangements. Install exposed conduit stubbing up through floor slab straight and plumb, lined up, and uniformly spaced. Install at sufficient depth below slab to eliminate part of bend above top of slab. Cap or plug stub-up before placing concrete.
10. Wrap conduit passing from concrete to air or to direct earth burial with conduit protection tape from 76 mm (3 inches) in concrete to 305 mm (12 inches) minimum in earth, or 76 mm (3 inches) in air, unless conduit is PVC or PVC coated.
11. Seal openings around conduit at concrete or block fire walls and floor penetrations. Use fire barrier sealing compound for openings to 6 mm (1/4 inch) maximum, and grout for larger openings. Make seals water-proof, and finish sealant flush with surrounding wall surfaces.
12. Seal openings around conduit at exterior wall penetrations and penetrations of walls which form boundaries between adjoining ventilation zones, using specified sealant. Make seals waterproof, and finish sealant flush with surrounding wall surfaces.
13. Use hangers with 9.5-mm (3/8-inch) rods for 53-mm (2-inch) and smaller conduit, and hangers with 13-mm (½-inch) rods for 63-mm (2-1/2-inch) and larger conduit. If conduit is suspended on rods more than 0.6 m (2 feet) long, rigidly brace to prevent horizontal motion or swaying.
14. Apply sealing compound after installation of conductors, at boxes, in conduits that penetrate walls or floors.
15. Where routing is parallel with hot water or steam pipes, maintain 152-mm (6-inches) minimum clearance from pipe covering. Where not run parallel with pipe, it is acceptable to run closer than 152 mm (6 inches), providing conduit does not touch pipe covering.
16. Secure conduit using specified conduit supports.

D. Underground Duct Banks

1. All installation shall be in accordance with the drawings.
2. Install ductbank 15 inches (minimum) to top of ductbank below finished grade.
3. Install duct with minimum slope of 4 inches per 100 feet. Slope duct to handholes.
4. Cut duct square using saw or pipe cutter; de-burr cut ends.
5. Insert duct to shoulder of fittings; fasten securely.
6. Join nonmetallic duct using adhesive as recomended by manufacturer.
7. Wipe nonmetallic duct dry and clean before joining. Apply full even coat of adhesive to entire area inserted in fitting. Allow joint to cure for 20 minutes, minimum.
8. Provide suitable fittings to accommodate expansion and deflection

where required.

9. Terminate duct at handhole entries using end bell.
10. Stagger duct joints vertically in concrete encasement 6 inches minimum.
11. Use suitable separators and chairs installed not greater than 4 feet on centers.
12. Band ducts together before placing concrete.
13. Securely anchor duct to prevent movement during concrete placement.
14. Place concrete under provisions of ***Section 03001***. Use mineral pigment to color concrete red.
15. Provide minimum 3-inch concrete cover at bottom, top, and sides of ductbank.
16. Provide pull rope in each duct except sleeves and nipples. Minimum ½ inch, 4,000 psi tensile strength polypropylene.
17. Swab duct. Use suitable caps to protect installed duct against entrance of dirt and moisture.
18. Perform excavations and backfill trenches under provisions of ***Section 02200*** of this specification package.
19. Interface installation of underground warning tape with backfilling. Install tape below finished surface. Refer to ***Section 02200.***

E. Boxes, Enclosures, and Wiring Devices

1. Install boxes firmly in position and plumb.

F. Conductors

1. Do not bend cables installed in raceways to less than manufacturer's recommended minimum bending radii.
2. Use lubricant recommended by wire or cable manufacturer, or wire pulling compound specified, when pulling wire and cable through conduit.
3. Do not install or handle wires with thermoplastic insulation or jacket when ambient temperature is -9 °C (15 °F) or lower.
4. Coding: Paint or pressure-sensitive electrical color-coding tape may be used for coding conductors instead of colored insulation on No. 8 AWG and larger wire for phase (ungrounded) conductors, and No. 4 AWG and larger wire for neutral (grounded) conductors and equipment grounding conductors only. Maintain phase color coding, in accordance with the following table, for branch and feeder circuits up to and including equipment connections.

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C. Acceptance Test

1. Contractor will provide approved (by FDF) CAT Test.
2. Before starting acceptance test, verify operability of circuits, equipment, and system. Notify FDF upon completion of verification.
3. Acceptance test will be directed by Test Director named in the CAT. Participate in acceptance test as directed by Test Director.

Conductor Origin	Conductor	Insulation Color
480Y/277 V, 3-phase systems, transformers, panels, switchboards, etc.	Phase A Phase B Phase C Neutral (grounded) Ground	Yellow Orange Brown Gray Green
208Y/120 V, 3-phase systems, transformers, panels, switchboards, etc.	Phase A Phase B Phase C Neutral (grounded) Ground	Black Red Blue White Green
Low Voltage Honeywell Protection System	Plant Fire Alarm System	Red and Yellow Brown & Yellow
120 V, Single Phase	Hot Neutral	Black White

G. Conductor/Cable Connections and Terminations

1. Connect conductors to terminal blocks, binder-screw, or stud-type terminals with terminal lug-type connectors.
2. Use plastic insulating tape for uninsulated splices and taps. Apply tape to thickness at least equal to conductor insulation. Where bolted splice or connection presents irregular surface, apply insulating putty to joints before taping.
3. Use twist-on wire joints for connections of conductors in lighting and receptacle circuits only.

3.3 FIELD QUALITY CONTROL

A. Before attempting to operate equipment, perform the following tests and verifications, and record results. Notify FDF Construction Engineer before starting tests.

1. Test equipment and wiring for continuity and unintentional grounds;
2. Verify proper phase sequence and voltage at equipment served; and
3. Check motors for correct rotation.

B. Furnish equipment and instruments for above tests and verifications which bear calibration stamps showing calibration and expiration dates. Calibration and accuracy of equipment and instruments shall have been certified by an independent testing laboratory having standards traceable to National Institute of Standards and Technology.

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Project No. 40315-TS-0001

Project Title: Silos Infrastructure Project

Specification Section: 16400

VENDOR INFORMATION LIST
("X" Indicates Required Data)

[1] EPN Identification	[2] Description	[3] Reference Drawing	[4] Specification Paragraph	[5] Data: Dimen. Drwgs.	Equip. Wghts.	Spec.	Material Dscrpt.	Perf. Data	Circuit or Control Digrm.	Data Sheets	Illust. Cuts	Install. Instruc.
	Switchgear Outdoor 480 V	94X-6100-E-02238	2.3, A	X	X		X			X	X	X
	Automatic Transfer Switch	94X-6100-E-02242	2.3, B		X	X	X		X	X	X	X
	Transformer (Reference Section 16320)	94X-6100-E-02238	2.3, E 16320	X	X	X				X		X

Remarks:

000145

1652

Project No. 40315-TS-0001

Project Title: Silos Infrastructure Project

Specification Section: 16400

APPROVAL DATA LIST
("X" Indicates Required Data)

1 EPN Identification	2 Description	3 Reference Drawing	4 Specification Paragraph	5 Data: Dimen. Drwgs.	Equip. Wghts.	Spec.	Cert Test Data	Circuit or Control Digrm.	Install. Instruc.	Instructions - Operations - Maintenance	Spare Parts List	Data Shts.	Illust. Cuts
	Switchgear Outdoor 480 V	94X-6100-E-02238	2.3, A							ALL		X	
	Automatic Transfer Switch	94X-6100-E-02242	2.3, B							ALL		X	
	Transformer (Reference Section 16320)	94X-6100-E-02238	2.3, E 16320	X			X		X	• MNT • Spare Parts		X	

Remarks:

END OF SECTION

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FLUOR DANIEL FERNALD

IFB NO. F98B157563

CONTRACT NO. FSC 631

SILOS INFRASTRUCTURE PROJECT

WASTE MANAGEMENT REQUIREMENTS

August 3, 1998
Rev.0

IFB NO. F98B157563

CONTRACT NO. FSC 631

SILOS INFRASTRUCTURE PROJECT

WASTE MANAGEMENT REQUIREMENTS

TABLE OF CONTENTS

1. Construction Debris 3
2. At- and Below-Grade Debris 3
3. Option 1 4
4. Option 2 4

Management of all secondary wastes generated as a result of the Infrastructure development shall be consistent with all FDF site procedures and applicable regulatory drivers. It is expected that the Contractor will generate free-releasable construction debris, contaminated construction debris and chemical waste and will encounter debris from the excavation of soil. In addition to these waste streams, the Contractor shall manage all soil excavated per FDF Waste Management guidance as stated herein. FDF is currently conducting activities to further characterize soil in the area of the proposed road. Once this data is available, FDF will provide the Contractor with any additional handling requirements that may be required.

1. Construction Debris

The Contractor shall set aside all construction debris generated in a predetermined construction laydown area. FDF radiological control shall survey all debris to ensure that it meets the free-release criteria for the site. FDF will arrange for the delivery and pickup of commercial disposal facility (CDF) containers for the disposition of all waste deemed free-releasable. FDF personnel will be responsible for tracking the volume of debris sent to any CDF.

Construction debris which cannot be free-released to a CDF must be segregated by waste stream as identified in the Waste Management Plan (WMP) which will be issued to the Contractor prior to mobilization. The Contractor and FDF project personnel will be briefed on waste segregation and size-reduction criteria. FDF will arrange for pickup and delivery of all containers of contaminated construction debris. FDF personnel will track all volumes of contaminated waste.

Any chemicals brought on-site by the Contractor must be identified in the Contractor's proposal. FDF Waste Management personnel will be responsible for the appropriate disposition of unused chemicals and empty containers. FDF will provide the Contractor direction on temporary storage of these materials.

2. At- and Below-Grade Debris

During excavation, the Contractor may encounter debris previously buried underground. In the event that debris is unearthed, the Contractor must notify FDF Waste Management personnel immediately. FDF will arrange for container delivery, characterization and sampling as required, and transportation of the container to the appropriate facility. FDF will track all volumes of such debris should it be encountered.

Preliminary data indicate that the soil in the area of the proposed road meets the Waste Acceptance Criteria (WAC) of the On-Site Disposal Facility (OSDF). Therefore, all excess soil generated can be spread in the field south of the K-65 trench, as identified on the attached map (Sketch No. 94X-5500-X-SK-1035). The Contractor must report the volume of excess soil generated to FDF on a daily basis. However, should additional sampling and characterization or real-time readings conducted during excavation indicate that the soil may exceed the OSDF WAC, it must be managed in one of the following two manners:

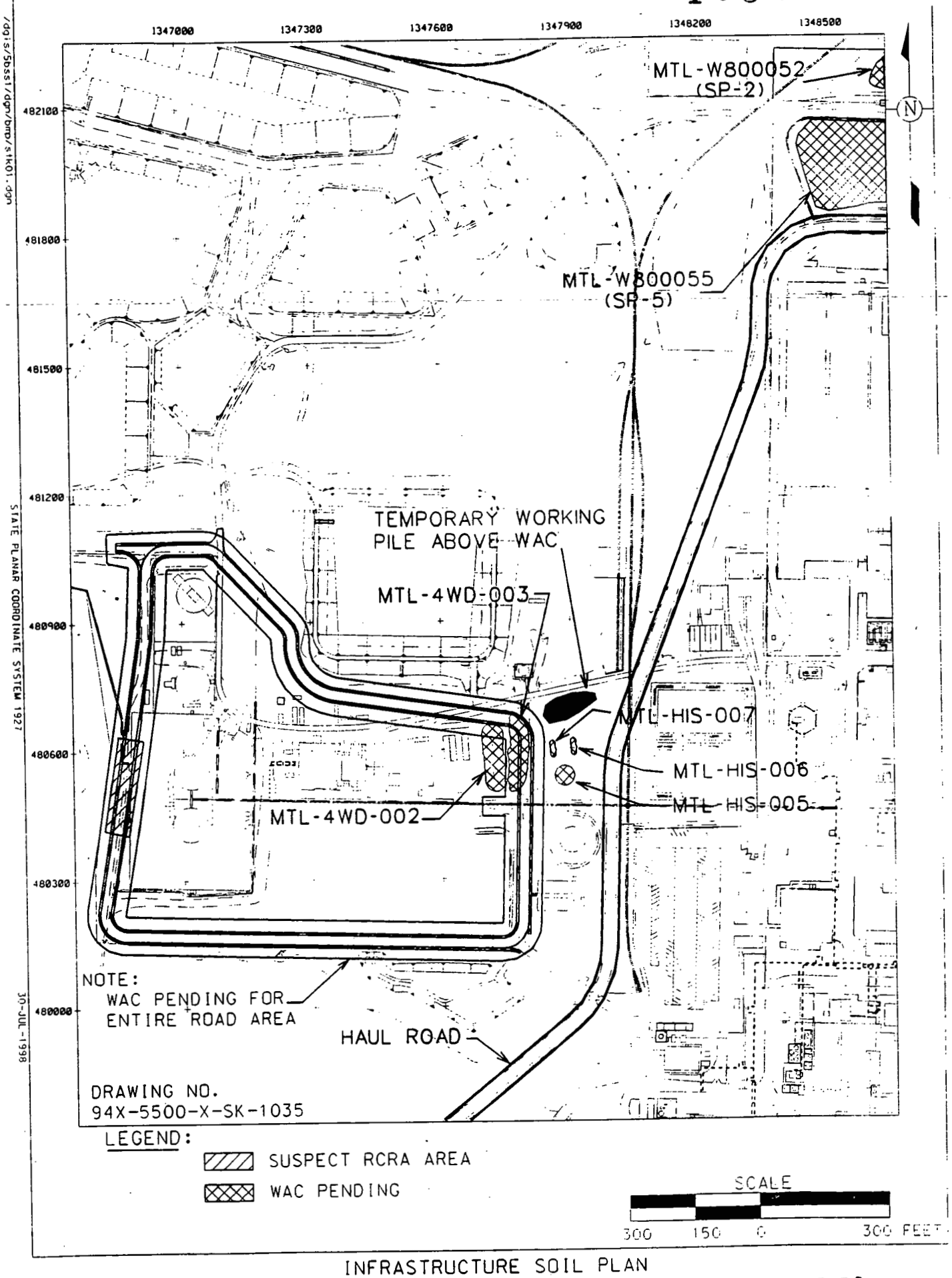
3. **Option 1**

Approximately 250 cubic yards of soil will be excavated to the west of Silos 1 and 2 (See Sketch No. 94X-5500-X-SK-1035). In the event that additional sampling indicate RCRA characteristic waste in this area, all suspected waste in this area shall be placed in boxes by the Contractor. FDF will provide delivery and pickup of the boxes and will track the volume of soil excavated. The Contractor is responsible for ensuring that the weight restrictions of the boxes are not exceeded. FDF will provide a scale for these activities. If RCRA characteristic waste is identified, none of the associated soil may be used as fill.

4. **Option 2**

In the event that additional sampling and characterization or real-time readings indicate elevated levels of Total Uranium and/or Technetium-99, indicating that soil exceeds the OSDF WAC, the Contractor shall transport all such soil to a temporary working stockpile as indicated on Sketch No. 94X-5500-X-SK-1035. The Contractor must lay down geotextile and install silt fence around the pile. The Contractor is responsible for grading the pile and ensuring dust is controlled. An existing Contractor will exit the haul road east of the pile, as shown in the attached sketch, and the Infrastructure Contractor will load his vehicle with above WAC soil for transport. The Infrastructure Contractor must report to FDF all volumes of soil transported to the temporary working soil pile. Above-WAC soil may not be used as fill. The estimated volume of soil that potentially exceeds WAC is 1,500 cubic yards.

If either Option 1 or 2 must be exercised, FDF will demarcate the areas to be excavated and transported or boxed. FDF will establish Material Tracking Locations (MTLs) and provide the Contractor with a map indicating where these MTLs are located. FDF is reponsible for tracking the soil by MTL given volumes reported by the Contractor.



INFRASTRUCTURE SOIL PLAN

RCI/DCN FORM

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE -

(1)WP / WO NO.: 40110	(2)S/C NO.: 599	(5)Pg OF	(6)DATE 6/30/98
(3)S/C TITLE: VIT PP		(11)RCI NO.:	
(4) RESPONSIBLE DISCIPLINE: E ☐ M ☐ C ☒ OTHER ☐	(4A)RCI/DCN TITLE: K-65 BRIDGE WIDENING	(11)DCN NO.: 40110-050	

(7)DOCUMENTS AFFECTED	(7)DOCUMENT NOS.	(7)REV.	(8)OTHER
	94X5900-6-00326	1	

(9) ☐ RCI - INQUIRY ☐ USQD SCREENING BY PROJECT ENGINEER (9) ☒ DCN - JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE

THE ROAD CROSSING AT THE K-65 TRENCH IS CURRENTLY SINGLE LANE. FOR SAFETY DUE TO THE INCREASE OF TRAFFIC DURING CONSTRUCTION AND REMEDIATION OF THE AREA A TWO LANE TRENCH CROSSING IS REQUIRED. BUILD A SUPPORT FOUNDATION AND COVER PLATE FOR HEAVY TRUCK TRAFFIC.

INFORMATION ONLY

(10)REQUESTOR:	COMPANY:	DATE:	(12)CE / PE	DATE:
Joe Straub	FDF	6/30/98	Joe Straub	6/30/98

(13)RESPONSE: FOR RCI, IS A DCN REQ'D? ☐ NO ☒ YES (14) FOR DCN: ☒ APPROVED ☐ APPROVED AS NOTED ☐ DISAPPROVED

SEE ATTACHED DESIGN DRAWINGS

RCI - DCN ACCEPTANCE

(15)DESIGN ORGANIZATION APPROVAL/DISAPPROVAL: Jay Thompson DATE: 6/30/98 ☐ FIT ☒ FORM ☐ FUNCTION	(20)CHARGE NO. FOR CADD SERVICES TO INCORPORATE:
(16)FDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY) DATE: 7/2/98 PERFORMANCE GRADE: (17) 5	
(18)CONSTRUCTION CONCURRENCE: DATE: 7/2/98 PURCHASE REQUISITION REQUIRED: ☒ YES ☐ NO (19)	(21)WORK COMPLETED: (SIGNOFF BY CE OR PE) DATE:

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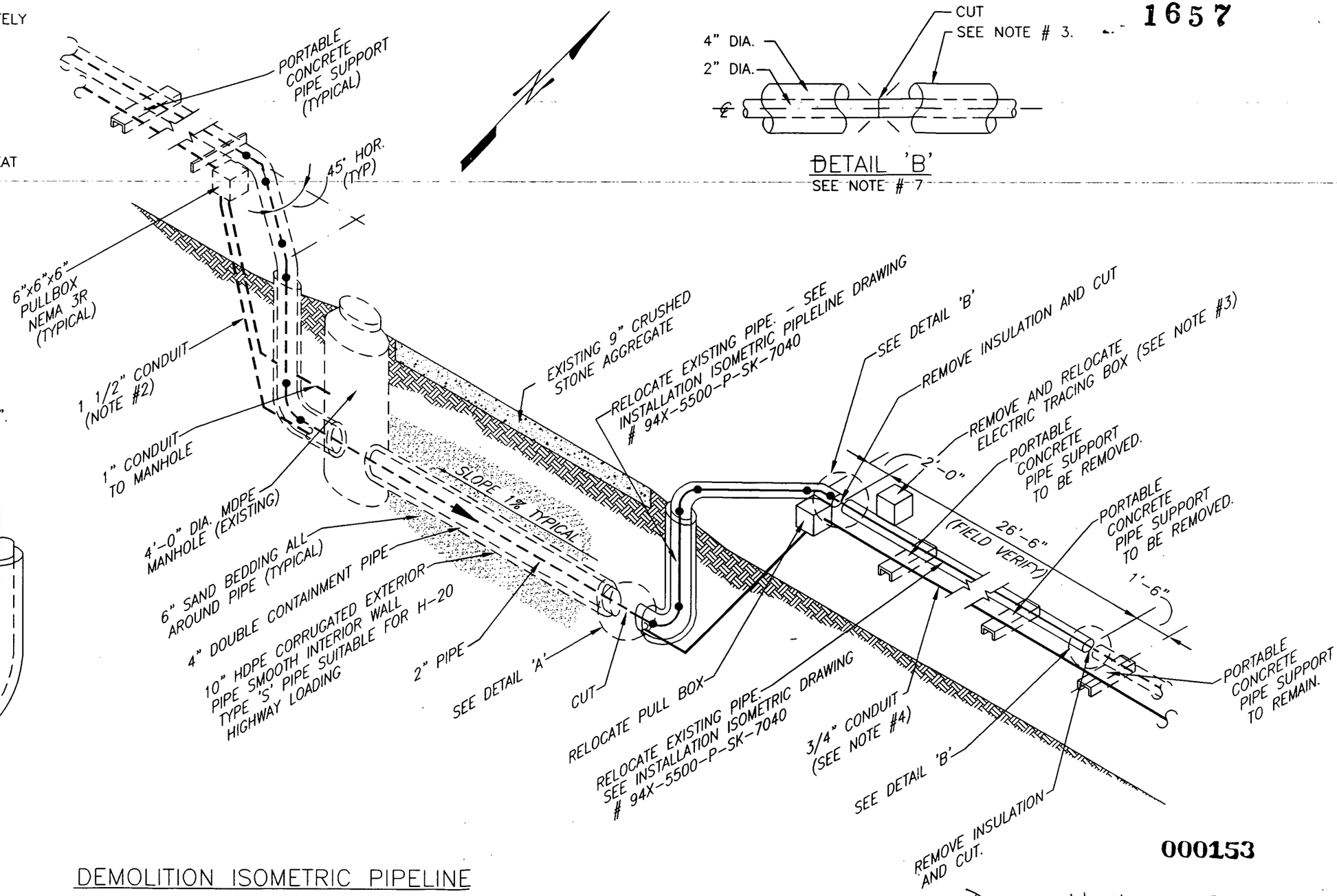
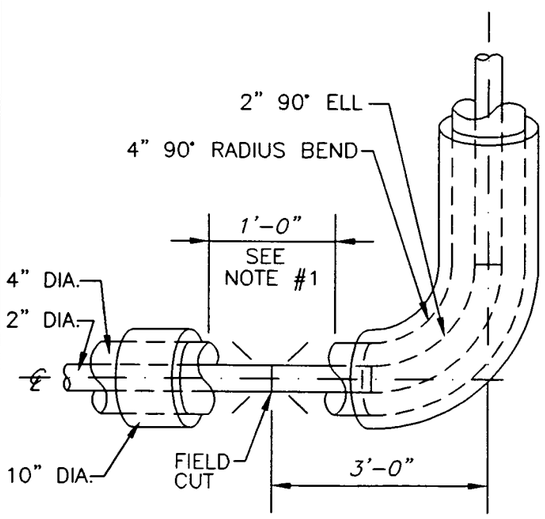
NOTES:

1. CUT BACK 10" HDPE PIPE APPROXIMATELY 9" FROM 4" PIPE CUT EACH SIDE.
2. EXISTING 1 1/2" CONDUIT, CABLES–LEAK DETECTOR CIRCUIT (2/C #16), AND HEAT TRACE CIRCUIT (3/C #10) TO BE DISCONNECTED AND REPLACED BETWEEN PULL BOXES.
3. CUT AND REMOVE INSULATION, AND HEAT TRACING FROM PIPES.
4. RELOCATE PULLBOX. MODIFY CONDUIT AND CIRCUITS.
5. SEE ISOMETRIC PIPELINE DRAWING # 94X–5500–P–SK–7040.
6. CUT BACK 10" HPDE PIPE. CUT SECTION OF 4" CONTAINMENT PIPE. CUT 2" PIPE.
7. CUT BACK INSULATION AND REMOVE HEAT TRACING. CUT SECTION OF 4" CONTAINMENT PIPE. CUT 2" PIPE.
8. TOLERANCES FOR ALL DIMENSIONS ±2".



DETAIL 'B'
SEE NOTE # 7



DETAIL 'A'
SEE NOTE # 6

DEMOLITION ISOMETRIC PIPELINE

000153

Dcn-40110-050

REFERENCE DRAWING NO.	THIS DRAWING PREPARED BY		DRAWING TITLE	
	FLUOR DANIEL FERNALD SILOS PROJECT CINCINNATI, OHIO PROJECT NAME	UNITED STATES DEPARTMENT OF ENERGY FERNALD ENVIRONMENTAL	DEMOLITION ISOMETRIC WW–4"–A–7109–ET	

CADFILE VITR–CRD			CADCODE ACAD		
DRAWN BY R. C. STENSBY II	DATE 03–25–98	DESIGNED, CHECKED BY J. THOMPSON	DATE 05–27–98	CHECKED BY	DAT
PLANT/BLDG. NO. OU4		FLOOR		SCALE NONE	CU
SUBMITTED FOR APPROVAL A–E DATE		APPROVAL RECOMMENDED OPERATING CONTRACTOR DATE			

INSTALLATION ISOMETRIC PIPELINE

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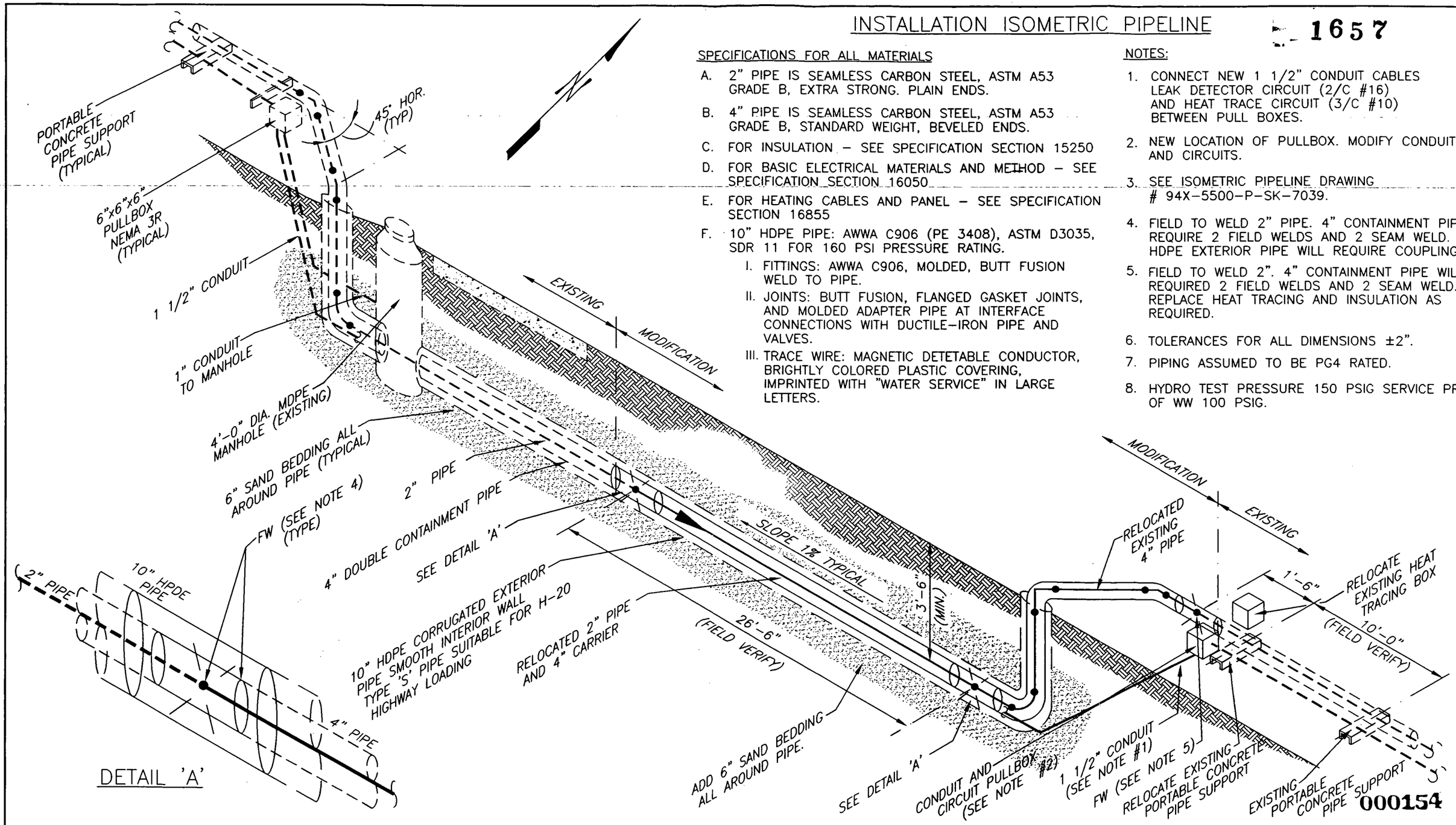

SPECIFICATIONS FOR ALL MATERIALS

A. 2" PIPE IS SEAMLESS CARBON STEEL, ASTM A53 GRADE B, EXTRA STRONG. PLAIN ENDS.

B. 4" PIPE IS SEAMLESS CARBON STEEL, ASTM A53 GRADE B, STANDARD WEIGHT, BEVELED ENDS.

C. FOR INSULATION – SEE SPECIFICATION SECTION 15250

D. FOR BASIC ELECTRICAL MATERIALS AND METHOD – SEE SPECIFICATION SECTION 16050

E. FOR HEATING CABLES AND PANEL – SEE SPECIFICATION SECTION 16855

F. 10" HDPE PIPE: AWWA C906 (PE 3408), ASTM D3035, SDR 11 FOR 160 PSI PRESSURE RATING.

I. FITTINGS: AWWA C906, MOLDED, BUTT FUSION WELD TO PIPE.

II. JOINTS: BUTT FUSION, FLANGED GASKET JOINTS, AND MOLDED ADAPTER PIPE AT INTERFACE CONNECTIONS WITH DUCTILE-IRON PIPE AND VALVES.

III. TRACE WIRE: MAGNETIC DETETABLE CONDUCTOR, BRIGHTLY COLORED PLASTIC COVERING, IMPRINTED WITH "WATER SERVICE" IN LARGE LETTERS.

NOTES:

1. CONNECT NEW 1 1/2" CONDUIT CABLES LEAK DETECTOR CIRCUIT (2/C #16) AND HEAT TRACE CIRCUIT (3/C #10) BETWEEN PULL BOXES.
2. NEW LOCATION OF PULLBOX. MODIFY CONDUIT AND CIRCUITS.
3. SEE ISOMETRIC PIPELINE DRAWING # 94X-5500-P-SK-7039.
4. FIELD TO WELD 2" PIPE. 4" CONTAINMENT PIPE W REQUIRE 2 FIELD WELDS AND 2 SEAM WELD. 10" HDPE EXTERIOR PIPE WILL REQUIRE COUPLINGS.
5. FIELD TO WELD 2". 4" CONTAINMENT PIPE WILL REQUIRED 2 FIELD WELDS AND 2 SEAM WELD. REPLACE HEAT TRACING AND INSULATION AS REQUIRED.
6. TOLERANCES FOR ALL DIMENSIONS ±2".
7. PIPING ASSUMED TO BE PG4 RATED.
8. HYDRO TEST PRESSURE 150 PSIG SERVICE PRESS OF WW 100 PSIG.

REFERENCE DRAWING NO.	THIS DRAWING PREPARED BY FLUOR DANIEL FERNALD SILOS PROJECT CINCINNATI, OHIO PROJECT NAME	UNITED STATES DEPARTMENT OF ENERGY FERNALD ENVIRONMENTAL	DRAWING TITLE INSTALLATION ISOMETRIC WW-4"-A-7109-ET

CADFILE VITR-CRI				CADCODE ACAD	
DRAWN BY R. C. STENSBY II	DATE 03-25-98	DESIGNED, CHECKED BY J. THOMPSON		DATE 05-27-98	CHECKED BY
PLANT/BLDG. NO. OU4		FLOOR			SCALE NONE
SUBMITTED FOR APPROVAL A-E	DATE	APPROVAL RECOMMENDED OPERATING CONTRACTOR	DATE		

GS\INFRA\VITR-CRI Fri Jun 26 09:26:25 1998 PLOTTED BY RCS II

1657

FLUOR DANIEL FERNALD, INC.

SCOPE OF WORK STATEMENT
for
MONITORING WELL
PLUGGING AND ABANDONMENT PROJECT
TASK A-11, REVISION 0, PROJECT NUMBER 04.127

May 11, 1998

60200-SOW-0001

ECDC CONTROLLED
COPY NO 8851

APPROVALS:

Mark Cherry — 5-7-98
Mark Cherry, Team Coach
Environmental Monitoring Project
Date

Jyh-Dong Chiou — 5/7/98
Jyh-Dong Chiou, Team Coach
Soils Project
Date

William A. Hertel — 5/11/98
William Hertel, Team Coach
Aquifer Restoration Project
Date

Harold Swiger — 5/7/98
Harold Swiger,
Quality Assurance
Date

SCOPE OF WORK STATEMENT
for
MONITORING WELL
PLUGGING AND ABANDONMENT PROJECT
TASK A-11, REVISION 0, PROJECT NUMBER 04.127

I. INTRODUCTION

The Ohio Environmental Protection Agency's Water Well Standards, section OAC 3745-9-10 (B), states, "If a well containing walls is not being used for obtaining groundwater or for determining the quality, quantity, or level of ground water, such well shall either be completely filled with grout or such other material as will prevent contaminants from entering ground water or maintained."

Monitoring well plugging and abandonment, chemical rehabilitation, and well modification activities at the Fernald Environmental Management Project (FEMP) are conducted by Environmental Monitoring (EM). This Scope of Work (SOW) Statement addresses the locations, administrative and technical requirements, specifications, and schedule for Monitoring Well Plugging and Abandonment Project, Task A-11. Any modifications to this SOW will be handled as a revision prior to completion of the modification.

II. SCOPE

Under the direction of EM representatives, the Sitewide Drilling Services Subcontractor (Subcontractor) shall plug and abandon, perform well treatment and cleaning, and well modification of the monitoring wells listed in this SOW (Tables 1 through 3 respectively). All work shall be performed in accordance with FEMP Site Procedures, Environmental Monitoring Project Standard Operating Procedures, and with the Sitewide Drilling Subcontract No. FSC 615 (November 17, 1997).

III. FIELD ACTIVITIES

A. Preparation

Prior to the execution of the work, the Subcontractor shall ensure that the tasks required in this SOW comply with the Drilling Subcontract. The reporting process shall follow the requirements outlined in Part 6 of the Sitewide Drilling Subcontract.

Each well site shall be evaluated by the Subcontractor Supervisor to confirm well conditions and locations for cost estimate purposes. Representatives from EM and the Subcontractor will review the SOW and the selected plugging and abandonment, rehabilitation, and modification method for each well. The methods of abandonment are determined on a case by case basis, as stated in *Well Plugging*

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and Abandonment, DRL-01. Acid rehabilitation will be completed in accordance with this SOW and *Well Development*, DRL-03.

EM shall obtain all necessary permits and health and safety documentation required for the project. A Project Briefing will be conducted prior to the initiation of field activities to review the SOW and the required health and safety document for the project. All personnel performing field activities are required to attend the briefing and shall abide by the health and safety requirements associated with this SOW. A copy of the health and safety documentation shall be provided to the Subcontractor by EM.

The Subcontractor shall ensure that all assigned subcontract personnel have received and are in compliance with all required site training for operations within the FEMP boundaries. Work performed under this SOW may be completed in Level D personal protective equipment unless specific areas or conditions require additional protection.

B. Plugging and Abandonment General Requirements

The Subcontractor will conduct plugging and abandonment activities under the supervision of EM personnel. All work performed shall meet minimum specifications as outlined by the Ohio Department of Health (ODH) and Ohio Environmental Protection Agency (OEPA) Well Abandonment Regulations 3701-28-01, 3701-28-07, 3745-9-01, and 3745-9-10, applicable FEMP Site Procedures, EM Department Procedures (Listed in Section C), and the Sitewide Drilling Subcontract.

A bentonite grout (slurry) shall be used to plug and abandon the wells as specified by EM on a case by case basis. The slurry shall be inserted in one continuous operation, using a side-discharge tremie line, from the bottom of the hole to the surface. The tremie line shall reach the bottom of the open hole, boring, or well. The end of the tremie line shall remain immersed in the slurry throughout the emplacement process and raised when the slurry can no longer easily be forced from the line into the well or when undiluted slurry reaches the top of the well.

If pellets or chips are required, they shall be poured slowly into the well or borehole in two to three foot intervals. The depth to the pellets or chips shall be measured and/or tamped to ensure bridging does not occur. Each interval shall be hydrated with a sufficient volume (five to ten gallons) of potable water.

Waste materials will be handled, stored, or disposed of according to waste disposition requirements. Every attempt will be made to reuse/recycle as much of the waste materials (well screens, well risers, etc.) as possible. Waste materials (used for well installation) removed from the borehole shall be disposed of according to the Project Waste Identification Document (PWID) Number 391 Rev. 5.

During field activities, the selected method for plugging and abandoning a particular well may prove to be inadequate or unattainable. If this occurs, all field activities will cease and an alternate method will be selected as per the requirements of *Well Plugging and Abandonment*, DRL-01.

The Subcontractor shall provide all personnel, equipment, and materials necessary to complete the plugging and abandonment activities (supplemental EM-supplied labor and materials may be utilized under the direction of EM). Specified work shall require the services of one driller, one helper, and/or one helper/welder. An auger rig shall be required for over drilling and/or pulling requirements. Certain situations may require the use of a hand jack such as a bottle jack and will be furnished by the drilling Subcontractor. Cutting tools for 4-inch I.D. riser pipe will be required and will be furnished by EM.

EM will ensure that the tasks outlined in this SOW have been completed according to required specifications in the following manner:

- There will be field supervision by EM personnel for field activities.
- EM personnel will review all Field Activity Logs and Subcontractor Daily Progress Reports.
- EM personnel will inspect the abandoned well site to ensure there is a surface seal and the site has been appropriately cleaned after completion of field activities.

C. Applicable Documents

Following is a list of documents that pertain to this SOW:

Environmental Monitoring Standard Operating Procedures:

Field Project Prerequisites, ADM-02
Groundwater Elevation Measurements, SMPL-05
Horiba ™ Water Quality Meter, EQT-02
MicroTIP ™ Photoionization Detector - Calibration, Operation, and Maintenance, EQT-04
Well Development, DRL-03
Well Plugging and Abandonment, DRL-01

FEMP Chemical/Hazardous Materials Permit
FEMP Health and Safety Matrix
FEMP Open Flame/Welding Permit
FEMP Penetration Permit
FEMP Radiological Work Permit
FEMP Site Procedures
FEMP Sitewide CERCLA Quality Assurance Project Plan (SCQ), FD-1000
FEMP Work Permit
ODH and OEPA Well Abandonment Regulations
OEPA Water Well Standards
Safety Performance Requirements, RM-0021
Sitewide Drilling Subcontract No. FSC 615 (November 17, 1997)

All personnel involved with this SOW should be aware of these documents and will have the opportunity to review these documents upon request.

D. Equipment and Materials

NOTE *Additional equipment and material items may be required as necessary.*

Auger rig	Horiba™ [a]
Bentonite (pellets, chips, and powder) [b]	Jack hammer
Breaker bar (4-5 feet in length)	LBA™
Buckets	Lifting/pulling tools
Casing cutter for 4-inch I.D. risers	MicroTIP™ [a]
Concrete mix	pH strips [a]
Development pump	Pipe cutter
Fine and medium-grained silica sand	Potable water
Generator	Polyethylene tubing
Grout pump with tremie line	Re-development rig
Hand jack	Sledge hammer
Haul truck	Surge block
	Water truck

[a] *These items will be supplied by the Fluor Daniel Fernald.*
[b] *These items will be supplied by Fluor Daniel Fernald until existing stock is depleted.*

E. Well-Specific Plugging and Abandonment Specifications

Table 1 provides the following well construction information: well diameter, riser material, screen depth, depth of well, bottom of boring, depth to water, and general location of well.

E.1 Type 1, 2-inch diameter PVC wells: 1891, 1892, 1893, 12113 and 12114

Break the existing concrete pad into pieces weighing less than 35 pounds and set them aside. Loosen and pull the protective casing and set it aside. If possible, push bottom out of well using drill rods or similar tool. Inject bentonite slurry through the riser from the bottom flush with the surface.

If the bottom will not push out of the well, then pull the riser and screen from the ground ensuring all well materials are removed. Inject grout consisting of bentonite slurry into the remaining open boring from the bottom to within 24-30 inches of the surface using a tremie line.

Allow grout to cure for 24 hours. If grout settles, add enough grout to bring grout to within 24-30 inches of the surface. Place a concrete cap flush with surface.

If required, cut casing materials into lengths determined by PWID. Transport waste materials to appropriate stock piles or storage containers as directed by EM.

E.2 Type 1, 2-inch and 4-inch diameter stainless steel wells: 1025, 1028, 1031, 1033, 1034, 1073, 1075, 1078, 1079, 1080, 1081, 1082, 1083, 1084, 1645, 1646, 1765, 1766, 1767, 1769, 1772, 1776, 1777, 1837, 1943, 1944, 11076 and 11079

Break the existing concrete pad into pieces weighing less than 35 pounds and set them aside. Loosen and pull the protective casing and set it aside. Bump the riser to loosen, if necessary. Either pull directly or sandlock a pulling tool into the lower part of the riser and pull the riser and screen from the ground. If the riser and screen will not pull, use the smallest diameter hollow-stem augers possible and over drill only enough to allow the riser and screen to be pulled. Ensure all well materials are removed and borehole has not collapsed.

Inject grout consisting of a bentonite slurry into the remaining open boring from the bottom to within 24-30 inches of the surface using a tremie line. Allow grout to cure for 24 hours. If grout settles, add enough to bring grout to within 24-30 inches of the surface. Place a concrete cap flush with surface.

If required, cut casing materials into lengths determined by Waste Programs. Transport waste materials to appropriate stockpile/storage container as directed by EM.

E.3 Type 2 & 3, 4-inch diameter stainless steel wells: 2004, 2028, 2084, 2435, 2643, 2822, 3003, 3004, 3008, 3435, and 4008

Break the existing concrete pad into pieces weighing less than 35 pounds and set them aside. Loosen and pull the protective casing and set it aside. Fill the screened interval and lower 2-feet of the riser with sand. Place 5 feet of bentonite pellets on top of the sand and hydrate the pellets if necessary. Cut the riser a minimum of 10 feet below the base of the till. Bump the riser to loosen, if necessary.

Inject grout consisting of bentonite slurry into the well through the casing from the top of the bentonite already placed in the well, flush with the surface using a tremie line. Pull the casing as the grout is being pumped into the well. Allow grout to cure for 24 hours. If grout settles, add enough grout to bring grout within 24-30 inches of surface. Place a concrete cap flush with surface. If required, cut casing materials into lengths determined by Waste Programs. Transport waste materials to the appropriate stockpile/storage containers as directed by EM.

F. Well Modifications/Repairs

Table 2 provides the following well information: well diameter, riser material, general location of well, and modification type.

F.1 Wells: 2046 and 3046

The Soils Characterization and Excavation Project (SCEP) has excavated around well 2046 and 3046. Hand dig around the base of the wells so the riser may be cut for an above-ground protective cover. Break the concrete pad into pieces weighing less than 35 pounds and set them aside. Loosen and pull the protective casing and set it aside. Cut the well riser two feet above the ground surface. Ensure grout is placed to within 24-30 inches of surface. If additional grout is required bentonite chips or pellets may be added. Install protective casing. Place a 4' x 4' x 6" concrete pad around the protective casing.

F.2 Well: 22302

The riser on well 22302 appears to be broken at the existing ground surface. Break existing concrete pad into pieces weighing less than 35 pounds and set them aside. Soil will be excavated by a Construction Subcontractor from around protective cover to a depth of approximately 5.5 feet. Excavate by hand within a one foot radius of the well. Loosen and remove the protective casing. Unscrew broken section of riser and replace with 2" I.D. PVC to a height of 2.0 feet above grade. Place 14" diameter cardboard concrete form (Sonotube™) over riser. Pour enough Portland cement around outside of Sonotube™ to prevent movement of the tube while backfilling. Place a sufficient quantity of bentonite chips/pellets inside Sonotube™ to minimize movement of the tube while backfilling. Hydrate with 5 to 10 gallons of potable water. Backfill around Sonotube™. Grade soil so water flows away from leaving enough of a mound to allow for any settling to take place. If required, additional topsoil may be used to fill around the well. Cut excess Sonotube™ at ground level. Fill remaining Sonotube™ with bentonite chips and hydrate. Place protective casing in concrete seal. Install a 4' x 4' x 6" concrete pad around the protective casing.

F.3 Wells: 31217 & 41217

Above-ground protective covers must be installed at these locations. Grade soil so water drains away from the wells. If required, additional top soil may be added. Sonotubes™ are currently placed around the wells with approximately 3 feet of the tube below grade and 5 feet above grade. Cut Sonotube™ flush with ground surface. Fill Sonotube™ with bentonite pellets to within 24 to 30 inches of surface and hydrate. Cut riser at two feet above ground surface. Fill remaining hole with concrete. Place protective casing in concrete seal allowing a six inch space between the top of the riser and the top of the protective casing. Install a 4' x 4' x 6" concrete pad around the protective casing.

F.4 Well: 2008

Guard posts shall be placed around the well to provide protection during remediation activities. The post installation shall be structurally independent of any concrete surface seal. The posts shall be set four feet below grade with three feet above grade. The posts shall be placed radially the well using enough post to provide a maximum gap of 4 feet between posts. Posts may be pushed or augered into the ground. If augering is used, the posts are to be set in portland cement.

G. Monitoring Well Chemical RehabilitationTreatment and Re-development General Requirements: 2002, 2027, 2424, 2426, 2430, 2431, 2432, 3027, 3067, 3070, 3821, and 4067

Table 3 provides the following well information: depth, top of screen, screen length, PID requirement.

The Subcontractor will conduct treatment and re-development activities under the supervision of EM personnel. All work performed shall meet minimum specifications as outlined by the manufacturer's instructions for use of LBA™, applicable FEMP Site Procedures, and the Sitewide Drilling Subcontract.

There are no EPA guidelines for treating monitoring wells for bio-fouling problems. In production wells, bio-fouling problems are often treated using very harsh chemicals. The chemicals are not environmentally friendly, and pose safety concerns to the users. LBA™, marketed by Colloid Environmental Technologies (CETCO), will be used to help rehabilitate selected groundwater monitoring wells. This product was selected because it is less corrosive and less dangerous to use, it does not create toxic fumes, and it is least likely to compromise monitoring well integrity. The manufacturer reports that LBA™ is in compliance with ANSI/NSF Standard 60; Drinking Water Treated Chemicals - Health Effects. The National Sanitation Foundation has approved the use of LBA™ in drinking water wells.

Field water quality measurements must be collected immediately prior to the addition of LBA™ so it may be determined if all LBA™ has been removed after purging well. Water quality parameters will be collected by the Geologist/Technician. These parameters will be used to determine if all LBA™ has been removed from the well. LBA™ should be added after the well is bailed to remove the majority of fines present in the well. The Geologist/Technician shall determine the volume of LBA™ added to the well by subtracting the total depth of the well from the water level. The result should be multiplied by 0.04 gallons to determine the amount of LBA™ required to achieve a pH of <2.5. LBA™ should be added to the well and surging should take place for a minimum of 30 minutes. If this volume of acid is insufficient to achieve a pH of <2.5, then additional acid must be added after surging. The Geologist/Technician must determine the volume of acid required to achieve a pH of <2.5. If additional acid is required, surge the well a minimum of 30 minutes after adding the additional acid and take a water quality reading to determine pH. Repeat if pH is ≥ 2.5. After a pH of <2.5 has been achieved, allow the well to sit for a minimum of 24 hours and a maximum of 48 hours before pumping the well. Once the pH of the purge water drops below 6.0, pH strips should be used in place of the Horiba™ Water Quality Meter. During pumping, to remove the LBA™, a minimum of 10 well volumes must be removed. Continue redevelopment according to DRL-03 until temperature, pH, specific conductivity, turbidity, and dissolved oxygen have stabilized. A turbidity of ≤ 5 NTU should be achieved.

IV. DELIVERABLES

The Subcontractor shall provide Daily Reports to EM through the Construction Contracts manager no later than the beginning of the first work-day of each week for work performed during the previous week. Daily Reports will be in the format specified in Part 6 of the Sitewide Drilling Services Subcontract.

V. SCHEDULE

Subcontractor field activities shall begin after receipt of written notice to proceed from EM. Completion of work and final acceptance will be acknowledged in writing from EM to the Fluor Daniel Fernald Contract Technical Representative and Quality Assurance.

The period of performance completion date (maximum allowable) for Plugging and Abandonment and Monitoring Well Acid Rehabilitation Treatment field work is June 30, 1998. Overtime hours are not authorized.

TABLE 1 - PLUGGING AND ABANDONMENT

ID #	DIAMETER (inches)	RISER MATERIAL	SCREEN DEPTH (feet)	DEPTH OF WELL (feet)	BOTTOM OF BORING (feet)	GROUND WATER LEVEL (feet)	LOCATION
3003	4	STEEL	UNK	UNK	UNK	35.89	BERM 3
2004	4	STEEL	38-43	43	43	32.58	CLEAR WELL
3004	4	SS	93-103	105	135	55.32	BERM 3
1025	4	SS	11-21	23	23	12.56	BERM 3
1028	4	SS	18-28	30	30.5	26.58	BERM 3
2028	4	SS	60-75.3	77.3	79	63.39	BERM 3
1031	4	SS	16-26	28	30	23.95	BERM 1
1033	4	SS	9-19	21	21	3.87	SILO 1
1034	4	SS	8-18	20	20	4.05	SILO 1
1073	4	SS	15-25	28.5	29	7.17	PIT 1
1075	4	SS	20-25	27.2	28	2.77	BERM 3
1078	4	SS	22-32	34.6	34.6	14.75	BURN PIT
1079	4	SS	23.6-28.6	31	39	22.7	BERM 5
1080	4	SS	18.5-28.5	30.9	51.5	14.52	BERM 5
1081	4	SS	20.4-30.4	33	33	14.07	BERM 5
1082	4	SS	9-19	21.5	22.5	4.08	BERM 6
1083	4	SS	9-19	21.5	22.5	3.65	BERM 6
1084	4	SS	20.4-30.4	33	33	15.51	BERM 4
2084	4	SS	58.4-73.4	76	77	60.83	BERM 4
2435	4	SS	55-70	72	72	64.9	BERM 4
3435	4	SS	118-128	130	131	UNK	BERM 4
2643	4	SS	63-78	80	82	59.02	BURN PIT
1645	4	SS	13-23	25	25.5	3.15	BERM 4
1646	4	SS	13-23	25	25.5	4.31	BERM 4
1765	4	SS	18-22	22.5	22.5	3.41	PIT 1
1766	4	SS	16-20	20.5	20.5	5.4	PIT 1
1767	4	SS	16-20	20.5	21	4.32	PIT 1

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TABLE 1 - PLUGGING AND ABANDONMENT

ID #	DIAMETER (inches)	RISER MATERIAL	SCREEN DEPTH (feet)	DEPTH OF WELL (feet)	BOTTOM OF BORING (feet)	GROUND WATER LEVEL (feet)	LOCATION
1769	4	SS	17.5-21.5	22	22	3.74	PIT 2
1772	4	SS	31-36	36.5	36.5	4.59	PIT 3
1776	4	SS	28-32	32.5	32.5	5.71	BURN PIT
1777	4	SS	20.5-25.5	26	26	6.57	BURN PIT
1837	4	SS	5.5-7.5	8	8.5	5.26	SOUTH EAST BIOSURGE LAGOON
1891	2	PVC	5.5-7.5	7.5	9	8.96	SILO 1
1892	2	PVC	16-19	19	21	10.75	SILO 1
1893	2	PVC	6.25-9.25	9.25	12	11.24	SILO 2
1943	4	SS	18-28	30	30	3.6	BURN PIT
1944	4	SS	18-28	30	30	1.59	BURN PIT
2822	4	SS	53-68	70	70	54.33	BERM 1
3008	4	STEEL	111-116	116	120	54.59	SOUTHEAST BIOSURGE LAGOON
4008	4	STEEL	175-180	180	180	55.6	SOUTHEAST BIOSURGE LAGOON
11076	4	SS	10-12	12.4	21.5	6.56	BERM 3
11079	4	SS	13-23	23.5	23.5	5.37	SILO 4
12113	2	PVC	NA	22.5	22.5	DRY	SOUTH FIELD
12114	2	PVC	NA	24	24	DRY	SOUTH FIELD

TABLE 2 - WELL MODIFICATIONS/REPAIRS				
ID #	DIAMETER (inches)	RISER MATERIAL	LOCATION	MODIFICATION TYPE
2008	4	SS	North Of Vitrification Plant	Guard Posts
2046	4	SS	Inactive Flyash Pile	Lower Riser
3046	4	SS	Inactive Flyash Pile	Lower Riser
22302	4	PVC	South Field	Fix Riser
31217	4	SS	North Access Road	Replace Protective Cover and Pad
41217	4	SS	North Access Road	Replace Protective Cover and Pad

TABLE 3 - MONITORING WELL CHEMICAL REHABILITATION TREATMENT				
ID#	DEPTH (ft.)* Top of Protective Casing (TPC)	TOP OF SCREEN (ft.)* (TPC)	SCREEN LENGTH (ft.)	PID REQUIREMENT (Y/N)
2002	82	65.5	15	N
2027	78.5	58.4	15	Y
3027	128.5	116.5	10	Y
3067	134.9	122.5	10	N
4067	214.2	202.5	10	N
3070	144.9	132.5	10	N
2424	109.7	92.7	15	N
2426	93.5	76.5	15	N
2430	88.8	71.8	15	N
2431	87.5	70.5	15	N
2432	97.5	80.5	15	N
3821	114.5	102.5	10	Y

Measured from Top of Protective Casing

ELEVATION REFERENCE DRAWING TABLE	
ELEVATION NUMBER	REFERENCE DRAWING NUMBER
A,B,C,D	94X-6100-E-02226
E,F,G,H,J	94X-6100-E-02227
K,L,M,N,P,R	94X-6100-E-02228

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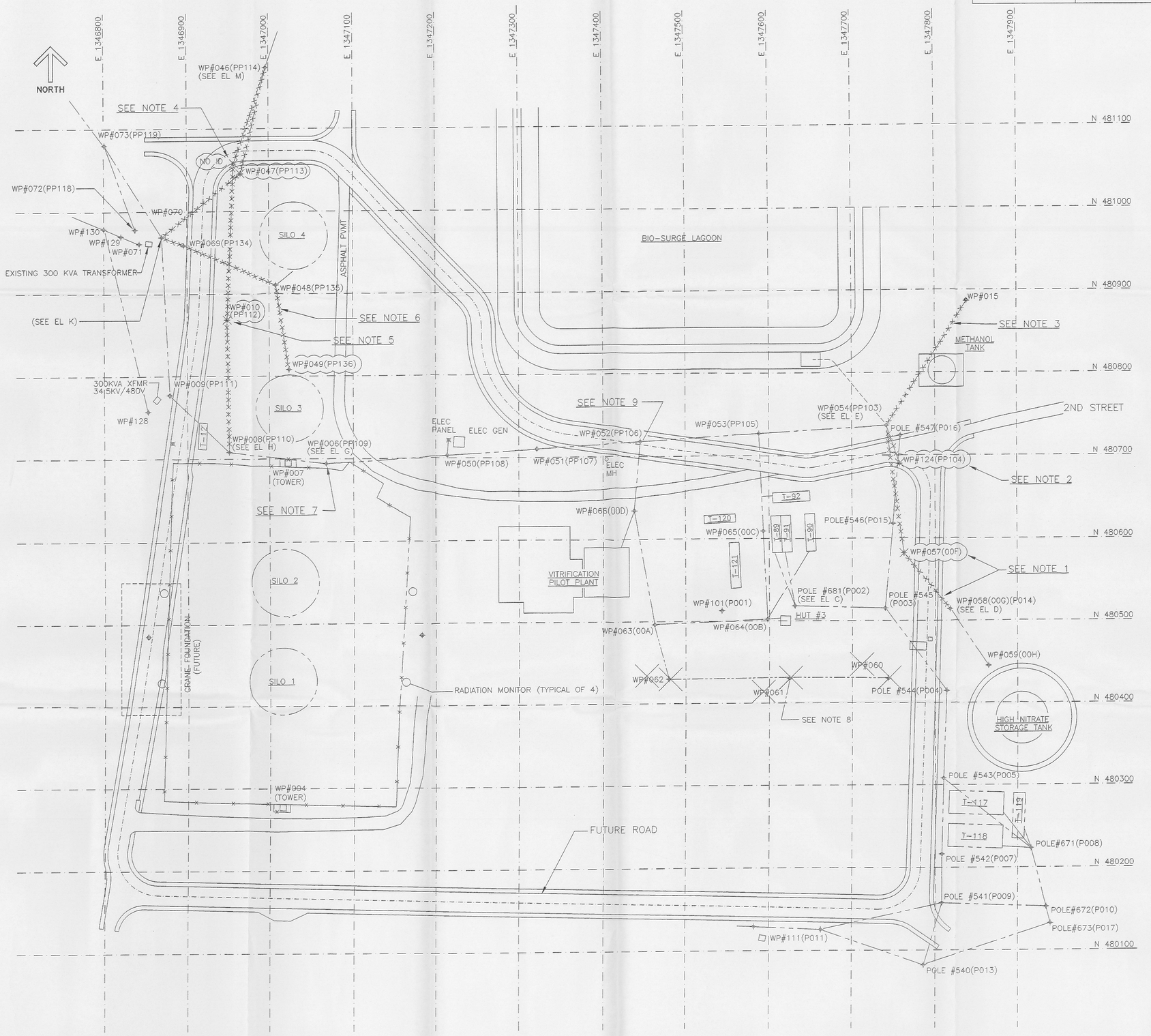

000182

DEMOLITION NOTES:

(USING NEW POLE IDENTIFIERS ONLY)

1 REMOVE #4 AWG AL TRIPLEX (480V DISTRIBUTION LINE), SIGNAL CABLE AND ASSOCIATED HARDWARE BETWEEN POLE WP#054 THRU POLE WP#058. ALSO REMOVE POLE WP#057.

2 REMOVE #4 AWG AL TRIPLEX (480V DISTRIBUTION LINE) AND ASSOCIATED HARDWARE BETWEEN POLE WP#054 AND WP#124. ALSO REMOVE POLE WP#124.

3 REMOVE 480V TRIPLEX CABLE FROM WP#054 TO POLE WP#015.

4 REMOVE 480V AERIAL CABLE AND ASSOCIATED HARDWARE BETWEEN POLE WP#070 AND WP#046. REMOVE POLE WP#047 NOTING IT WILL BE RELOCATED AS SHOWN ON DRAWING # 94X-6100-E-02224.

5 REMOVE SIGNAL CABLES BETWEEN POLES WP#008, WP#010, NO ID POLE AND POLE WP#046. REMOVE POLE WP#010 AND SHORT UNIDENTIFIED POLE ADJACENT TO POLE WP#047.

6 REMOVE AERIAL FEEDER CABLE AND ASSOCIATED HARDWARE FROM POLE WP#070 THRU POLE WP#049 VIA POLE WP#069 & WP#048. ALSO REMOVE POLE WP#049.

7 AT POLE WP#006 REMOVE ALL EQUIPMENT AND CONDUIT ASSOCIATED WITH THE RTS SYSTEM. THIS WILL MAKE AVAILABLE BACKBOARD SPACE FOR MOUNTING NEW CONTROL AND SIGNAL BOXES. NOTE THAT EL "G", DWG 94X-6100-E-02227 IS NOT AN ACCURATE REPRESENTATION OF ALL EQUIPMENT TO BE REMOVED.

8 REMOVE TELEPHONE LINE FROM POLES WP#062, WP#061 AND WP#060. REMOVE POLES FOR FUTURE USE BY FDF.

9 POLE SHALL BE RELOCATED BY OTHERS.

GENERAL NOTES:

1 REMOVE ALL DOWN GUYS WITH REMOVAL OF ASSOCIATED POLES AND SPANS. REMOVE CABLE & ASSOCIATED HARDWARE. DIG GUY ANCHORS OUT AND RETURN GRADE TO LEVEL.

LEGEND:

WP#000(P000) (NEW / OLD)	UTILITY POLE AND IDENTIFIER
POLE#000(P000) (NEW / OLD)	13.2 KV UTILITY POLE AND INDENTIFIER
× × × × ×	REMOVE ALL ITEMS AS SHOWN AND NOTED
	REMOVE ALL ITEMS AS HIGHLIGHTED AND NOTED
	EXISTING AERIAL CABLE
	EXISTING ELECTRICAL DUCT BANK
	EXISTING ELECTRICAL LINE

REF. DWG. NO.	DRAWING TITLE
40A-5500-E-00036	POLE MOUNTED ELEC. DIST. SYSTEM FOR THE WASTE PITE AREA

REV. NO.	ISSUE OR REVISION PURPOSE - DESCRIPTION	A-E	FDF	DATE
0	ISSUED FOR CONSTRUCTION	JTM 7/1/98	RLW 7/2/98	

INITIALS AND DATE

UNITED STATES DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

THIS DRAWING PREPARED BY
FLUOR DANIEL NORTHWEST, INC.
1100 JADWIN, P.O. BOX 1050
RICHLAND, WASHINGTON

PROJECT NAME
SILOS INFRASTRUCTURE

DRAWING TITLE
EXISTING OVERHEAD UTILITIES
SILO INFRASTRUCTURE – SITE PLAN (DEMOLITION)

DRAWN BY	DATE	LEAD ENGINEER	DATE	CHECKED BY	DATE
GJ KUBINSKI	03-25-98	Ron Jonson	7-1-98	Roscoe Black	7-1-98

PLANT/BLDG. NO.	FLOOR	SCALE	CLASS
OU4		1"=50'	

SUBMITTED FOR APPROVAL — A-E DATE
FDF/APPROVAL — DATE 7/1/98

40315

DOE PROJECT NO.	FEMP PROJECT NO.	DRAWING INDEX CODE NO.	SHEET NO.	REV. NO.
	WBS 2.1.3.G.R	94X-6100-E-02223	1	0

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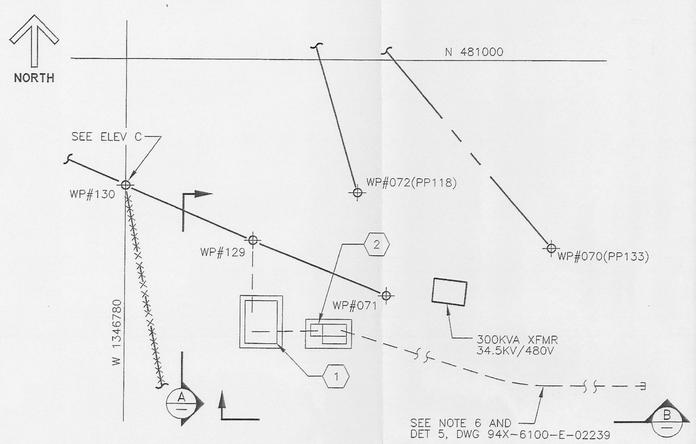
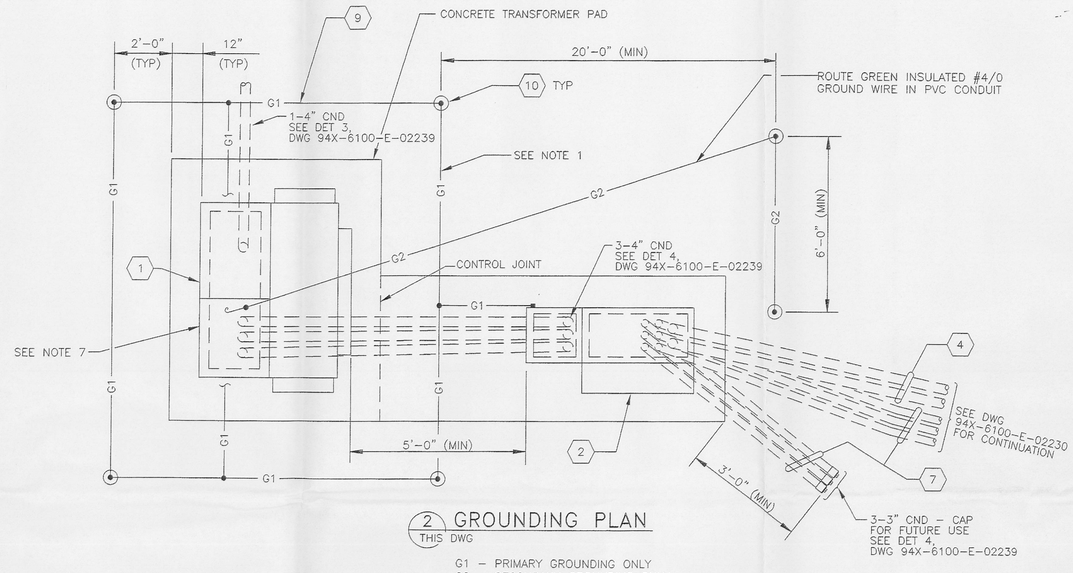


1 ENLARGED PLAN
DWG 94X-6100-E-02229 & 94X-6100-E-02230



2 GROUNDING PLAN
THIS DWG

G1 - PRIMARY GROUNDING ONLY
G2 - SECONDARY GROUNDING ONLY

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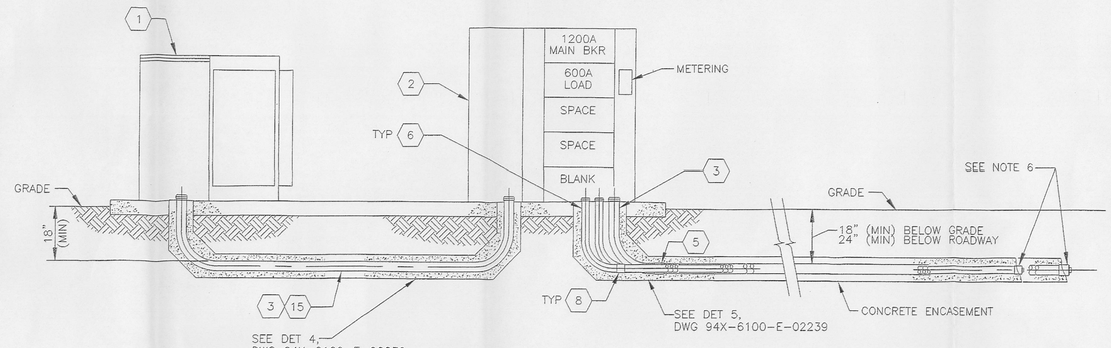
NOTES

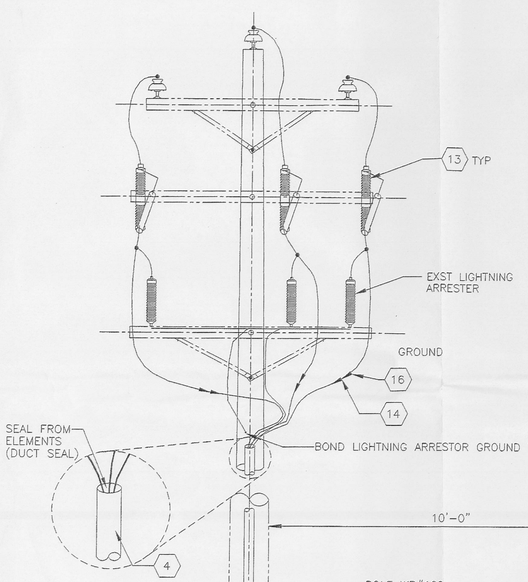
1. THE GROUND GRID IS TO BE BURIED A MINIMUM OF 2'-6". WHERE THE GROUND GRID CROSSES A DUCT BANK THE GROUND GRID IS TO BE BURIED BELOW THE DUCT BANK.
2. BOND THE CONDUCTOR SHIELDS AND THE ARRESTER GROUND LEADS TO A #2AWG BARE COPPER CONDUCTOR USING SUITABLE CONNECTORS. CONNECT THIS CONDUCTOR TO THE TRANSFORMER TANK GROUND LUG.
3. INSTALL #4 AWG COPPER CONDUCTOR FROM TRANSFORMER XO BUSHING TO THE ASSOCIATED G2 GROUND ROD. CONNECT G2 GROUND RODS AS SHOWN ON PLAN. GROUND PER 1996 NEC 450-10
4. INSTALL THE TRANSFORMER AND PAD PER MANUFACTURER'S INSTRUCTIONS.
5. SEE DWG 94X-6100-E-02229 & 94X-6100-E-02230 FOR LEGEND.
6. CONTINUE 2 - 4" CND AND 3 - 3" CND DUCTS TO SILO 3 & 4 AREA EAST OF NEW ROAD AS SHOWN ON PLAN DWG E-02230. PLUG FOR FUTURE USE.
7. NESC RULES APPLY TO PRIMARY OF TRANSFORMER. NFPA TO (NEC) RULES APPLY AT SECONDARY OF TRANSFORMER.

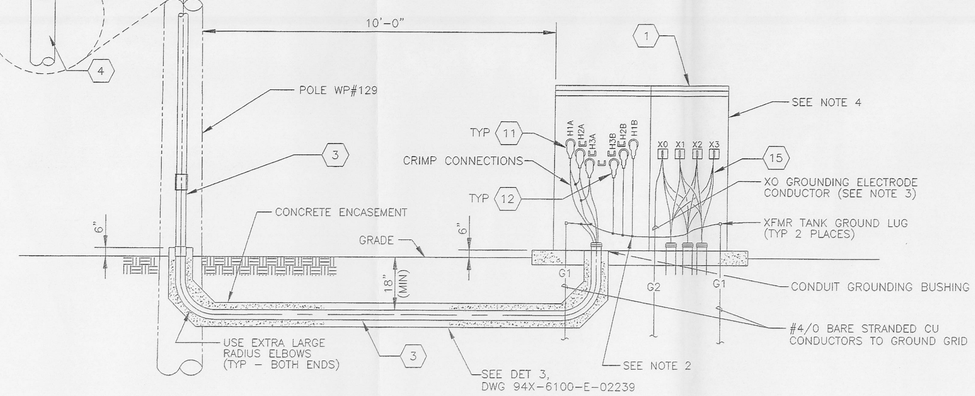
MATERIAL LIST

1. TRANSFORMER, 1000KVA, 34.5KV-480Y/277V, 3PH, 4WIRE OIL FILLED, DEAD FRONT, WITH SURGE PROTECTION
2. 1200A DISTRIBUTION SWITCHBOARD, FREE STANDING NEMA 3R 480Y/277V, 3PH, 4WIRE WITH 1200A GROUND FAULT PROTECTED MAIN BREAKER AND 600A LOAD BREAKERS. MAIN BREAKER SHALL HAVE DEMAND AND KWH METERING.
3. 4" RIGID GALVANIZED STEEL CONDUIT
4. 4" PVC CONDUIT, HEAVY WALL SCHEDULE 40 (FOR USE IN DUCT BANKS)
5. 4" COUPLING, PVC CONDUIT TO STEEL CONDUIT ADAPTOR
6. 3" RIGID GALVANIZED STEEL CONDUIT
7. 3" PVC CONDUIT, HEAVY WALL SCHEDULE 40 (FOR USE IN DUCT BANKS)
8. 3" COUPLING, PVC CONDUIT TO STEEL CONDUIT ADAPTOR
9. GROUND CONDUCTOR, #4/0 STRANDED BARE COPPER
10. GROUND ROD, COPPERCLAD STEEL, 5/8" x 8'-0" LONG, WITH GROUND ROD TO CABLE CLAMP (COPPER COMPRESSION TYPE OR EXOTHERMIC WELD)
11. LOADBREAK ELBOW CONNECTOR
12. METAL OXIDE ELBOW SURGE ARRESTER - (27KV)
13. LOAD BREAK FUSED CUTOUT (25T FUSE) - (REPLACES EXST FUSED LINKS)
14. 35KV POWER CABLE, 1/C #1/0 AWG, STRANDED CU, SUITABLE FOR OUTDOOR INSTALLATION
15. 600 KCMIL CABLE, 600V INSUL RATING, 90°C, XHHW, W/ INSULATED 4/0 GRND CALBE
16. TERMINATION KIT - SUITABLE FOR MANUFACTURER'S CABLE (RAYCHEM MFG OR FDF APPROVED EQUIVALENT)
17. INSTRUMENTATION CABLE, 600V, SHIELDED TWISTED PAIR WITH DRAIN WIRE. WIRE COLORS RED AND WHITE.



B SECTION
THIS DWG





A SECTION
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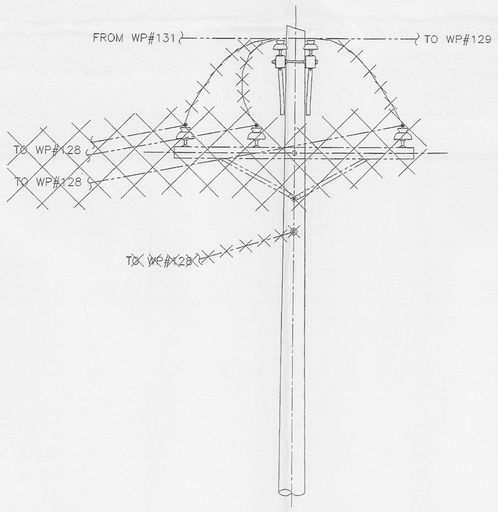


C ELEVATION
POLE WP#130

000183

REV. NO.	ISSUE OR REVISION PURPOSE - DESCRIPTION	A-E	FDF	DATE
0	ISSUED FOR CONSTRUCTION			7/1/96

INITIALS AND DATE

UNITED STATES DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

THIS DRAWING PREPARED BY
FLUOR DANIEL NORTHWEST, INC.
1100 JADWIN, P.O. BOX 1050
RICHLAND, WASHINGTON

PROJECT NAME
SILOS INFRASTRUCTURE

DRAWING TITLE
EXISTING OVERHEAD UTILITIES
SILO INFRASTRUCTURE - 34.5KV OVERHEAD UTILITIES
POLE AND 1000KVA XFMR DETAILS

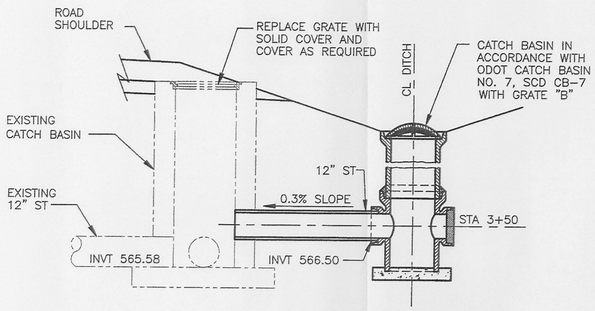
DRAWN BY	DATE	LEAD ENGINEER	DATE	CHECKED BY	DATE
G.J. Kubiaski	6/20/96	Dan Jensen	6/20/96	Roger Elliot	6/20/96

PLANT/BLDG. NO.	FLOOR	SCALE	CLASS
OU4		NONE	

SUBMITTED FOR APPROVAL — A-E — DATE
FDF APPROVAL — DATE 6/21/96

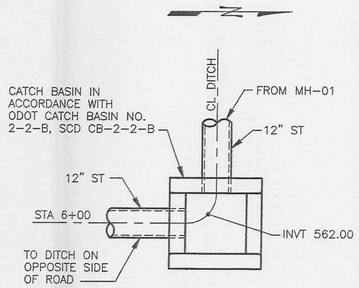
40315

DOE PROJECT NO.	FEMP PROJECT NO.	DRAWING INDEX CODE NO.	SHEET NO.	REV. NO.
	WBS 2.1.3.G.R	94X-6100-E-02238	1	0



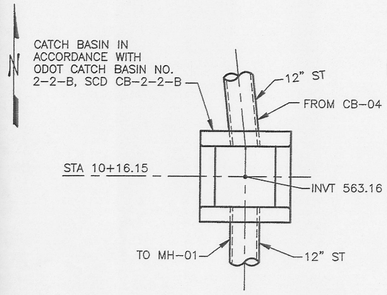
CATCH BASIN CB-01

SCALE: NONE



CATCH BASIN CB-02

SCALE: NONE



CATCH BASIN CB-03

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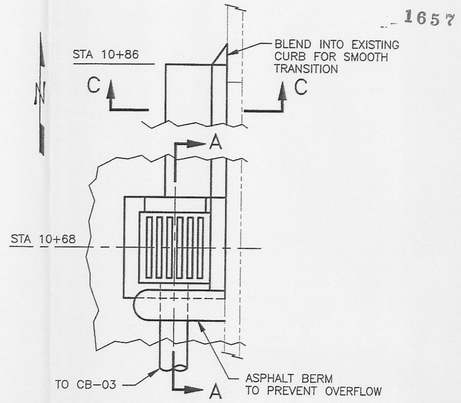
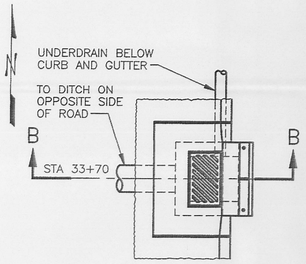


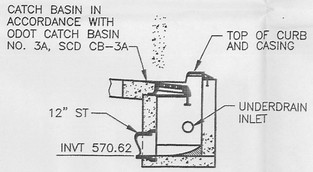
CATCH BASIN CB-04

SCALE: NONE



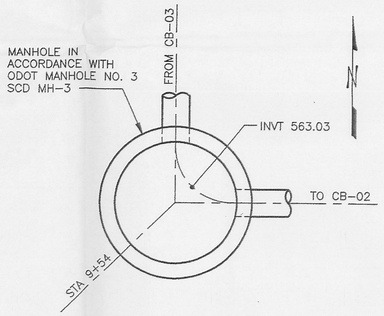
CATCH BASIN CB-05

SCALE: NONE



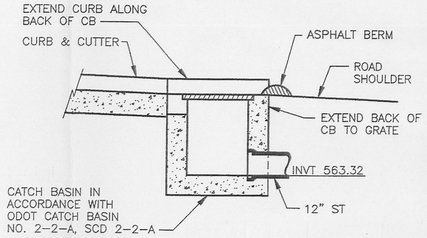
SECTION B-B

SCALE: NONE



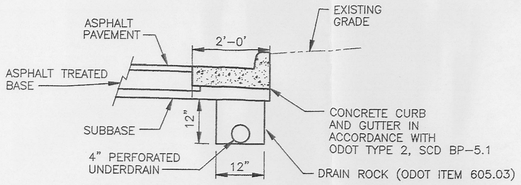
MAN HOLE MH-01

SCALE: NONE



SECTION A-A

SCALE: NONE



2 CURB AND GUTTER

94X-6100-G-02211
94X-6100-G-02212
SCALE: NONE

LEFT SIDE OF ROAD:

FROM CORNER OF EXISTING CATCH BASIN (STA14+50) TO 14+68 (14' L – BACK OF CURB) TO STA 15+50

PLACE UNDERDRAIN FROM START OF CURB AND GUTTER (STA 14+50) TO STA 15+50

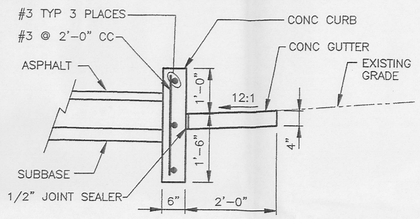
FROM SOUTH SIDE OF K-65 TRENCH (STA 31+10.50) TO STA 33+75

PLACE UNDERDRAIN FROM START OF CURB TO CB-05

RIGHT SIDE OF ROAD:

FROM START OF CURB AND GUTTER (STA 14+60) TO STA 14+60 (14' R – BACK OF CURB) TO STA 15+50

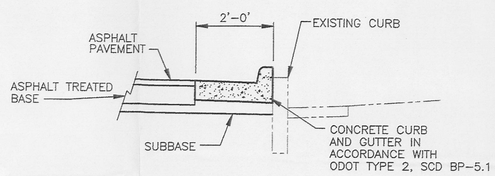
PLACE UNDERDRAIN FROM EXIST CATCH BASIN (STA 14+50) TO START OF CURB AND GUTTER (STA 14+60) TO STA 15+50



1 CURB

94X-6100-G-02211
SCALE: NONE

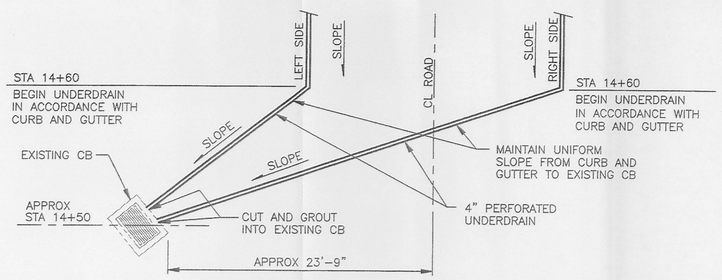
FROM STA 12+50 TO STA 14+60



SECTION C-C

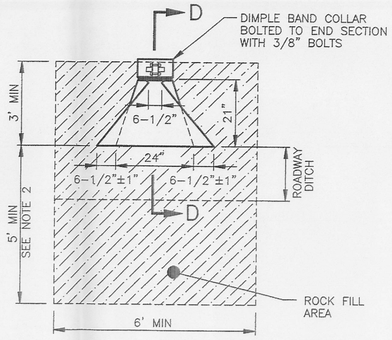
SCALE: NONE

FROM CB-04 (STA 10+68) TO STA 10+86



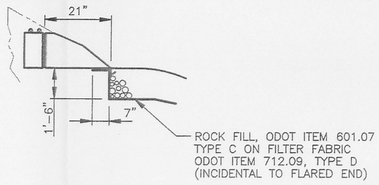
3 UNDERDRAIN DETAIL

94X-6100-G-02211
SCALE: NONE



STORM DRAIN FLARED END SECTION

SCALE: NONE



SECTION D-D

SCALE: NONE

000184

NOTES

1. FOR LEGEND, ABBREVIATIONS AND NOTES SEE 94X-6100-G-02209.
2. THE ROCK FILL AT THE END OF THE FLARED END SECTION SHALL EXTEND A MINIMUM OF 5' UNLESS OTHERWISE DIRECTED BY FDF.

REF DWG NO.	DRAWING TITLE
94X-6100-X-02208	DRAWING LIST AND VICINITY MAP
94X-6100-G-02210	PLAN AND PROFILE – STATION 0+00 TO 12+00
94X-6100-G-02211	PLAN AND PROFILE – STATION 12+00 TO 25+00
94X-6100-G-02212	PLAN AND PROFILE – STATION 25+00 TO END
94X-6100-G-02213	CROSS SECTIONS – STATION 0+00 TO 7+35
94X-6100-G-02214	CROSS SECTIONS – STATION 7+55 TO 13+50
94X-6100-G-02215	CROSS SECTIONS – STATION 14+00 TO 22+00
94X-6100-G-02216	CROSS SECTIONS – STATION 22+50 TO 30+50
94X-6100-G-02217	CROSS SECTIONS – STATION 31+50 TO END

REV. NO.	ISSUE OR REVISION PURPOSE – DESCRIPTION	A-E	FDF	DATE
0	CERTIFIED FOR CONSTRUCTION			6/29/98

INITIALS AND DATE

UNITED STATES DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

THIS DRAWING PREPARED BY
FLUOR DANIEL NORTHWEST
RICHLAND, WASHINGTON

PROJECT NAME
SILOS INFRASTRUCTURE PROJECT

DRAWING TITLE
MISCELLANEOUS DETAILS

DRAWN BY	DATE	LEAD ENGINEER	DATE	CHECKED BY	DATE
RS CHRISTENSEN	6-24-98		6/24/98		6/24/98

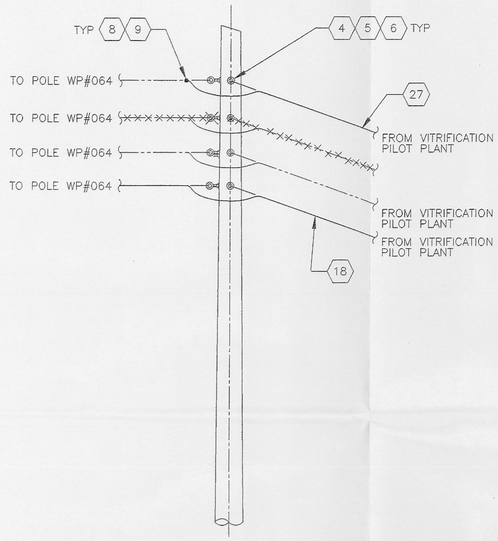
PLANT/BLDG. NO.	FLOOR	SCALE	CLASS
OU4		NONE	

SUBMITTED FOR APPROVAL — A-E — DATE
FDF APPROVAL — DATE 6/29/98

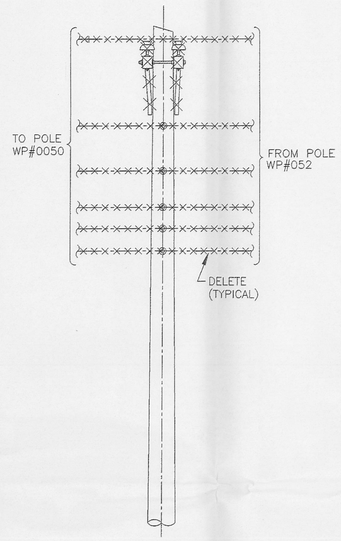
40315

DOE PROJECT NO.	FEMP PROJECT NO.	DRAWING INDEX/CODE NO.	SHEET NO.	REV. NO.
	WBS 2.1.3.G.R	94X-6100-G-02243	1 OF 1	0

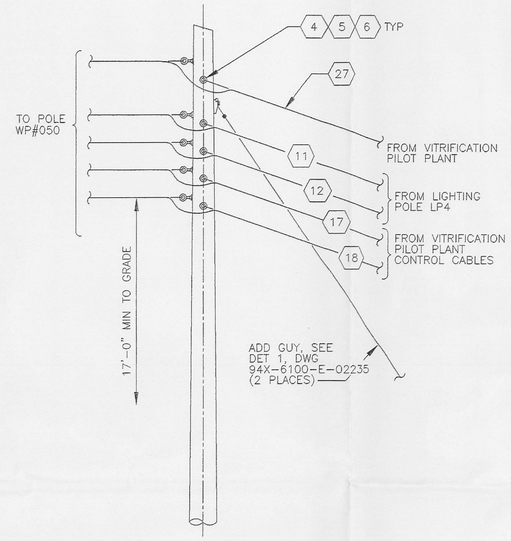
1657



A ELEVATION
POLE WP#063(00A)

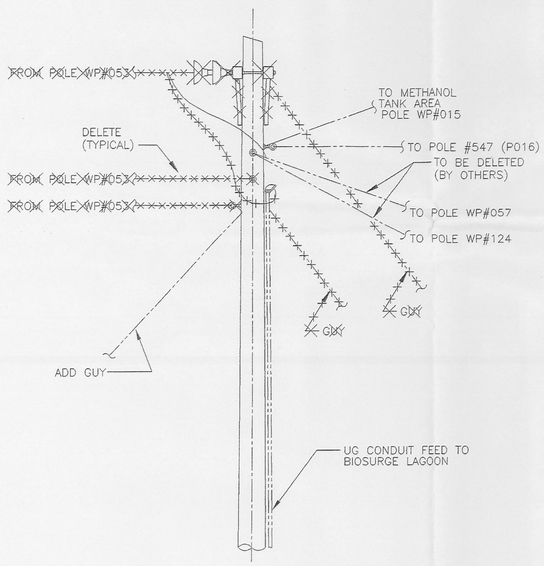


DEMOLITION

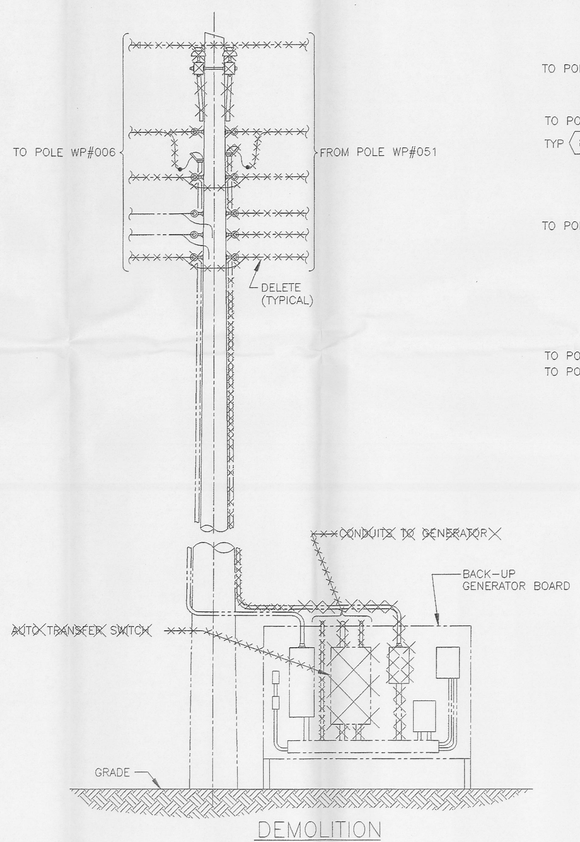


MODIFICATIONS

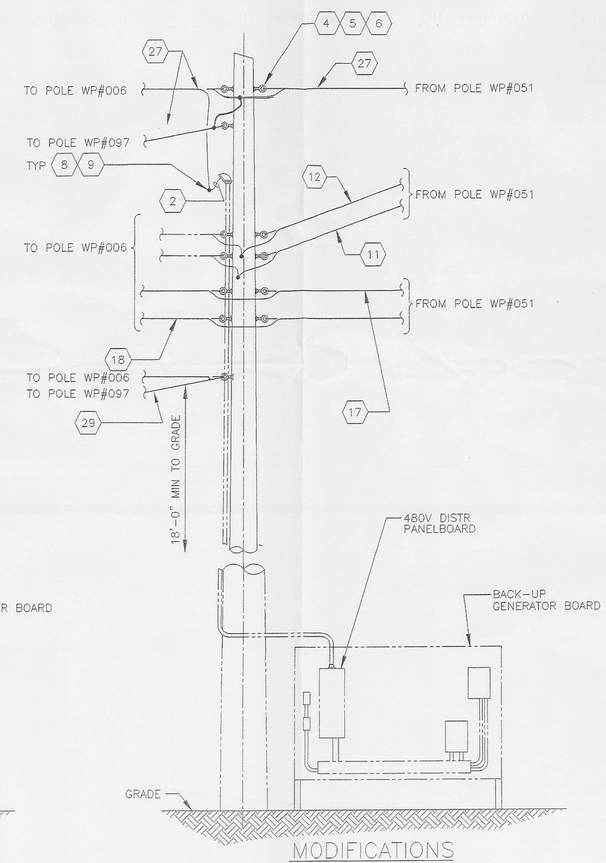
C ELEVATION
POLE WP#051(PP107)



B ELEVATION
POLE WP#054(PP103)



DEMOLITION



MODIFICATIONS

D ELEVATION
POLE WP#050(PP108)

000185

NOTES

1 SOME EXISTING AERIAL CONDUCTORS, DOWNGUYS AND HARDWARE MAY NOT BE SHOWN OR NOT SHOWN IN ACTUAL POSITIONS ON POLE ELEVATIONS FOR CLARITY.

2 EQUIPMENT LOCATIONS AND CONDUIT ROUTING IS APPROXIMATE. EQUIPMENT LOCATION IS FIELD DETERMINED AND CONDUIT IS FIELD ROUTED.

MATERIAL LIST

1 – NOT USED

2 – 3-1/C #1/0 AWG & 1/C #6AWG GND, STRANDED CU, TYPE RHW, SUNLIGHT RESISTANT CABLE.

3 – NOT USED

4 – THIMBLE, FOR STATIC WIRE OR MESSENGER WIRE DEAD-END.

5 – EYE BOLT, OVAL EYE TYPE, FOR DEAD-END, 5/8" DIA, WITH ONE SQUARE NUT. ADDITIONAL NUTS, WASHERS, AND LENGTH AS REQUIRED.

6 – GUY GRIP, FOR STATIC WIRE, PREFORMED WIRE TYPE.

7 – 1-1/2" RIGID GALVANIZED STEEL CONDUIT

8 – CONNECTOR – AS REQUIRED

9 – WEATHERPROOF CONNECTOR COVER – AS REQUIRED

10 – WEATHERHEAD, CONDUIT, OUTDOOR, WEATHERTIGHT, SIZE AS REQUIRED

11 – 2-2/C #16AWG SH PR TYPE TC SUNLIGHT RESISTANT CABLE INTERLACED ON 5/16" STEEL MESSENGER CABLE.

12 – 1-7/C #10AWG TYPE TC SUNLIGHT RESISTANT CABLE INTERLACED ON 5/16" STEEL MESSENGER CABLE.

13 – COMBINED TRANSFORMER / PANELBOARD SQUARE D 7.5 KVA MINI POWER ZONE MODEL MPZ7S40F OR FDF APPROVED EQUAL

14 – COMBINED TRANSFORMER / PANELBOARD SQUARE D 5 KVA MINI POWER ZONE MODEL MPZ5S40F OR FDF APPROVED EQUAL

15 – INLINE 120/240 VOLT PHOTOCELL SIZED TO CONTROL EXISTING LIGHT FIXTURES (CAMERA TOWERS, POLE WP#005 AND POLE WP#003), 3600 WATT MIN RATING

16 – NOT USED

17 – 1-2/C #10AWG TYPE TC SUNLIGHT RESISTANT CABLE INTERLACED ON 5/16" STEEL MESSENGER CABLE.

18 – 25 PAIR #19AWG, SUNLIGHT RESISTANT TELEPHONE CABLE INTERLACED ON 5/16" STEEL MESSENGER CABLE.

19 – ENCLOSURE, NEMA 3R, HINGED COVER, 12"x 10"x 6" DEEP WITH RAINPROOF CONDUIT HUBS AS REQD.

20 – 30 AMPERE SAFETY SWITCH WITH 60 AMP CLASS R FUSES (NEMA 3R) W/RAINPROOF HUBS SQUARE D H361RB-GL OR FDF APPROVED EQUIVALENT

21 – NOT USED

22 – 4" RIGID GALVANIZED STEEL CONDUIT

23 – 1" RIGID GALVANIZED STEEL CONDUIT

24 – 2" RIGID GALVANIZED STEEL CONDUIT

25 – 6" x 6" x 2'-0" WIREWAY, NEMA 3R

26 – TELEPHONE DISTRIBUTION CABLE, SELF SUPPORTING, FIGURE EIGHT 2 PR #19AWG

27 – #1/0 AL QUADRUPLEX ON ACSR MESSENGER, CODE WORD COSTENA

28 – TELEPHONE DISTRIBUTION CABLE (EXCHANGE CABLE) 6 PAIR #19 AWG ANIXTER E-000619 OR EQUIVALENT

29 – TWO PAIR SHIELDED CABLE #16 AWG W/DRAIN WIRE W/MESSENGER

30 – COAXIAL CCTV CABLE RG59 – SELF SUPPORTING

REV. NO.	ISSUE OR REVISION PURPOSE - DESCRIPTION	A-E	FDF	DATE
0	ISSUED FOR CONSTRUCTION		RCM	7.1.98

INITIALS AND DATE

UNITED STATES DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

THIS DRAWING PREPARED BY
FLUOR DANIEL NORTHWEST, INC.
1100 JADWIN, P.O. BOX 1050
RICHLAND, WASHINGTON

PROJECT NAME
SILOS INFRASTRUCTURE

DRAWING TITLE
EXISTING OVERHEAD UTILITIES
SILO INFRASTRUCTURE – POLE ELEVATIONS

DRAWN BY	DATE	LEAD ENGINEER	DATE	CHECKED BY	DATE
G.J. Kulewski	6/29/98	Dan Larson	6-29-98	Raymond Mead	6/30/98

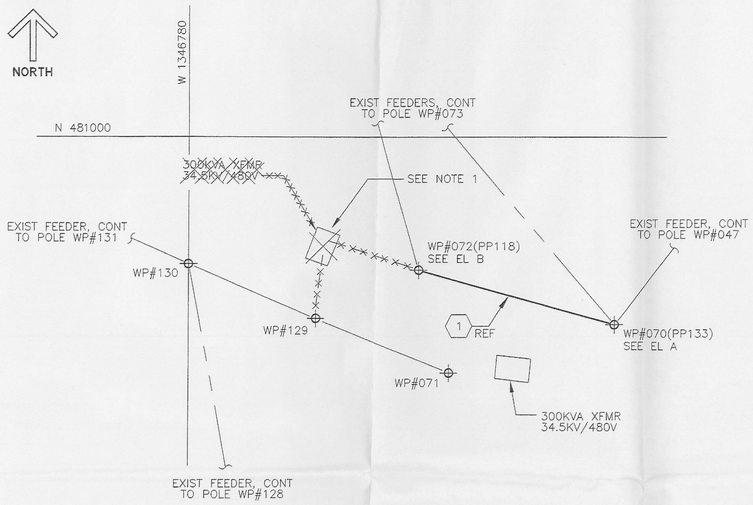
PLANT/BLDG NO.	FLOOR	SCALE	CLASS
OU4		NONE	

SUBMITTED FOR APPROVAL — A-E — DATE
FDF APPROVAL — DATE 6/30/98

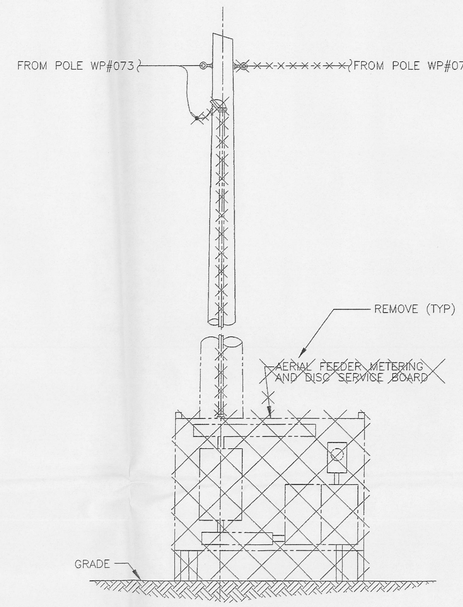
40315

DOE PROJECT NO.	FEMP PROJECT NO.	DRAWING INDEX CODE NO.	SHEET NO.	REV. NO.
	WBS 2.1.3.G.R	94X-6100-E-02231	1	0

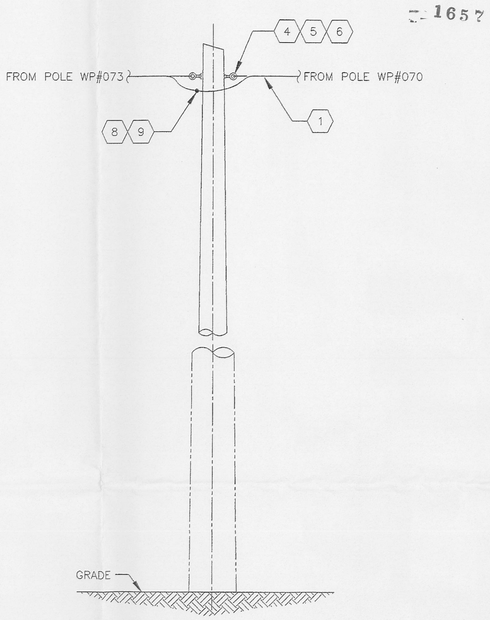
G:\DANGNS\1\FRN\REV-0\E-02231 Wed Jun 29 17:06:22 1998



WASTE PIT AREA POWER FEEDER LOCATION PLAN

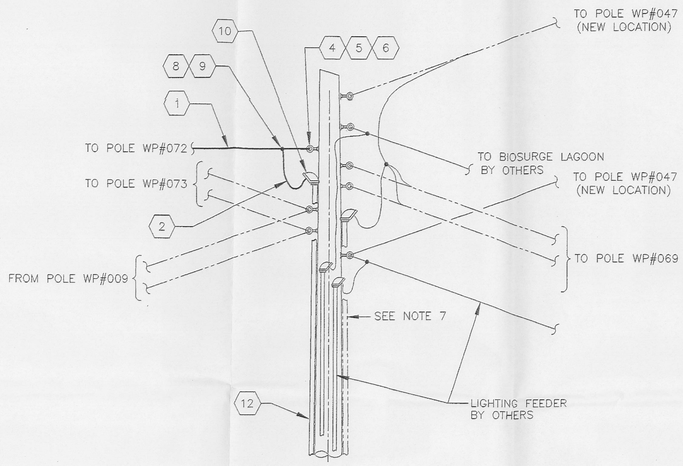


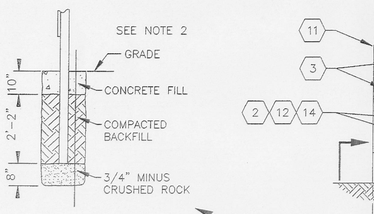
DEMOLITION

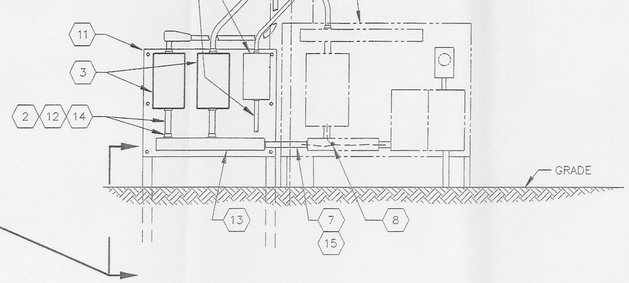


MODIFICATIONS

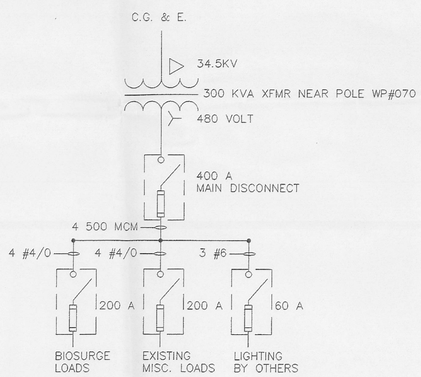
(B) ELEVATION
POLE WP#072(PP118)







(A) ELEVATION
POLE WP#070(PP133)



MATERIAL LIST

1. PREASSEMBLED AERIAL CABLE, 4-1/C #2/0 AWG, 600V, TYPE XHHW, STRANDED CU WITH MESSENGER
2. 4-1/C #4/0 AWG & 1/C #6 AWG GND, STRANDED CU, TYPE RHW, SUNLIGHT RESISTANT CABLE
3. DISCONNECT SWITCH, FUSED, 3 POLE, 200A, 600VAC, NEMA 3R WITH CLASS R FUSE KIT, 300A FUSES & RAINPROOF CND HUB INSTALLED
4. THIMBLE, FOR STATIC WIRE OR MESSENGER WIRE DEAD-END
5. EYE BOLT, OVAL EYE TYPE, FOR DEAD-END, 5/8" DIA, WITH ONE SQUARE NUT. ADDITIONAL NUTS, WASHERS, AND LENGTH AS REQUIRED
6. GUY GRIP, FOR STATIC WIRE, PREFORMED WIRE TYPE
7. 2 1/2" RIGID GALVANIZED STEEL CONDUIT & FITTINGS AS SHOWN
8. CONNECTOR - AS REQUIRED
9. WEATHERPROOF CONNECTOR COVER - AS REQUIRED
10. WEATHERHEAD, CONDUIT, OUTDOOR, WEATHERTIGHT, SIZE AS REQUIRED
11. WATERPROOF BACKBOARD (SIZE AS REQD), 1" AD GRADE TREATED PLYWOOD MOUNTED ON 4"x 4"x 10'-8" TREATED POSTS
12. 3" RIGID GALVANIZED STEEL CONDUIT & FITTINGS
13. 4"x 4"x 2'-0" WIREWAY, NEMA 3R
14. 3" RAINPROOF CONDUIT HUB
15. 4 500 KCMIL W/#2 GROUND THHN/THWN, 90° C (A,B,C & N)

000186

NOTES

1. REMOVE EXISTING 300KVA TRANSFORMER (SERIAL NO 142H-11), PAD AND ASSOCIATED PRIMARY AND SECONDARY CONDUIT AND CABLES, SERVICE BOARD AND SECONDARY CONDUIT AND CONDUCTORS TO AERIAL CABLE TO POLE WP#072. ALSO REMOVE AERIAL GUY BETWEEN POLES WP#070 AND WP#072. INSTALL NEW AERIAL CABLE AT APPROX 33' ABOVE GRADE. LEVEL GRADE TO MATCH SURROUNDING AREA. (CROSSARMS, DISCONNECTS AND LIGHTNING ARRESTORS LOCATED ON PRIMARY POLE WP#129 TO REMAIN).
2. AT POLE WP#070 PROVIDE NEW 200A DISC SWITCH, BACKBOARD, POLE CONDUIT RISER & HARDWARE, FEEDER AND AERIAL POWER CABLE TO POLE WP#072. BACKBOARD SHALL BE SIZED LARGE ENOUGH TO ALLOW INSTALLATION OF LIGHTING FEEDER DISC SWITCH IN THE FUTURE. RECONNECT EXISTING AERIAL POWER FEEDER AT POLE WP#072 TO NEW AERIAL POWER FEEDER.
3. ITEMS REMOVED SHALL BE TURNED OVER TO THE OWNER.
4. ALL POLE LINE WORK SHALL MEET THE 1997 NATIONAL ELECTRICAL SAFETY CODE (NESC) REQUIREMENTS UNLESS NOTED OTHERWISE.
5. ALL 480VAC GROUND LEVEL WORK SHALL MEET THE 1996 NATIONAL ELECTRICAL CODE (NEC) REQUIREMENTS UNLESS NOTED OTHERWISE.
6. PERFORM ALL DEMOLITION AND CONSTRUCTION WORK IN A MANNER TO KEEP SERVICE OUTAGES TO A MINIMUM.
7. REMOVE EXISTING CONDUIT, WIRE, AND WEATHERHEAD. THIS SHALL BE REPLACED WITH ALTERNATE SUPPLY SUITABLE FOR 400 AMPS.

REFERENCE DRAWINGS

1. 40A-5500-E-00036
2. 96X-5900-X-00350

LEGEND:

WP#000(P000) (NEW / OLD)	UTILITY POLE AND IDENTIFIER
POLE#000(P000) (NEW / OLD)	13.2 KV UTILITY POLE AND INDENTIFIER
x x x x x	REMOVE ALL ITEMS AS SHOWN AND NOTED
	REMOVE ALL ITEMS AS HIGHLIGHTED AND NOTED
	EXISTING AERIAL CABLE
	EXISTING ELECTRICAL DUCT BANK
	EXISTING ELECTRICAL LINE

REF. DWG. NO.	DRAWING TITLE
404-5500-E-00036	POLE MOUNTED ELEC. DIST. SYSTEM FOR THE WASTE PIT AREA

REV. NO.	ISSUE OR REVISION PURPOSE - DESCRIPTION	A-E	FDF	DATE
0	ISSUED FOR CONSTRUCTION			7/2/98

INITIALS AND DATE

UNITED STATES DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

THIS DRAWING PREPARED BY

FLUOR DANIEL NORTHWEST, INC.
1100 JADWIN, P.O. BOX 1050
RICHLAND, WASHINGTON

PROJECT NAME: SILOS INFRASTRUCTURE

DRAWING TITLE: EXISTING OVERHEAD UTILITIES SILO INFRASTRUCTURE - FEEDER MODIFICATIONS

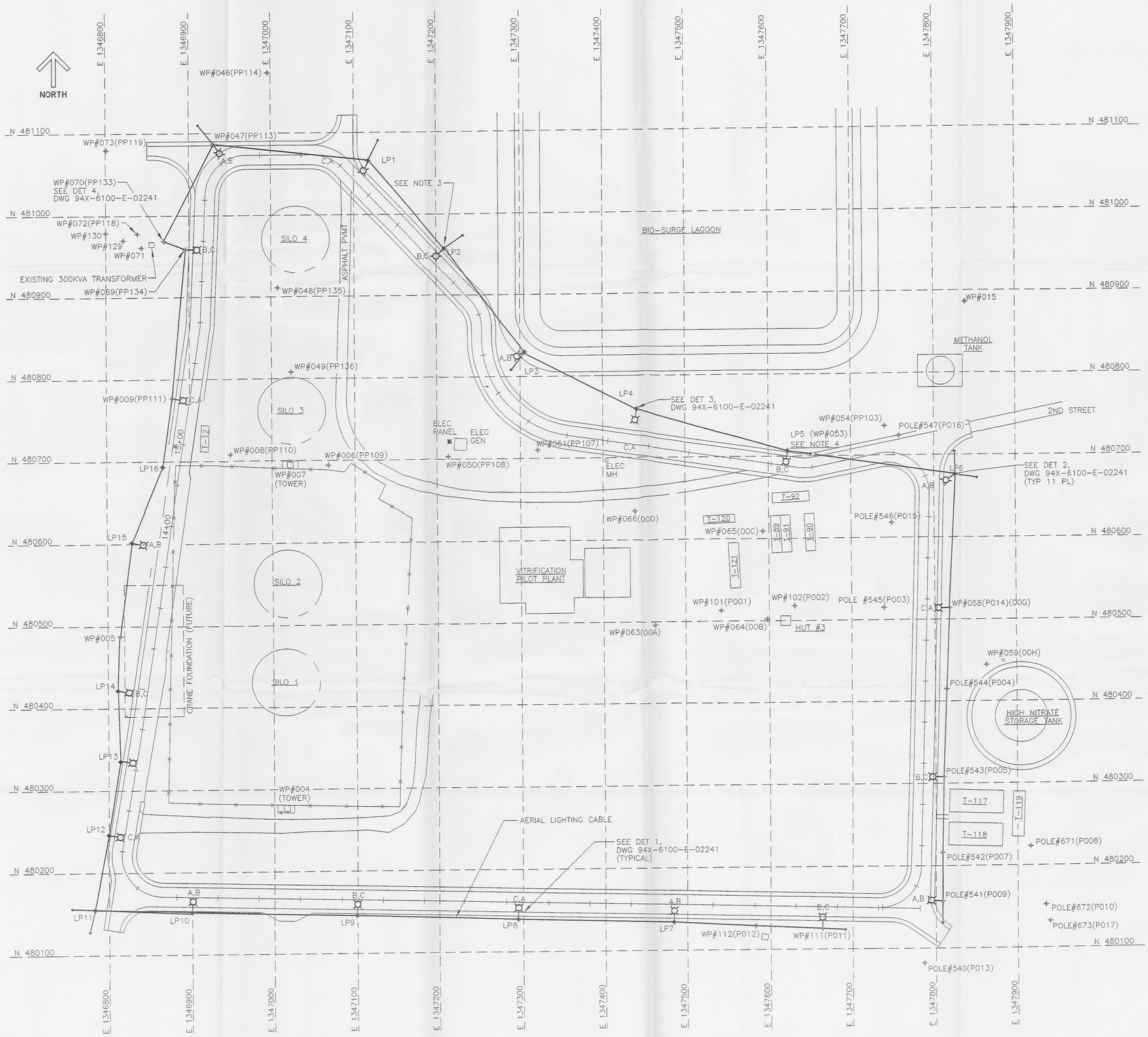
DRAWN BY	DATE	LEAD ENGINEER	DATE	CHECKED BY	DATE
GJ KUBINSKI	03-25-98	Dan Forson	7-1-98	Renee Black	7-1-98

PLANT/BLDG. NO.	FLOOR	SCALE	CLASS
OU4		NONE	

SUBMITTED FOR APPROVAL (A-E, DATE) — FDF APPROVAL (DATE 7/1/98) — 40315

DOE PROJECT NO.	FEMP PROJECT NO.	DRAWING INDEX CODE NO.	SHEET NO.	REV. NO.
	WBS 2.1.3.G.R	94X-6100-E-02222	1	0

G:\XDWGNGS\INFRA\REV-01\E-02222 Wed Jul 01 09:05:12 1998



NOTES

1. PLACE NEW LIGHTING POLES AT THE APPROXIMATE LOCATIONS SHOWN ON DRAWING. FINAL LOCATION TO BE DETERMINED IN FIELD. NEW LIGHTING POLES AND GUYS SHALL BE LOCATED A MINIMUM OF 5'-0" FROM THE EDGE OF NEW ROADWAY PAVEMENT.
2. PLACEMENT OF NEW POLES SHALL NOT EXCEED 200 FT SEPARATION.
3. ADD ROCK BALLAST AS NEEDED FOR POLE SUPPORT AT ANY LOWER GRADE UNSTABLE MARSH AREA. NOTIFY FDF OF ANY WATER IN HOLES.
4. EXISTING POLE WP#053 (PP105) IS TO SERVE AS LP5.
5. POLES WP#111(P011), WP#112(P012) AND LP8 SHALL BE 60 FT LONG. POLES LP8, LP9, LP10, LP11, LP12, LP13, LP14, LP15 AND LP16 SHALL BE 50 FT LONG.

LEGEND:

LP#00	NEW UTILITY LIGHTING POLE AND IDENTIFYER
WP#000	EXISTING UTILITY POLE AND IDENTIFYER
A,B	NEW LIGHTING FIXTURE AND PHASE CONNECTIONS
	480VAC AERIAL LIGHTING CABLE, #6AWG
	GUY

REF. DWG. NO.	DRAWING TITLE
40A-5500-E-00036	POLE MOUNTED ELEC. DIST. SYSTEM FOR THE WASTE PITE AREA

REV. NO.	ISSUE OR REVISION PURPOSE - DESCRIPTION	A-E	FDF	DATE
0	ISSUED FOR CONSTRUCTION			5/1/98

INITIALS AND DATE

UNITED STATES DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

THIS DRAWING PREPARED BY

FLUOR DANIEL NORTHWEST, INC.
1100 JADWIN, P.O. BOX 1050
RICHLAND, WASHINGTON

PROJECT NAME: SILOS INFRASTRUCTURE

DRAWING TITLE: EXISTING OVERHEAD UTILITIES
SILO INFRASTRUCTURE
ROADWAY LIGHTING PLAN

DRAWN BY	DATE	LEAD ENGINEER	DATE	CHECKED BY	DATE
G.J. KOBIAK	6/29/98	Dan Larson	6/29/98	Roger Beck	6/29/98

PLANT/BLDG. NO.	FLOOR	SCALE	CLASS
OU4		NONE	

SUBMITTED FOR APPROVAL — A-E DATE — FDF APPROVAL — DATE 6/30/98

40315

DOE PROJECT NO.	FEMP PROJECT NO.	DRAWING INDEX CODE NO.	SHEET NO.	REV. NO.
	WBS 2.1.3.G.R	94X-6100-E-02240	1	0

000187

1657

STATE OF OHIO NORTH (NAD 83)

FEMP NORTH = 1.5672 °

E 1346800 | E 1347000 | E 1347200 | E 1347400 | E 1347600 | E 1347800

N 481000 | N 480800 | N 480600 | N 480400 | N 480200

W-14A-30 STA 19+22

R-1-30 STOP

NO THROUGH TRAFFIC EMERGENCY AND PEDESTRIAN TRAFFIC ONLY

STOP R-1-30

W-14B-30 STA 19+22

SILO 4

W-14A-30 STA 21+28

2ND STREET

W-14A-30 STA 21+03

R-10-24 STA 16+50

SPEED LIMIT 15

W-14B-30 STA 16+81

SILO 3

T-12

ELEC GEN

ELEC PANEL

FHY

W-5-30 STA 25+75

STOP R-1-30

STOP R-1-30 STA 29+10

2ND STREET

STOP R-1-30

NO THROUGH TRAFFIC EMERGENCY AND PEDESTRIAN TRAFFIC ONLY

W-14-30 STA 27+45

SILO 2

SILO 1

K-65 TRENCH

STA 31+45 CL CROSSWALK PAINT IN ACCORDANCE WITH MUTCD SECTION 3B-18

PIV

W-14-30 STA 30+98

W-14-30 STA 11+27

SPEED LIMIT 15

R-10-24 STA 32+85

W-14B-30 STA 32+50

T-117

T-118

SPEED LIMIT 15

R-10-24 STA 2+00

W-14-30 STA 7+92

TOWER

SPEED LIMIT 15

R-10-24 STA 7+92

W-14-30 STA 1+45

R-1-30 STA 0+48

STOP R-1-30

0+00 1+00 2+00 3+00 4+00 5+00 6+00 7+00 8+00 9+00 10+00 11+00 12+00 13+00 14+00 15+00 16+00 17+00 18+00 19+00 20+00 21+00 22+00 23+00 24+00 25+00 26+00 27+00 28+00 29+00 30+00 31+00 32+00 33+00 34+00

TYPICAL ROAD MARKING DETAIL

SCALE: NTS

NOTE: ALL PAVEMENT IS STRIPED AS SHOWN WITH PAINT

GRAVEL

4" WHITE EDGE LINES

4" DUAL YELLOW LINES AT 11" CENTERS

12'-0"

5'-0"

5'-0"

GRAVEL

PAVEMENT MARKING AND SIGNING PLAN

50 0 50 100

SCALE IN FEET

000188

NOTES

1. FOR LEGEND, ABBREVIATIONS AND NOTES SEE 94X-6100-G-02209.

REF DWG NO.	DRAWING TITLE
94X-6100-X-02208	DRAWING LIST AND VICINITY MAP
94X-6100-X-02209	SITE PLAN AND GENERAL NOTES

REV. NO.	ISSUE OR REVISION PURPOSE - DESCRIPTION	A-E	FDF	DATE
0	CERTIFIED FOR CONSTRUCTION			

INITIALS AND DATE

UNITED STATES DEPARTMENT OF ENERGY

FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

THIS DRAWING PREPARED BY

FLUOR DANIEL NORTHWEST

RICHLAND, WASHINGTON

PROJECT NAME

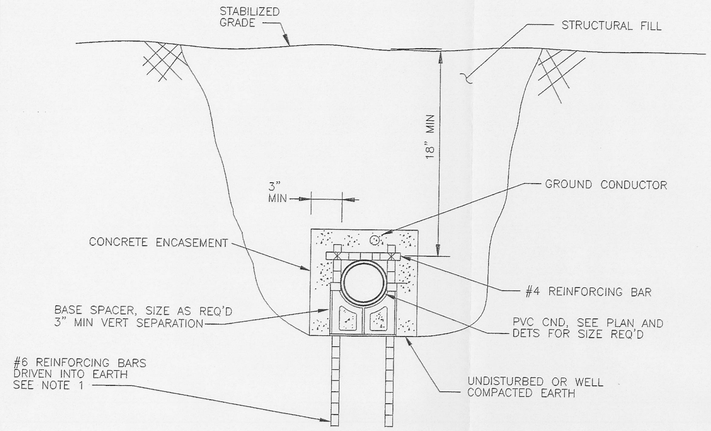
SILOS INFRASTRUCTURE PROJECT

DRAWING TITLE

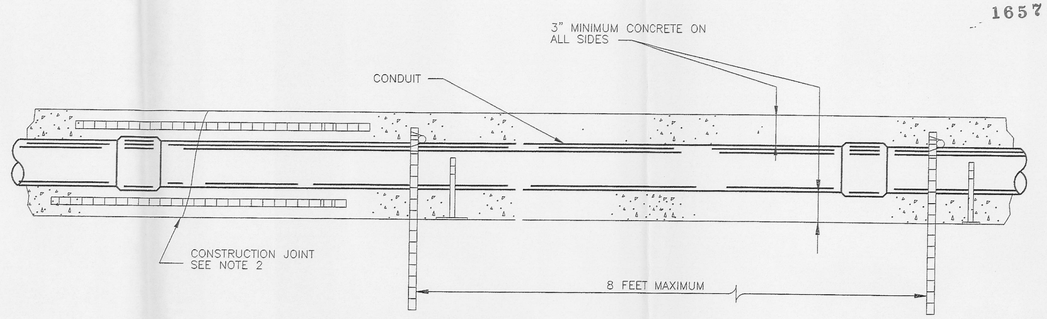
SIGNING AND PAVEMENT MARKING

DRAWN BY	DATE	LEAD ENGINEER	DATE	CHECKED BY	DATE
RS CHRISTENSEN	6-24-98		6/24/98		6/24/98
PLANT/BLDG. NO.		FLOOR		SCALE	CLASS
OU4				1"=50'	
SUBMITTED FOR APPROVAL		FDF APPROVAL		40315	
A-E	DATE		DATE 6/29/98		

DOE PROJECT NO.	FEMP PROJECT NO.	DRAWING INDEX CODE NO.	SHEET NO.	REV. NO.
	WBS 2.1.3.G.R	94X-6100-G-02220	1 OF 1	0



3 DETAIL
DWG 94X-6100-E-02238

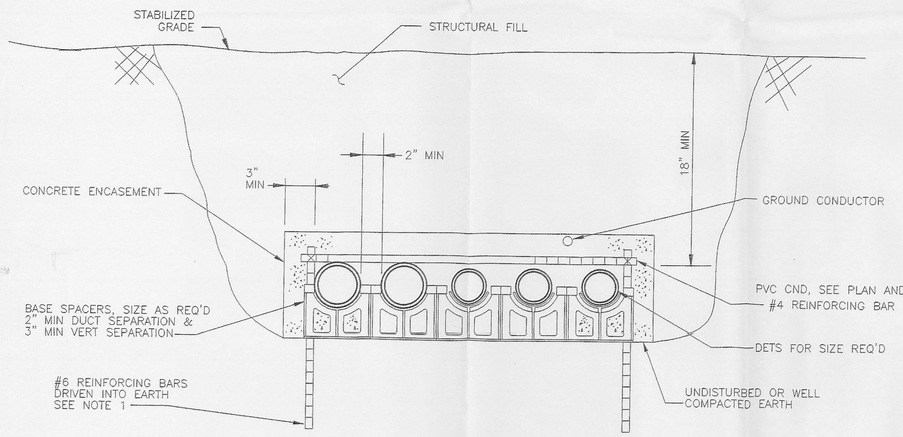


1 TIER DUCTBANK – TYP ELEVATION

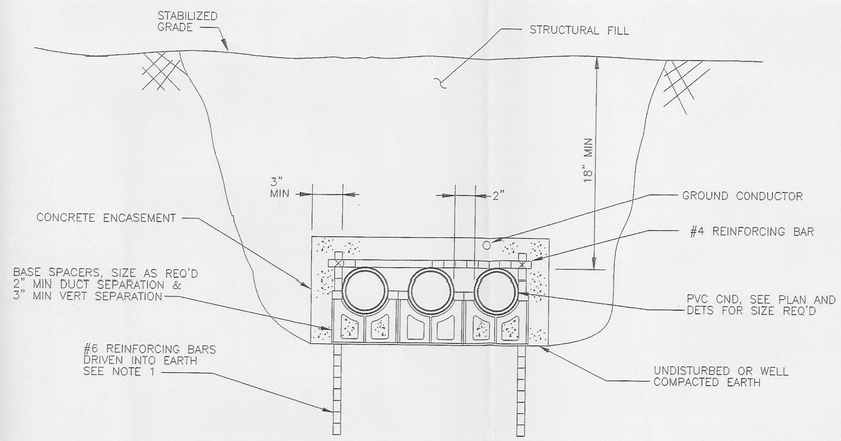
1657

NOTES

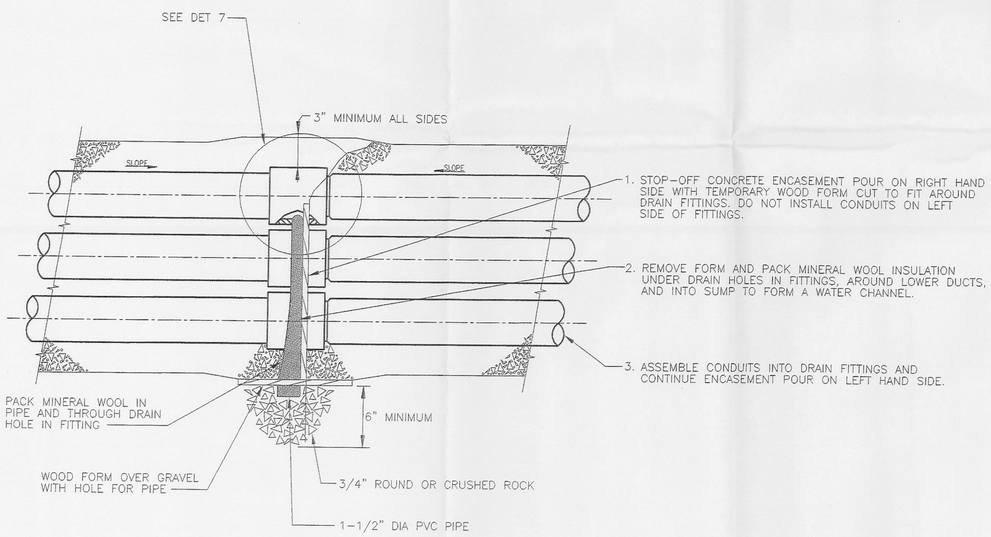
1. SPACING OF CONDUIT SUPPORTS SHALL NOT EXCEED 8 FEET. LENGTH OF VERTICAL REINFORCING BARS SHALL BE AS REQUIRED FOR FIRM ANCHORAGE. WIRE TIE OR WELD THE HORIZONTAL REINFORCING BARS TO THE VERTICAL BARS.
2. AT CONSTRUCTION JOINTS IN ENCASEMENTS, 4 FOOT LENGTHS OF #6 REINFORCING BARS SHALL BE PLACED IN EACH CORNER OF THE ENCASEMENT, A MINIMUM OF 2" FROM THE OUTSIDE EDGES AND CENTERED ACROSS THE JOINT.
3. INSTALL #1 AWG STRANDED COPPER GROUND WIRE IN ENCASEMENT. THIS CONDUCTOR SHALL BE USED FOR INTERCONNECTION OF GROUNDING GRIDS.
4. DUCTS SHALL BE SLOPED A MIN OF 3" PER 100' FOR DRAINAGE. DRAIN CONDUITS AS SHOWN IN DETAIL 6 AT LOW POINT OF DUCT BANK. EXPANSION JOINTS SHALL BE USED EVERY 100 FT.



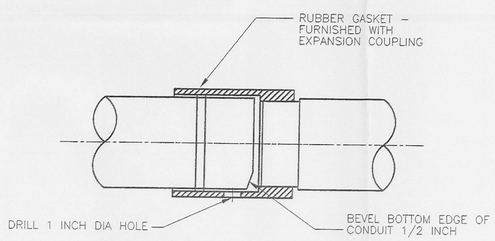
5 DETAIL
DWG 94X-6100-E-02238



4 DETAIL
DWG 94X-6100-E-02238



6 DETAIL
FRENCH DRAIN



7 DETAIL

000189

REV. NO.	ISSUE OR REVISION PURPOSE - DESCRIPTION	A-E	FDF	DATE
0	ISSUED FOR CONSTRUCTION			8/1/96

INITIALS AND DATE

UNITED STATES DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

THIS DRAWING PREPARED BY
FLUOR DANIEL NORTHWEST, INC.
1100 JADWIN, P.O. BOX 1050
RICHLAND, WASHINGTON

PROJECT NAME
SILOS INFRASTRUCTURE

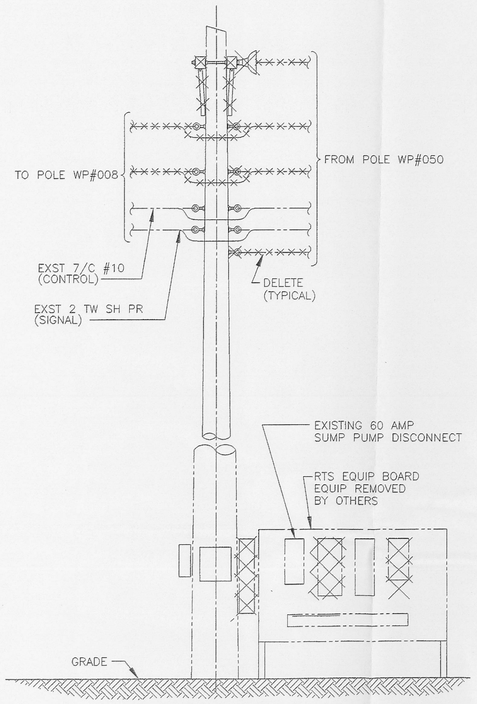
DRAWING TITLE
EXISTING OVERHEAD UTILITIES
SILO INFRASTRUCTURE
BELOW GRADE DUCT BANKS – TYPICAL DETAILS

DRAWN BY	DATE	LEAD ENGINEER	DATE	CHECKED BY	DATE
C.L. Fitzpatrick	6/29/96	Dan Faison	6/29/96	[illegible]	6/29/96

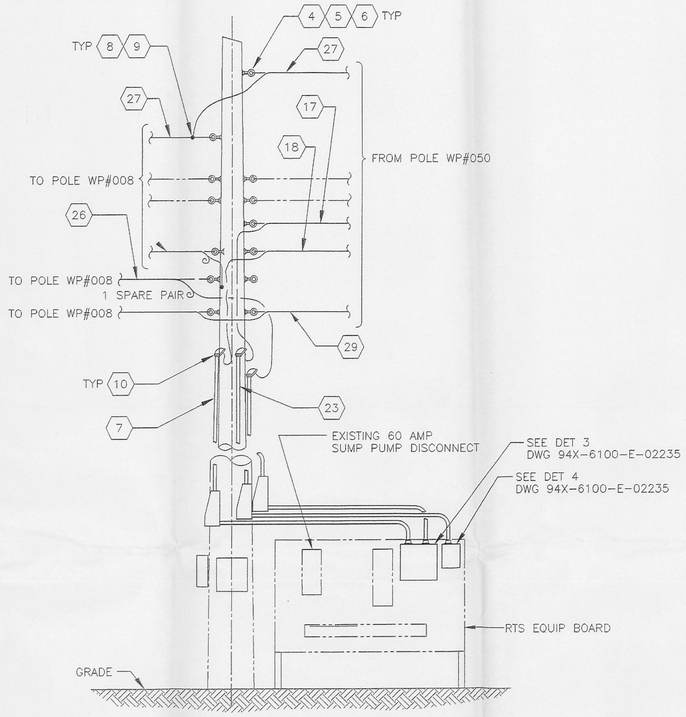
PLANT/BLDG. NO.	FLOOR	SCALE	CLASS
OU4		NONE	

SUBMITTED FOR APPROVAL — A-E — DATE
FDF APPROVAL — DATE 6/30/96
40315

DOE PROJECT NO.	FEMP PROJECT NO.	DRAWING INDEX CODE NO.	SHEET NO.	REV. NO.
	WBS 2.1.3.G.R	94X-6100-E-02239	1	0

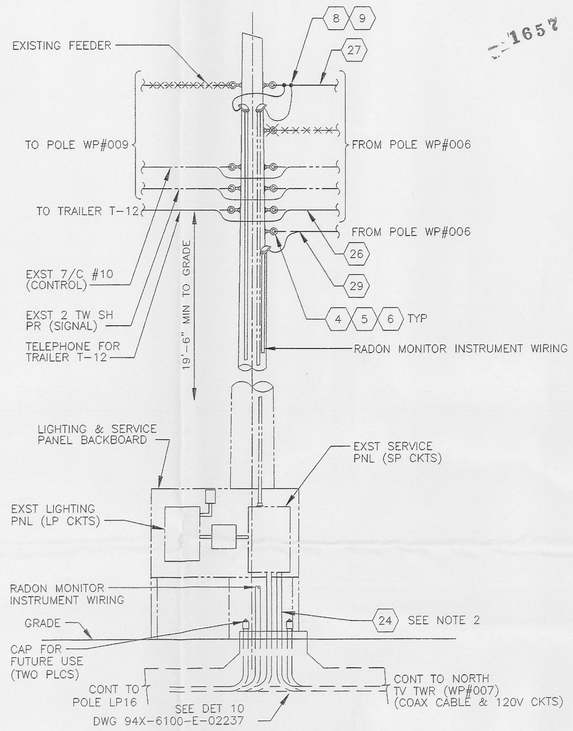


DEMOLITION



MODIFICATIONS

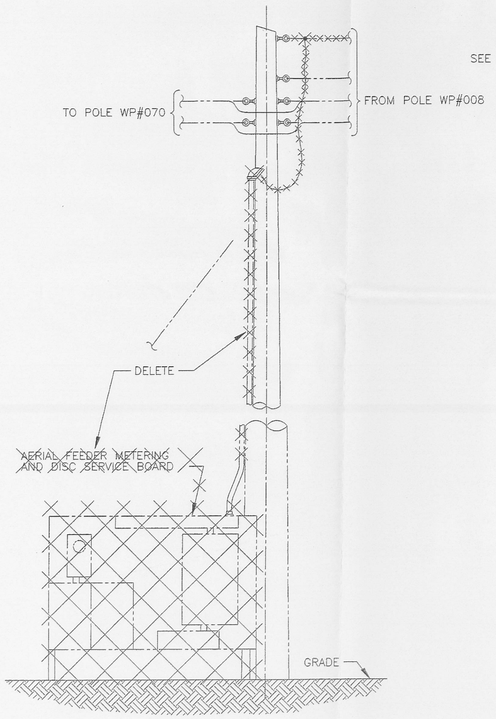
E ELEVATION
POLE WP#006(PP109)



F ELEVATION
POLE WP#008(PP110)

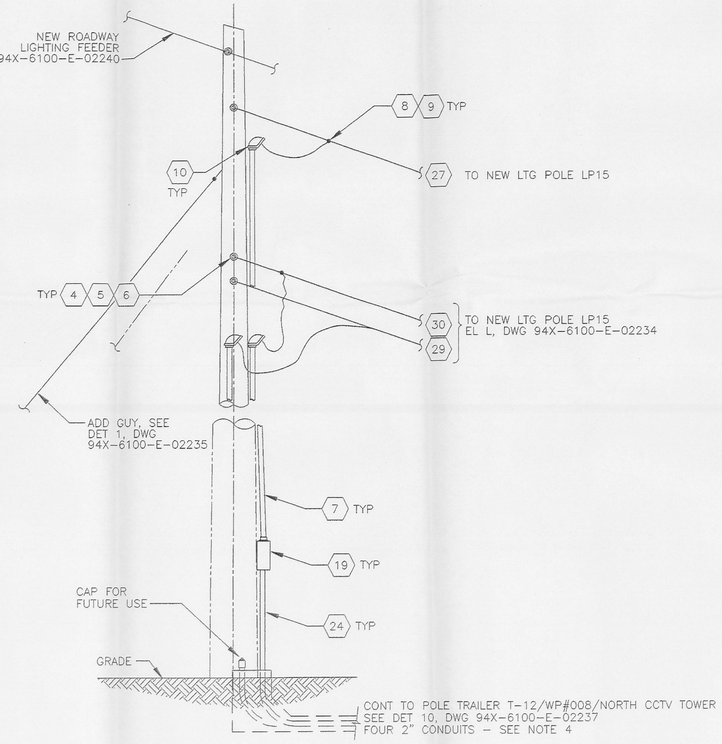
NOTES

1. FOR MATERIAL LIST AND NOTES SEE DRAWING 94X-6100-E-02231.
2. PROVIDE ADDITIONAL SUPPORT FOR CONDUITS AS REQUIRED.
3. EXISTING CIRCUITS TO NORTH CCTV TOWER ARE TO BE RE-UTILIZED. THEY SHALL BE REROUTED THROUGH DUCT BANK.
4. FOUR CONDUITS ARE ROUTED FROM POLE WP#008 TO LP16. FIRST CONDUIT IS A SPARE. SECOND CONDUIT CONTAINS RADON MONITOR INSTRUMENT WIRING. THIRD CONDUIT CONTAINS 480 VOLT POWER WIRING. FOURTH CONDUIT CONTAINS CCTV COAXIAL CABLE.



DEMOLITION

G ELEVATION
POLE WP#009(PP111)



MODIFICATIONS

P ELEVATION
POLE LP16

000190

REV. NO.	ISSUE OR REVISION PURPOSE - DESCRIPTION	A-E	FDF	DATE
0	ISSUED FOR CONSTRUCTION			

INITIALS AND DATE

UNITED STATES DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

THIS DRAWING PREPARED BY
FLUOR DANIEL NORTHWEST, INC.
1100 JADWIN, P.O. BOX 1050
RICHLAND, WASHINGTON

PROJECT NAME
SILOS INFRASTRUCTURE

DRAWING TITLE
EXISTING OVERHEAD UTILITIES
SILO INFRASTRUCTURE - POLE ELEVATIONS

DRAWN BY	DATE	LEAD ENGINEER	DATE	CHECKED BY	DATE
G.L. Kubinski	6/20/98	Don Lawson	6/23/98	Renee Black	6/23/98

PLANT/BLDG. NO.	FLOOR	SCALE	CLASS
		NONE	

SUBMITTED FOR APPROVAL — A-E — DATE
FDF APPROVAL — DATE 6/30/98

DOE PROJECT NO.	FEMP PROJECT NO.	DRAWING INDEX CODE NO.	SHEET NO.	REV. NO.
	WBS 2.1.3.G.R	94X-6100-E-02232	1	0

SILOS INFRASTRUCTURE PROJECT

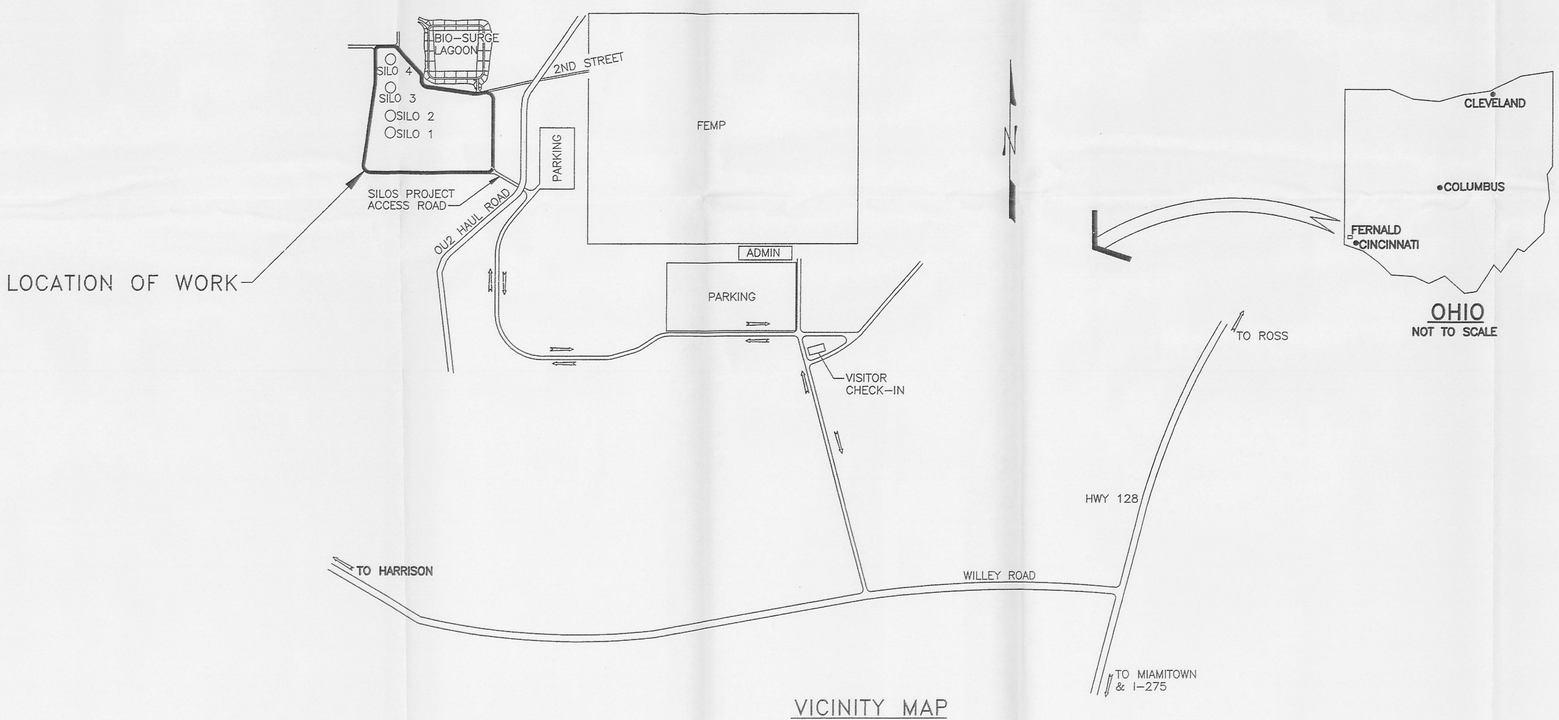
1657

FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
FERNALD, OHIO

UNITED STATES DEPARTMENT OF ENERGY

DRAWING INDEX

DRAWING NUMBER	TITLE
94X-6100-X-02208	DRAWING LIST AND VICINITY MAP
94X-6100-G-02209	SITE PLAN AND GENERAL NOTES
94X-6100-G-02210	PLAN AND PROFILE - STATION 0+00 TO 12+00
94X-6100-G-02211	PLAN AND PROFILE - STATION 12+00 TO 25+00
94X-6100-G-02212	PLAN AND PROFILE - STATION 25+00 TO END
94X-6100-G-02213	CROSS SECTIONS - STATION 0+00 TO 7+35
94X-6100-G-02214	CROSS SECTIONS - STATION 7+55 TO 13+50
94X-6100-G-02215	CROSS SECTIONS - STATION 14+00 TO 22+00
94X-6100-G-02216	CROSS SECTIONS - STATION 22+50 TO 30+50
94X-6100-G-02217	CROSS SECTIONS - STATION 31+50 TO END
94X-6100-G-02218	SECTIONS AND DETAILS
94X-6100-G-02219	INTERSECTION DETAILS
94X-6100-G-02220	SIGNING AND PAVEMENT MARKING
94X-6100-G-02221	TEMPORARY EROSION CONTROL
94X-6100-G-02243	MISCELLANEOUS DETAILS
94X-6100-E-02229	EXISTING OVERHEAD UTILITIES SITE PLAN - DEMOLITION
94X-6100-E-02230	EXISTING OVERHEAD UTILITIES SITE PLAN - MODIFICATIONS
94X-6100-E-02231	EXISTING OVERHEAD UTILITIES POLE ELEVATIONS
94X-6100-E-02232	EXISTING OVERHEAD UTILITIES POLE ELEVATIONS
94X-6100-E-02233	EXISTING OVERHEAD UTILITIES POLE ELEVATIONS
94X-6100-E-02234	EXISTING OVERHEAD UTILITIES POLE ELEVATIONS
94X-6100-E-02235	EXISTING OVERHEAD UTILITIES MISCELLANEOUS DETAILS
94X-6100-E-02236	BELOW GRADE DUCT BANKS MISCELLANEOUS DETAILS
94X-6100-E-02237	BELOW GRADE DUCT BANKS MISCELLANEOUS DETAILS
94X-6100-E-02238	34.5KV OVERHEAD UTILITIES POLE & 1000 KVA XFMR DETALS
94X-6100-E-02239	BELOW GRADE DUCT BANKS TYPICAL DETAILS
94X-6100-E-02240	ROADWAY LIGHTING PLAN
94X-6100-E-02241	ROADWAY LIGHTING DETAILS
94X-6100-E-02242	VITRIFICATION PILOT PLANT AERIAL CABLE CONNECTION DETAILS



VICINITY MAP

100 200 600 1000
0 400 800

REV. NO.	ISSUE OR REVISION PURPOSE - DESCRIPTION	A-E	FDF	DATE
0	CERTIFIED FOR CONSTRUCTION			

INITIALS AND DATE

UNITED STATES DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

THIS DRAWING PREPARED BY
FLUOR DANIEL NORTHWEST
RICHLAND, WASHINGTON

PROJECT NAME
SILOS INFRASTRUCTURE PROJECT

DRAWING TITLE
DRAWING LIST AND VICINITY MAP

DRAWN BY	DATE	LEAD ENGINEER	DATE	CHECKED BY	DATE
RS CHRISTENSEN	6-24-98		6/24/98		6/24/98

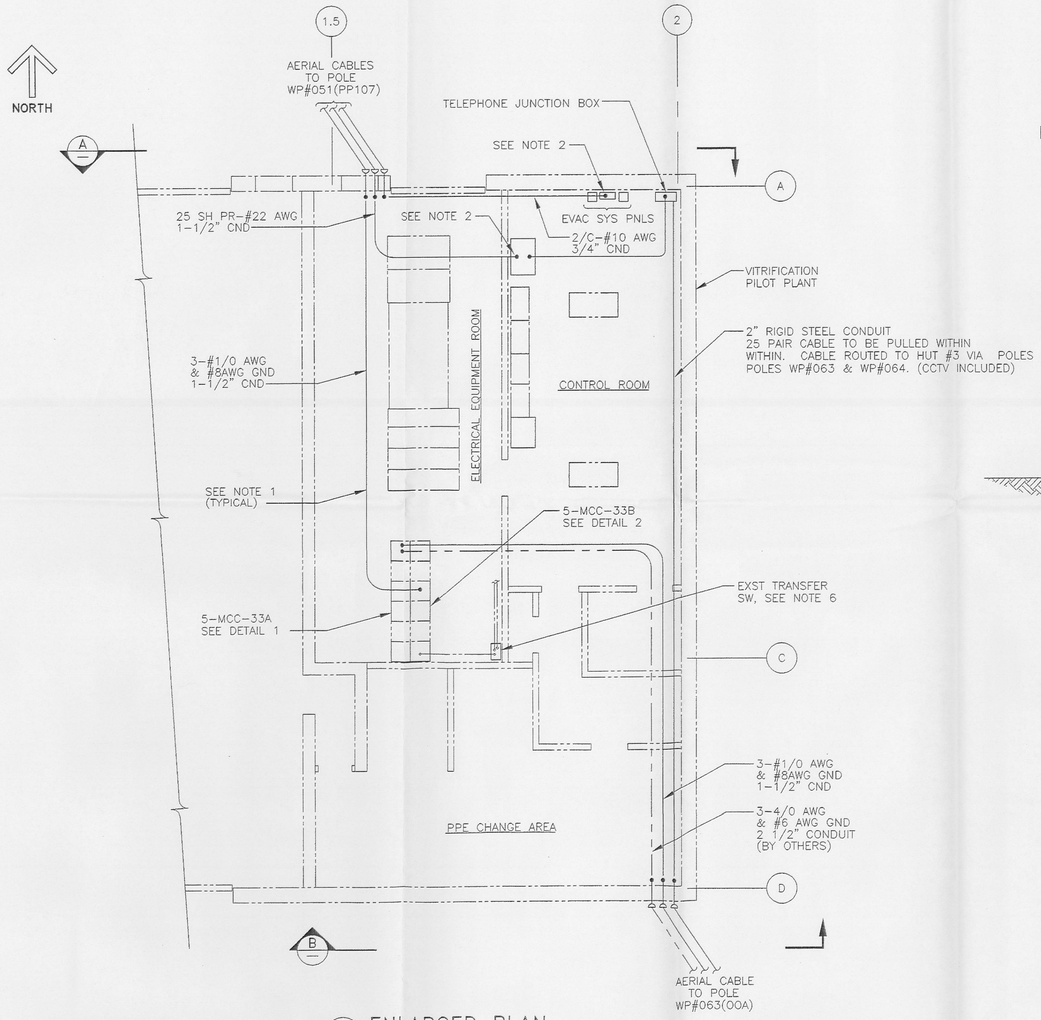
PLANT/BLDG. NO.	FLOOR	SCALE	CLASS
OU4		NONE	

SUBMITTED FOR APPROVAL — A-E — DATE
FDF APPROVAL — DATE 6/29/98
40315

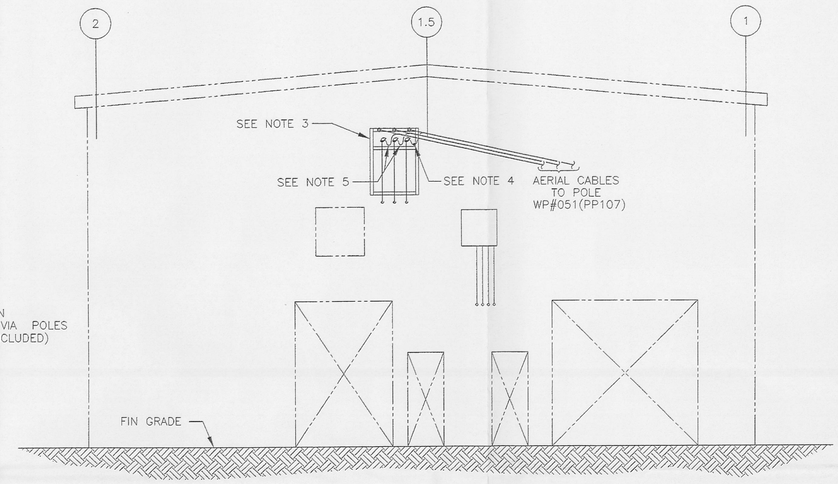
DOE PROJECT NO.	FEMP PROJECT NO.	DRAWING INDEX CODE NO.	SHEET NO.	REV. NO.
	WBS 2.1.3.G.R	94X-6100-X-02208	1 OF 1	0

000191

1657



2 ENLARGED PLAN
DWG 94X-6100-E-02230



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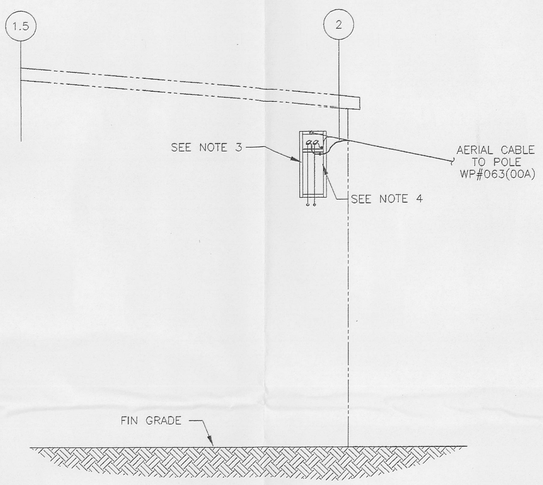

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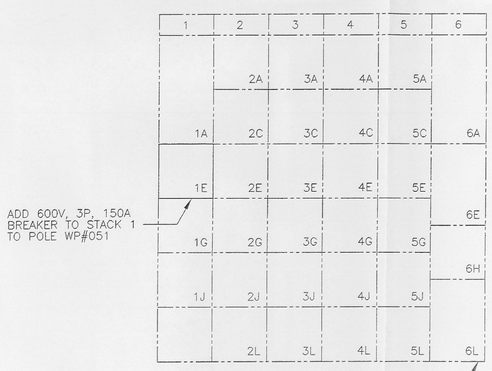
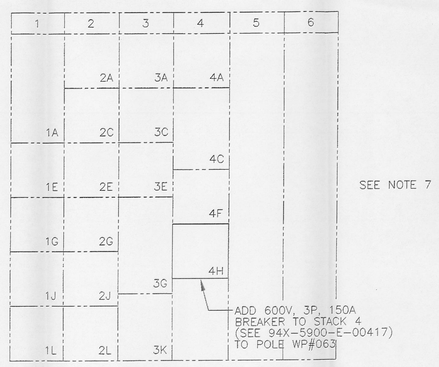


1 DETAIL
#5-MCC-33A



2 DETAIL
#5-MCC-33B

000192

NOTES

1. CONDUIT RUNS ARE SHOWN DIAGRAMATICALLY. EXACT LOCATION DETERMINED BY FIELD CONDITIONS.
2. CONDUIT ENTRY INTO SPECIFIC CABINET TO BE DETERMINED BY SITE OPERATIONS.
3. PROVIDE FRAMING CHANNEL (UNISTRUT OR SIMILAR) SUPPORT, CONDUIT, WEATHERHEADS, MESSENGER CABLE TERMINATIONS AND ALL MISCELLANEOUS HARDWARE NEEDED FOR SIGNAL AND POWER CABLES TO PLANT AERIAL SYSTEM. EXACT LOCATION TO BE DETERMINED BY FIELD CONDITIONS.
4. SPLICE 3-1/C #1/0 AWG CU CABLE & 1/C #6 AWG GND CABLE FROM MCC TO 3/C #1/0 AWG AERIAL CABLE USING WEATHERPROOF CONNECTORS AND COVERS AS REQUIRED. SPLICE 3-1/C #4/0 AWG CU CABLE & 1 #6 AWG GROUND CABLE FROM MCC TO 3 #4/0 AERIAL CABLE (COSTENA) & 1 # 6 AWG AERIAL GROUND CABLE USING WEATHERPROOF CONNECTORS AND COVERS AS REQUIRED. PROVIDE DRIPLOOP AT WEATHERHEAD.
5. CONTINUE AERIAL CONTROL & SIGNAL CABLES THRU WEATHERHEAD TO VITRIFICATION PLANT CONTROL ROOM. PROVIDE DRIP LOOP WHEN TRANSITIONING TO INSIDE BLDG.
6. REPLACE EXST MANUAL TRANSFER SWITCH WITH NEW AUTOMATIC TRANSFER SWITCH. CONTRACTOR SHALL RECONNECT POWER & CONTROL WIRING AND MAKE CONTROL SETTINGS PER MANUFACTURER & OWNER DIRECTION. CONTRACTOR SHALL PROVIDE AND PERFORM AN ACCEPTANCE TEST PROCEDURE FOR THIS EQUIPMENT. MOUNT TRANSFER SWITCH PER MANUFACTURER'S INSTRUCTIONS.
7. MOTOR CONTROL CENTERS ARE OF SQUARE D MANUFACTURE. CIRCUIT BREAKERS USED ARE MHL SERIES.

REF. DWG. NO.	DRAWING TITLE
404-5500-E-00036	POLE MOUNTED ELECTRICAL DISTRIBUTION SYSTEM FOR THE WASTE PIT AREA

REV. NO.	ISSUE OR REVISION PURPOSE - DESCRIPTION	A-E	FDF	DATE
0	ISSUED FOR CONSTRUCTION			7/1/96

INITIALS AND DATE

UNITED STATES DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

THIS DRAWING PREPARED BY
FLUOR DANIEL NORTHWEST, INC.
1100 JADWIN, P.O. BOX 1050
RICHLAND, WASHINGTON

PROJECT NAME
SILOS INFRASTRUCTURE

DRAWING TITLE
EXISTING OVERHEAD UTILITIES
SILO INFRASTRUCTURE – VITRIFICATION PILOT PLANT
AERIAL CABLE CONNECTION DETAILS

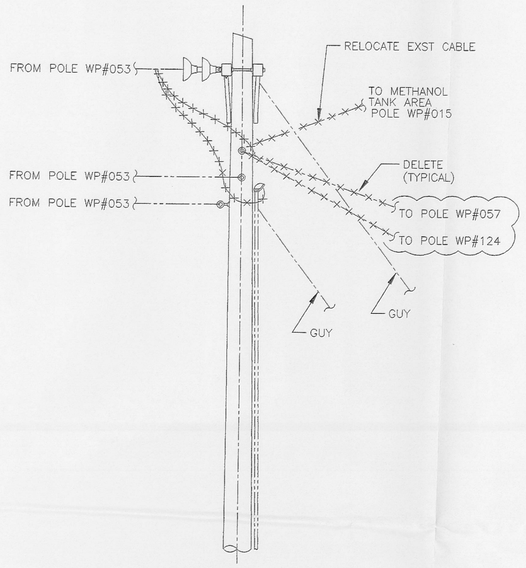
DRAWN BY	DATE	LEAD ENGINEER	DATE	CHECKED BY	DATE
G.J. Kilpatrick	6/29/96	Dan Faraon	6-29-96	Rosa Chen	6-29-96

PLANT/BLDG. NO.	FLOOR	SCALE	CLASS
OU4		NONE	

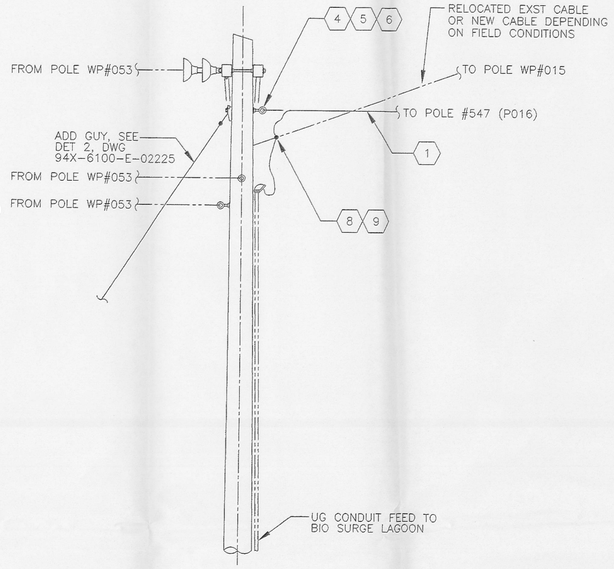
SUBMITTED FOR APPROVAL — A-E — DATE
FDF APPROVAL — DATE 6/30/96

40315

DOE PROJECT NO.	FEMP PROJECT NO.	DRAWING INDEX CODE NO.	SHEET NO.	REV. NO.
	WBS 2.1.3.G.R	94X-6100-E-02242	1	0

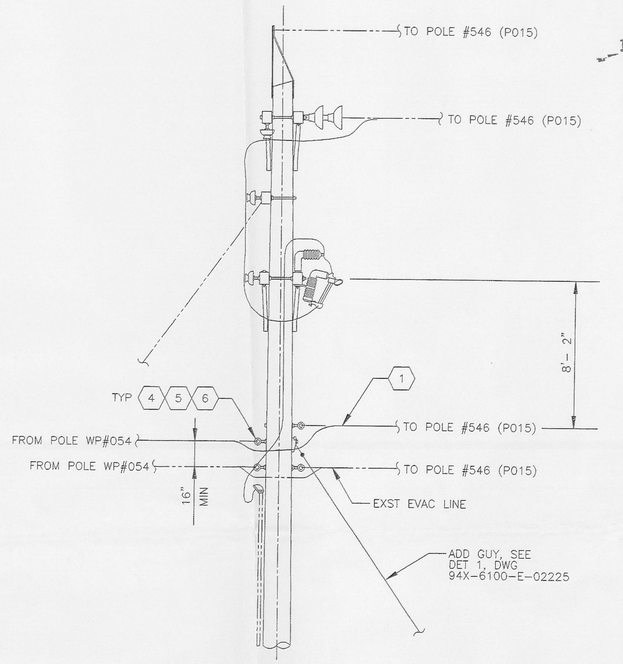


DEMOLITION



MODIFICATIONS

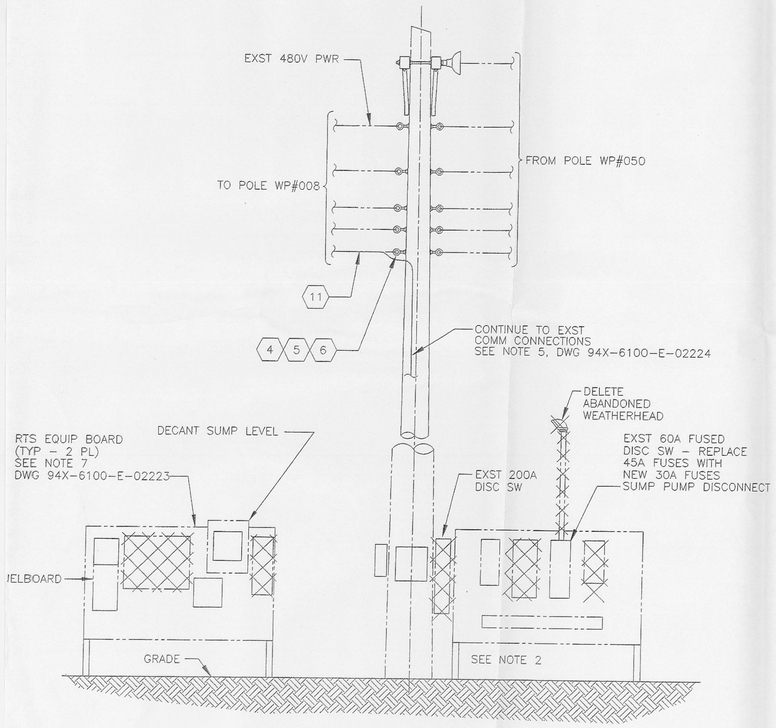
E ELEVATION
POLE WP#054(PP103)



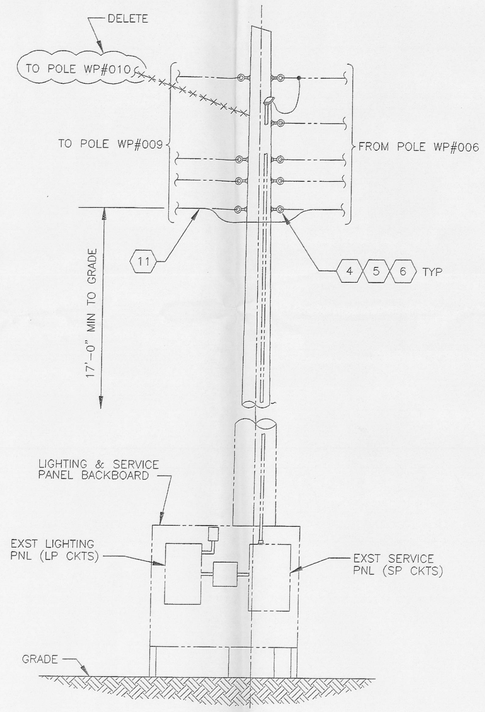
F ELEVATION
POLE #547 (P016)
(REF 94X-6100-E-00966, SH 8, ELEV E6)

NOTES

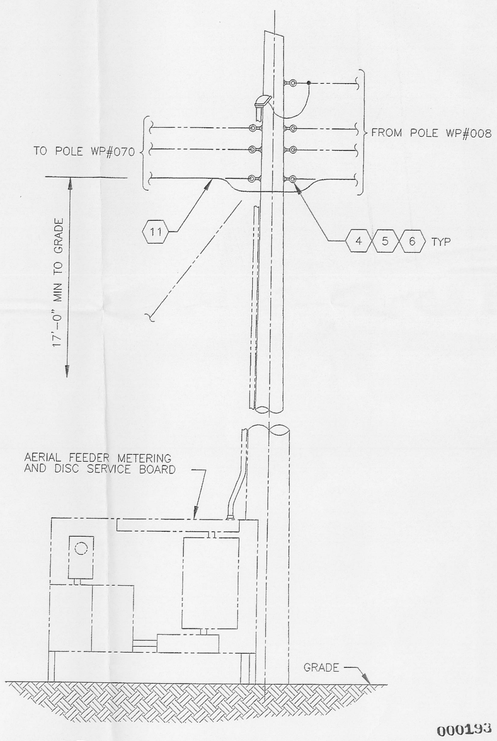
1. FOR MATERIAL LIST AND NOTES SEE DWG 94X-6100-E-02226.
2. REMOVE 200A DISCONNECT SWITCH THAT PRESENTLY SUPPLIES SUMP PUMP AND COMBINED TRANSFORMER /PANELBOARD. RESUPPLY FROM EXISTING 60 AMP SQUARE D DISCONNECT. USE #6 AWG WIRE TO SUPPLY BOTH LOADS. MAKE TAP TO LOADS IN WIREWAY.



G ELEVATION
POLE WP#006(PP109)



H ELEVATION
POLE WP#008(PP110)



J ELEVATION
POLE WP#009(PP111)

000193

REV. NO.	ISSUE OR REVISION PURPOSE - DESCRIPTION	A-E	FDF	DATE
0	ISSUED FOR CONSTRUCTION	JRS		7/1/98

INITIALS AND DATE

UNITED STATES DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

THIS DRAWING PREPARED BY
FLUOR DANIEL NORTHWEST, INC.
1100 JADWIN, P.O. BOX 1050
RICHLAND, WASHINGTON

PROJECT NAME
SILOS INFRASTRUCTURE

DRAWING TITLE
EXISTING OVERHEAD UTILITIES
SILO INFRASTRUCTURE - POLE ELEVATIONS

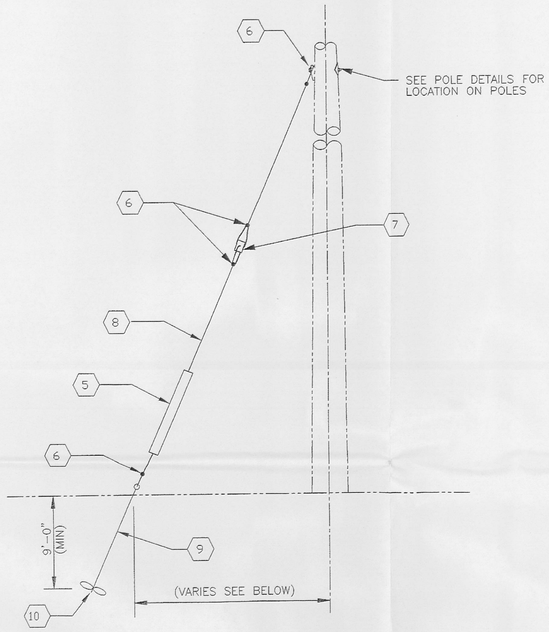
DRAWN BY	DATE	LEAD ENGINEER	DATE	CHECKED BY	DATE
GJ KUBINSKI	03-25-98	Dan Jackson	7-1-98	Roxanne Black	7-1-98

PLANT/BLDG. NO.	FLOOR	SCALE	CLASS
004		NONE	

SUBMITTED FOR APPROVAL — A-E — DATE
FDF APPROVAL — DATE 7-1-98
40315

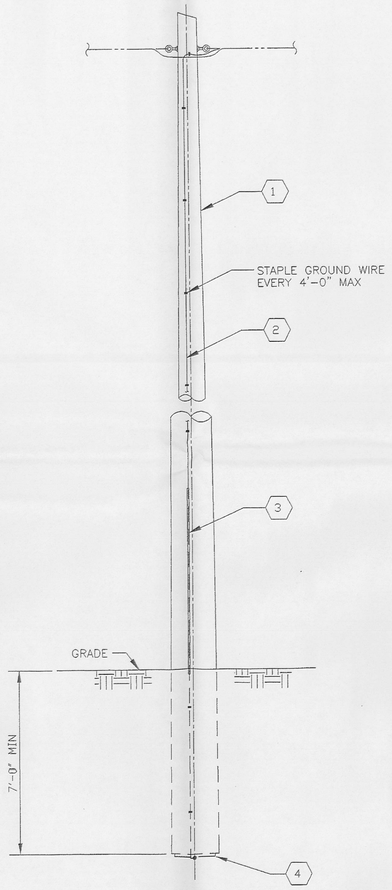
DOE PROJECT NO.	FEMP PROJECT NO.	DRAWING INDEX CODE NO.	SHEET NO.	REV. NO.
	WBS 2.1.3.G.R	94X-6100-E-02227	1	0

E:\004NOS\INFRA\REV-01\E-02227 Wed Jul 01 09:12:19 1998

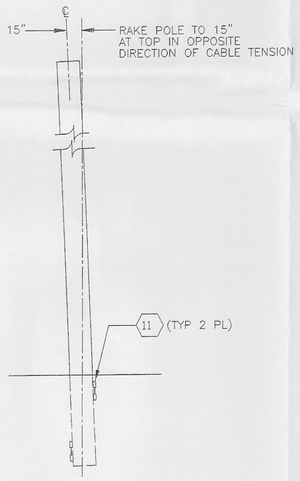


1 DETAIL
GUY – TYPICAL

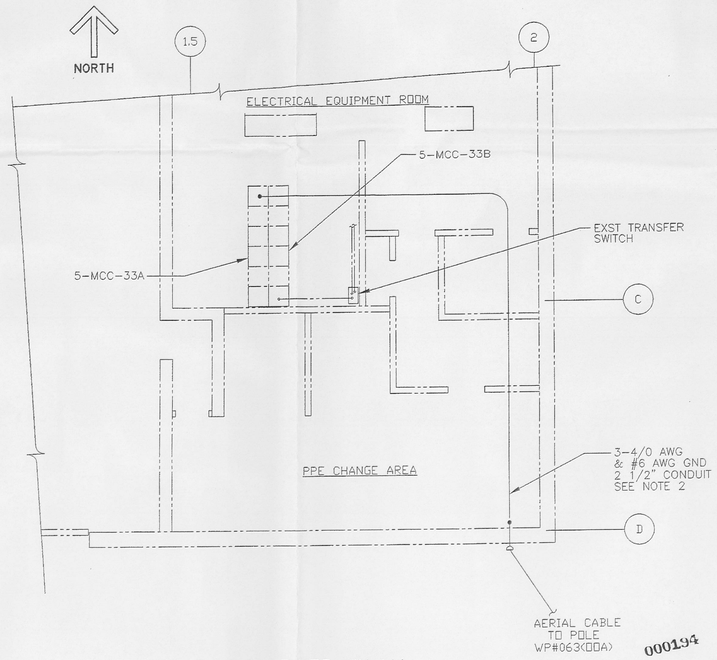
GUYS SHALL BE SET AT 45° UNLESS APPROVED BY FDF.
GUYS SHALL BE NO CLOSER TO POLE THAN 15 FT UNLESS APPROVED BY FDF.



2 DETAIL
POLE – TYPICAL



3 DETAIL
POLE RAKE – TYPICAL WHERE NEEDED



4 ENLARGED PLAN
DWG 94X-6100-E-02224

000194

MATERIAL LIST

1657

1. – 40' POLE (OR AS REQUIRED), CLASS 2
2. – #6 AWG SOLID COPPER GROUND WIRE
3. – PLASTIC GROUND WIRE SAFETY GUARD
4. – COPPER POLE BOTTOM GROUND PLATE OR MINIMUM 6' #6 AWG SOLID BARE COPPER WIRE COILED AROUND BOTTOM OF POLE.
5. – GUY WIRE MARKER, HALF ROUND, 2" WIDE, 96" LONG, UV RESISTANT W/ HARDWARE
6. – GUY GRIP, FOR STATIC WIRE, PREFORMED WIRE TYPE
7. – GUY STRAIN INSULATOR, ANSI CLASS 54-4, FOR 5/8" GUY WIRE
8. – 5/8" DIAMETER, 7 STRAND, HIGH STRENGTH, GALVANIZED STEEL STRAND
9. – TRIPLEYE, GALVANIZED ANCHOR ROD, 1" DIAMETER, LENGTH AS REQUIRED
10. – 14" DIAMETER HELICAL SCREW TYPE GUY ANCHOR WITH MINIMUM PULLOUT CAPACITY OF 28,000 LBS
11. – EXPANDING POLE KEY, CHANCE P4817 OR SIMILAR

NOTES

1. SEE DWG 94X-6100-E-02224 FOR LOCATION OF DETAILS
2. ROUTE CONDUIT TO MCC -3A, STACK 6, COMPARTMENT 6L. RETAIN SPACE ON SUPPORT RACK FOR THE ADDITION OF FUTURE CONDUITS. MCC IS MANUFACTURED BY SQUARE D AND USES MHL SERIES CIRCUIT BREAKERS. THIS FEEDER WILL SUPPLY METHANOL TANK / BIOSURGE LAGOON / HIGH NITRATE TANK LOADS.
3. INSTALL NEW DISCONNECT SWITCH ON POLE #673(P017). THIS SWITCH WILL SERVICE A FUTURE CONTRACTOR TRAILER. DISCONNECT SHALL BE SERVICE ENTRANCE RATED, 200 AMP, 240 VOLT, SINGLE PHASE WITH 200 AMP FUSES (CLASS R). DISCONNECT SHALL BE SERVICED FROM NEW WEATHERHEAD USING 2 4/0 THHN/THWN 90° COPPER CONDUCTORS THROUGH A 2 1/2" CONDUIT. SEPARATE WEATHERHEAD SHALL BE USED FOR THE LINE AND LOAD CONDUCTORS OF THE DISCONNECT SWITCH. GROUND CONDUCTORS SHALL BE #2 AWG. BOND EXISTING LOW VOLTAGE GROUND TO DISCONNECT SWITCH. GROUND FRAME OF DISCONNECT SWITCH. ADDITIONAL GROUNDING SHALL BE REQUIRED TO BE INSTALLED PER ARTICLE 250 PART H OF THE 1996 NATIONAL ELECTRICAL CODE AT TIME OF TRAILER INSTALLATION. COIL 75 FT OF 3 CONDUCTOR #4/0 #4/0 AND #2 GROUND WIRES (SERVICE ENTRANCE CABLE FOR FUTURE INSTALLATION). MOUNT WEATHERPROOF PLYWOOD PANEL TO POLE FOR DISCONNECT SWITCH SUPPORT.
3. INSTALL NEW DISCONNECT SWITCH ON POLE #671(P008). THIS SWITCH WILL SERVICE A FUTURE DOUBLE-WIDE TRAILER. DISCONNECT SHALL BE SERVICE ENTRANCE RATED, 200 AMP, 600 VOLT, THREE PHASE WITH 200 AMP FUSES (CLASS R). DISCONNECT SHALL BE SERVICED FROM NEW WEATHERHEAD USING 3 4/0 THHN/THWN 90° COPPER CONDUCTORS THROUGH A 2 1/2" CONDUIT. ANOTHER WEATHERHEAD SHALL BE USED FOR THE LOAD CONDUCTORS FROM THE DISCONNECT SWITCH. GROUND CONDUCTORS SHALL BE #2 AWG. BOND EXISTING LOW VOLTAGE GROUND TO DISCONNECT SWITCH. GROUND FRAME OF DISCONNECT SWITCH. ADDITIONAL GROUNDING SHALL BE REQUIRED TO BE INSTALLED PER ARTICLE 250 PART H OF THE 1996 NATIONAL ELECTRICAL CODE AT TIME OF TRAILER INSTALLATION. COIL 75 FT OF 3 CONDUCTOR #4/0 AWG AND #2 GROUND SERVICE ENTRANCE CABLE FOR FUTURE INSTALLATION. MOUNT WEATHERPROOF PLYWOOD PANEL TO POLE TO SUPPORT DISCONNECT SWITCH.

REV. NO.	ISSUE OR REVISION PURPOSE - DESCRIPTION	A-E	FDF	DATE
0	ISSUED FOR CONSTRUCTION	7/1/98	7/2/98	

INITIALS AND DATE

UNITED STATES DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

THIS DRAWING PREPARED BY
FLUOR DANIEL NORTHWEST, INC.
1100 JADWIN, P.O. BOX 1050
RICHLAND, WASHINGTON

PROJECT NAME
SILOS INFRASTRUCTURE

DRAWING TITLE
EXISTING OVERHEAD UTILITIES
SILO INFRASTRUCTURE – MISC DETAILS

DRAWN BY	DATE	LEAD ENGINEER	DATE	CHECKED BY	DATE
GJ KUBINSKI	03-25-98	Dan Larson	7-1-98	Roger Blind	7-1-98

PLANT/BLDG. NO.	FLOOR	SCALE	CLASS
OU4		NONE	

SUBMITTED FOR APPROVAL — A-E — DATE
FDF APPROVAL — DATE 7/1/98
40315

DOE PROJECT NO.	FEMP PROJECT NO.	DRAWING INDEX CODE NO.	SHEET NO.	REV. NO.
	WBS 2.1.3.G.R	94X-6100-E-02225	1	0

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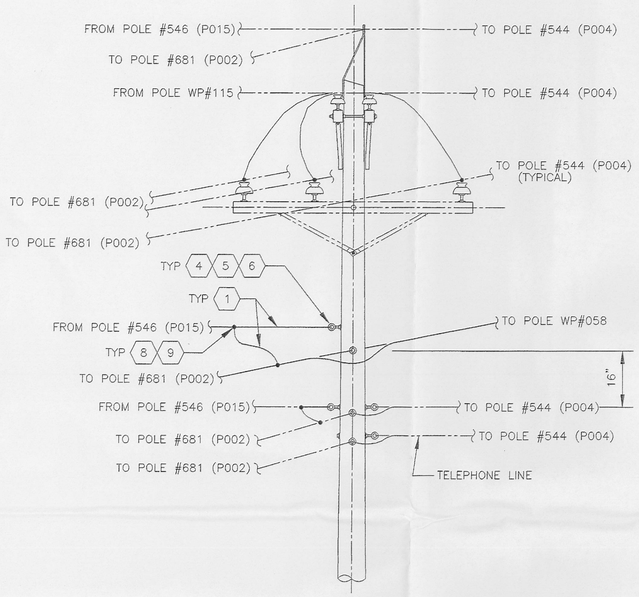
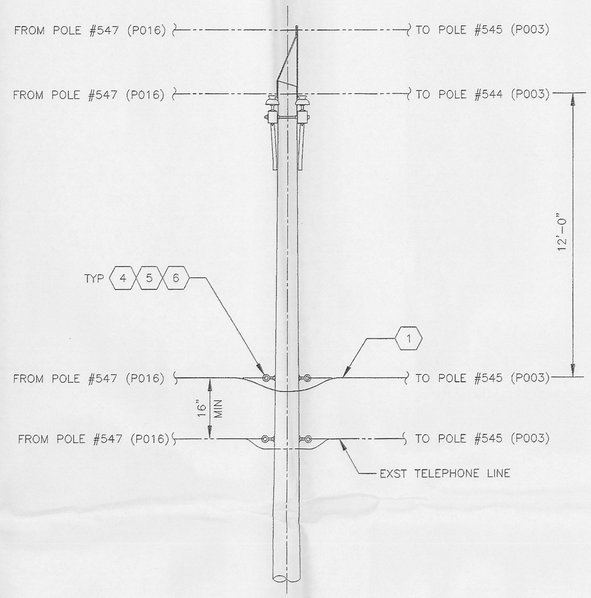
1657



A ELEVATION
POLE WP#545(P003)
(REF 94X-5900-E-00952, SH 6, ELEV E2)



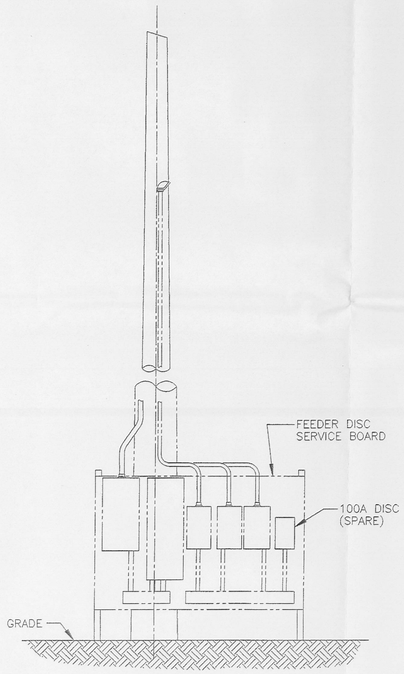
B ELEVATION
POLE #546(P015)
(REF 94X-5900-E-00966, SH 8, ELEV E15)

MATERIAL LIST:

1. #4/0 AL QUADRUPLEX W/NEUTRAL ON ACSR MESSENGER, CODE WORD STALLION, NEUTRAL ACSR 6A1./1S, ULTIMATE STRENGTH 8,350 LBS. WEIGHT PER 1000 FT – 1,053 LBS
2. 3-1/C #1/0 AWG & 1/C #6AWG GND, STRANDED CU, TYPE RHW, SUNLIGHT RESISTANT CABLE.
3. NOT USED
4. THIMBLE, FOR STATIC WIRE OR MESSENGER WIRE DEAD-END.
5. EYE BOLT, OVAL EYE TYPE, FOR DEAD-END, 5/8" DIA, WITH ONE SQUARE NUT. ADDITIONAL NUTS, WASHERS, AND LENGTH AS REQUIRED.
6. GUY GRIP, FOR STATIC WIRE, PREFORMED WIRE TYPE.
7. 2" RIGID GALVANIZED STEEL CONDUIT
8. CONNECTOR – AS REQUIRED
9. WEATHERPROOF CONNECTOR COVER – AS REQUIRED
10. WEATHERHEAD, CONDUIT, OUTDOOR, WEATHERTIGHT, SIZE AS REQUIRED
11. TELEPHONE DISTRIBUTION CABLE, SELF SUPPORTING, FIGURE EIGHT 2 PR #19AWG
12. #1/0 ALUMINUM QUADRUPLEX ON ACSR MESSENGER, CODE WORD COSTENA

NOTES

1. SOME EXISTING AERIAL CONDUCTORS, DOWNGUYS AND HARDWARE MAY NOT BE SHOWN OR NOT BE SHOWN IN ACTUAL POSITIONS ON POLE ELEVATIONS FOR CLARITY.
2. LOCATION SHALL BE APPROXIMATELY AS SHOWN ON MODIFICATION SITE PLAN (DWG 94X-6100-E-02224) SET POLE TO CLEAR NEW ROADWAY EDGE (PAVEMENT) BY 10'.
3. STIRRUP CLAMPS SHALL BE USED FOR EQUIPMENT TAPS FROM 13.2 KV LINES. OTHER TAPS SHALL BE COMPRESSION TYPE.



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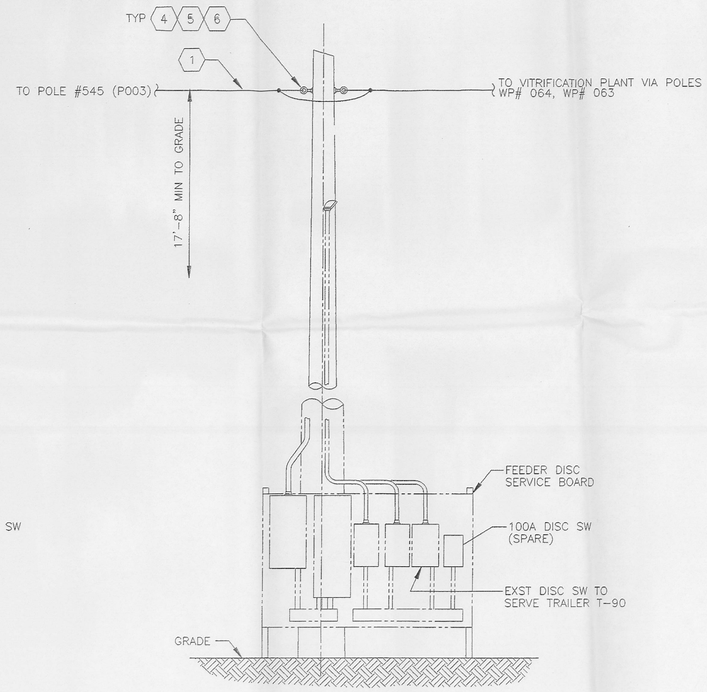
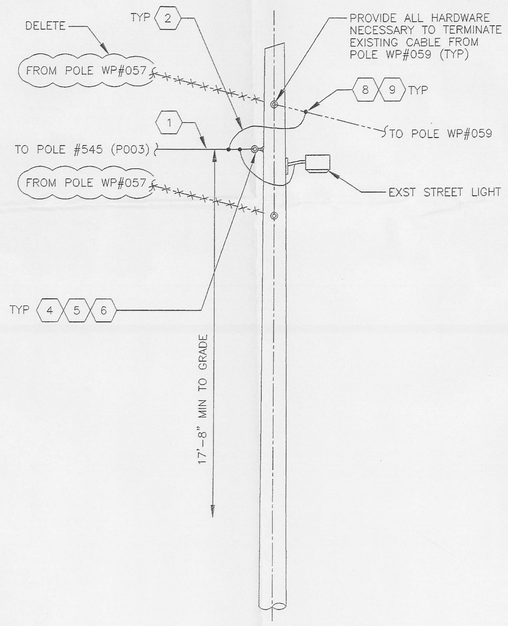


MODIFICATIONS

C ELEVATION
POLE #681(P002)

RACK SHOWN FOR INFORMATION ONLY – NO CHANGES



D ELEVATION
POLE WP#058(00G)

000195

REV. NO.	ISSUE OR REVISION PURPOSE - DESCRIPTION	A-E	FDF	DATE
0	ISSUED FOR CONSTRUCTION			

INITIALS AND DATE

UNITED STATES DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

THIS DRAWING PREPARED BY
FLUOR DANIEL NORTHWEST, INC.
1100 JADWIN, P.O. BOX 1050
RICHLAND, WASHINGTON

PROJECT NAME
SILOS INFRASTRUCTURE

DRAWING TITLE
EXISTING OVERHEAD UTILITIES
SILO INFRASTRUCTURE – POLE ELEVATIONS

DRAWN BY	DATE	LEAD ENGINEER	DATE	CHECKED BY	DATE
GJ KUBINSKI	03-25-98	Bill Forrest	7-1-98	Roscoe Black	7-1-98

PLANT/BLDG. NO.	FLOOR	SCALE	CLASS
OU4		NONE	

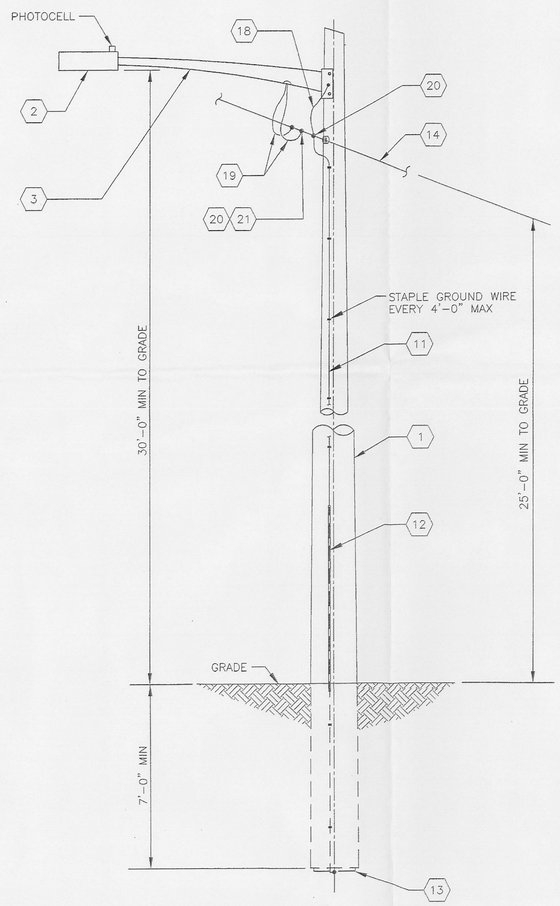
SUBMITTED FOR APPROVAL A-E DATE
FDF APPROVAL DATE 7/1/98
40315

DOE PROJECT NO.	FEMP PROJECT NO.	DRAWING INDEX CODE NO.	SHEET NO.	REV. NO.
	WBS 2.1.3.G.R	94X-6100-E-02226	1	0

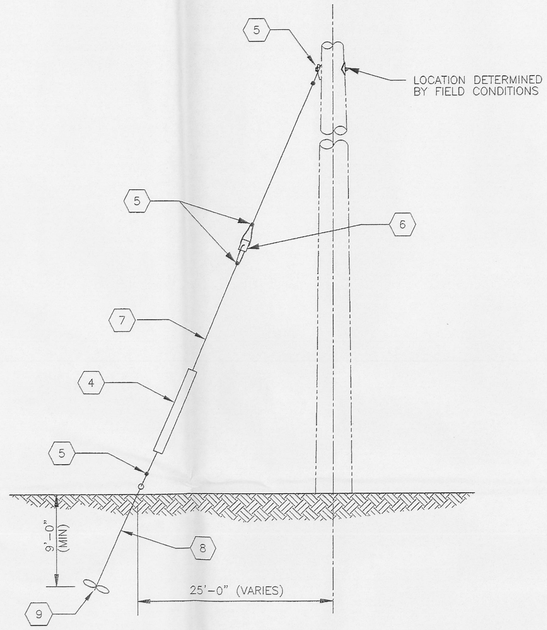
1657

NOTES

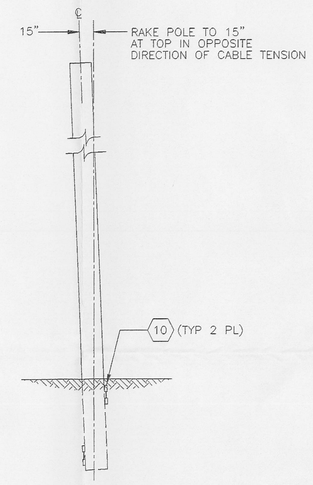
1. FOR NOTES SEE DWG 94X-6100-E-02240.



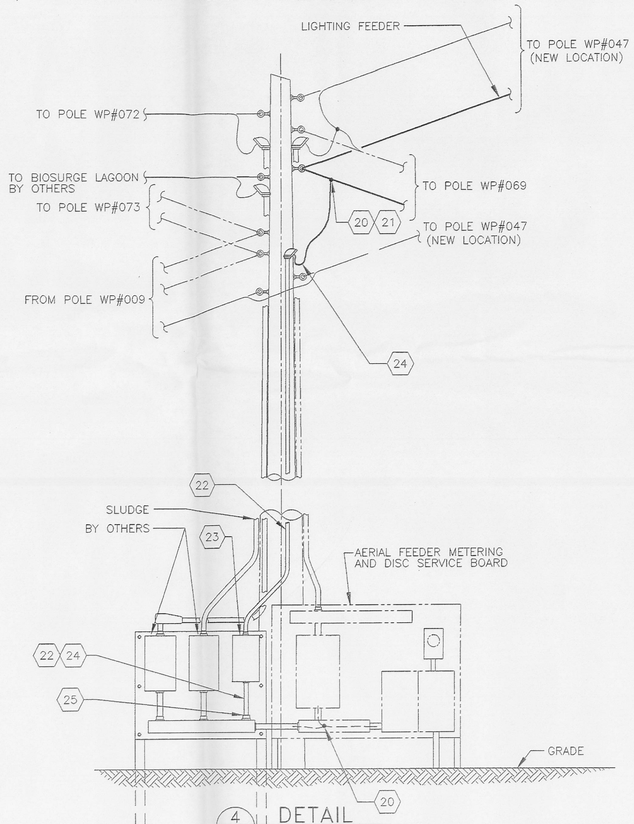
1 DETAIL
DWG 94X-6100-E-02240
LIGHTING POLE



2 DETAIL
DWG 94X-6100-E-02240
GUY
GUYS SHALL BE SET AT 45° UNLESS APPROVED BY FDF.
GUYS SHALL BE NO CLOSER TO POLE THAN 15 FT.



3 DETAIL
DWG 94X-6100-E-02240



4 DETAIL
DWG 94X-6100-E-02240

LTG FEEDER
(POLE WP#070)

MATERIAL LIST

1. 45' POLE, CLASS 2
2. ROADWAY LIGHTING FIXTURE, HIGH PRESSURE SODIUM, 400W, 480VAC WITH PHOTOCELL, LUMEC TYPE HBM, E-37 OR SIMILAR
3. 48" LIGHTING BRACKET FOR WOOD POLES, TO BE COMPATIBLE WITH LIGHTING FIXTURE.
4. GUY WIRE MARKER, HALF ROUND, 2" WIDE, 96" LONG, UV RESISTANT W/ HARDWARE
5. GUY GRIP, FOR STATIC WIRE, PREFORMED WIRE TYPE
6. GUY STRAIN INSULATOR, ANSI CLASS 54-4, FOR 5/8" GUY WIRE
7. 5/8" DIAMETER, 7 STRAND, HIGH STRENGTH, GALVANIZED STEEL STRAND
8. TRIPLEYE, GALVANIZED ANCHOR ROD, 1" DIAMETER, LENGTH AS REQUIRED
9. 14" DIAMETER HELICAL SCREW TYPE GUY ANCHOR WITH MINIMUM PULLOUT CAPACITY OF 28,000 LBS
10. EXPANDING POLE KEY, CHANCE P4817 OR SIMILAR
11. #6 AWG SOLID COPPER GROUND WIRE
12. PLASTIC GROUND WIRE SAFETY GUARD
13. COPPER POLE BOTTOM GROUND PLATE OR WIRE WRAP WITH #6 AWG COPPER.
14. AERIAL LIGHTING CABLE - 3/C #6 AWG CU ON 1/4" 30 PERCENT EHS COPPERWELD MESSENGER
15. NOT USED
16. NOT USED
17. NOT USED
18. #10 AWG SOLID COPPER GROUND WIRE
19. 1/C #10, UV RESISTANT WIRE FOR OUTDOOR USE
20. CONNECTOR - AS REQUIRED
21. WEATHERPROOF CONNECTOR COVER - AS REQUIRED
22. 1-1/2" RIGID GALVANIZED STEEL CONDUIT
23. DISCONNECT SWITCH, FUSED, 3 POLE, 30A, 600VAC, NEMA 3R WITH CLASS R FUSE KIT, 30A FUSES & 1-1/2" RAINPROOF CND HUB INSTALLED. SQUARE D H361RB-GL OR FDF APPROVED EQUIVALENT
24. 3-1/C #6AWG & 1/C #8AWG GND, STRANDED CU, TYPE RHW, SUNLIGHT RESISTANT CABLE
25. 1-1/2" RAINPROOF CONDUIT HUB

REF. DWG. NO.	DRAWING TITLE
404-5500-E-00036	---

REV. NO.	ISSUE OR REVISION PURPOSE - DESCRIPTION	A-E	FDF	DATE
0	ISSUED FOR CONSTRUCTION			

INITIALS AND DATE

UNITED STATES DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

THIS DRAWING PREPARED BY
FLUOR DANIEL NORTHWEST, INC.
1100 JADWIN, P.O. BOX 1050
RICHLAND, WASHINGTON

PROJECT NAME
SILOS INFRASTRUTURE

DRAWING TITLE
EXISTING OVERHEAD UTILITIES
SILO INFRASTRUCTURE
ROADWAY LIGHTING DETAILS

DRAWN BY	DATE	LEAD ENGINEER	DATE	CHECKED BY	DATE
Gwd. RUDINSKI	6/29/96	Dan Larson	6/29/98	Roger Black	6/29/98

PLANT/BLDG. NO.	FLOOR	SCALE	CLASS
OU4		NONE	

SUBMITTED FOR APPROVAL — A-E — DATE
FDF APPROVAL — DATE 6/30/98
40315

DOE PROJECT NO.	FEMP PROJECT NO.	DRAWING INDEX CODE NO.	SHEET NO.	REV. NO.
	WBS 2.1.3.G.R	94X-6100-E-02241	1	0

000196

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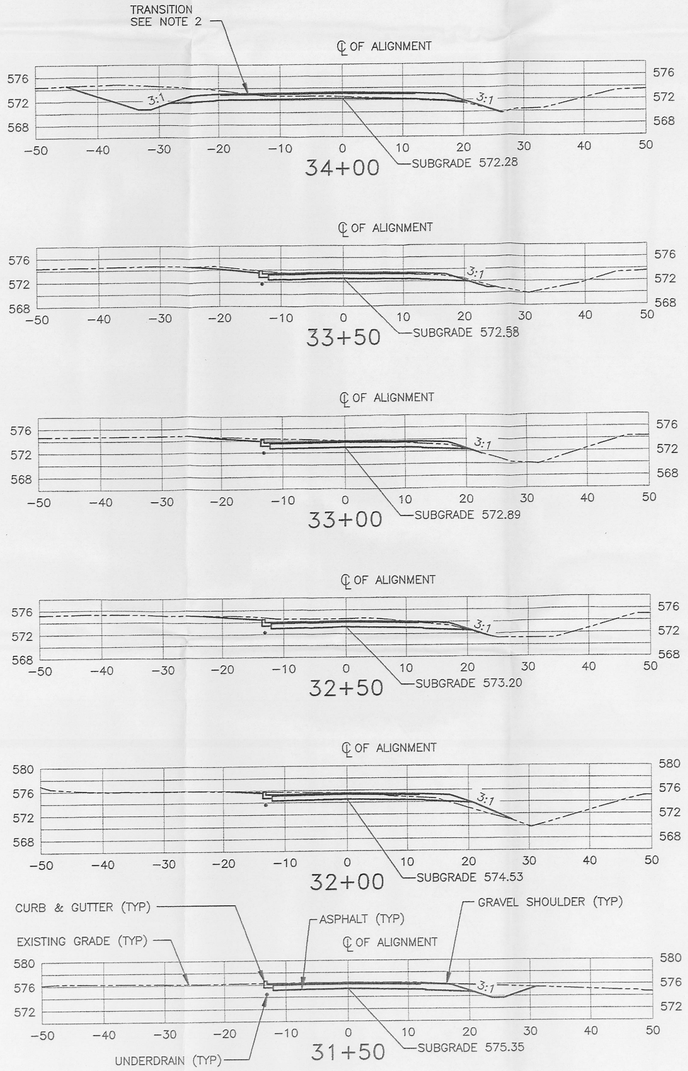


000197

NOTES

1. FOR LEGEND, ABBREVIATIONS, AND NOTES SEE DRAWING 94X-6100-G-02209.
2. FOR INTERSECTION DETAILS SEE DRAWING 94X-6100-G-02219.

REF DWG NO.	DRAWING TITLE
94X-6100-X-02208	DRAWING LIST AND VICINITY MAP
94X-6100-G-02212	PLAN AND PROFILE – STATION 25+00 TO END
94X-6100-G-02218	SECTIONS AND DETAILS
94X-6100-G-02219	INTERSECTION DETAILS
94X-6100-G-02243	MISCELLANEOUS DETAILS

REV. NO.	ISSUE OR REVISION PURPOSE – DESCRIPTION	A-E	FDF	DATE
0	CERTIFIED FOR CONSTRUCTION			

INITIALS AND DATE

UNITED STATES DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

THIS DRAWING PREPARED BY
FLUOR DANIEL NORTHWEST
RICHLAND, WASHINGTON

PROJECT NAME
SILOS INFRASTRUCTURE PROJECT

DRAWING TITLE
CROSS SECTIONS
STATION 31+50 TO END

DRAWN BY	DATE	LEAD ENGINEER	DATE	CHECKED BY	DATE
RS CHRISTENSEN	6-24-98				6/24/98

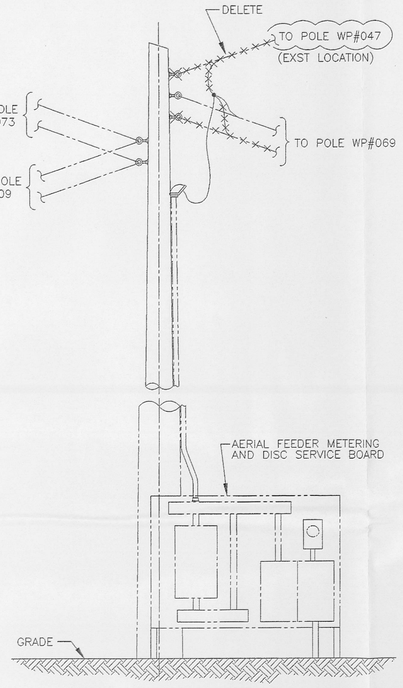
PLANT/BLDG. NO.	FLOOR	SCALE	CLASS
OU4		1"=10'	

SUBMITTED FOR APPROVAL — A-E — DATE

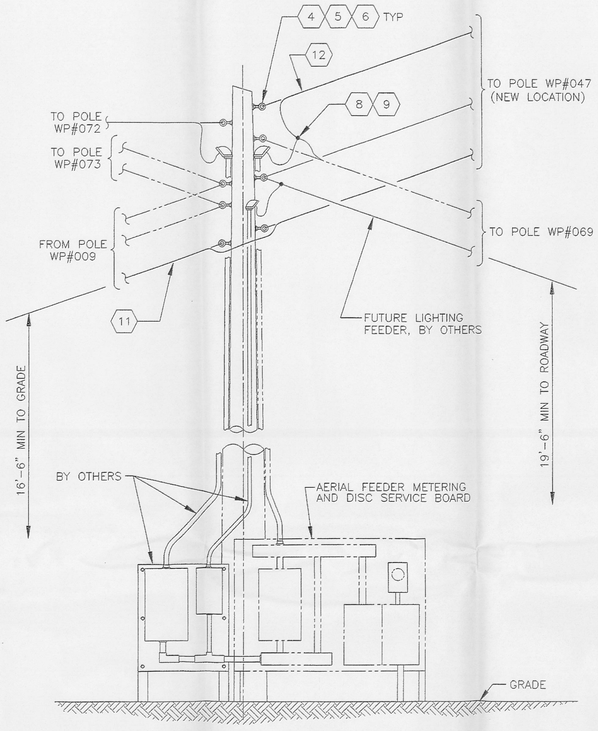
FDF APPROVAL — DATE 6/25/98

40315

DOE PROJECT NO.	FEMP PROJECT NO.	DRAWING INDEX CODE NO.	SHEET NO.	REV. NO.
	WBS 2.1.3.G.R	94X-6100-G-02217	5 OF 5	0

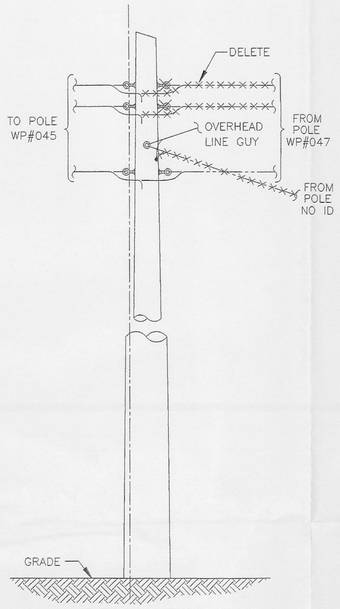


DEMOLITION

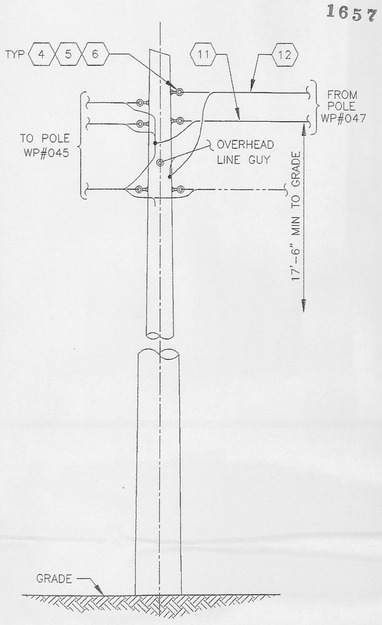


MODIFICATIONS

K ELEVATION
POLE WP#070(PP133)

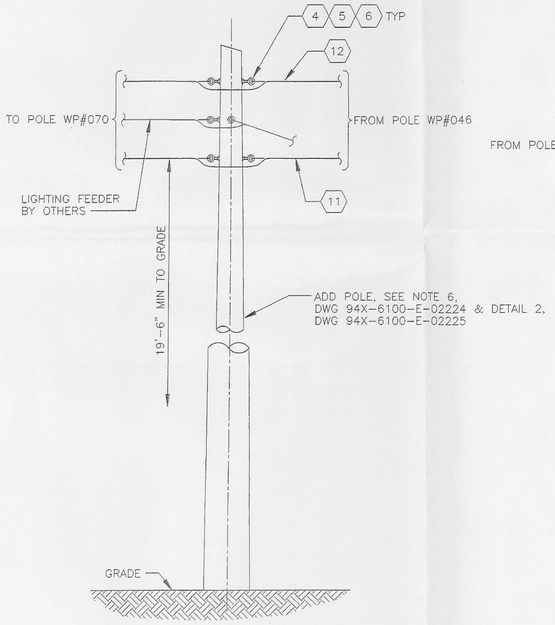


DEMOLITION

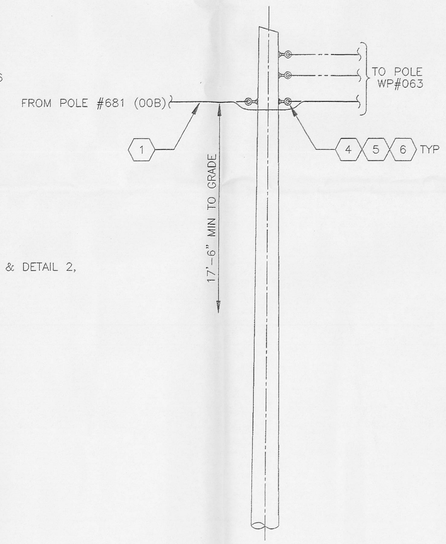


MODIFICATIONS

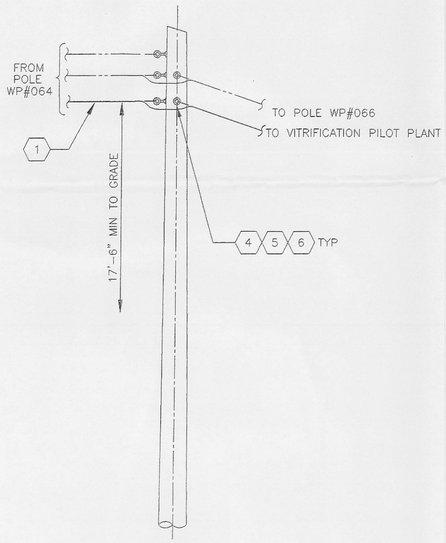
M ELEVATION
POLE WP#046(PP114)



L ELEVATION
POLE WP#047(PP113)



N ELEVATION
POLE WP#064(00B)



P ELEVATION
POLE WP#063(00A)

1657

000198

NOTES

1. FOR MATERIAL LIST AND NOTES SEE DRAWING 94X-6100-E-02226.

REV. NO.	ISSUE OR REVISION PURPOSE - DESCRIPTION	A-E	FDF	DATE
0	ISSUED FOR CONSTRUCTION			

INITIALS AND DATE

UNITED STATES DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

THIS DRAWING PREPARED BY
FLUOR DANIEL NORTHWEST, INC.
1100 JADWIN, P.O. BOX 1050
RICHLAND, WASHINGTON

PROJECT NAME
SILOS INFRASTRUCTURE

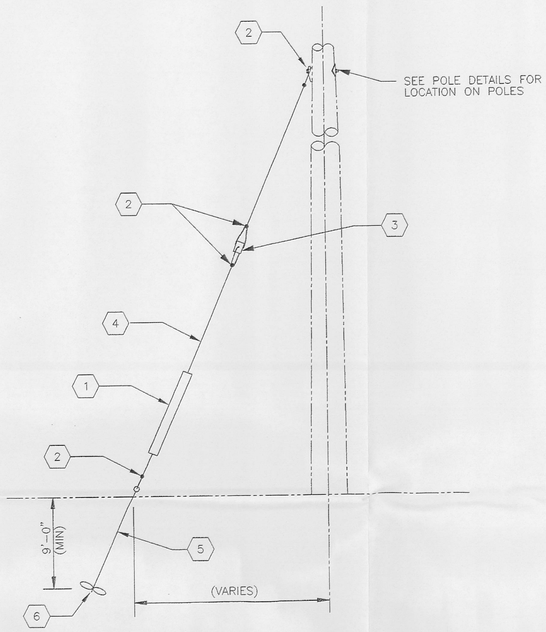
DRAWING TITLE
EXISTING OVERHEAD UTILITIES
SILO INFRASTRUCTURE – POLE ELEVATIONS

DRAWN BY	DATE	LEAD ENGINEER	DATE	CHECKED BY	DATE
GJ KUBINSKI	03-25-98	Stan Larson	7-1-98		7-1-98

PLANT/BLDG. NO.	FLOOR	SCALE	CLASS
OU4		NONE	

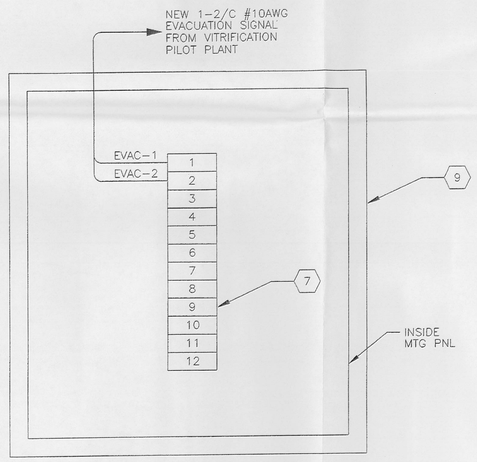
SUBMITTED FOR APPROVAL — A-E — DATE
FDF APPROVAL — DATE 7-1-98
40315

DOE PROJECT NO.	FEMP PROJECT NO.	DRAWING INDEX CODE NO.	SHEET NO.	REV. NO.
	WBS 2.1.3.G.R	94X-6100-E-02228	1	0

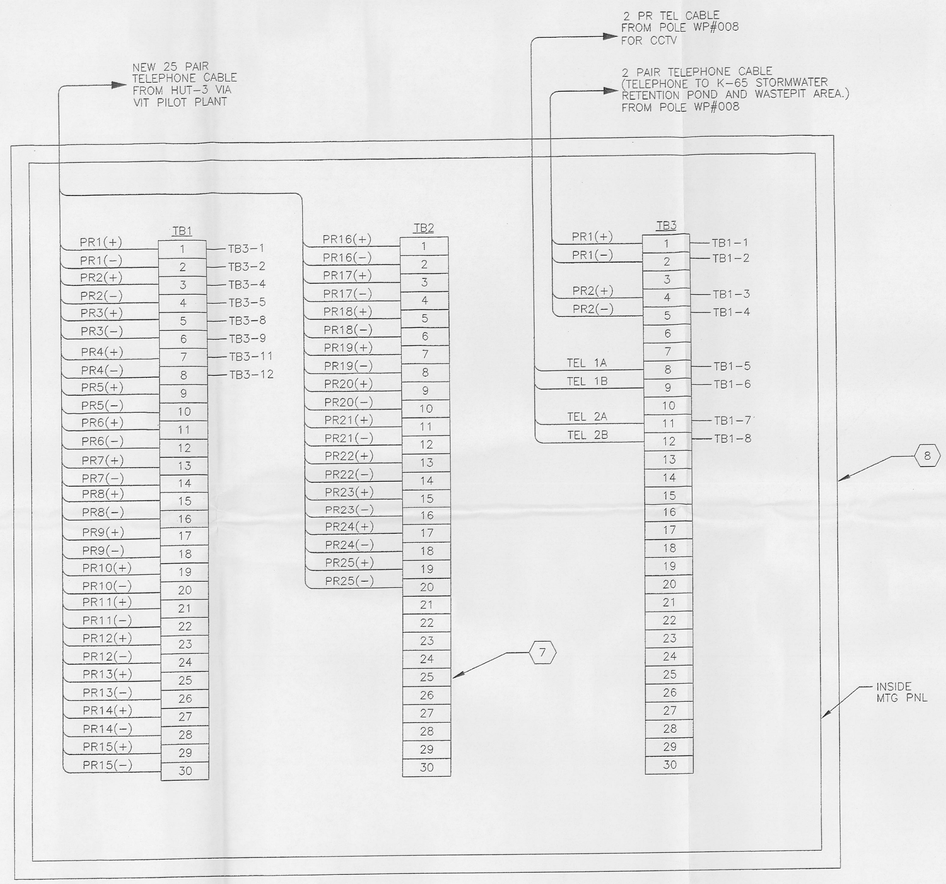


1 DETAIL
DWG 94X-6100-E-02230

GUYS SHALL BE SET AT 45° UNLESS APPROVED BY FDF.
GUY ANCHORS SHALL NOT BE LESS THAN 15 FT FROM POLE.
SEE NOTE 1



4 DETAIL
DWG 94X-6100-E-02232



3 DETAIL
DWG 94X-6100-E-02232

MATERIAL LIST

1657

1. GUY WIRE MARKER, HALF ROUND, 2" WIDE, 96" LONG, UV RESISTANT W/ HARDWARE
2. GUY GRIP, FOR STATIC WIRE, PREFORMED WIRE TYPE
3. GUY STRAIN INSULATOR, ANSI CLASS 54-4, FOR 5/8" GUY WIRE
4. 5/8" DIAMETER, 7 STRAND, HIGH STRENGTH, GALVANIZED STEEL STRAND
5. TRIPLEYE, GALVANIZED ANCHOR ROD, 1" DIAMETER, LENGTH AS REQUIRED
6. 14" DIAMETER HELICAL SCREW TYPE GUY ANCHOR WITH MINIMUM PULLOUT CAPACITY OF 28,000 LBS
7. TERMINAL BLOCK, CHANNEL MOUNTED, HIGH DENSITY MINIATURE, TUBULAR CLAMP TYPE, BUCHANAN CAT NO 125 OR SIMILAR
8. ENCLOSURE, NEMA 3R, HINGED COVER WITH INTERNAL MOUNTING PANEL 16"x 16"x 6" DEEP, HOFFMAN CAT NO A-16R166HCLO OR SIMILAR INSTALL RAINPROOF CND HUBS AS REQUIRED
9. ENCLOSURE, NEMA 3R, HINGED COVER WITH INTERNAL MOUNTING PANEL 12"x 10"x 6" DEEP, HOFFMAN CAT NO A-12R106HCLO OR SIMILAR INSTALL RAINPROOF CND HUBS AS REQUIRED

NOTES

1. FILL ALL UNUSED HOLES IN POLES TO PREVENT PREMATURE ROT.

REV. NO.	ISSUE OR REVISION PURPOSE - DESCRIPTION	A-E	FDF	DATE
0	ISSUED FOR CONSTRUCTION			7/1/98

INITIALS AND DATE

UNITED STATES DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

THIS DRAWING PREPARED BY
FLUOR DANIEL NORTHWEST, INC.
1100 JADWIN, P.O. BOX 1050
RICHLAND, WASHINGTON

PROJECT NAME
SILOS INFRASTRUCTURE

DRAWING TITLE
EXISTING OVERHEAD UTILITIES
SILO INFRASTRUCTURE - MISC DETAILS

DRAWN BY	DATE	LEAD ENGINEER	DATE	CHECKED BY	DATE
G.L. Robinson	6/09/98	Don Fenson	6/29/98	Renee Hack	6/29/98

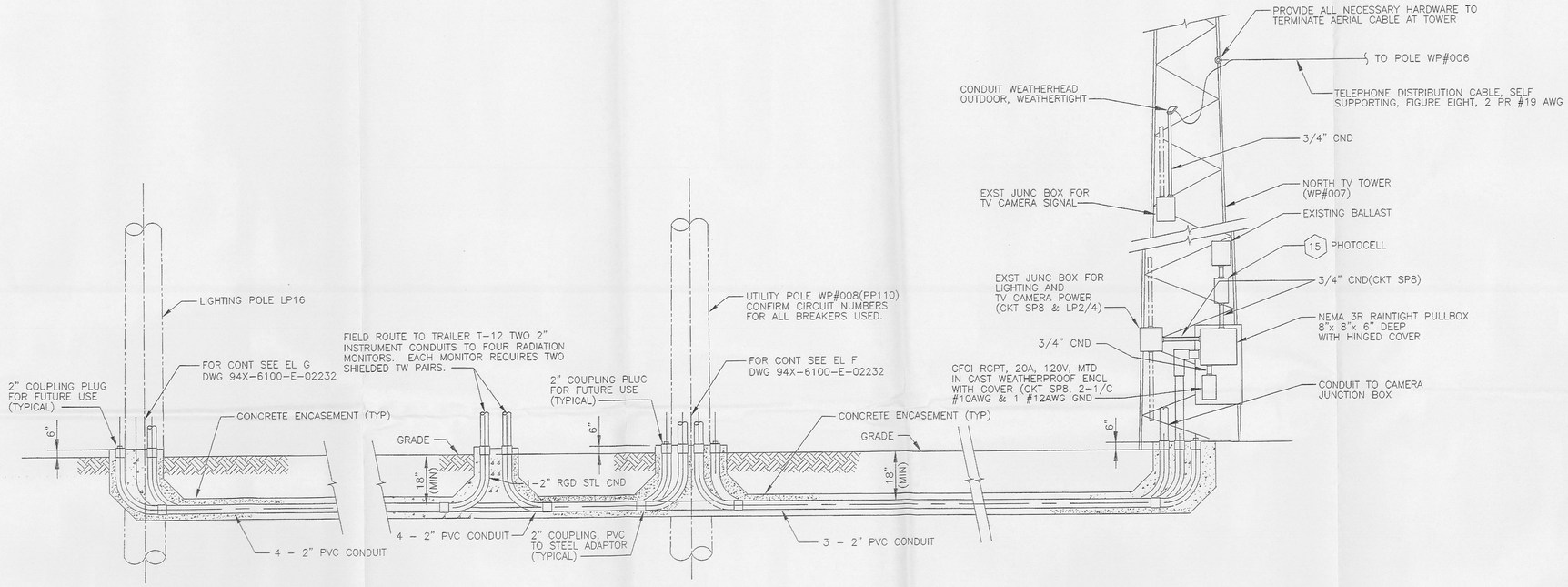
PLANT/BLDG. NO.	FLOOR	SCALE	CLASS
OU4		NONE	

SUBMITTED FOR APPROVAL A-E DATE
FDF APPROVAL DATE 6/30/98
40315

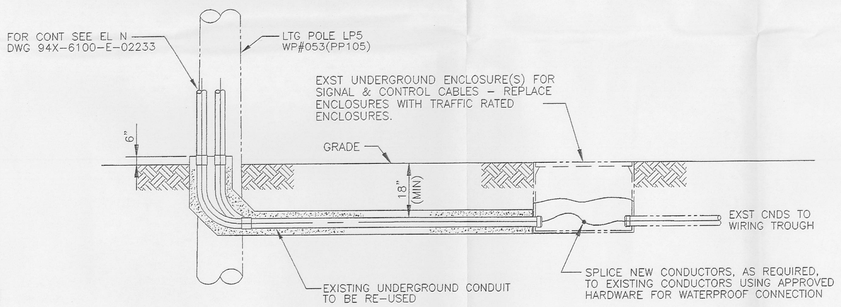
DOE PROJECT NO.	FEMP PROJECT NO.	DRAWING INDEX CODE NO.	SHEET NO.	REV. NO.
	WBS 2.1.3.G.R	94X-6100-E-02235	1	0

000199

1657



10 DETAIL
DWG 94X-6100-E-02230



11 DETAIL
DWG 94X-6100-E-02230

NOTES

1. FOR GENERAL NOTES SEE DWG 94X-6100-E-02236.
2. FIELD ROUTE DUCT BANK OUTSIDE OF EXISTING SILOS FENCE.
3. EACH RADON MONITOR ON EAST SIDE OF SILOS HAS A TWO PAIR SHIELDED CABLE ROUTED TO IT AERIALLY VIA POLES WP#008, WP#006, WP#050, WP#097 AND WP#003.

REV. NO.	ISSUE OR REVISION PURPOSE - DESCRIPTION	INITIALS AND DATE A-E	FBF	DATE
0	ISSUED FOR CONSTRUCTION			

UNITED STATES DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

THIS DRAWING PREPARED BY
FLUOR DANIEL NORTHWEST, INC.
1100 JADWIN, P.O. BOX 1050
RICHLAND, WASHINGTON

PROJECT NAME
SILOS INFRASTRUCTURE

DRAWING TITLE
EXISTING OVERHEAD UTILITIES
SILO INFRASTRUCTURE
BELOW GRADE DUCT BANKS - MISC DETAILS

DRAWN BY	DATE	LEAD ENGINEER	DATE	CHECKED BY	DATE
G.J. KLIBINSKI	10/29/98	Dan Faison	6/23/98	Roger Blick	6/24/98

PLANT/BLDG. NO.	FLOOR	SCALE	CLASS
OU4		NONE	

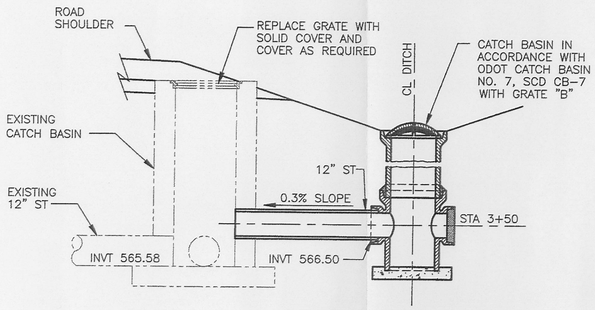
SUBMITTED FOR APPROVAL A-E DATE

FDF APPROVAL DATE 6/24/98

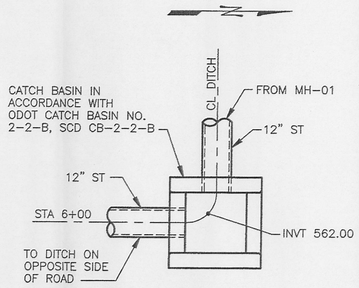
40315

DOE PROJECT NO.	FEMP PROJECT NO.	DRAWING INDEX CODE NO.	SHEET NO.	REV. NO.
	WBS 2.1.3.G.R	94X-6100-E-02237	1	0

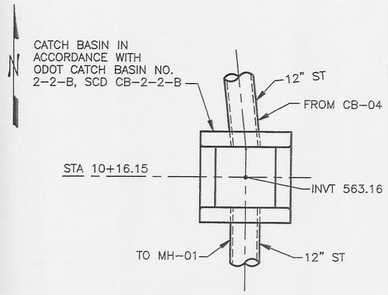
000200



CATCH BASIN CB-01
SCALE: NONE



CATCH BASIN CB-02
SCALE: NONE



CATCH BASIN CB-03
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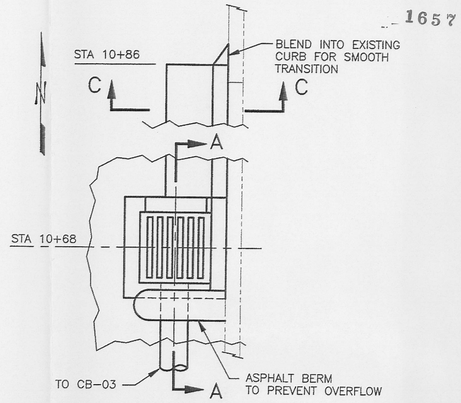
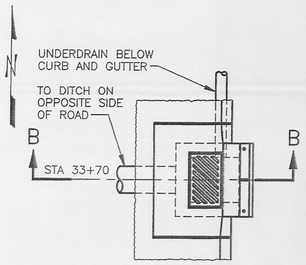


CATCH BASIN CB-04
SCALE: NONE



CATCH BASIN CB-05
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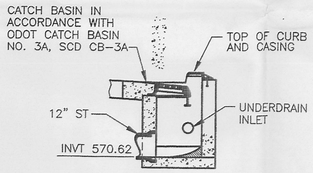
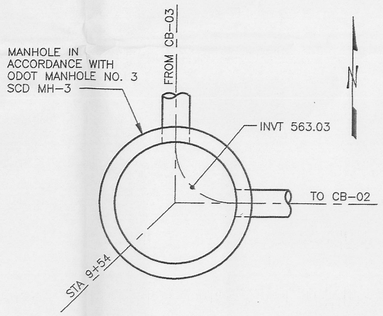
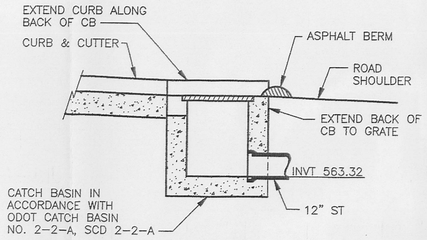


SECTION B-B
SCALE: NONE



MAN HOLE MH-01
SCALE: NONE



SECTION A-A
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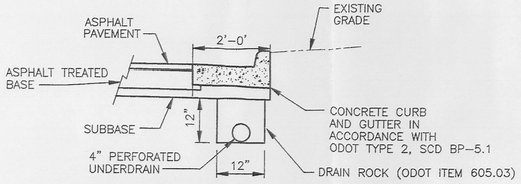


2 CURB AND GUTTER
94X-6100-G-02211
94X-6100-G-02212
SCALE: NONE

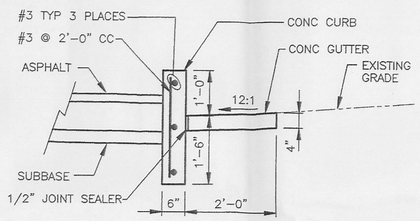
LEFT SIDE OF ROAD:

FROM CORNER OF EXISTING CATCH BASIN (STA14+50) TO 14+68 (14' L – BACK OF CURB) TO STA 15+50
PLACE UNDERDRAIN FROM START OF CURB AND GUTTER (STA 14+50) TO STA 15+50

FROM SOUTH SIDE OF K-65 TRENCH (STA 31+10.50) TO STA 33+75
PLACE UNDERDRAIN FROM START OF CURB TO CB-05

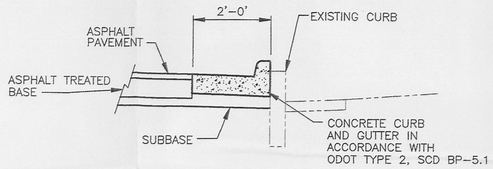
RIGHT SIDE OF ROAD:

FROM START OF CURB AND GUTTER (STA 14+60) TO STA 14+60 (14' R – BACK OF CURB) TO STA 15+50
PLACE UNDERDRAIN FROM EXIST CATCH BASIN (STA 14+50) TO START OF CURB AND GUTTER (STA 14+60) TO STA 15+50

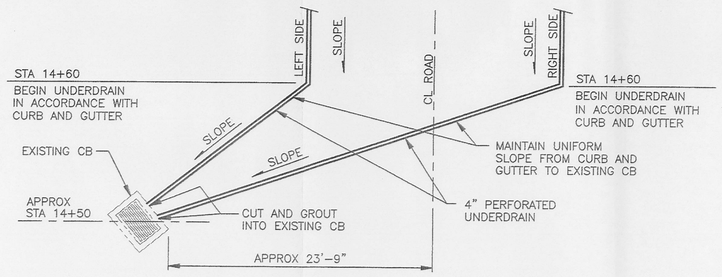


1 CURB
94X-6100-G-02211
SCALE: NONE

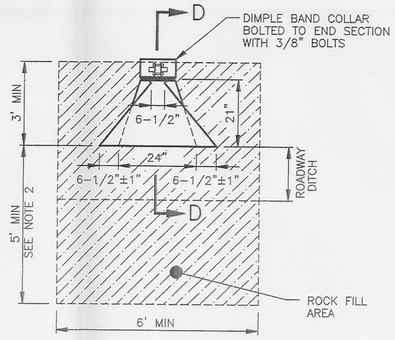
FROM STA 12+50 TO STA 14+60



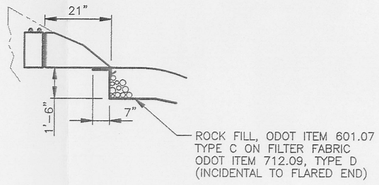
SECTION C-C
SCALE: NONE
FROM CB-04 (STA 10+68) TO STA 10+86



3 UNDERDRAIN DETAIL
94X-6100-G-02211
SCALE: NONE



STORM DRAIN FLARED END SECTION
SCALE: NONE



SECTION D-D
SCALE: NONE

000184

NOTES

1. FOR LEGEND, ABBREVIATIONS AND NOTES SEE 94X-6100-G-02209.
2. THE ROCK FILL AT THE END OF THE FLARED END SECTION SHALL EXTEND A MINIMUM OF 5' UNLESS OTHERWISE DIRECTED BY FDF.

REF DWG NO.	DRAWING TITLE
94X-6100-X-02208	DRAWING LIST AND VICINITY MAP
94X-6100-G-02210	PLAN AND PROFILE – STATION 0+00 TO 12+00
94X-6100-G-02211	PLAN AND PROFILE – STATION 12+00 TO 25+00
94X-6100-G-02212	PLAN AND PROFILE – STATION 25+00 TO END
94X-6100-G-02213	CROSS SECTIONS – STATION 0+00 TO 7+35
94X-6100-G-02214	CROSS SECTIONS – STATION 7+55 TO 13+50
94X-6100-G-02215	CROSS SECTIONS – STATION 14+00 TO 22+00
94X-6100-G-02216	CROSS SECTIONS – STATION 22+50 TO 30+50
94X-6100-G-02217	CROSS SECTIONS – STATION 31+50 TO END

REV. NO.	ISSUE OR REVISION PURPOSE – DESCRIPTION	A-E	FDF	DATE
0	CERTIFIED FOR CONSTRUCTION			

INITIALS AND DATE

UNITED STATES DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

THIS DRAWING PREPARED BY
FLUOR DANIEL NORTHWEST
RICHLAND, WASHINGTON

PROJECT NAME
SILOS INFRASTRUCTURE PROJECT

DRAWING TITLE
MISCELLANEOUS DETAILS

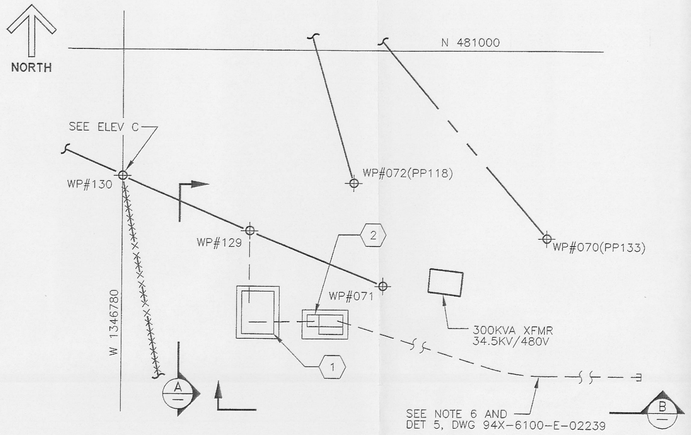
DRAWN BY	DATE	LEAD ENGINEER	DATE	CHECKED BY	DATE
RS CHRISTENSEN	6-24-98		6/24/98		6/24/98

PLANT/BLDG NO.	FLOOR	SCALE	CLASS
OU4		NONE	

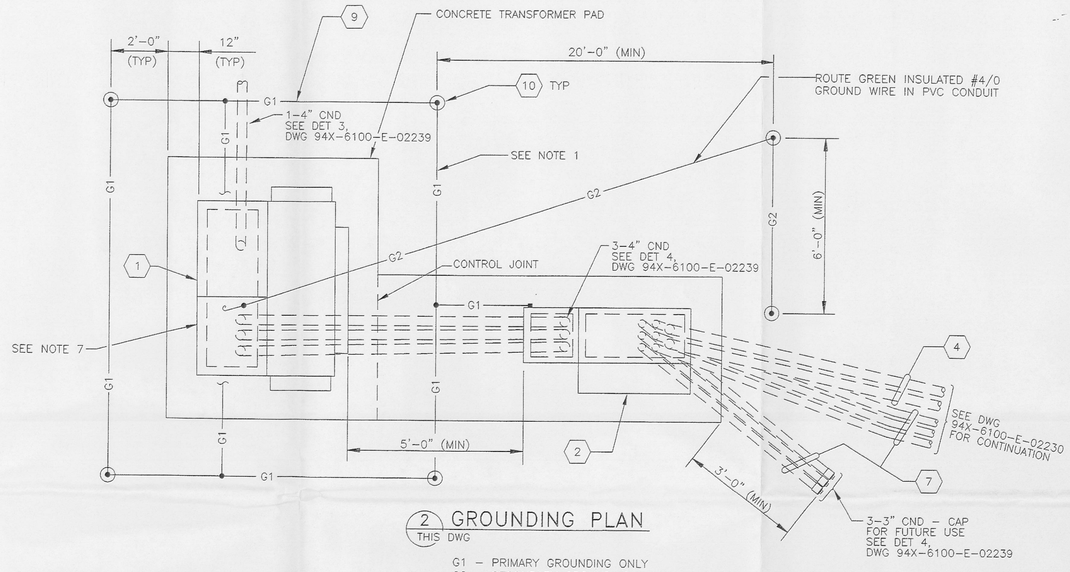
SUBMITTED FOR APPROVAL — A-E — DATE
FDF APPROVAL — DATE 6/29/98
40315

DOE PROJECT NO.	FEMP PROJECT NO.	DRAWING INDEX/CODE NO.	SHEET NO.	REV. NO.
	WBS 2.1.3.G.R	94X-6100-G-02243	1 OF 1	0

1657

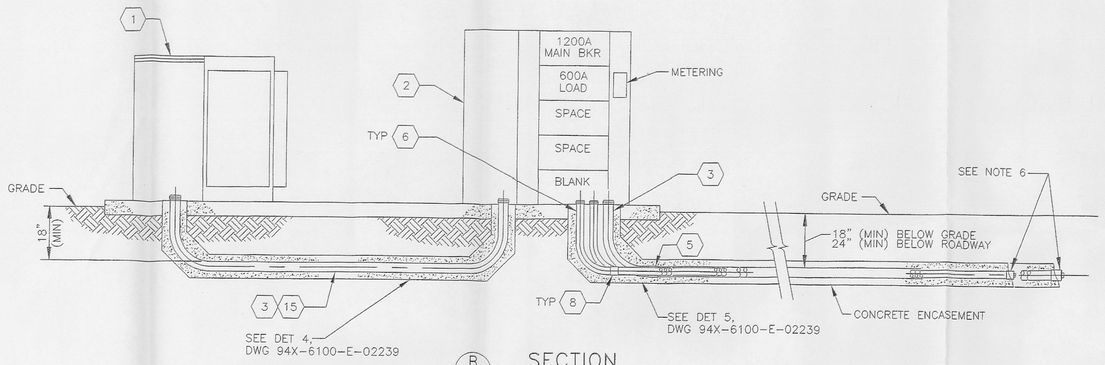


1 ENLARGED PLAN
DWG 94X-6100-E-02229 & 94X-6100-E-02230

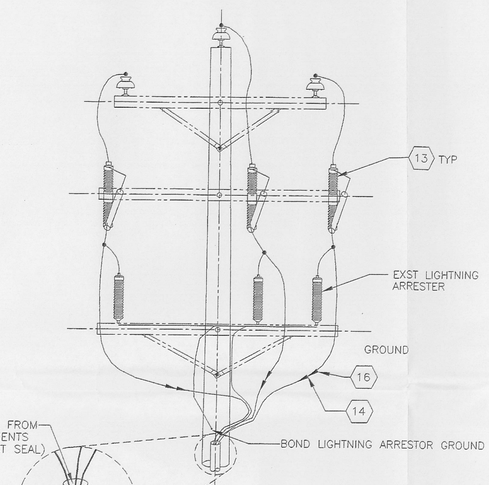


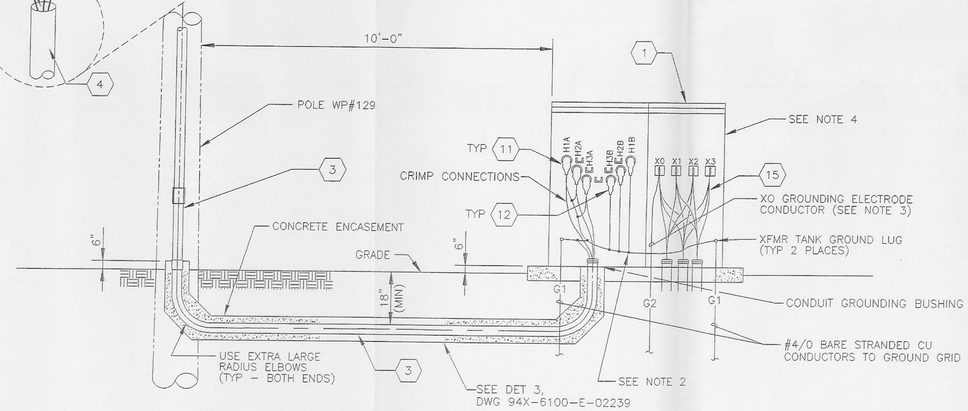
2 GROUNDING PLAN
THIS DWG

G1 - PRIMARY GROUNDING ONLY
G2 - SECONDARY GROUNDING ONLY

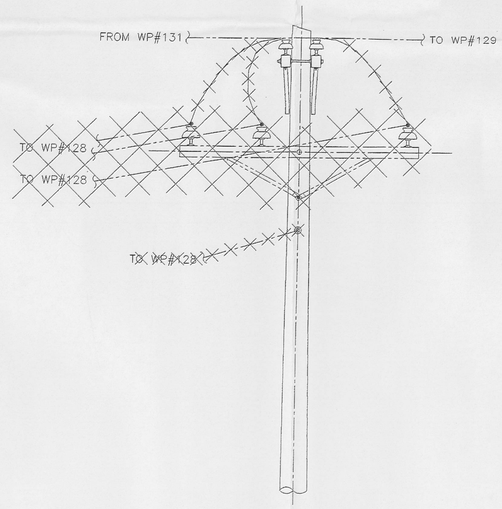


B SECTION
THIS DWG





A SECTION
THIS DWG



C ELEVATION
POLE WP#130

000183

NOTES

1. THE GROUND GRID IS TO BE BURIED A MINIMUM OF 2'-6". WHERE THE GROUND GRID CROSSES A DUCT BANK THE GROUND GRID IS TO BE BURIED BELOW THE DUCT BANK.
2. BOND THE CONDUCTOR SHIELDS AND THE ARRESTER GROUND LEADS TO A #2AWG BARE COPPER CONDUCTOR USING SUITABLE CONNECTORS. CONNECT THIS CONDUCTOR TO THE TRANSFORMER TANK GROUND LUG.
3. INSTALL #4 AWG COPPER CONDUCTOR FROM TRANSFORMER XO BUSHING TO THE ASSOCIATED G2 GROUND ROD. CONNECT G2 GROUND RODS AS SHOWN ON PLAN. GROUND PER 1996 NEC 450-10
4. INSTALL THE TRANSFORMER AND PAD PER MANUFACTURER'S INSTRUCTIONS.
5. SEE DWG 94X-6100-E-02229 & 94X-6100-E-02230 FOR LEGEND.
6. CONTINUE 2 - 4" CND AND 3 - 3" CND DUCTS TO SILO 3 & 4 AREA EAST OF NEW ROAD AS SHOWN ON PLAN DWG E-02230. PLUG FOR FUTURE USE.
7. NESC RULES APPLY TO PRIMARY OF TRANSFORMER. NFPA TO (NEC) RULES APPLY AT SECONDARY OF TRANSFORMER.

MATERIAL LIST

1. TRANSFORMER, 1000KVA, 34.5KV-480Y/277V, 3PH, 4WIRE OIL FILLED, DEAD FRONT, WITH SURGE PROTECTION
2. 1200A DISTRIBUTION SWITCHBOARD, FREE STANDING NEMA 3R 480Y/277V, 3PH, 4WIRE WITH 1200A GROUND FAULT PROTECTED MAIN BREAKER AND 600A LOAD BREAKERS. MAIN BREAKER SHALL HAVE DEMAND AND KWH METERING.
3. 4" RIGID GALVANIZED STEEL CONDUIT
4. 4" PVC CONDUIT, HEAVY WALL SCHEDULE 40 (FOR USE IN DUCT BANKS)
5. 4" COUPLING, PVC CONDUIT TO STEEL CONDUIT ADAPTOR
6. 3" RIGID GALVANIZED STEEL CONDUIT
7. 3" PVC CONDUIT, HEAVY WALL SCHEDULE 40 (FOR USE IN DUCT BANKS)
8. 3" COUPLING, PVC CONDUIT TO STEEL CONDUIT ADAPTOR
9. GROUND CONDUCTOR, #4/0 STRANDED BARE COPPER
10. GROUND ROD, COPPERCLAD STEEL, 5/8" x 8'-0" LONG, WITH GROUND ROD TO CABLE CLAMP (COPPER COMPRESSION TYPE OR EXOTHERMIC WELD)
11. LOADBREAK ELBOW CONNECTOR
12. METAL OXIDE ELBOW SURGE ARRESTER - (27KV)
13. LOAD BREAK FUSED CUTOUT (25T FUSE) - (REPLACES EXST FUSED LINKS)
14. 35KV POWER CABLE, 1/C #1/0 AWG, STRANDED CU, SUITABLE FOR OUTDOOR INSTALLATION
15. 600 KCMIL CABLE, 600V INSUL RATING, 90°C, XHHW, W/ INSULATED 4/0 GRND CALBE
16. TERMINATION KIT - SUITABLE FOR MANUFACTURER'S CABLE (RAYCHEM MFG OR FDF APPROVED EQUIVALENT)
17. INSTRUMENTATION CABLE, 600V, SHIELDED TWISTED PAIR WITH DRAIN WIRE. WIRE COLORS RED AND WHITE.

REV. NO.	ISSUE OR REVISION PURPOSE - DESCRIPTION	A-E	FDF	DATE
0	ISSUED FOR CONSTRUCTION			7/1/94

INITIALS AND DATE

UNITED STATES DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

THIS DRAWING PREPARED BY
FLUOR DANIEL NORTHWEST, INC.
1100 JADWIN, P.O. BOX 1050
RICHLAND, WASHINGTON

PROJECT NAME
SILOS INFRASTRUCTURE

DRAWING TITLE
EXISTING OVERHEAD UTILITIES
SILO INFRASTRUCTURE - 34.5KV OVERHEAD UTILITIES
POLE AND 1000KVA XFMR DETAILS

DRAWN BY	DATE	LEAD ENGINEER	DATE	CHECKED BY	DATE
G.J. Kubiak	6/29/94	Dan Larson	6/29/94	Donald Abel	6/29/94

PLANT/BLDG. NO.	FLOOR	SCALE	CLASS
OU4		NONE	

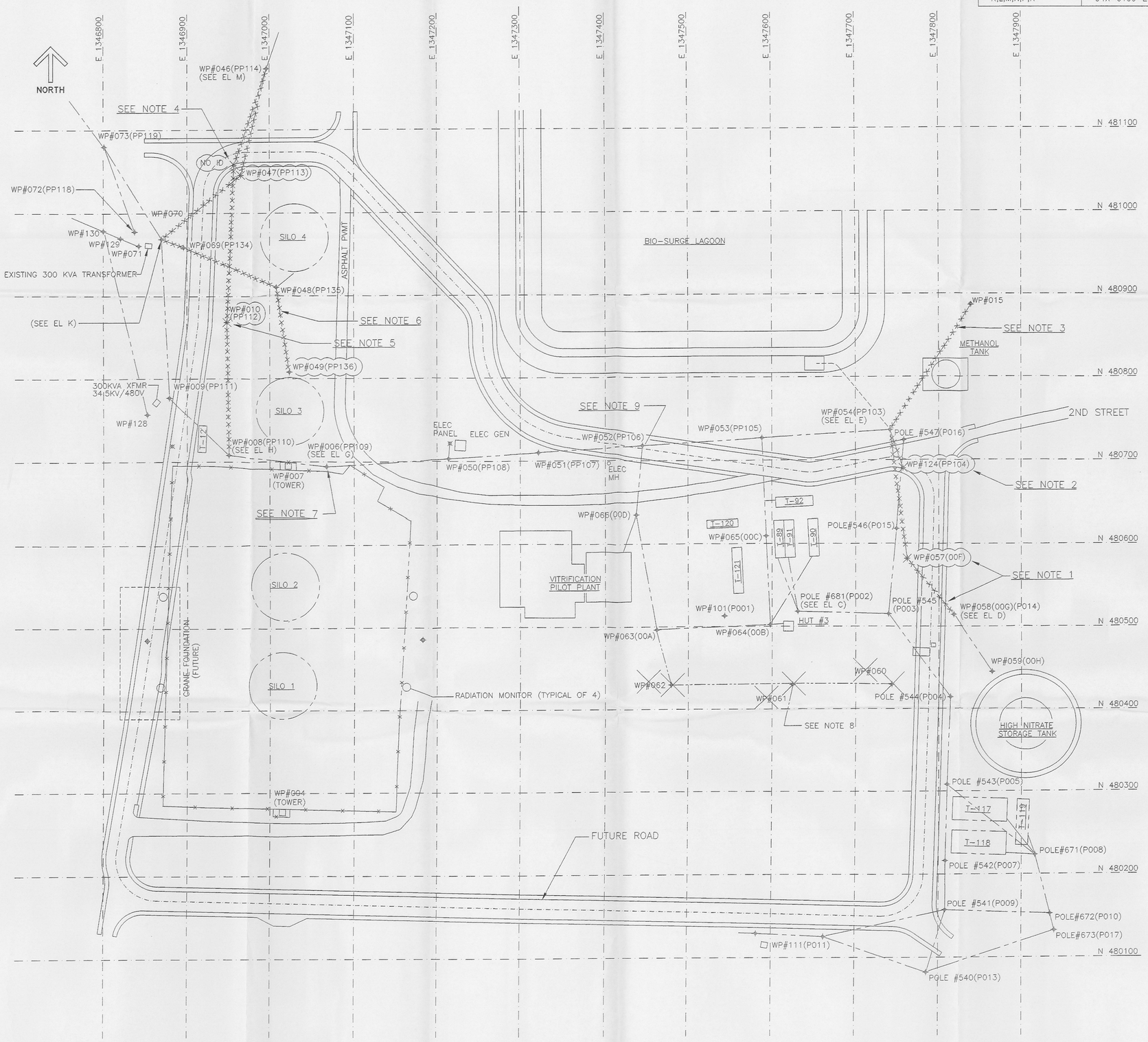
SUBMITTED FOR APPROVAL: A-E DATE
FDF APPROVAL: DATE 6/30/94

40315

DOE PROJECT NO.	FEMP PROJECT NO.	DRAWING INDEX CODE NO.	SHEET NO.	REV. NO.
	WBS 2.1.3.G.R	94X-6100-E-02238	1	0

ELEVATION REFERENCE DRAWING TABLE	
ELEVATION NUMBER	REFERENCE DRAWING NUMBER
A,B,C,D	94X-6100-E-02226
E,F,G,H,J	94X-6100-E-02227
K,L,M,N,P,R	94X-6100-E-02228

1657



000182

DEMOLITION NOTES:

(USING NEW POLE IDENTIFIERS ONLY)

1 REMOVE #4 AWG AL TRIPLEX (480V DISTRIBUTION LINE), SIGNAL CABLE AND ASSOCIATED HARDWARE BETWEEN POLE WP#054 THRU POLE WP#058. ALSO REMOVE POLE WP#057.

2 REMOVE #4 AWG AL TRIPLEX (480V DISTRIBUTION LINE) AND ASSOCIATED HARDWARE BETWEEN POLE WP#054 AND WP#124. ALSO REMOVE POLE WP#124.

3 REMOVE 480V TRIPLEX CABLE FROM WP#054 TO POLE WP#015.

4 REMOVE 480V AERIAL CABLE AND ASSOCIATED HARDWARE BETWEEN POLE WP#070 AND WP#046. REMOVE POLE WP#047 NOTING IT WILL BE RELOCATED AS SHOWN ON DRAWING # 94X-6100-E-02224.

5 REMOVE SIGNAL CABLES BETWEEN POLES WP#008, WP#010, NO ID POLE AND POLE WP#046. REMOVE POLE WP#010 AND SHORT UNIDENTIFIED POLE ADJACENT TO POLE WP#047.

6 REMOVE AERIAL FEEDER CABLE AND ASSOCIATED HARDWARE FROM POLE WP#070 THRU POLE WP#049 VIA POLE WP#069 & WP#048. ALSO REMOVE POLE WP#049.

7 AT POLE WP#006 REMOVE ALL EQUIPMENT AND CONDUIT ASSOCIATED WITH THE RTS SYSTEM. THIS WILL MAKE AVAILABLE BACKBOARD SPACE FOR MOUNTING NEW CONTROL AND SIGNAL BOXES. NOTE THAT EL "G", DWG 94X-6100-E-02227 IS NOT AN ACCURATE REPRESENTATION OF ALL EQUIPMENT TO BE REMOVED.

8 REMOVE TELEPHONE LINE FROM POLES WP#062, WP#061 AND WP#060. REMOVE POLES FOR FUTURE USE BY FDF.

9 POLE SHALL BE RELOCATED BY OTHERS.

GENERAL NOTES:

1 REMOVE ALL DOWN GUYS WITH REMOVAL OF ASSOCIATED POLES AND SPANS. REMOVE CABLE & ASSOCIATED HARDWARE. DIG GUY ANCHORS OUT AND RETURN GRADE TO LEVEL.

LEGEND:

NEW / OLD WP#000(P000)	UTILITY POLE AND IDENTIFIER
NEW / OLD POLE#000(P000)	13.2 KV UTILITY POLE AND INDENTIFIER
× × × × ×	REMOVE ALL ITEMS AS SHOWN AND NOTED
(highlighted)	REMOVE ALL ITEMS AS HIGHLIGHTED AND NOTED
— — — —	EXISTING AERIAL CABLE
- - - - - -	EXISTING ELECTRICAL DUCT BANK
—·—·—·—	EXISTING ELECTRICAL LINE

REF. DWG. NO.	DRAWING TITLE
40A-5500-E-00036	POLE MOUNTED ELEC. DIST. SYSTEM FOR THE WASTE PITE AREA

REV. NO.	ISSUE OR REVISION PURPOSE - DESCRIPTION	A-E	FDF	DATE
0	ISSUED FOR CONSTRUCTION	JKS 7/1/98	RCW 7/2/98	

INITIALS AND DATE

UNITED STATES DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

THIS DRAWING PREPARED BY

FLUOR DANIEL NORTHWEST, INC.
1100 JADWIN, P.O. BOX 1050
RICHLAND, WASHINGTON

PROJECT NAME: SILOS INFRASTRUCTURE

DRAWING TITLE: EXISTING OVERHEAD UTILITIES
SILO INFRASTRUCTURE – SITE PLAN (DEMOLITION)

DRAWN BY	DATE	LEAD ENGINEER	DATE	CHECKED BY	DATE
GJ KUBINSKI	03-25-98	Dom Longo	7-1-98	Roscoe Black	7-1-98

PLANT/BLDG. NO.	FLOOR	SCALE	CLASS
OU4		1"=50'	

SUBMITTED FOR APPROVAL — A-E — DATE
FDF APPROVAL — John Smith — DATE 7/1/98

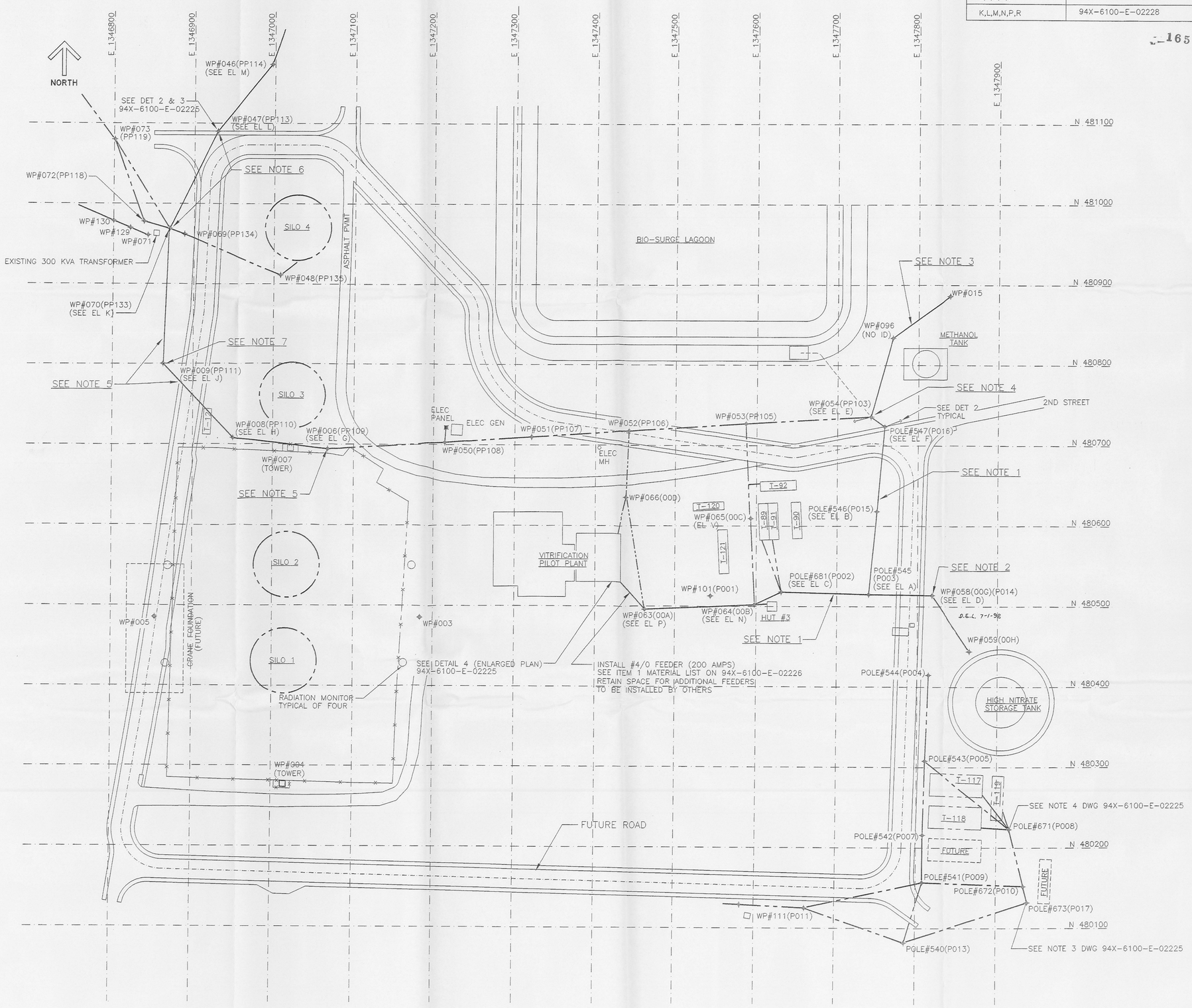
40315

DOE PROJECT NO.	FEMP PROJECT NO.	DRAWING INDEX CODE NO.	SHEET NO.	REV. NO.
	WBS 2.1.3.G.R	94X-6100-E-02223	1	0

03/23/98 10:00:02 AM J:\DGN\PLANT\SIGNDGN\01.DGN

ELEVATION REFERENCE DRAWING TABLE	
ELEVATION NUMBER	REFERENCE DRAWING NUMBER
A,B,C,D	94X-6100-E-02226
E,F,G,H,J	94X-6100-E-02227
K,L,M,N,P,R	94X-6100-E-02228

-1657



000181

CONSTRUCTION NOTES:

(USING NEW POLE IDENTIFIERS ONLY)

1 INSTALL NEW 480V AERIAL FEEDER CABLE FROM VITRIFICATION PLANT POLE WP#058 VIA POLE #545. CONNECT SECOND AERIAL CABLE AT POLE #545 AND CONTINUE TO POLE WP#054 VIA POLE #546 AND POLE #547. NEW AERIAL FEEDER ROUTES TO METHANOL TANK VIA POLE#681, POLE #545, POLE #546, POLE #547, POLE WP#054 AND WP #06. THIS FEEDER IS #4/0 (200 AMPS).

2 AT POLE #545 TERMINATE NEW FEEDER TO EXST FEEDER AT POLE WP#059 TO HIGH NITRATE STORAGE TANK. (SIZE #4/0 – 200 AMPS)

3 RELOCATE CABLE BETWEEN POLE WP#054 & POLE WP#015, VIA WP #096 AS SHOWN ON PLAN. USE EXISTING CABLE AND/OR NEW CABLE AS REQUIRED.

4 TERMINATE NEW CONDUCTORS AT POLE WP#054. ADD TAPS FROM NEW FEEDER TO EXST UNDERGROUND FEEDER TO BIO-SURGE LAGOON AND EXST AERIAL FEEDER TO POLE WP#015.

5 INSTALL TWO PAIR TELEPHONE CABLES FROM SIGNAL BOX AT POLE WP#006 TO POLE WP#046 VIA POLE WP#008, POLE WP#009, POLE WP#070 AND RELOCATED POLE WP#047. AT POLE WP#006 CONNECT TWO PAIR TELEPHONE CABLE TO EXISTING CABLE. EXACT LOCATION OF EXST CABLES TO BE DETERMINED IN FIELD.

RELOCATE EXISTING POLE WP#169 (PP134) APPROXIMATELY 7 FT WEST OF EXISTING LOCATION.

6 INSTALL POLE WP#047. AT POLE WP#070 RECONNECT AERIAL POWER CABLE FEEDING RELOCATED POLE WP#047 TO EXST DISC SWITCH AND CONDUIT RISER. CONTINUE POWER CABLE VIA POLE WP#047 TO POLE WP#046.

7 RELOCATE EXISTING POLE WP#009 (PP111) APPROXIMATELY 16 FT NORTHWEST OF EXISTING LOCATION. MAINTAIN 15 FT DISTANCE FROM 34.5 KV LINE. BE AWARE THAT POLE WILL SUPPORT ROAD LIGHT.

GENERAL NOTES:

1 CONSTRUCTION SHALL MEET REQUIREMENTS OF THE 1997 NATIONAL ELECTRICAL SAFETY CODE AND 1996 NATIONAL ELECTRICAL CODE.

2 SEE DWG 94X-6100-E-02223 FOR EXISTING OVERHEAD CABLES AND HARDWARE TO BE REMOVED.

3 FIELD VERIFY ALL EXISTING CABLE SIZES, NUMBER OF CONDUCTORS AND INSULATION TYPES TO ENSURE COMPATABILITY WITH NEW CABLES BEING ADDED.

4 VERIFY FIELD CONDITIONS AND MEASUREMENTS. COORDINATE WITH EXISTING GRID & UTILITY DRAWINGS.

5 FOR REDESIGN OF 13.2 KV DISTRIBUTION SYSTEM, PROJECT ORDER 179 DRAWING LIST SEE DRAWING 96X-5900-X-00350.

6 CONTRACTOR TO VERIFY ALL PANELBOARD CIRCUITS PRIOR TO ANY WORK. CONTRACTOR TO SUPPLY CORRECT CIRCUIT NUMBERS TO FDF. CONTRACTOR TO CORRECT PANELBOARD SCHEDULES ACCORDINGLY.

7 EVACUATION LINE MUST HAVE 40" CLEARANCE FROM 480V LINES.

LEGEND:

NEW / OLD WP#000(P000)	UTILITY POLE AND IDENTIFIER
NEW / OLD POLE#000(P000)	13.2 KV UTILITY POLE AND INDENTIFIER
X X X X X	REMOVE ALL ITEMS AS SHOWN AND NOTED
	REMOVE ALL ITEMS AS HIGHLIGHTED AND NOTED
	EXISTING AERIAL CABLE
	EXISTING ELECTRICAL DUCT BANK
	EXISTING ELECTRICAL LINE
	PLANNED FUTURE EQUIPMENT

REF. DWG. NO.	DRAWING TITLE
40A-5500-E-00036	POLE MOUNTED ELEC. DIST. SYSTEM FOR THE WASTE PITE AREA

REV. NO.	ISSUE OR REVISION PURPOSE - DESCRIPTION	A-E	FDF	DATE
0	ISSUED FOR CONSTRUCTION	7/1/98	7/2/98	

INITIALS AND DATE

UNITED STATES DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

THIS DRAWING PREPARED BY
FLUOR DANIEL NORTHWEST, INC.
1100 JADWIN, P.O. BOX 1050
RICHLAND, WASHINGTON

PROJECT NAME
SILOS INFRASTRUCTURE

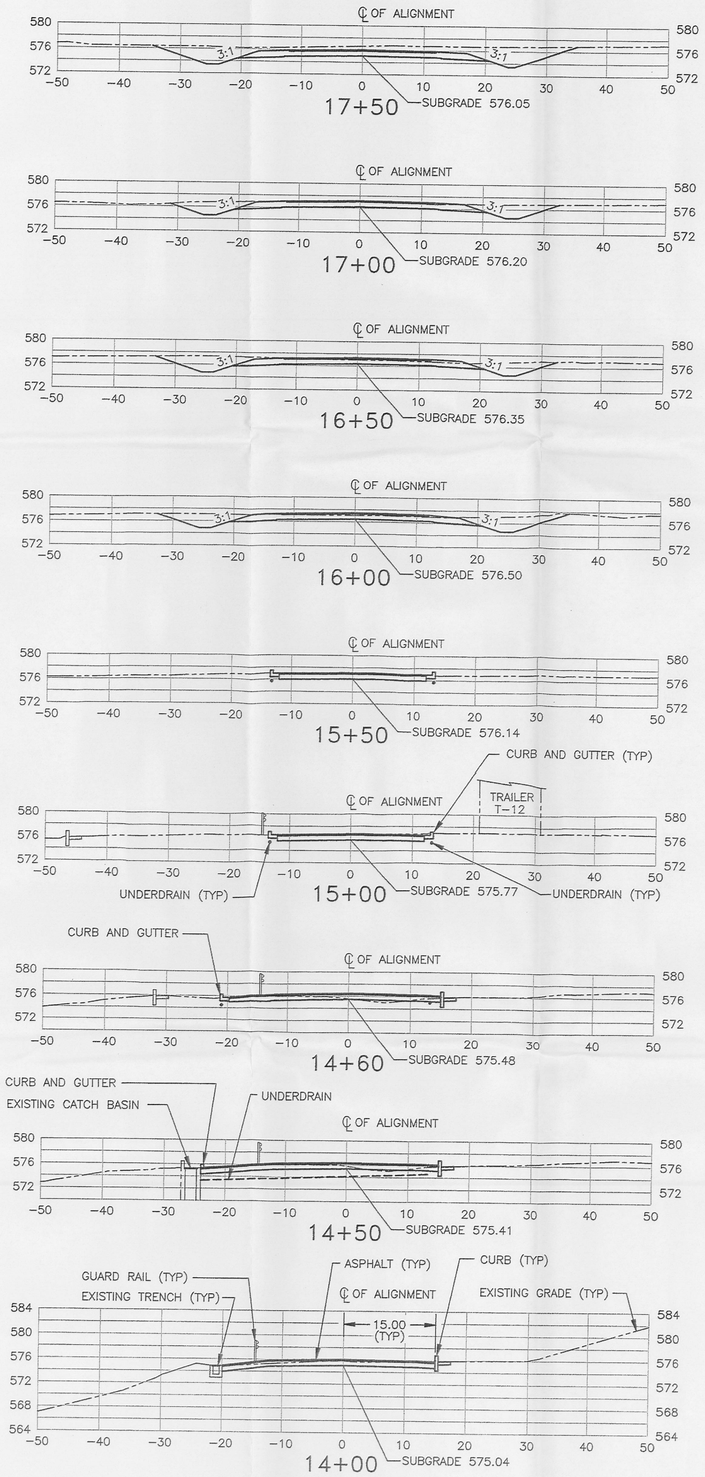
DRAWING TITLE
EXISTING OVERHEAD UTILITIES
SILOS INFRASTRUCTURE – SITE PLAN (MODIFICATIONS)

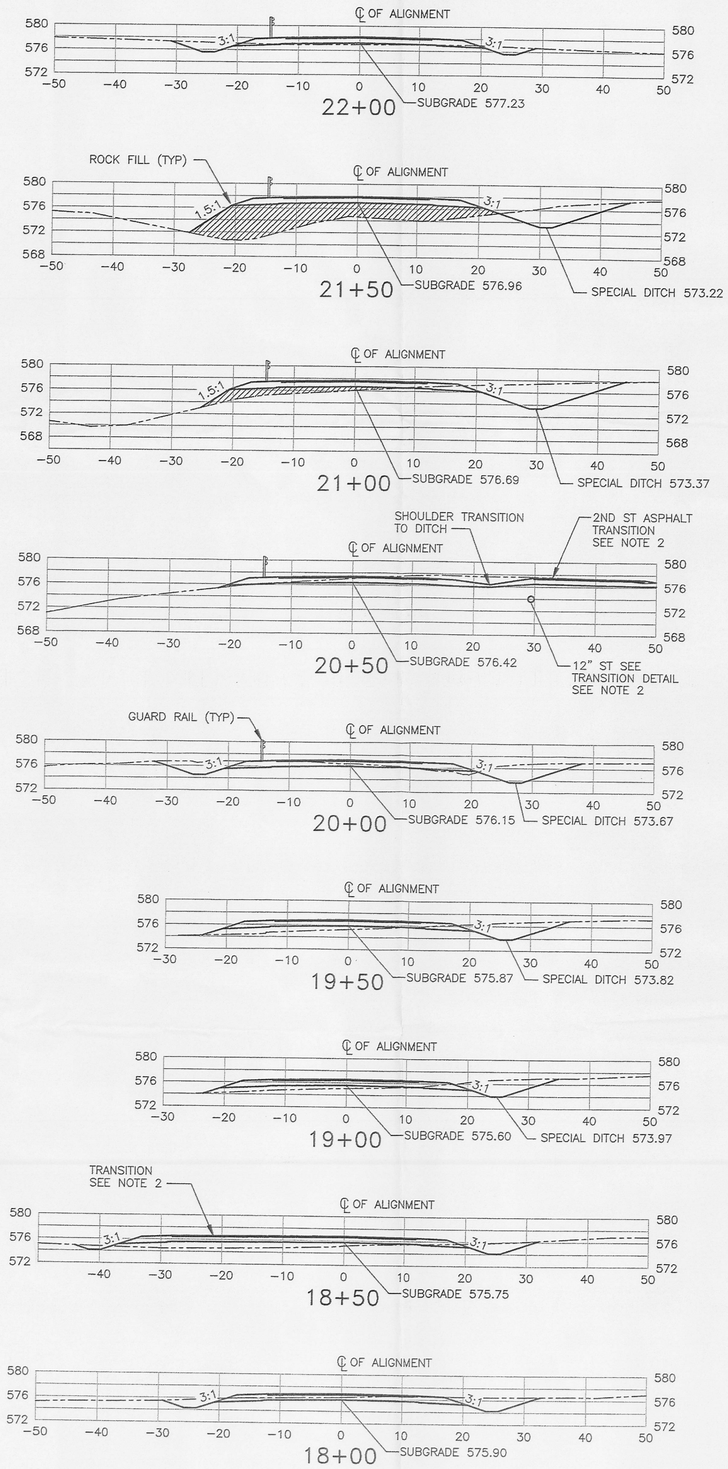
DRAWN BY	DATE	LEAD ENGINEER	DATE	CHECKED BY	DATE
GJ KUBINSKI	03-25-98	Dan Jarson	7-1-98	Roger Ward	7-1-98

PLANT/BLDG. NO.	FLOOR	SCALE	CLASS
OU4		1"=50'	

SUBMITTED FOR APPROVAL — A-E — DATE
FDF APPROVAL — DATE 7/1/98
40315

DOE PROJECT NO.	FEMP PROJECT NO.	DRAWING INDEX CODE NO.	SHEET NO.	REV. NO.
	WBS 2.1.3.G.R	94X-6100-E-02224	1	0





1657

NOTES

1. FOR LEGEND, ABBREVIATIONS, AND NOTES SEE DRAWING 94X-6100-G-02209.
2. FOR INTERSECTION DETAILS SEE DRAWING 94X-6100-G-02219.
3. FROM STA 9+00 TO STA 14+00 APPLY TYPICAL GRAVEL CROSS SECTION TO ROAD UNTIL DIRECTED BY FDF.

REF DWG NO.	DRAWING TITLE
94X-6100-X-02208	DRAWING LIST AND VICINITY MAP
94X-6100-G-02211	PLAN AND PROFILE – STATION 12+00 TO 25+00
94X-6100-G-02218	SECTIONS AND DETAILS
94X-6100-G-02219	INTERSECTION DETAILS
94X-6100-G-02243	MISCELLANEOUS DETAILS

REV. NO.	ISSUE OR REVISION PURPOSE – DESCRIPTION	A-E	FDF	DATE
0	CERTIFIED FOR CONSTRUCTION			6/29/98

INITIALS AND DATE

UNITED STATES DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

THIS DRAWING PREPARED BY
FLUOR DANIEL NORTHWEST
RICHLAND, WASHINGTON

PROJECT NAME
SILOS INFRASTRUCTURE PROJECT

DRAWING TITLE
CROSS SECTIONS
STATION 14+00 TO 22+00

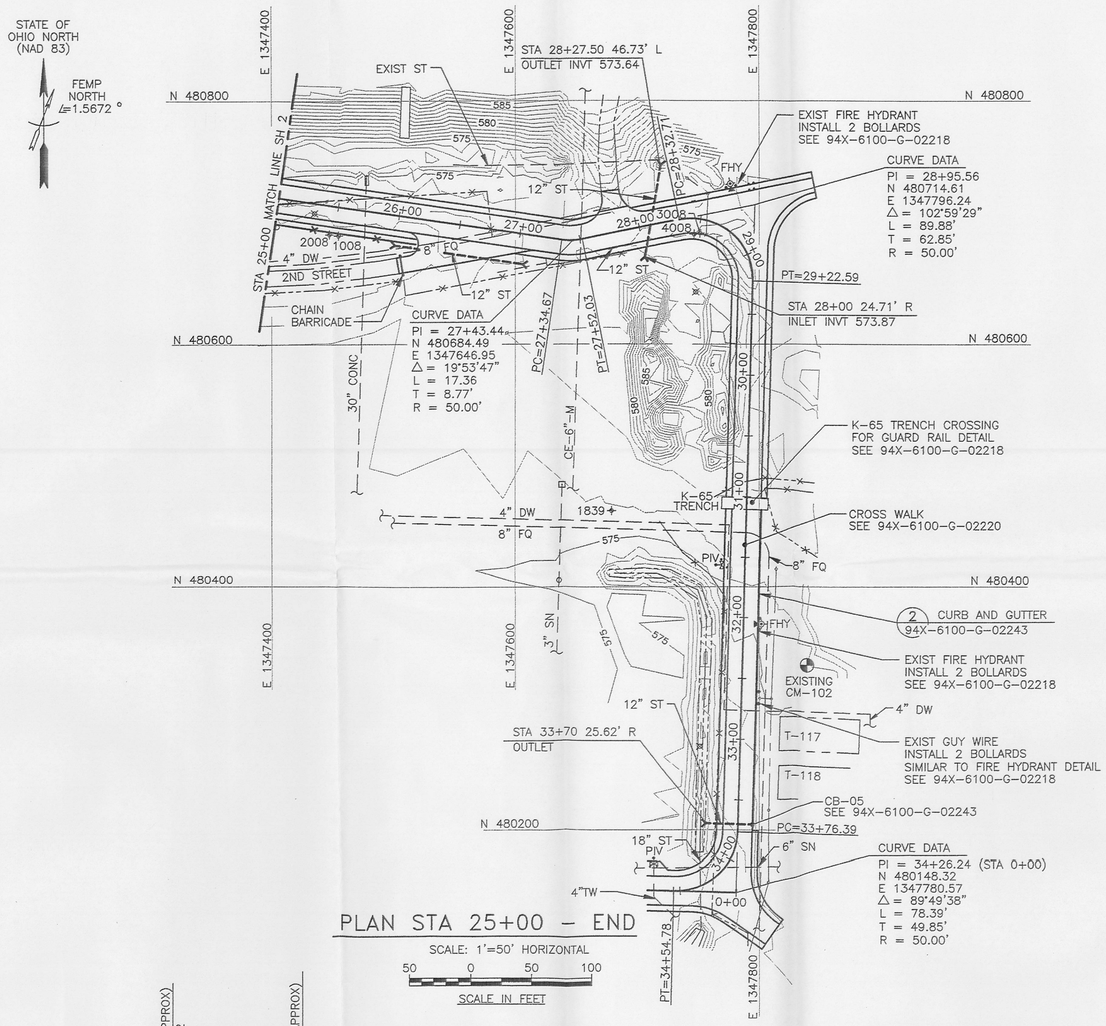
DRAWN BY	DATE	LEAD ENGINEER	DATE	CHECKED BY	DATE
RS CHRISTENSEN	6-24-98		6/29/98		6/29/98

PLANT/BLDG. NO.	FLOOR	SCALE	CLASS
04U		1"=10'	

SUBMITTED FOR APPROVAL — A-E — DATE
FDF APPROVAL — DATE 6/29/98
40315

DOE PROJECT NO.	FEMP PROJECT NO.	DRAWING INDEX CODE NO.	SHEET NO.	REV. NO.
	WBS 2.1.3.G.R	94X-6100-G-02215	3 OF 5	0

000180

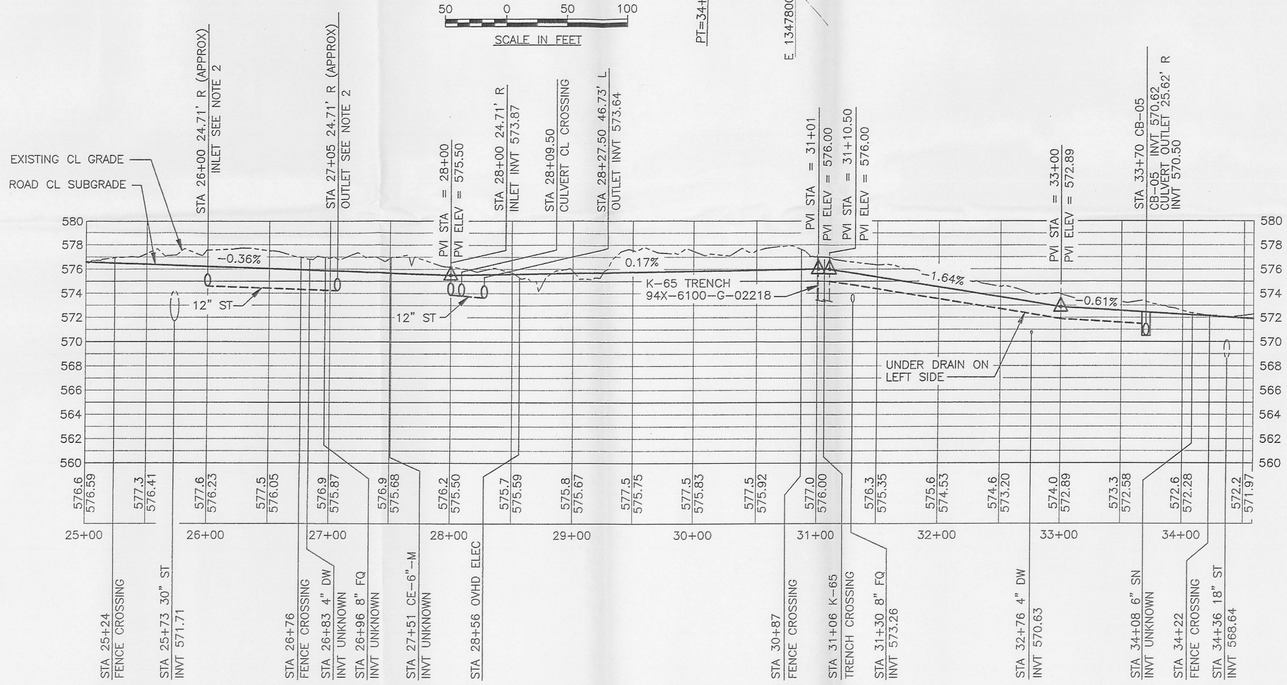


PLAN STA 25+00 – END

SCALE: 1'=50' HORIZONTAL

50 0 50 100

SCALE IN FEET



PROFILE STA 25+00 TO END

SCALE: 1"=50' HORIZONTAL
1"=5' VERTICAL

1657

000179

NOTES

1. FOR PLACEMENT AND LOCATION OF NEW ELECTRICAL CONDUITS SEE DRAWING 94X-6100-E-02230.
2. FOR ROAD INTERSECTIONS SEE DRAWING 94X-6100-G-02219.
3. FOR LEGEND, ABBREVIATIONS AND NOTES SEE 94X-6100-G-02209.
4. PROFILE GRADE INDICATES SUBGRADE ELEVATIONS.

REF DWG NO.	DRAWING TITLE
94X-6100-X-02208	DRAWING LIST AND VICINITY MAP
94X-6100-G-02216	CROSS SECTIONS – STATION 22+50 TO 30+50
94X-6100-G-02217	CROSS SECTIONS – STATION 31+50 TO END
94X-6100-G-02218	SECTIONS AND DETAILS
94X-6100-G-02219	INTERSECTION DETAILS
94X-6100-G-02243	MISCELLANEOUS DETAILS
94X-6100-E-02230	EXISTING OVERHEAD UTILITIES SITE PLAN – MODIFICATIONS

REV. NO.	ISSUE OR REVISION PURPOSE – DESCRIPTION	A-E	FDF	DATE
0	CERTIFIED FOR CONSRUCTION			

INITIALS AND DATE

UNITED STATES DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

THIS DRAWING PREPARED BY
FLUOR DANIEL NORTHWEST
RICHLAND, WASHINGTON

PROJECT NAME
SILOS INFRASTRUCTURE PROJECT

DRAWING TITLE
PLAN AND PROFILE
STATION 25+00 TO END

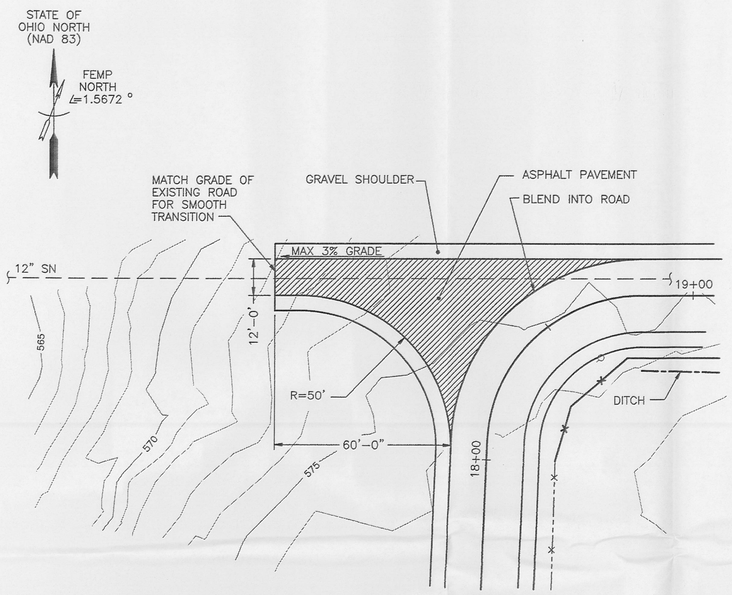
DRAWN BY	DATE	LEAD ENGINEER	DATE	CHECKED BY	DATE
RS CHRISTENSEN	6-24-98		6/24/98		6/24/98

PLANT/BLDG. NO.	FLOOR	SCALE	CLASS
OU4		1'=50'	

SUBMITTED FOR APPROVAL — A-E — DATE
FDF APPROVAL — DATE 6/28/98

40315

DOE PROJECT NO.	FEMP PROJECT NO.	DRAWING INDEX CODE NO.	SHEET NO.	REV. NO.
	WBS 2.1.3.G.R	94X-6100-G-02212	3 OF 3	0

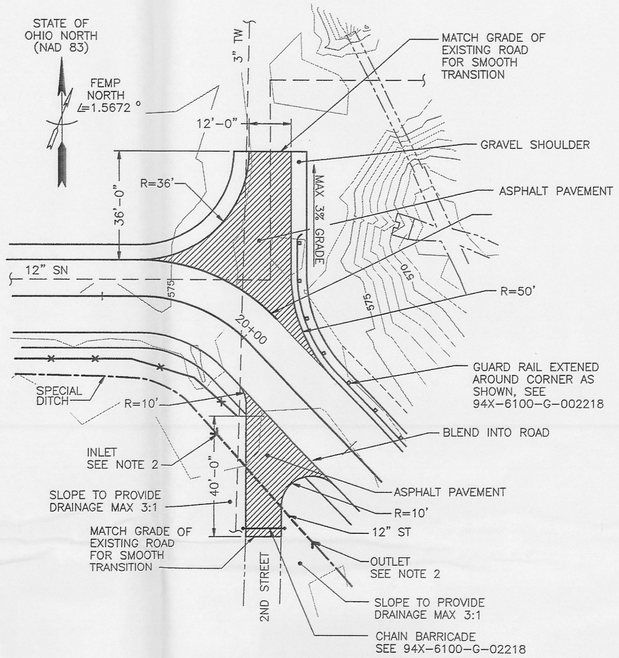


TRANSITION DETAIL

SCALE: 1"=20'

20 0 20 40

SCALE IN FEET

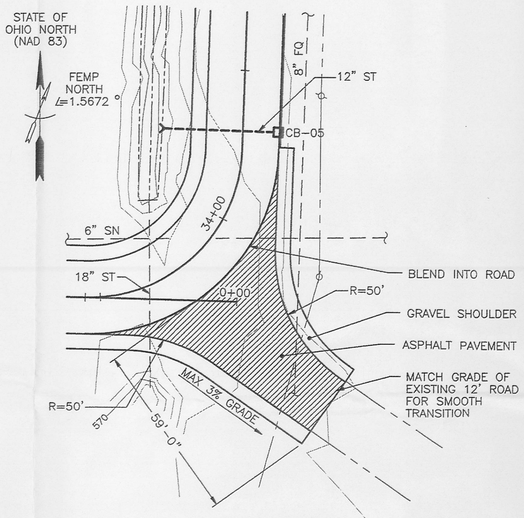


TRANSITION DETAIL

SCALE: 1"=20'

20 0 20 40

SCALE IN FEET

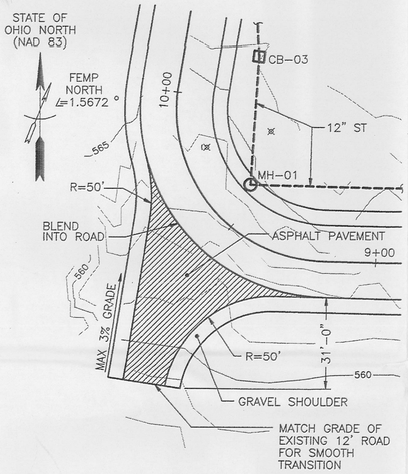


TRANSITION DETAIL

SCALE: 1"=20'

20 0 20 40

SCALE IN FEET

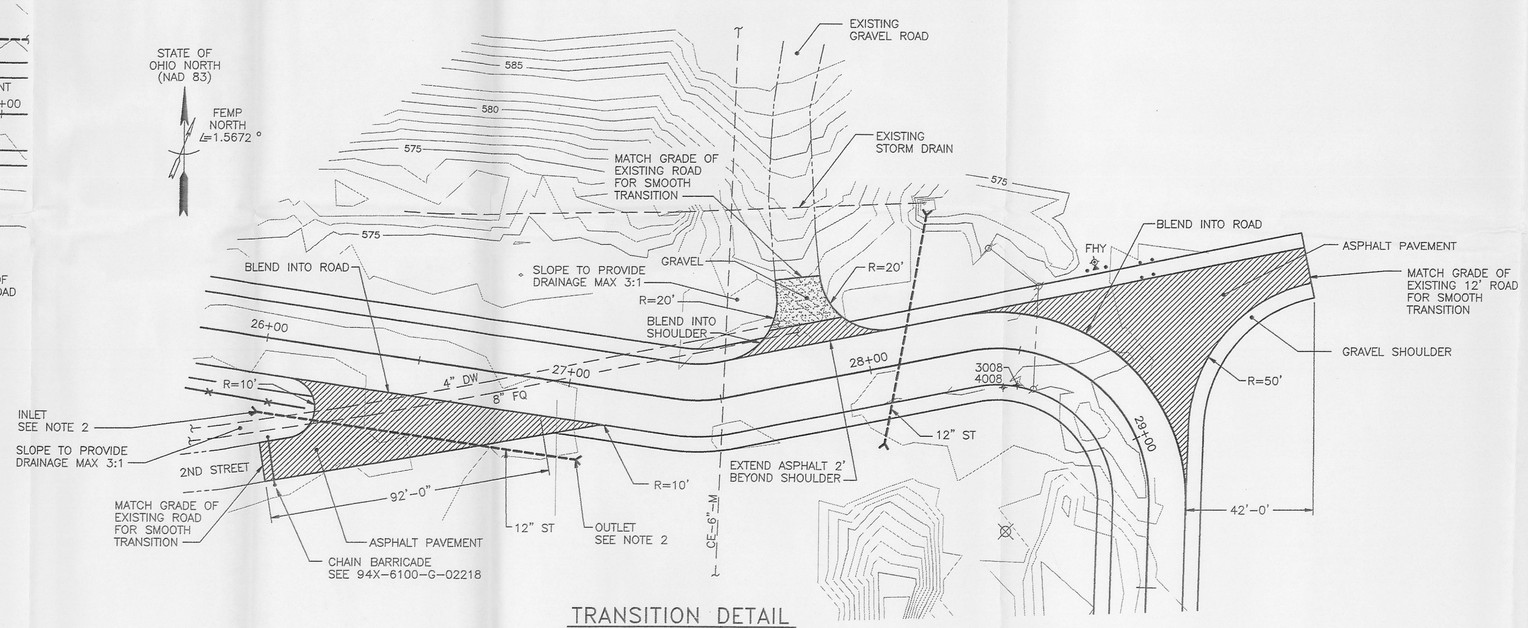


TRANSITION DETAIL

SCALE: 1"=20'

20 0 20 40

SCALE IN FEET



TRANSITION DETAIL

SCALE: 1"=20'

20 0 20 40

SCALE IN FEET

000178

NOTES

1. FOR LEGEND, ABBREVIATIONS, AND NOTES SEE 94X-6100-G-02209.
2. PLACE INLET AND OUTLET OF 12" ST AT LOW POINT IN DITCH. FOR CULVERT DETAILS SEE 94X-6100-G-02218.

REF DWG NO.	DRAWING TITLE
94X-6100-X-02208	DRAWING LIST AND VICINITY MAP

REV. NO.	ISSUE OR REVISION PURPOSE – DESCRIPTION	A-E	FDF	DATE
0	CERTIFIED FOR CONSTRUCTION			

INITIALS AND DATE

UNITED STATES DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

THIS DRAWING PREPARED BY

FLUOR DANIEL NORTHWEST
RICHLAND, WASHINGTON

PROJECT NAME

SILOS INFRASTRUCTURE PROJECT

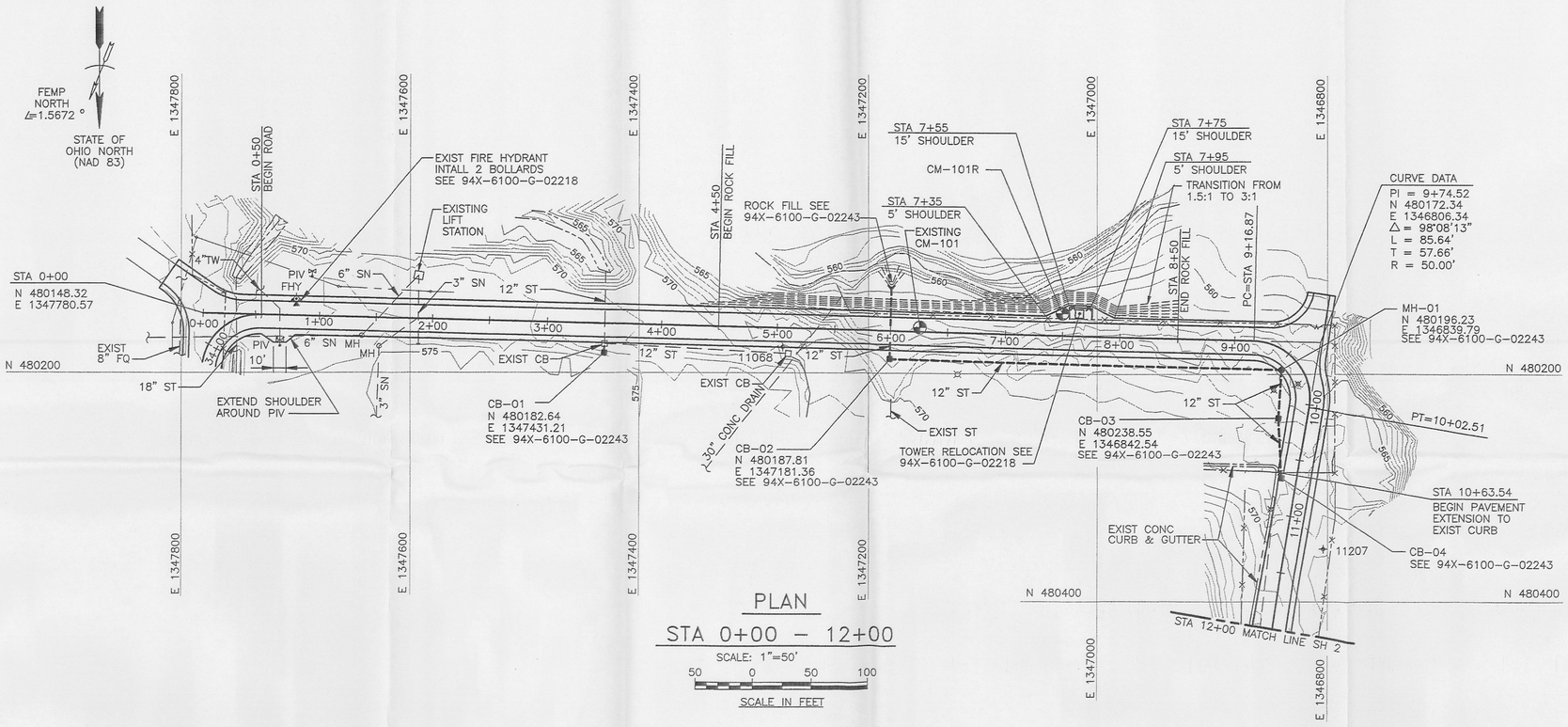
DRAWING TITLE

INTERSECTION DETAILS

DRAWN BY	DATE	LEAD ENGINEER	DATE	CHECKED BY	DATE
RS CHRISTENSEN	6-24-98		6/24/98		6/29/98
PLANT/BLDG. NO.		FLOOR		SCALE	CLASS
0U4				1"=20'	
SUBMITTED FOR APPROVAL		FDF APPROVAL		40315	
A-E	DATE		DATE 6/29/98		

DOE PROJECT NO.	FEMP PROJECT NO.	DRAWING INDEX CODE NO.	SHEET NO.	REV. NO.
	WBS 2.1.3.G.R	94X-6100-G-02219	1 OF 1	0

1657



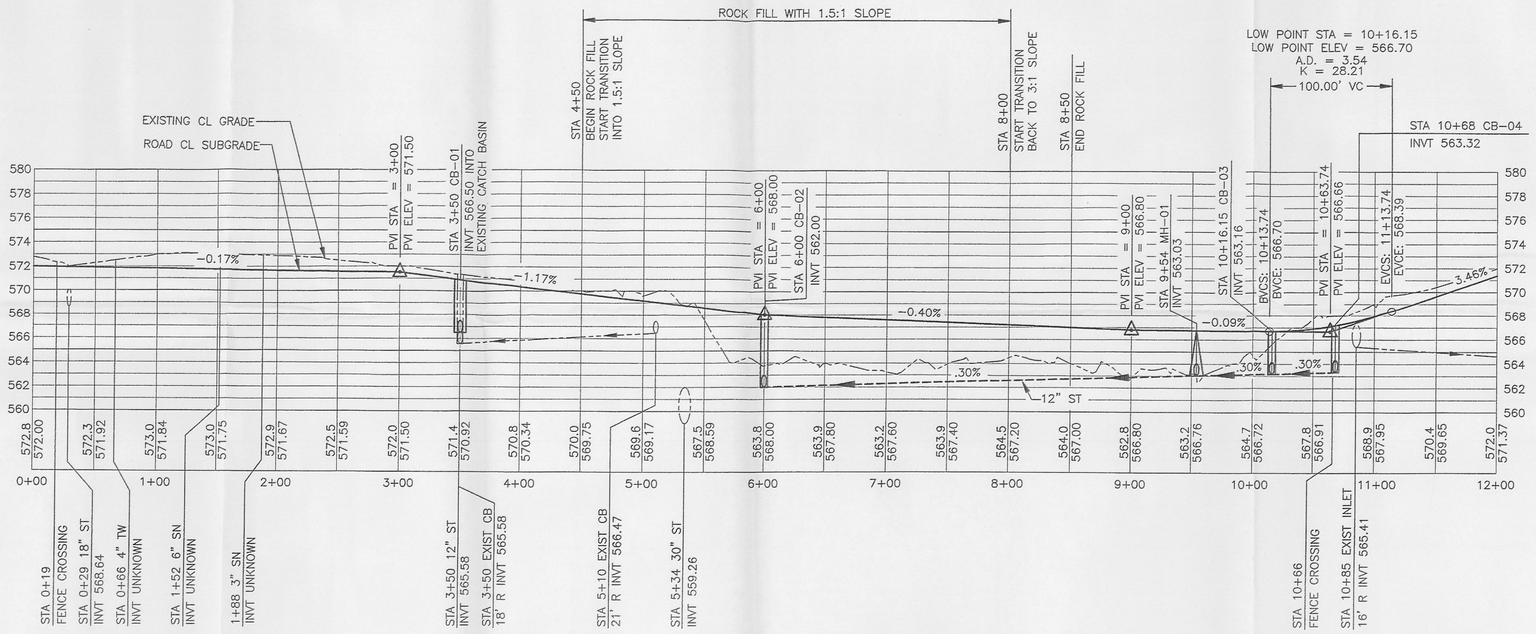
PLAN

STA 0+00 – 12+00

SCALE: 1"=50'

50 0 50 100

SCALE IN FEET



PROFILE STA 0+00 TO STA 12+00

SCALE: 1"=50' HORIZONTAL
1"=5' VERTICAL

000177

NOTES

1. FOR PLACEMENT AND LOCATION OF NEW ELECTRICAL CONDUITS SEE DRAWING 94X-6100-E-02230.
2. FOR ROAD INTERSECTIONS SEE DRAWING 94X-6100-G-02219.
3. FOR LEGEND, ABBREVIATIONS AND NOTE SEE 94X-6100-G-02209.
4. PROFILE GRADE INDICATES SUBGRADE ELEVATIONS.

REF DWG NO.	DRAWING TITLE
94X-6100-X-02208	DRAWING LIST AND VICINITY MAP
94X-6100-G-02213	CROSS SECTIONS – STATION 0+00 TO 7+35
94X-6100-G-02214	CROSS SECTIONS – STATION 7+55 TO 13+50
94X-6100-G-02218	SECTIONS AND DETAILS
94X-6100-G-02219	INTERSECTION DETAILS
94X-6100-G-02243	MISCELLANEOUS DETAILS
94X-6100-E-02230	EXISTING OVERHEAD UTILITIES SITE PLAN – MODIFICATIONS

REV. NO.	ISSUE OR REVISION PURPOSE – DESCRIPTION	A-E	FDF	DATE
0	CERTIFIED FOR CONSTRUCTION			

INITIALS AND DATE

UNITED STATES DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

THIS DRAWING PREPARED BY
FLUOR DANIEL NORTHWEST
RICHLAND, WASHINGTON

PROJECT NAME
SILOS INFRASTRUCTURE PROJECT

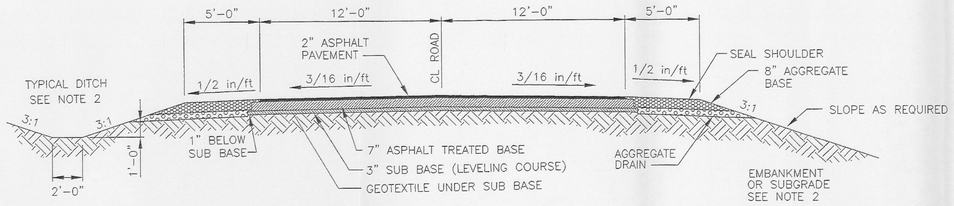
DRAWING TITLE
PLAN AND PROFILE
STATION 0+00 TO 12+00

DRAWN BY	DATE	LEAD ENGINEER	DATE	CHECKED BY	DATE
RS CHRISTENSEN	6-24-98		6/24/98		6/24/98

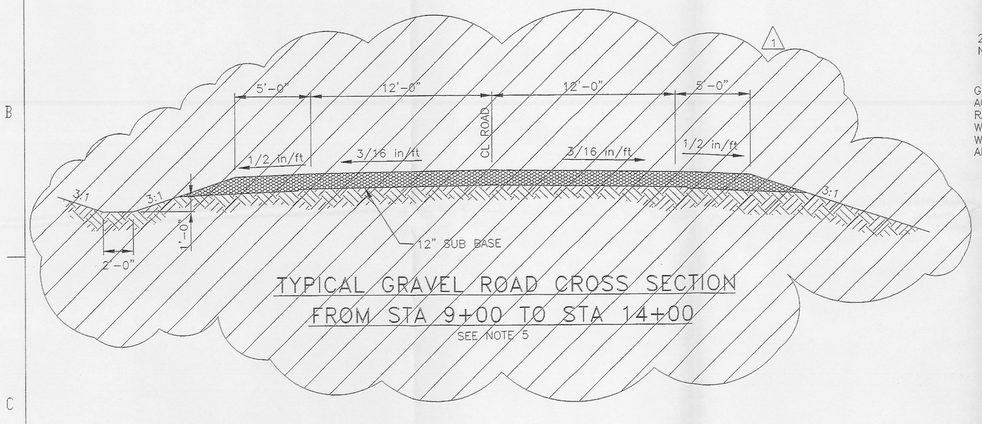
PLANT/BLDG. NO.	FLOOR	SCALE	CLASS
OU4		1"=50'	

SUBMITTED FOR APPROVAL — A-E — DATE
FDF APPROVAL — DATE 6/29/98
40315

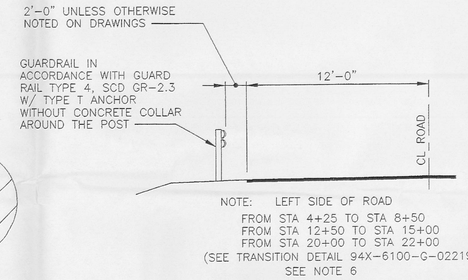
DOE PROJECT NO.	FEMP PROJECT NO.	DRAWING INDEX CODE NO.	SHEET NO.	REV. NO.
	WBS 2.1.3.G.R	94X-6100-G-02210	1 OF 3	0



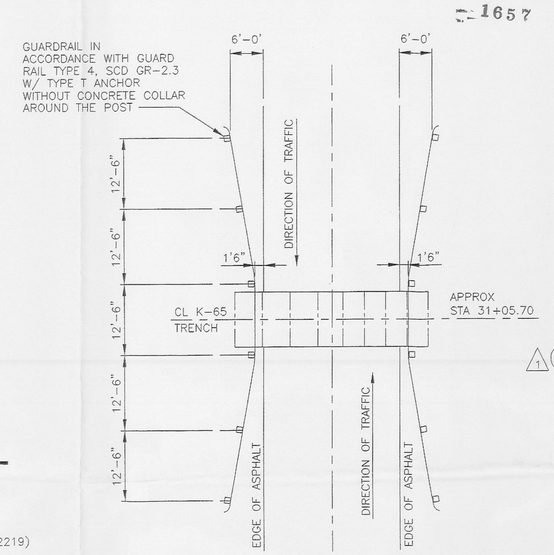
TYPICAL ROAD CROSS SECTION



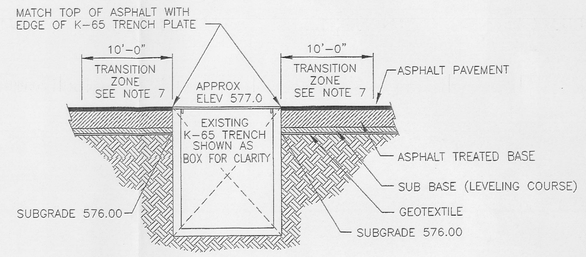
TYPICAL GRAVEL ROAD CROSS SECTION
FROM STA 9+00 TO STA 14+00
SEE NOTE 5



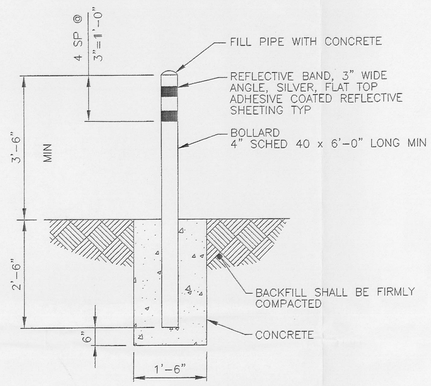
GUARD RAIL
SCALE: NONE



GUARD RAIL @ K-65 TRENCH
SCALE: NONE



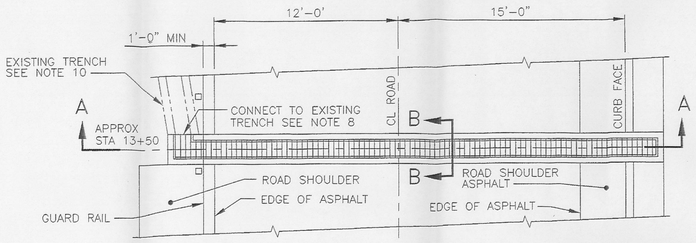
K-65 TRENCH CROSSING
SCALE: NONE



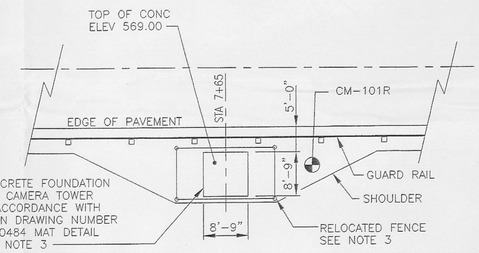
PRIOR TO PAINTING BOLLARD, PIPE SHALL BE THOROUGHLY WIRE BRUSHED TO REMOVE ALL DIRT, RUST AND OTHER FOREIGN MATERIAL. OIL, GREASE AND SIMILAR SUBSTANCES SHALL BE REMOVED WITH SOLVENTS PRIOR TO WIRE BRUSHING.

PAINT COLORS SHALL BE IN ACCORDANCE WITH ANSI Z53.1, SAFETY COLOR CODE FOR MARKING PHYSICAL HAZARDS.

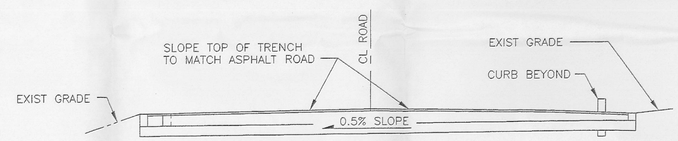
TYPICAL BOLLARD DETAIL
SCALE: NONE



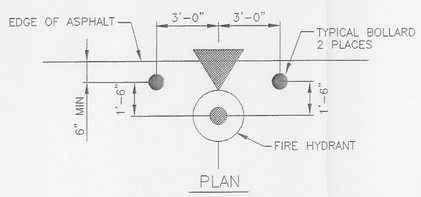
TRENCH CROSSING @ STA 13+50
SCALE: NONE



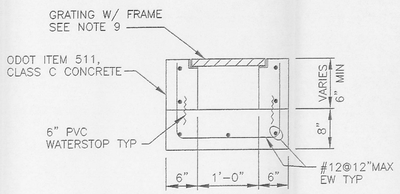
CAMERA TOWER BASE
SCALE: NONE



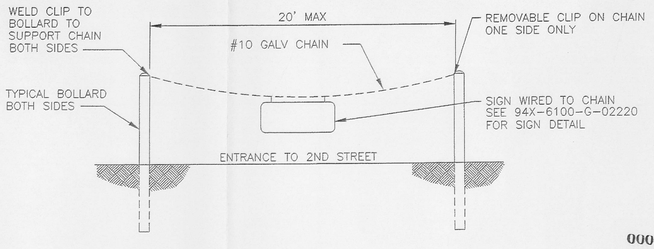
SECTION A-A
SCALE: NONE



FIRE HYDRANT PROTECTION
SCALE: NONE



SECTION B-B
SCALE: NONE



TYPICAL CHAIN BARRICADE DETAIL
SCALE: NONE

000176

NOTES

1. SEE PLAN AND PROFILE SHEETS AND CROSS SECTION SHEETS FOR DETAILS OF GRADING AND DRAINAGE.
2. IN ORDER TO AVOID CONFLICTS WITH EXISTING FEATURES AND UTILITIES, LOCALIZED CHANGES IN SIDE SLOPES AND DITCH WIDTH MAY BE REQUIRED IN ORDER TO CONSTRUCT THE ROAD AND IT'S DRAINAGE SYSTEM. ANY CHANGES SHALL BE COORDINATED WITH FDF.
3. RELOCATE EXISTING CAMERA TOWER AND FENCE TO SOUTH SIDE OF ROAD AS SHOWN IN CAMERA TOWER BASE DETAIL. SALVAGE EXISTING FENCE AND REINSTALL IN NEW LOCATION. PROVIDE NEW CONCRETE FOUNDATION USING ODOT ITEM 511, CLASS C CONCRETE. PROVIDE NEW EMBEDDED TOWER BASE. INSTALL CONDUIT AS DIRECTED BY FDF. SEE ELECTRICAL DRAWINGS FOR ADDITIONAL INFORMATION.
4. MATERIAL FOR TYPICAL ROAD CROSS SECTION:

ASPHALT PAVEMENT	ODOT ITEM 404
ASPHALT TREATED BASE	ODOT ITEM 301
SUBBASE (LEVELING COURSE)	ODOT ITEM 304
AGGREGATE BASE	ODOT ITEM 304
GEOTEXTILE	ODOT ITEM 712.09 TYPE D
SEAL (FOR SHOULDER)	ODOT ITEM 408 @ 0.5 GAL/SQ YD
AGGREGATE DRAIN	ODOT ITEM 605.06

5. FROM STA 9+00 TO STA 14+00 CONSTRUCT THE ROADWAY STRUCTURAL SECTION USING ODOT ITEM 304 ONLY. (1)
6. GUARDRAIL TO BE INSTALLED AFTER ASPHALT IS LAYED.
7. TRANSITION ROAD FROM CROWNED SECTION TO LEVEL SECTION THAT MATCHES TOP EDGE OF K-65 TRENCH FOR SMOOTH TRANSITION.
8. MATCH INVERT OF EXITING TRENCH TO INVERT OF NEW TRENCH TO PROVIDE CONTINUOUS SLOPE. CONNECT TRENCH TO EXITING TRENCH WITH MIN 4 DOWELS EQ SPACED. DOWELS SHALL PROVIDE A MIN 4" EMBEDMENT INTO EXISTING TRENCH AND MIN 12" EMBEDMENT INTO TRENCH CROSSING AND BE CONNECTED TO REINFORCEMENT.
9. MATCH EXISTING R-4999-DX GRATING AND FRAME. REUSE EXITING WHEREVER POSSIBLE.
10. CLEAN EXISTING TRENCH OF ALL DEBRIS.

REF DWG NO.	DRAWING TITLE
94X-6100-X-02208	DRAWING LIST AND VICINITY MAP
94X-6100-G-02210	PLAN AND PROFILE - STATION 0+00 TO 11+00
94X-6100-G-02211	PLAN AND PROFILE - STATION 11+00 TO 25+00
94X-6100-G-02212	PLAN AND PROFILE - STATION 25+00 TO END

REV. NO.	ISSUE OR REVISION PURPOSE - DESCRIPTION	A-E	FDF	DATE
1	PER DCN # 40315-005	RS 7/29/98	RLM 7/29/98	
0	CERTIFIED FOR CONSTRUCTION	J.S. 7/1/98	R.M. 7/2/98	

INITIALS AND DATE

UNITED STATES DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

THIS DRAWING PREPARED BY
FLUOR DANIEL NORTHWEST
RICHLAND, WASHINGTON

PROJECT NAME
SILOS INFRASTRUCTURE PROJECT

DRAWING TITLE
SECTIONS AND DETAILS

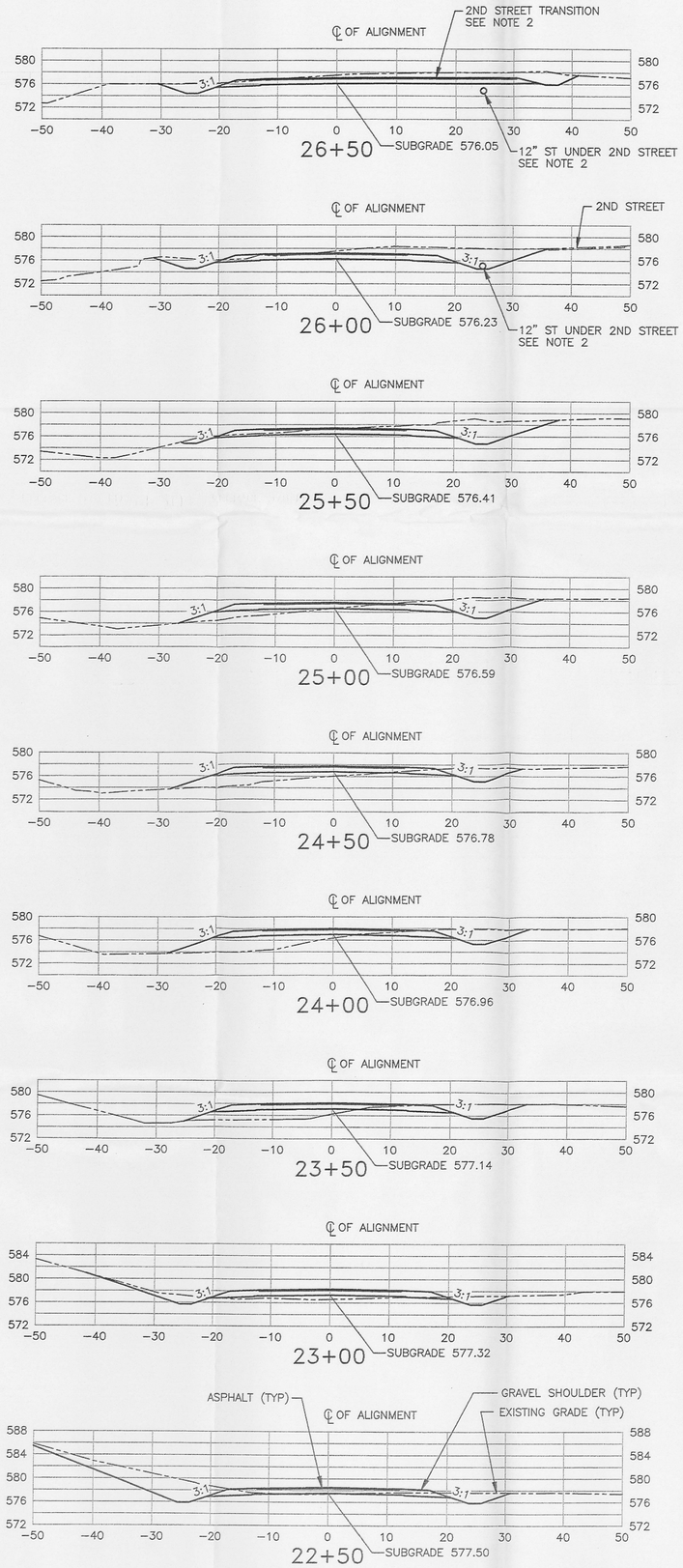
DRAWN BY	DATE	LEAD ENGINEER	DATE	CHECKED BY	DATE
RS CHRISTENSEN	6-24-98	DAN LARSON	7/1/98	ROSCOE BLACK	7/1/98

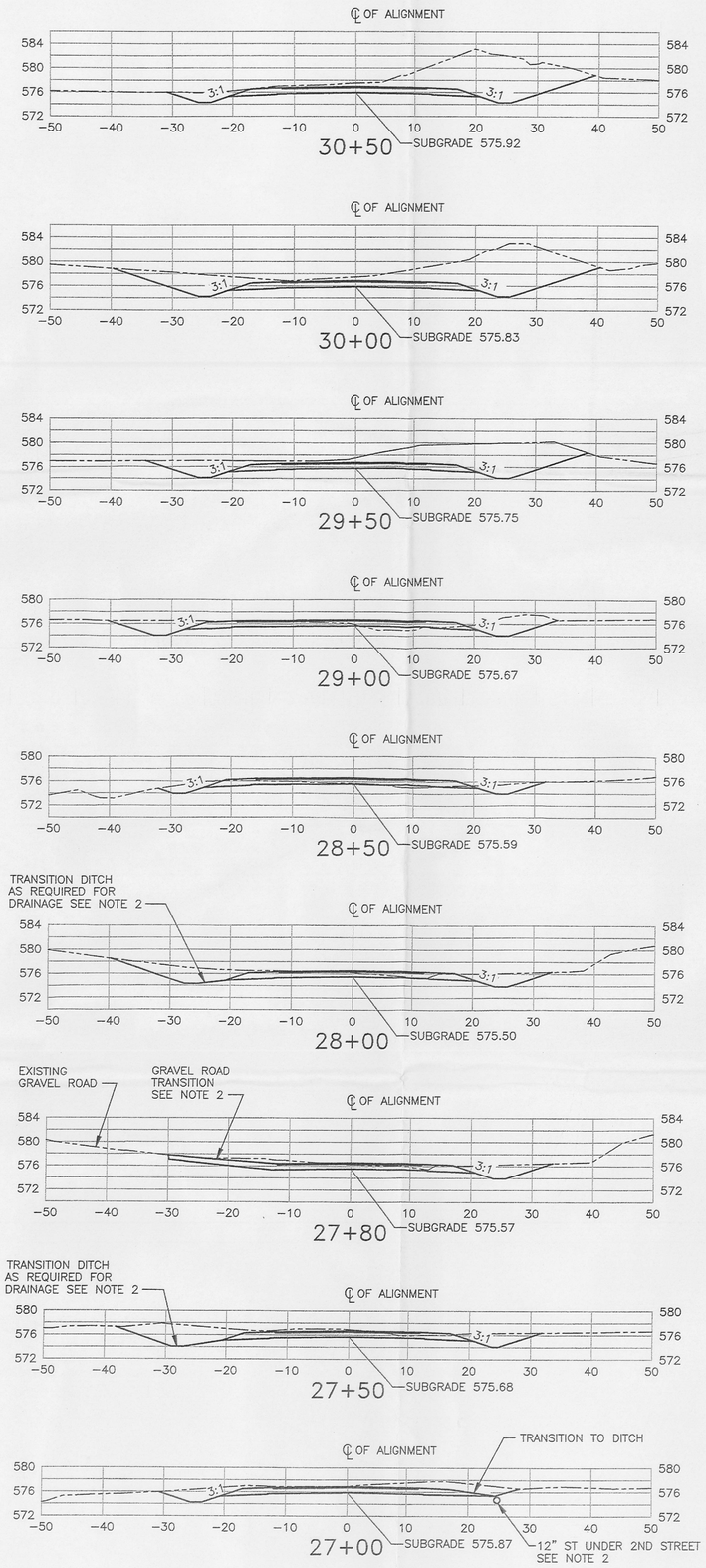
PLANT/BLDG. NO.	FLOOR	SCALE	CLASS
OU4		NONE	

SUBMITTED FOR APPROVAL — A-E — DATE
FDF APPROVAL — JOHN SMETS — DATE 7/1/98
40315

DOE PROJECT NO.	FEMP PROJECT NO.	DRAWING INDEX CODE NO.	SHEET NO.	REV. NO.
	WBS 2.1.3.G.R	94X-6100-G-02218	1 OF 1	1

\INFRA\DCN\02218 Mon Jul 27 14:42:37 1998 PLOTTED BY RGS II





1657

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NOTES

1. FOR LEGEND, ABBREVIATIONS, AND NOTES SEE DRAWING 94X-6100-G-02209.
2. FOR INTERSECTION DETAILS SEE DRAWING 94X-6100-G-02219.

REF DWG NO.	DRAWING TITLE
94X-6100=X-02208	DRAWING LIST AND VICINITY MAP
94X-6100-G-02211	PLAN AND PROFILE – STATION 12+00 TO 25+00
94X-6100-G-02212	PLAN AND PROFILE – STATION 25+00 TO END
94X-6100-G-02218	SECTIONS AND DETAILS
94X-6100-G-02219	INTERSECTION DETAILS
94X-6100-G-02243	MISCELLANEOUS DETAILS

REV. NO.	ISSUE OR REVISION PURPOSE – DESCRIPTION	A-E	FDF	DATE
0	CERTIFIED FOR CONSTRUCTION			

INITIALS AND DATE

UNITED STATES DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

THIS DRAWING PREPARED BY
FLUOR DANIEL NORTHWEST
RICHLAND, WASHINGTON

PROJECT NAME
SILOS INFRASTRUCTURE PROJECT

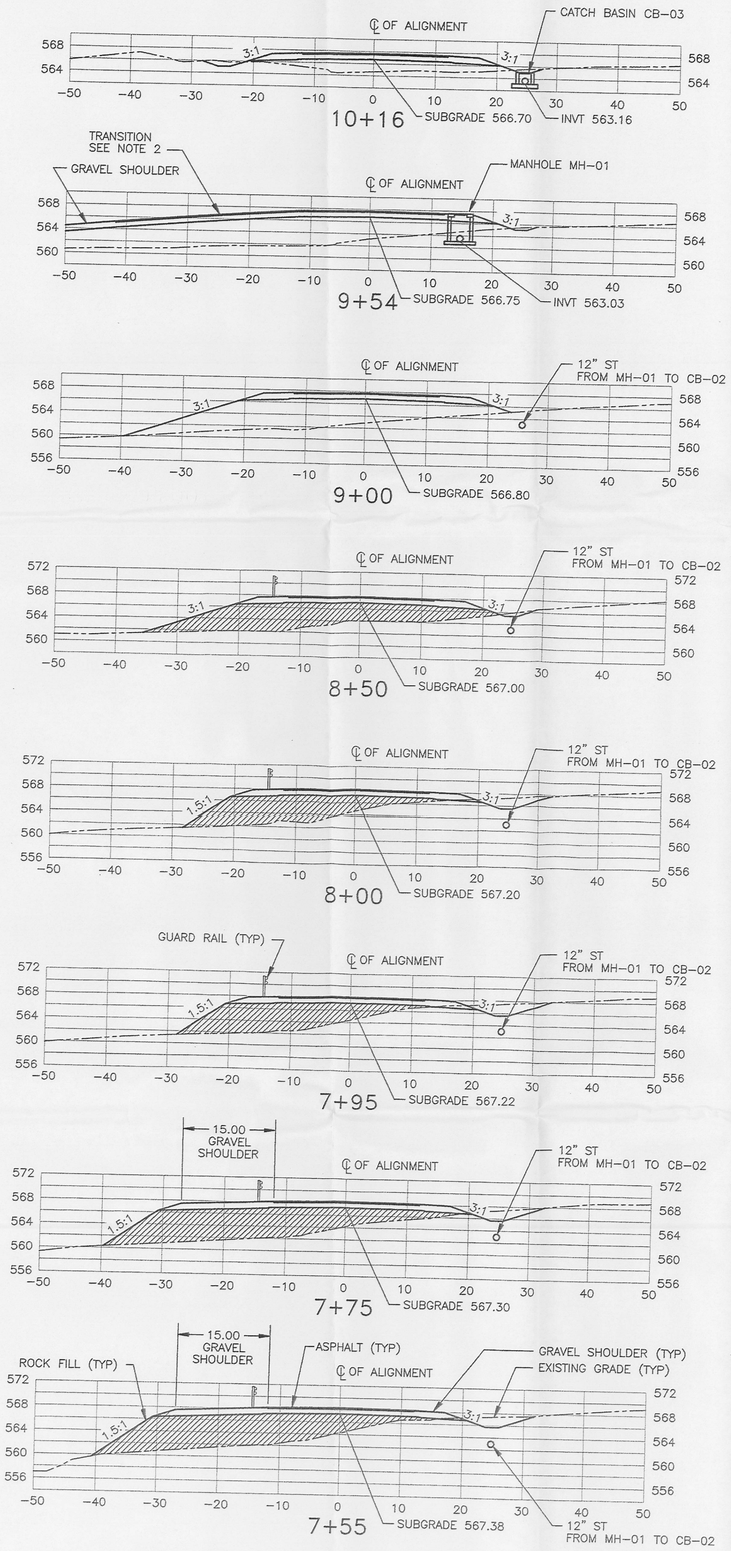
DRAWING TITLE
CROSS SECTIONS
STATION 22+50 TO 30+50

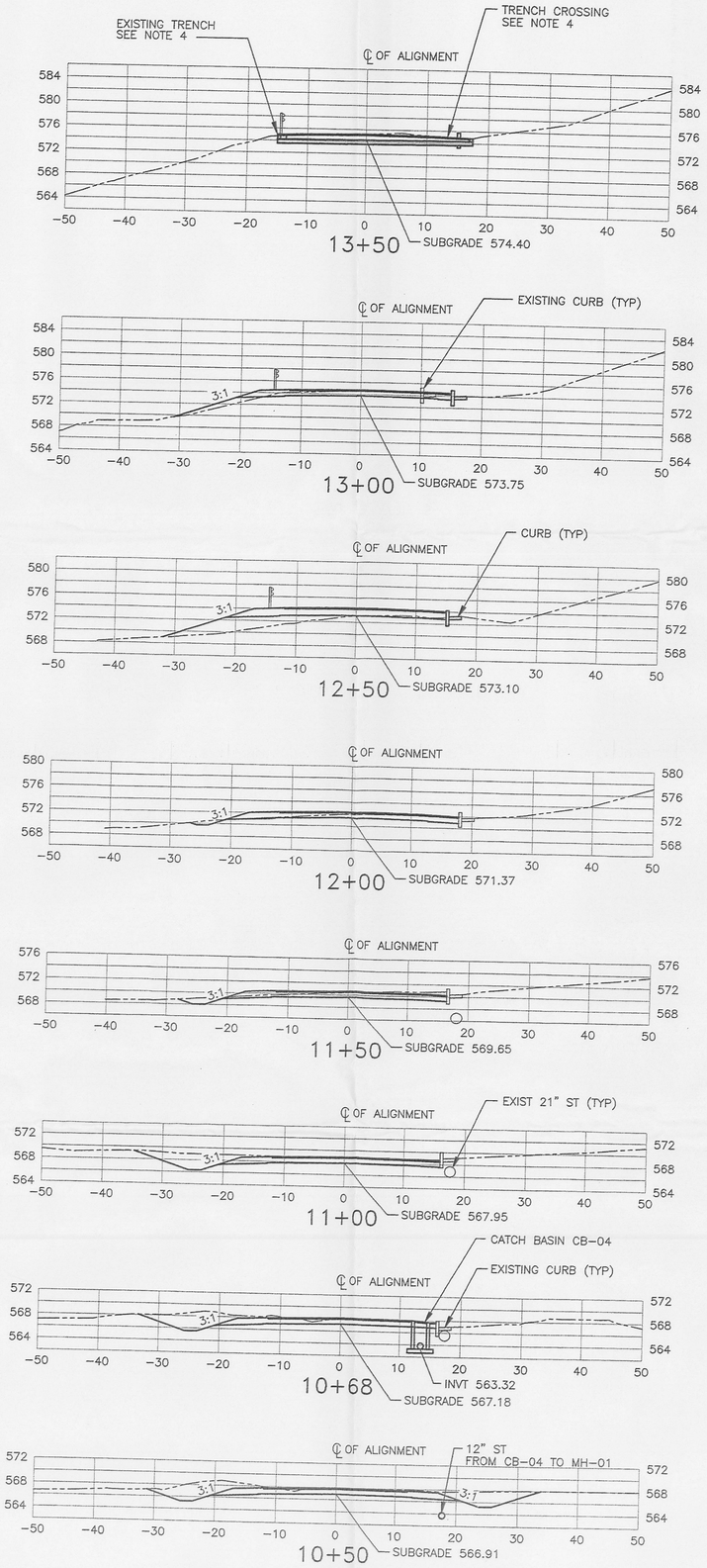
DRAWN BY	DATE	LEAD ENGINEER	DATE	CHECKED BY	DATE
RS CHRISTENSEN	6-24-98		6/24/98		6/26/98

PLANT/BLDG. NO.	FLOOR	SCALE	CLASS
OU4		1"=10'	

SUBMITTED FOR APPROVAL — A-E — DATE
FDF APPROVAL — DATE 6/26/98
40315

DOE PROJECT NO.	FEMP PROJECT NO.	DRAWING INDEX CODE NO.	SHEET NO.	REV. NO.
	WBS 2.1.3.G.R	94X-6100-G-02216	4 OF 5	0





1657

000174

NOTES

1. FOR LEGEND, ABBREVIATIONS, AND NOTES SEE DRAWING 94X-6100-G-02209.
2. FOR INTERSECTION DETAILS SEE DRAWING 94X-6100-G-02219.
3. FROM STA 9+00 TO STA 14+00 APPLY TYPICAL GRAVEL CROSS SECTION TO ROAD UNTIL DIRECTED BY FDF.
4. FOR TRENCH CROSSING @ STA 13+50 SEE DRAWING 94X-6100-G-02218.

REF DWG NO.	DRAWING TITLE
94X-6100-X-02208	DRAWING LIST AND VICINITY MAP
94X-6100-G-02210	PLAN AND PROFILE – STATION 0+00 TO 12+00
94X-6100-G-02211	PLAN AND PROFILE – STATION 12+00 TO 25+00
94X-6100-G-02218	SECTIONS AND DETAILS
94X-6100-G-02219	INTERSECTION DETAILS
94X-6100-G-02243	MISCELLANEOUS DETAILS

REV. NO.	ISSUE OR REVISION PURPOSE – DESCRIPTION	A-E	FDF	DATE
0	CERTIFIED FOR CONSTRUCTION			

INITIALS AND DATE

UNITED STATES DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

THIS DRAWING PREPARED BY
FLUOR DANIEL NORTHWEST
RICHLAND, WASHINGTON

PROJECT NAME
SILOS INFRASTRUCTURE PROJECT

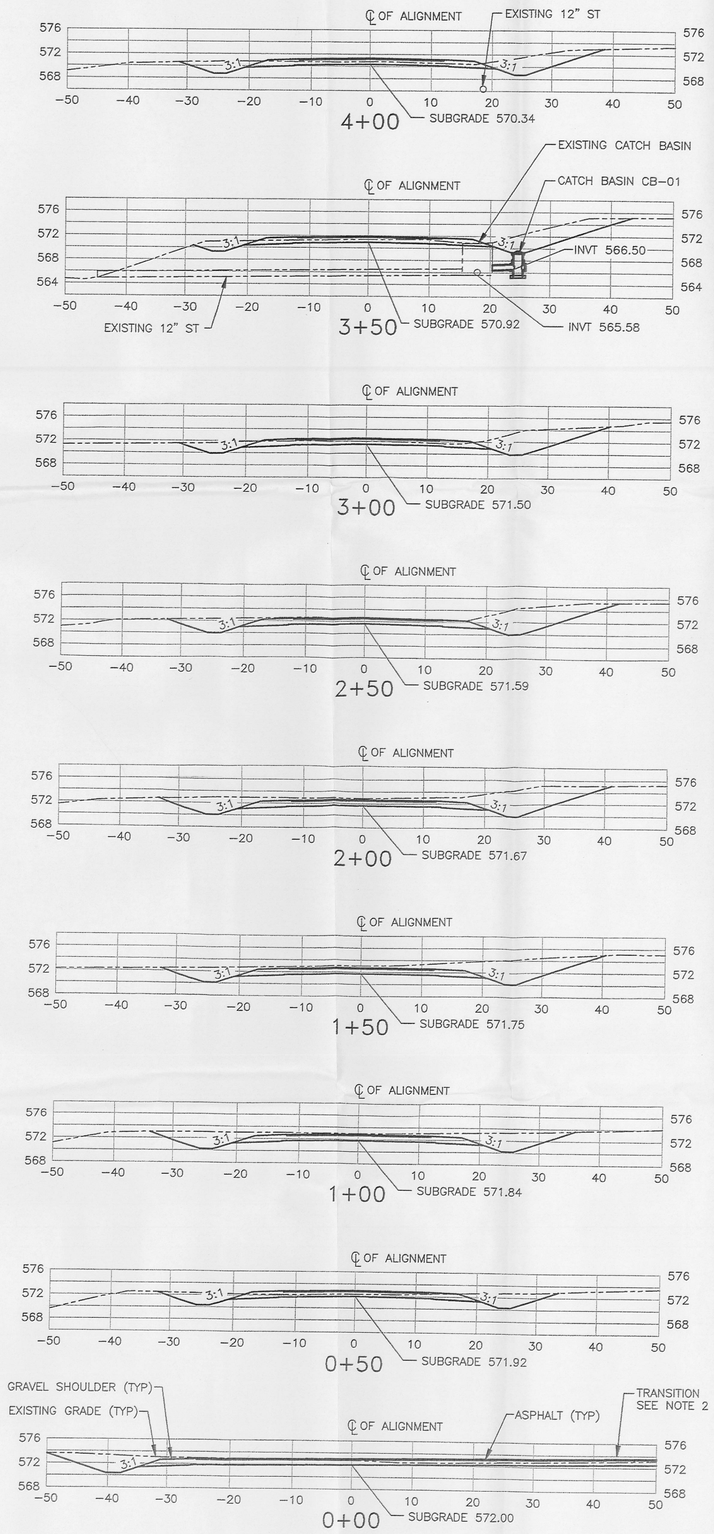
DRAWING TITLE
CROSS SECTIONS
STATION 7+55 TO 13+50

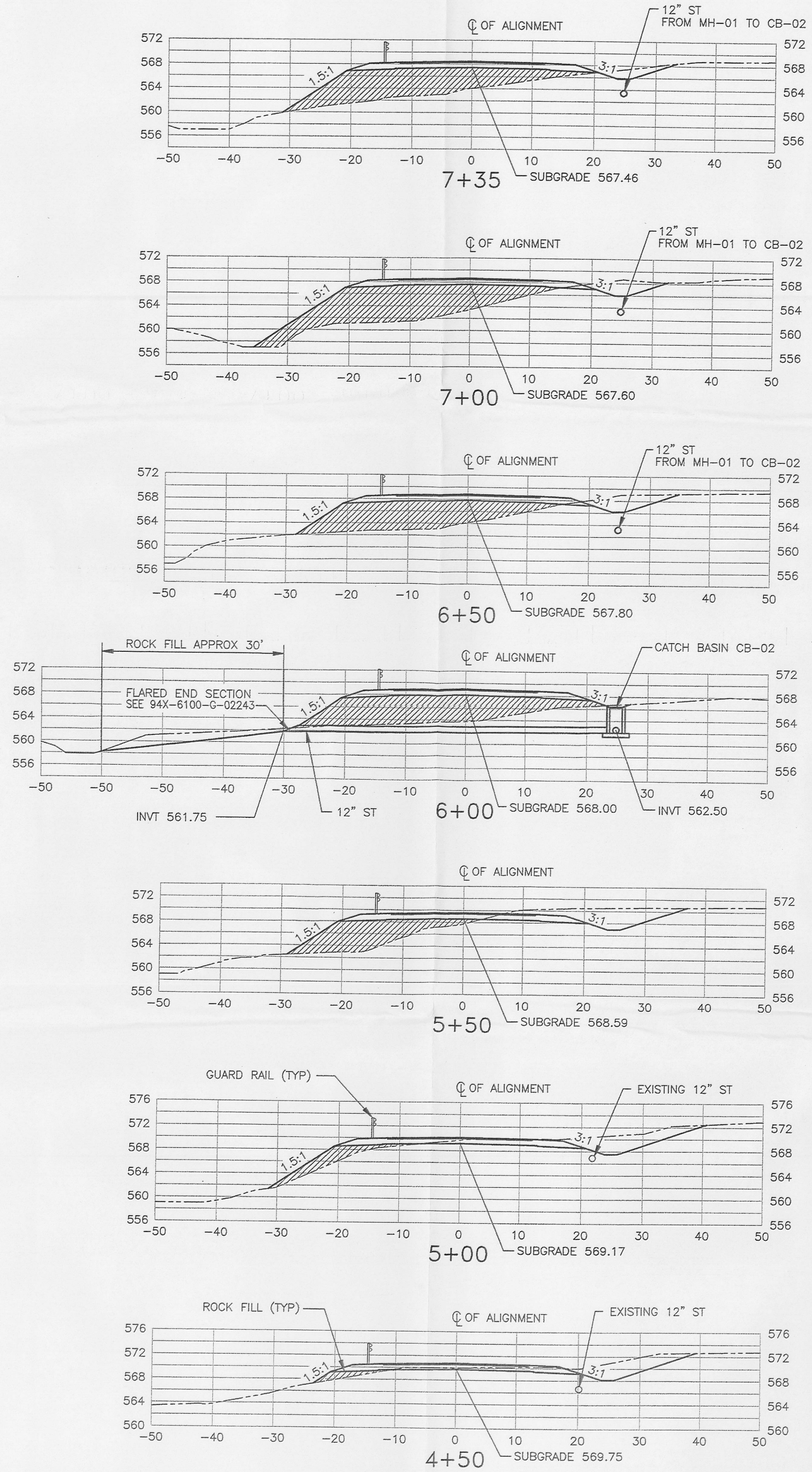
DRAWN BY	DATE	LEAD ENGINEER	DATE	CHECKED BY	DATE
RS CHRISTENSEN	6-24-98	David R. Wessing	6/24/98	Laurence A. Stelle	6/24/98

PLANT/BLDG. NO.	FLOOR	SCALE	CLASS
04U		1"=10'	

SUBMITTED FOR APPROVAL — A-E — DATE
FDF APPROVAL — DATE 6/25/98
40315

DOE PROJECT NO.	FEMP PROJECT NO.	DRAWING INDEX CODE NO.	SHEET NO.	REV. NO.
	WBS 2.1.3.G.R	94X-6100-G-02214	2 OF 5	0





1657

NOTES

1. FOR LEGEND, ABBREVIATIONS AND NOTES SEE DRAWING 94X-6100-G-02209.
2. FOR INTERSECTION DETAILS SEE DRAWING 94X-6100-G-02219.

REF DWG NO.	DRAWING TITLE
94X-6100-X-02208	DRAWING LIST AND VICINITY MAP
94X-6100-G-02210	PLAN AND PROFILE - STATION 0+00 TO 12+00
94X-6100-G-02218	SECTIONS AND DETAILS
94X-6100-G-02219	INTERSECTION DETAILS
94X-6100-G-02243	MISCELLANEOUS DETAILS

REV. NO.	ISSUE OR REVISION PURPOSE - DESCRIPTION	A-E	FDF	DATE
0	CERTIFIED FOR CONSTRUCTION			

INITIALS AND DATE

UNITED STATES DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

THIS DRAWING PREPARED BY
FLUOR DANIEL NORTHWEST
RICHLAND, WASHINGTON

PROJECT NAME
SILOS INFRASTRUCTURE PROJECT

DRAWING TITLE
CROSS SECTIONS
STATION 0+00 TO 7+35

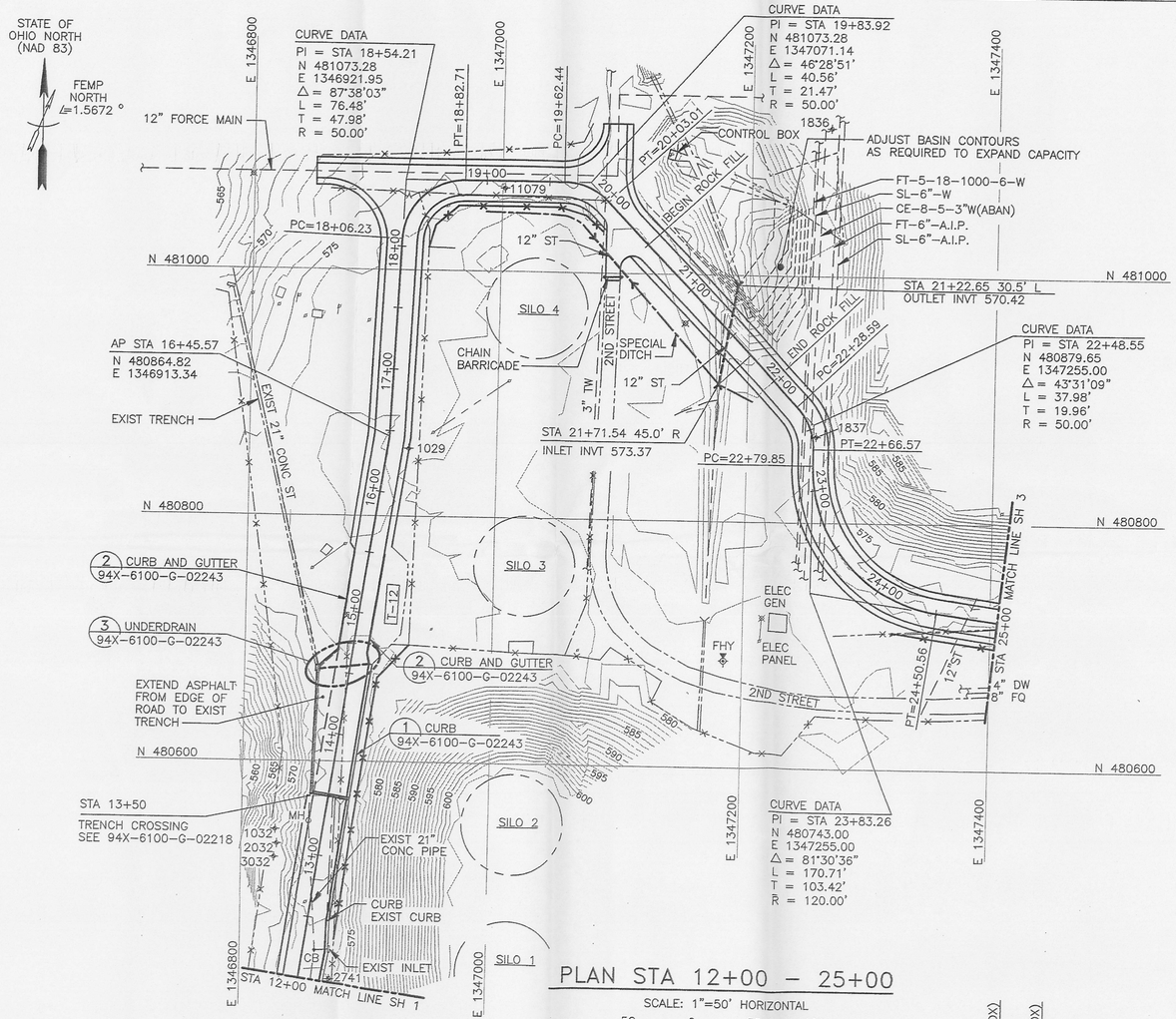
DRAWN BY	DATE	LEAD ENGINEER	DATE	CHECKED BY	DATE
RS CHRISTENSEN	6-24-98		6/24/98		6/24/98

PLANT/BLDG. NO.	FLOOR	SCALE	CLASS
04U		1"=10'	

SUBMITTED FOR APPROVAL	FDF APPROVAL	
A-E DATE	DATE 6/26/98	40315

DOE PROJECT NO.	FEMP PROJECT NO.	DRAWING INDEX CODE NO.	SHEET NO.	REV. NO.
	WBS 2.1.3.G.R	94X-6100-G-02213	1 OF 5	0

000173

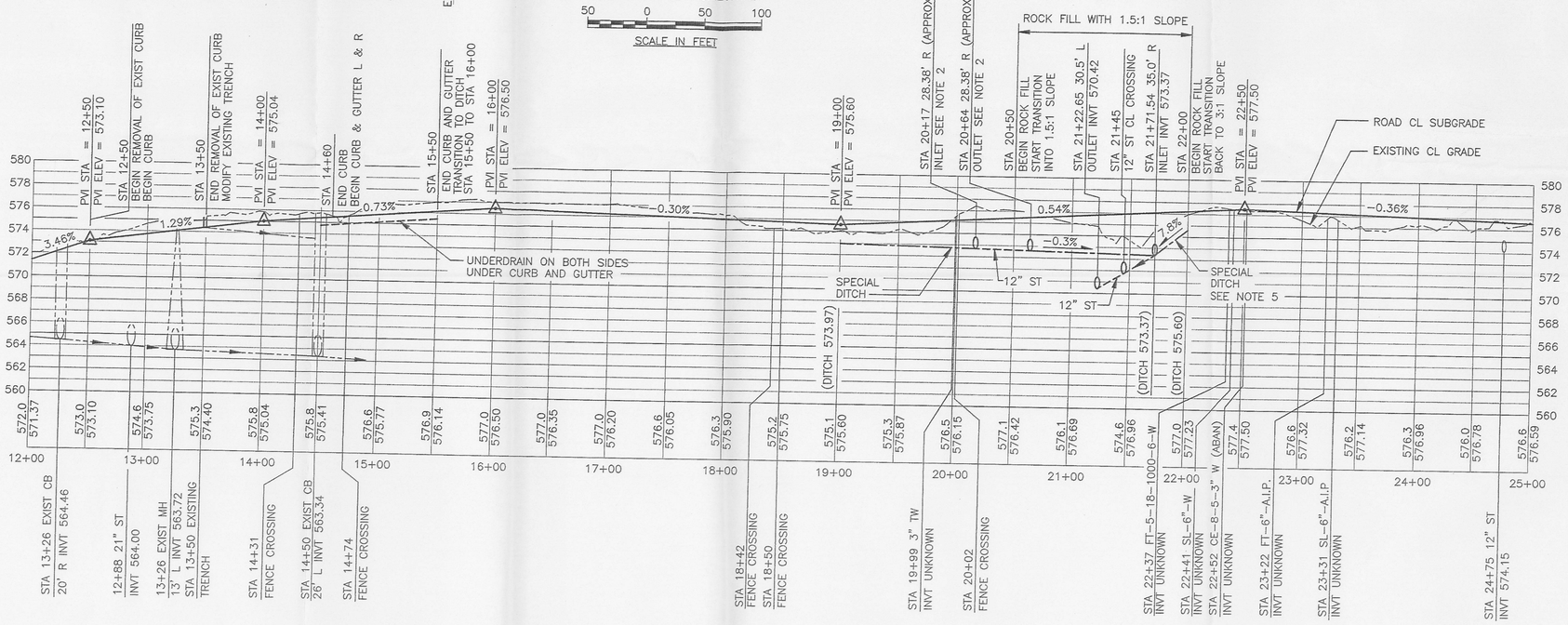


PLAN STA 12+00 – 25+00

SCALE: 1"=50' HORIZONTAL

50 0 50 100

SCALE IN FEET



PROFILE STA 12+00 TO STA 25+00

SCALE: 1"=50' HORIZONTAL
1"=5' VERTICAL

1657

000172

NOTES

1. FOR PLACEMENT AND LOCATION OF NEW ELECTRICAL CONDUIT SEE DRAWING 94X-6100-E-02230.
2. FOR ROAD INTERSECTIONS SEE DRAWING 94X-6100-G-02219.
3. FOR LEGEND, ABBREVIATIONS AND NOTES SEE 94X-6100-G-02209.
4. PROFILE GRADE INDICATES SUBGRADE ELEVATIONS.
5. LINE THE BOTTOM OF DITCH FROM STA 21+71 TO 22+00 WITH ROCK FILL ODOT ITME 601.07 TYPE C.

REF DWG NO.	DRAWING TITLE
94X-6100-X-02208	DRAWING LIST AND VICINITY MAP
94X-6100-G-02214	CROSS SECTIONS – STATION 7+55 TO 13+50
94X-6100-G-02215	CROSS SECTIONS – STATION 14+00 TO 22+00
94X-6100-G-02216	CROSS SECTIONS – STATION 22+50 TO 30+50
94X-6100-G-02218	SECTIONS AND DETAILS
94X-6100-G-02219	INTERSECTION DETAILS
94X-6100-G-02243	MISCELLANEOUS DETAILS
94X-6100-E-02230	EXISTING OVERHEAD UTILITIES SITE PLAN – MODIFICATIONS

REV. NO.	ISSUE OR REVISION PURPOSE – DESCRIPTION	A-E	FDF	DATE
0	CERTIFIED FOR CONSTRUCTION			

INITIALS AND DATE

UNITED STATES DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

THIS DRAWING PREPARED BY
FLUOR DANIEL NORTHWEST
RICHLAND, WASHINGTON

PROJECT NAME
SILOS INFRASTRUCTURE PROJECT

DRAWING TITLE
PLAN AND PROFILE
STATION 12+00 TO 25+00

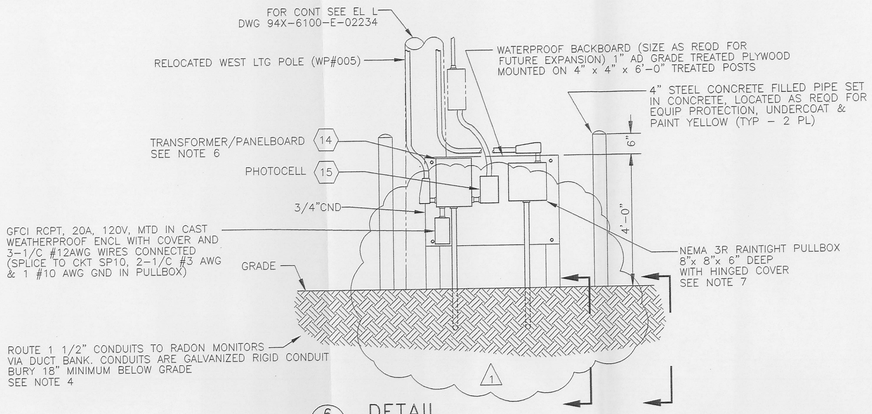
DRAWN BY	DATE	LEAD ENGINEER	DATE	CHECKED BY	DATE
RS CHRISTENSEN	6-24-98	Ferrell Pennington	6/24/98	Thomas A. Bolek	6/24/98

PLANT/BLDG. NO.	FLOOR	SCALE	CLASS
04U		1"=50'	

SUBMITTED FOR APPROVAL — A-E — DATE
FDF APPROVAL — DATE 6/24/98

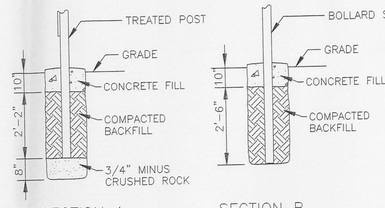
40315

IDE PROJECT NO.	FEMP PROJECT NO.	DRAWING INDEX CODE NO.	SHEET NO.	REV. NO.
	WBS 2.1.3.G.R	94X-6100-G-02211	2 OF 3	0



6 DETAIL
DWG 94X-6100-E-02230

SECTION A SECTION B



SECTION A

SECTION B

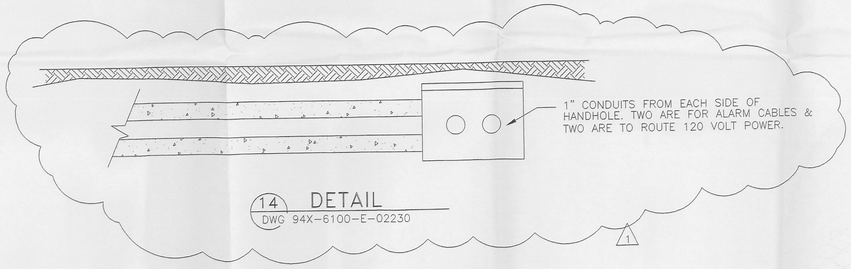
1657

PANELBOARD WP#005	LOCATION POLE WP#005	VOLTS 120/240VAC 1PH,3W
MFG & TYPE SQ-D	POWER SUPPLIED FROM	
CKT BRKR TYPE PLUG-ON		
NEMA TYPE ENCL 3R	☒ MAIN CKT BRKR ☐ MAIN LUGS ONLY	☐ PANELBOARD GROUND FAULT PROTECTION — 40 AMP BUS, 40 AMP NEUT
☒ SURFACE MOUNTED ☐ FLUSH MOUNTED	☒ TOP ☐ BOT	☒ GROUND BUS

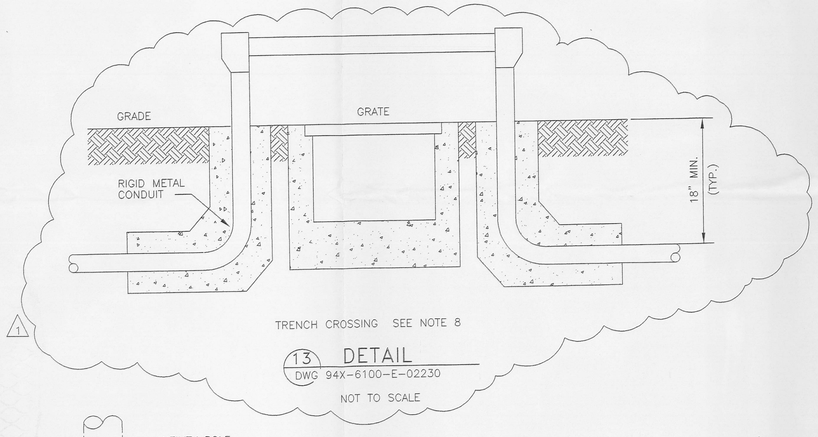
SERVICE	VA	NO.	A	B	NO.	VA	SERVICE
LIGHTING	2000	1	30A				
2 POLE BREAKER		3	20A / 20A	20A / 20A	2	180	RECEPTACLE AT WP#005
SPARE		5	20A	20A	4	180	RADON RECEPTACLES
					6		SPARE

TOTAL CONNECTED LOAD: 2360 ESTIMATED MAX LOAD: 2360

PANELBOARD SCHEDULE IS FOR RELOCATED WEST LIGHT POLE. PANELBOARD AT RELOCATED EAST LIGHT POLE WILL BE SIMILAR.



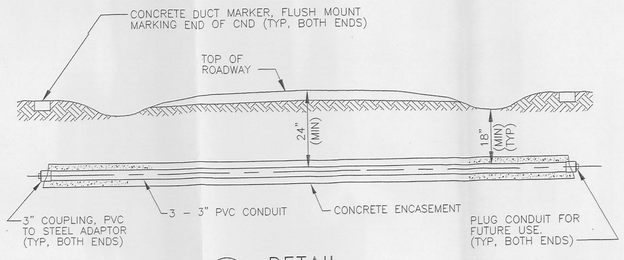
14 DETAIL
DWG 94X-6100-E-02230



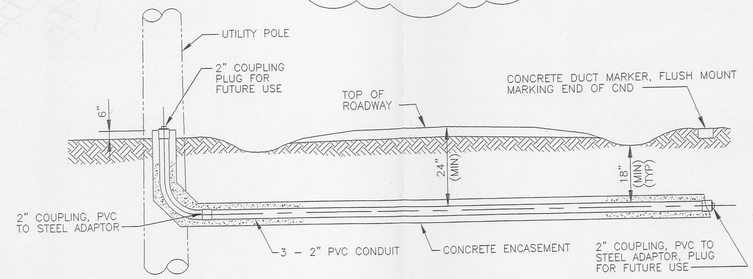
TRENCH CROSSING SEE NOTE 8

13 DETAIL
DWG 94X-6100-E-02230

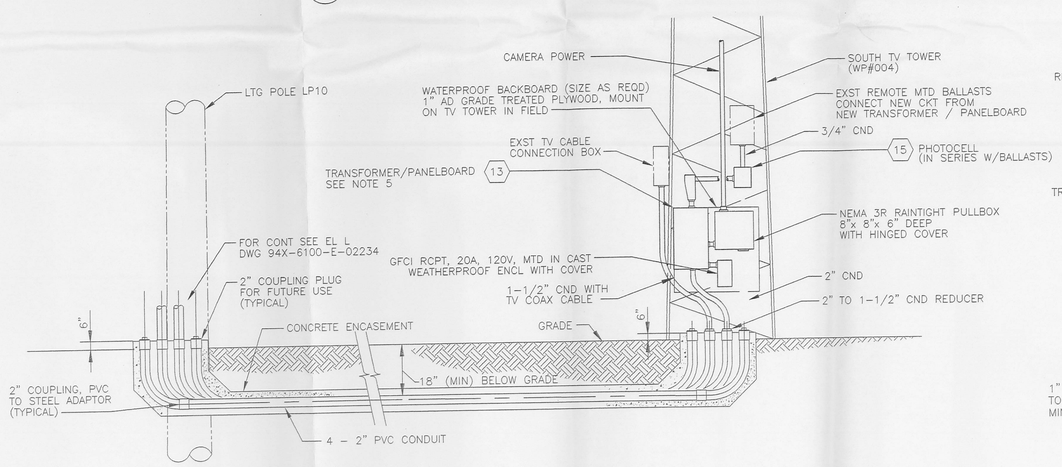
NOT TO SCALE



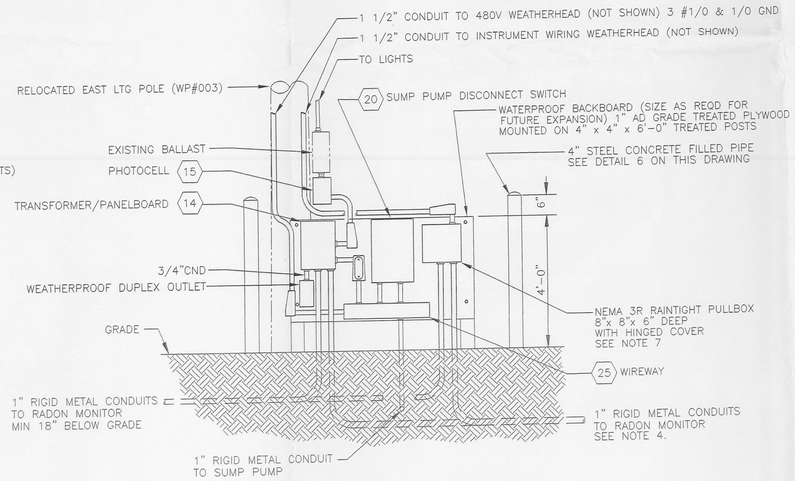
5 DETAIL
DWG 94X-6100-E-02230



7 DETAIL
DWG 94X-6100-E-02230



8 DETAIL
DWG 94X-6100-E-02230



12 DETAIL
DWG 94X-6100-E-02230

EQUIPMENT LOCATIONS AND CONDUIT ROUTING IS APPROXIMATE. EQUIPMENT LOCATION IS FIELD DETERMINED AND CONDUIT IS FIELD ROUTED.

000171

NOTES

1. FOR SPECIFIC DETAILS OF DUCTBANK CONSTRUCTION SEE DWG 94X-6100-E-02239.
2. ALL CONDUIT ABOVE GRADE SHALL BE RIGID GALVANIZED STEEL.
3. PROVIDE RAINTIGHT CONDUIT HUBS ON ALL ABOVE GRADE INSTALLATIONS AS REQUIRED.
4. EACH OF THE EXISTING RADON MONITORS HAS AN ASSOCIATED WEATHERPROOF DUPLEX OUTLET. INSTALL OUTLET ON 48" LONG WEATHER TREATED 4" X 4" POST. EMBED POST 24" INTO EARTH. HAND TAMP. POST WILL SERVE AS CONDUIT AND OUTLET SUPPORT. ROUTE FLEXIBLE CONDUIT (SEALTITE OR EQUAL) TO RADON MONITORS.
5. REPLACE EACH OF THE EXISTING CIRCUITS NOW SUPPLIED BY PANELBOARDS AT POLE WP#008 (PP110) WITH CIRCUITS FROM THE NEW TRANSFORMER / PANELBOARD COMBINED UNIT INSTALLED AT TOWER. ASSIGN CIRCUITS AS REQUIRED. TWENTY AMPERE SINGLE POLE BREAKERS SHALL BE INSTALLED IN ALL UNUSED SPACES.
6. SUPPLY PANELBOARD AT WP#003 FROM A-B PHASES, PANELBOARD AT WP#005 FROM B-C PHASES AND PANELBOARD AT SOUTH TV TOWER FROM A-C PHASES.
7. MOUNT 12 POINT TERMINAL STRIP WITHIN BOX. CONNECT INSTRUMENT WIRING TO TERMINALS (INCLUDING DRAIN WIRE). PULL NEW WIRING BEYOND BOX TO RADON MONITORS THROUGH UNDERGROUND CONDUITS. EACH RADON MONITOR REQUIRES TWO SHIELDED PAIRS. (ITEM 7 DWG 94X-6100-E-02235)
8. CONCRETE ENCASE ELBOWS FOR RIGIDITY WITH 3" CONCRETE. MARK TRENCH CROSSING AS DIRECTED BY FDF CONSTRUCTION COORDINATOR.

REV. NO.	ISSUE OR REVISION PURPOSE - DESCRIPTION	A-E INITIALS AND DATE	FDF INITIALS AND DATE
1	CHANGE PER DCN 40315-006	J.S. 6/30/98	R.M. 7/01/98
0	ISSUED FOR CONSTRUCTION		

UNITED STATES DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

THIS DRAWING PREPARED BY
FLUOR DANIEL NORTHWEST, INC.
1100 JADWIN, P.O. BOX 1050
RICHLAND, WASHINGTON

PROJECT NAME
SILOS INFRASTRUCTURE

DRAWING TITLE
EXISTING OVERHEAD UTILITIES
SILO INFRASTRUCTURE
BELOW GRADE DUCT BANKS - MISC DETAILS

DRAWN BY	DATE	LEAD ENGINEER	DATE	CHECKED BY	DATE
G. D. KUBINSKI	6/29/98	DAN LARSON	6/29/98	ROSCOE BLACK	6/29/98

PLANT/BLDG. NO.	FLOOR	SCALE	CLASS
		NONE	

SUBMITTED FOR APPROVAL — A-E DATE
FDF APPROVAL — JOHN SMETS — DATE 6/30/98
40315

ACE PROJECT NO.	FEMP PROJECT NO.	DRAWING INDEX CODE NO.	SHEET NO.	REV. NO.
	WBS 2.1.3.G.R	94X-6100-E-02236	1	1

FILENAME: E-02236

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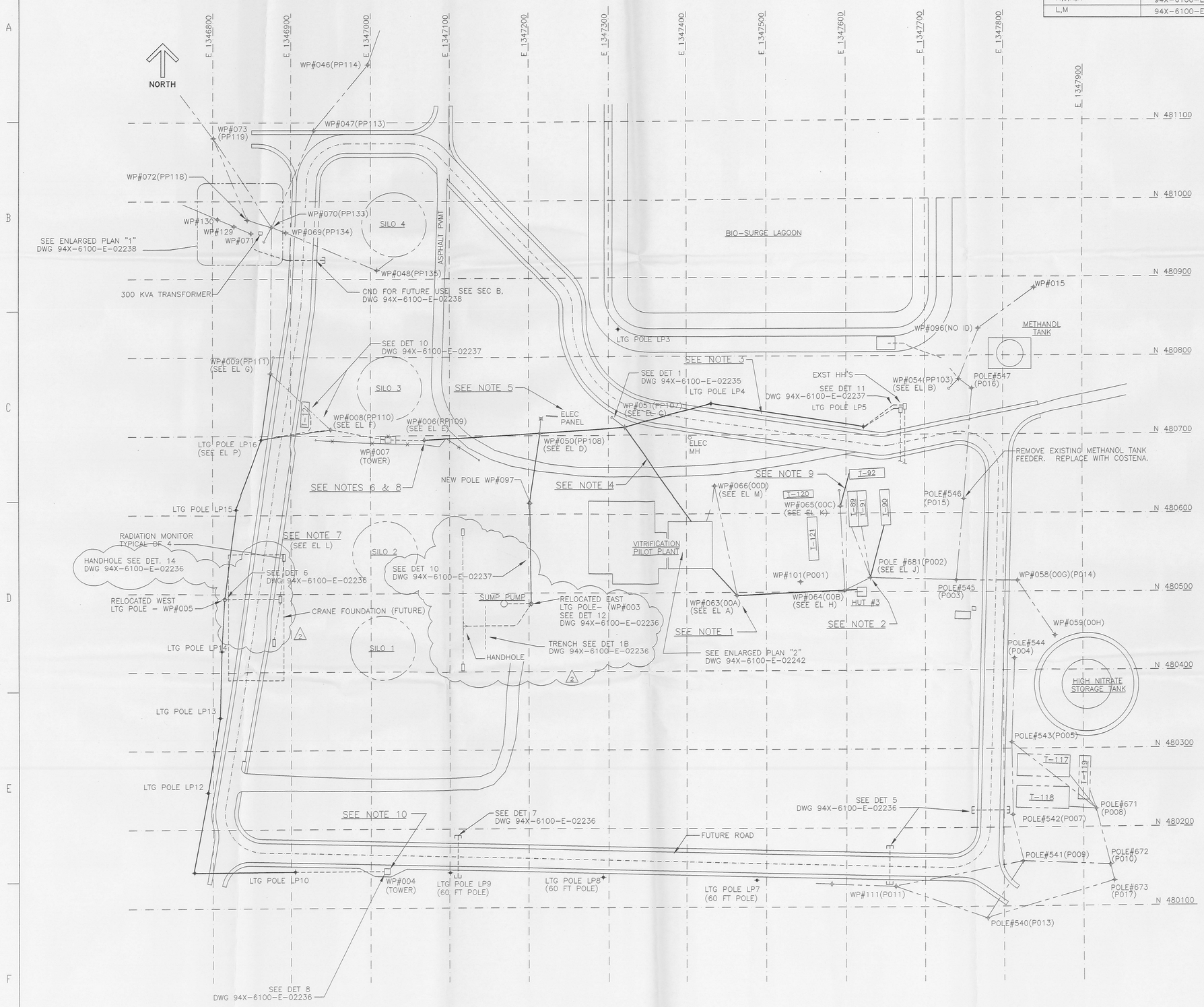
ELEVATION REFERENCE DRAWING TABLE	
ELEVATION NUMBER	REFERENCE DRAWING NUMBER
A,B,C,D	94X-6100-E-02231
E,F,G,P	94X-6100-E-02232
H,J,K,N	94X-6100-E-02233
L,M	94X-6100-E-02234

1657



000170

CONSTRUCTION NOTES:

1. INSTALL NEW 480V AERIAL FEEDER CABLES AND CCTV CABLES FROM VITRIFICATION PILOT PLANT (SEE DWG 94X-6100-E-02242) TO POLE WP#063. CCTV CABLES ARE 6 PAIR, 19 GAGE CABLES (NON-COAXIAL).
2. AT POLE #681 (P002), RECONNECT EXST CABLE FROM TRAILER T-90 (PREVIOUSLY FED FROM POLE WP#064).
3. INTERCEPT EXST 2-2/C #16 AWG TW SH PRS AND 1-7/C #10 AWG CABLE AT EXST HANDHOLES NEAR POLE WP#053 (LP5). RE-USE CONDUIT FROM LP5 TO HANDHOLES. EXTEND CABLES TO POLE WP#050 VIA LTG POLE LP5, LP4 AND WP#051. MAINTAIN A MINIMUM CLEARANCE OF 19'-6" ABOVE NEW ROADWAY AND GRADE. NOTE: CONVERT TO TRAFFIC RATED HANDHOLES.
4. INSTALL NEW 480V AERIAL FEEDER CABLE, EVACUATION SIGNAL CABLE AND MISC 25 PR CABLE FROM VITRIFICATION PILOT PLANT (SEE DWG 94X-6100-E-02242) TO POLE WP#051. CONTINUE FEEDER TO POLE WP#050, POLE WP#006, WP#008 AND WP#009. FEEDER CONTINUES VIA LIGHTING POLES AND DUCT BANK TO SOUTH CAMERA TOWER. EVACUATION SIGNAL CABLE AND 25 PAIR CABLE STOP AT POLE WP#006.
5. AT POLE WP#050 BACKBOARD, REPLACE FEEDER AS SHOWN ON ELEVATION D.
6. AT POLE WP#006 TERMINATE NEW FEED TO 60 AMP FUSED SAFETY SWITCH FROM POLE WP#050.
7. CIRCUITS PREVIOUSLY RUN IN CONDUIT ALONG FENCING SURROUNDING SILO 1 & 2 TO BE RELOCATED AERIALLY IN DUCT BANK AND IN ENCASED CONDUIT TO THEIR SPECIFIC LOCATIONS.
8. TERMINATE EVACUATION SIGNAL CABLE AND 25 PAIR CABLE IN CONTROL AND SIGNAL BOXES LOCATED AT POLE WP#006. SPLICE ONE PAIR OF CABLE FROM NORTH CAMERA TOWER TO THE 25 PAIR CABLE. THIS PAIR WILL CONTINUE TO HUT-3.
9. ADD NEW SERVICE DROP TO TRAILER T-92. TAP FEEDER SUPPLY TO 45 KVA TRANSFORMER 94-A059 AT POLE WP#065 (00C). NEW SUPPLY TO TRANSFORMER SHALL BE FROM 350 KCMIL CABLES. ADD GUY TO BALANCE CABLE TENSION.
10. RELOCATE SOUTH TOWER TO SOUTH OF NEW ROAD AS DIRECTED BY FDF. DUPLICATE EXISTING FOUNDATION, BUT PROVIDE ALLOWANCE FOR DUCT BANK. GROUND IN IDENTICAL MANNER AS ORIGINAL FOUNDATION. RETAIN AS MUCH TOWER WIRING AS POSSIBLE TO ENSURE EQUIPMENT FUNCTIONALITY. SEE TOWER FOUNDATION DRAWING 34X-5500-E-00098 AND SUPPLEMENTAL INFORMATION PROVIDED. WIRING DIAGRAMS ARE WITHIN JUNCTION BOXES MOUNTED ON TOWER. REPLACE FENCE AROUND TOWER.

GENERAL NOTES:

1. CONSTRUCTION SHALL MEET REQUIREMENTS OF THE 1997 NATIONAL ELECTRICAL SAFETY CODE AND 1996 NATIONAL ELECTRICAL CODE.
2. SEE DWG 94X-6100-E-02229 FOR EXISTING OVERHEAD CABLES & HARDWARE TO BE REMOVED.
3. FIELD VERIFY ALL EXISTING CABLE SIZES, NUMBER OF CONDUCTORS AND INSULATION TYPES TO ENSURE COMPATABILITY WITH NEW CABLES BEING ADDED.
4. VERIFY FIELD CONDITIONS AND MEASUREMENTS. COORDINATE WITH EXISTING GRID & UTILITY DRAWINGS.
5. CONTRACTOR TO VERIFY ALL PANELBOARD CIRCUITS PRIOR TO ANY WORK. CONTRACTOR TO SUPPLY CORRECT CIRCUIT NUMBERS TO FDF. CONTRACTOR TO CORRECT PANELBOARD SCHEDULES ACCORDINGLY. △1
6. TELEPHONE WIRING INSTALLATION TO BE PERFORMED BY OTHERS.

LEGEND:

NEW / OLD WP#000(P000)	UTILITY POLE AND IDENTIFIER
NEW / OLD POLE#000(P000)	13.2 KV UTILITY POLE AND IDENTIFIER
	NEW AERIAL CABLE
	EXST AERIAL CABLE
	GUY
	ELECTRICAL DUCT BANK
	TRAFFIC RATED HANDHOLE

REF. DWG. NO.	DRAWING TITLE
40A-5500-E-00036	POLE MOUNTED ELEC. DIST. SYSTEM FOR THE WASTE PITE AREA

REV. NO.	ISSUE OR REVISION PURPOSE - DESCRIPTION	A-E	FDF	DATE
2	MODIFIED PER DCN 40315-006 & REV 1 CORRECTIONS	8/17/98	RLM 8/17/98	
1	PER DCN 40315-005	J.S. 7/28/98	R.M. 7/28/98	
0	ISSUE FOR CONSTRUCTION	J.S. 7/01/98	R.M. 7/02/98	

INITIALS AND DATE

UNITED STATES DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

THIS DRAWING PREPARED BY

FLUOR DANIEL NORTHWEST, INC.
1100 JADWIN, P.O. BOX 1050
RICHLAND, WASHINGTON

PROJECT NAME: SILOS INFRASTRUCTURE

DRAWING TITLE: EXISTING OVERHEAD UTILITIES
SILO INFRASTRUCTURE - SITE PLAN (MODIFICATIONS)

DRAWN BY	DATE	LEAD ENGINEER	DATE	CHECKED BY	DATE
GJ KUBINSKI	3/25/98	DAN LARSON	7/01/98	ROSCOE BLACK	7/01/98

PLANT/BLDG NO.	FLOOR	SCALE	CLASS
OU4		1"=50'	

SUBMITTED FOR APPROVAL — A-E — DATE
FDF APPROVAL: JOHN SMETS — DATE 7/01/98
40315

DOE PROJECT NO.	FEMP PROJECT NO.	DRAWING INDEX CODE NO.	SHEET NO.	REV. NO.
	WBS 2.1.3.G.R	94X-6100-E-02230	1	2

FILENAME: E-02230

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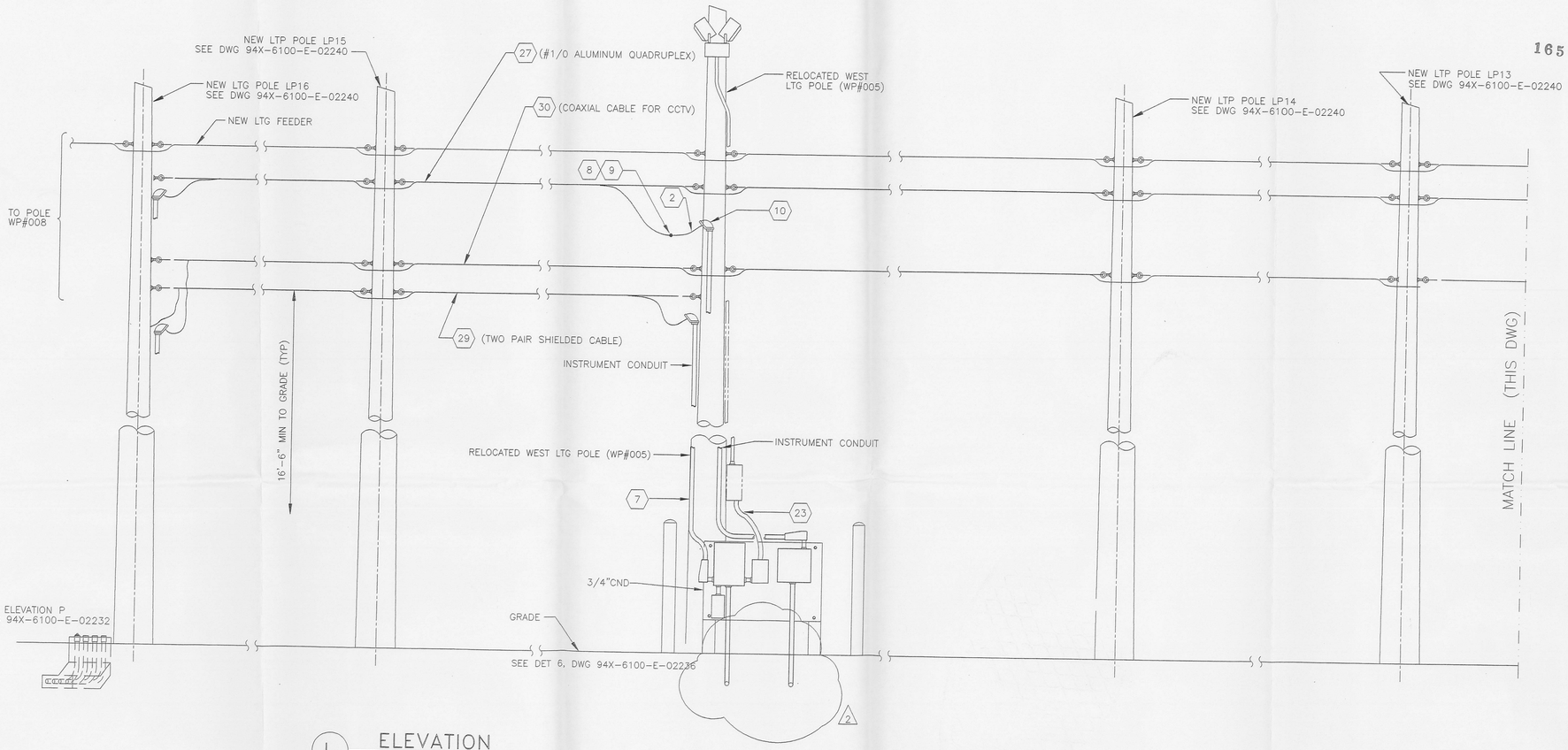
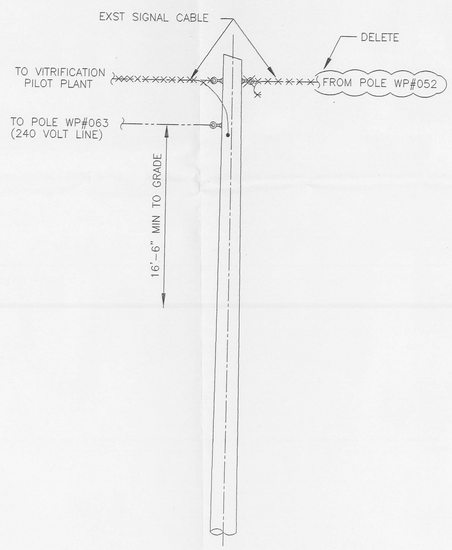
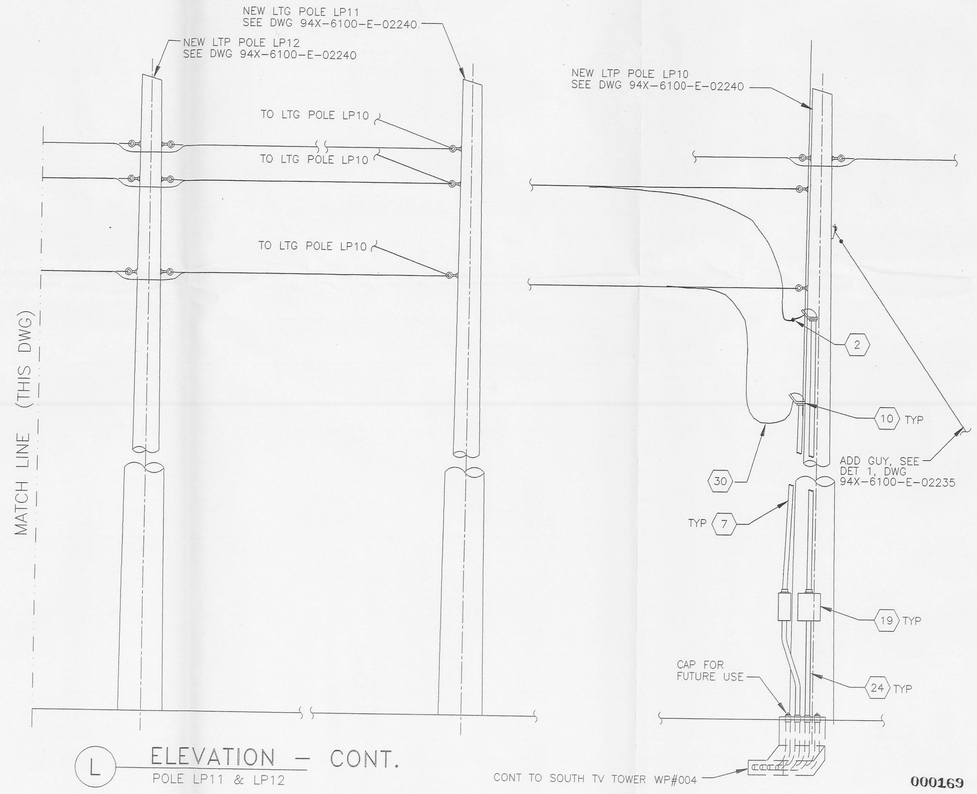
1657



L ELEVATION
POLE LP13, LP14,
WP#005, LP15, LP16



M ELEVATION
POLE WP#066(OOD)



L ELEVATION – CONT.
POLE LP11 & LP12

000169

NOTES

1. FOR MATERIAL LIST AND NOTES SEE DRAWING 94X-6100-E-02231.

REV. NO.	ISSUE OR REVISION PURPOSE - DESCRIPTION	A-E	FDF	DATE
2	PER DCN 40315-006	JS 8/17/98	RM 8/17/98	
1	PER DCN 40315-005	J.S. 7/29/98	R.M. 7/28/98	
0	ISSUED FOR CONSTRUCTION	J.S. 7/1/98	R.M. 7/2/98	

INITIALS AND DATE

UNITED STATES DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

THIS DRAWING PREPARED BY
FLUOR DANIEL NORTHWEST, INC.
1100 JADWIN, P.O. BOX 1050
RICHLAND, WASHINGTON

PROJECT NAME
SILOS INFRASTRUCTURE

DRAWING TITLE
EXISTING OVERHEAD UTILITIES
SILO INFRASTRUCTURE – POLE ELEVATIONS

DRAWN BY	DATE	LEAD ENGINEER	DATE	CHECKED BY	DATE
GJ KUBINSKI	3-25-98	DAN LARSON	7-1-98	ROSCOE BLACK	7-1-98
PLANT/BLDG. NO. OU4		FLOOR		SCALE NONE	CLASS
SUBMITTED FOR APPROVAL A-E DATE		FDF APPROVAL JOHN SMETS DATE 7/01/98		40315	
DOE PROJECT NO.	FEMP PROJECT NO. WBS 2.1.3.G.R	DRAWING INDEX CODE NO. 94X-6100-E-02234		SHEET NO. 1	REV. NO. 2

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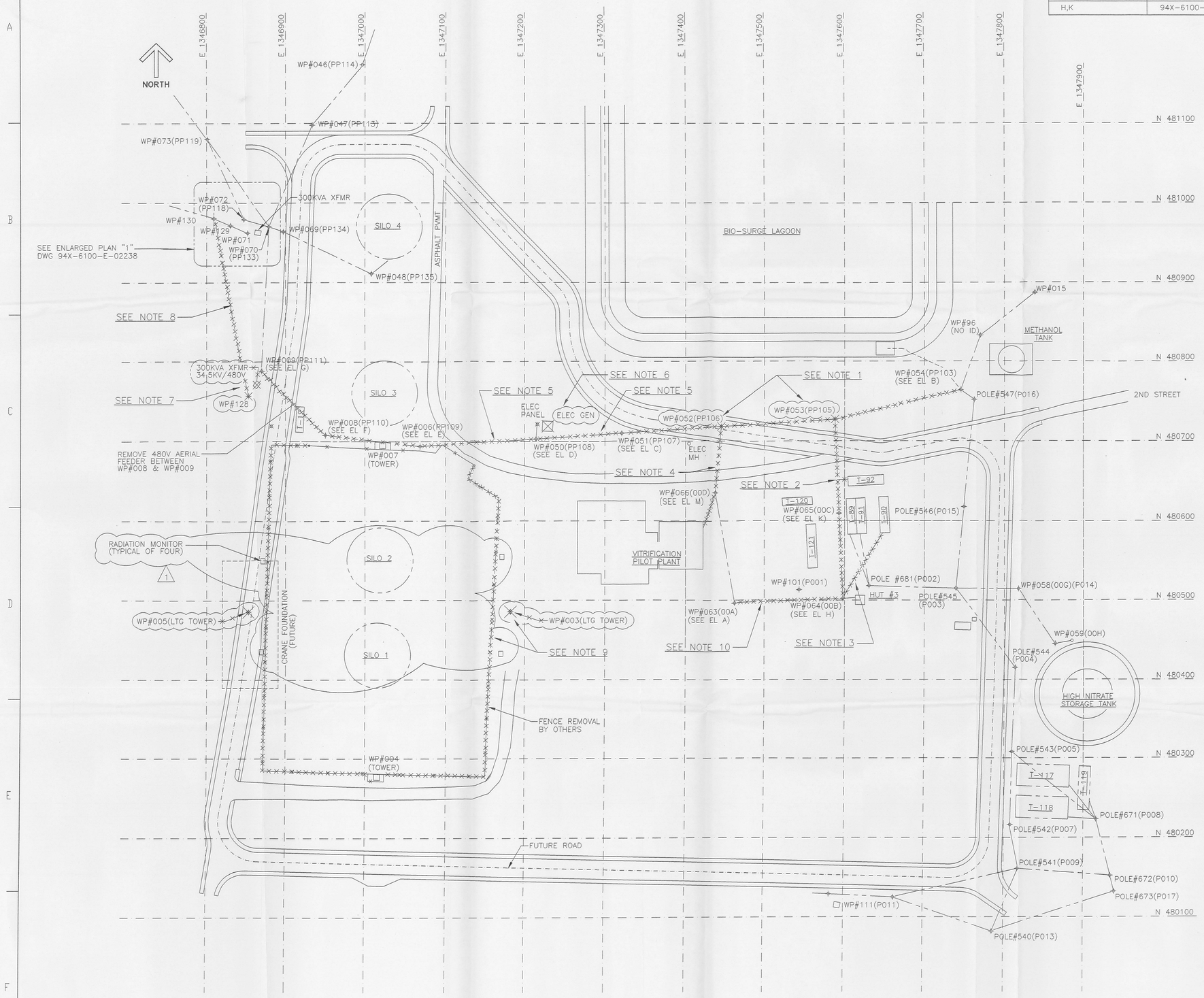
ELEVATION REFERENCE DRAWING TABLE	
ELEVATION NUMBER	REFERENCE DRAWING NUMBER
A,B,C,D	94X-6100-E-02231
E,F,G,P	94X-6100-E-02232
H,K	94X-6100-E-02233



1657

DEMOLITION NOTES:

(USING NEW POLE IDENTIFIERS ONLY)

ALL WORK WILL REQUIRE OUTAGES. OUTAGES SHALL BE COORDINATED WITH FDF.

1 REMOVE 480V AERIAL OPEN WIRE FEEDERS, GROUND & CONTROL CABLES AND ASSOCIATED HARDWARE BETWEEN POLE WP#051 THRU POLE WP#054.

2 REMOVE 480VAC TRIPLEX & SIGNAL CABLE BETWEEN POLE WP#053 AND POLE WP#065. ALSO REMOVE AERIAL FEEDER TAPS TO TRAILER T-92. POLE WP#053 IS TO BE RE-USED FOR LIGHTING.

3 AT POLE WP#064 REMOVE FEEDER TO TRAILER T-90 FOR RELOCATION TO POLE #681 (P002).

4 REMOVE SIGNAL CABLE FROM VITRIFICATION PILOT PLANT TO POLE WP#052 VIA POLE WP#066. ALSO REMOVE POLE WP#052.

5 REMOVE 480V AERIAL OPEN WIRE FEEDERS, GROUND & CONTROL/SIGNAL CABLES AND ASSOCIATED CROSSARMS AND HARDWARE BETWEEN POLE WP#051, POLE WP#050 AND POLE WP#006. ALSO REMOVE CONTROL/SIGNAL CABLES CONTINUING FROM POLE WP#006 TO POLE WP#008.

6 REMOVE AUTO TRANSFER SWITCH AND ASSOCIATED CONDUIT AND WIRING FROM SERVICE BOARD TO DSL GEN UNIT. ALSO REMOVE DSL GEN AND ANY ASSOCIATED EQUIPMENT AND HARDWARE. GENERATOR FOUNDATION (PAD) IS TO BE REMOVED.

7 AT POLE WP#128, REMOVE EXST 300KVA TRANSFORMER AND PAD, ASSOCIATED PRIMARY AND SECONDARY CONDUIT & CABLE, SERVICEBOARD AND SECONDARY CONDUIT & CONDUCTORS TO AERIAL CABLE ON POLE WP#009. AERIAL FEEDER TO BE REMOVED AS SHOWN. (THIS 480V FEEDER WILL BE SERVICED FROM THE EAST END.)

8 REMOVE 34.5KV SPAN BETWEEN POLE WP#128 AND WP#130. REMOVE POLE WP#128 AND REMOVE ASSOCIATED TAPS, CONDUCTORS, AND DOWNGUY FROM POLE WP#130. CROSS ARM IS TO REMAIN ON POLE.

9 REMOVE CONDUIT ON FENCING AROUND SILOS 1 & 2 ON THREE SIDES LEAVING ONLY THE NORTH SECTION AS OUTLINED ON PLAN. ALSO RELOCATE LIGHTING POLES CENTRALLY EAST AND WEST OF SILOS.

10 REMOVE 480V AERIAL FEEDER BETWEEN POLE WP#065 TO POLE WP#064 AND POLE WP#064 TO POLE WP#063 AS SHOWN ON ELEVATION A.

GENERAL NOTES:

1 REMOVE ALL DOWN GUYS WITH REMOVAL OF ASSOCIATED POLES AND SPANS. REMOVE CABLE & ASSOCIATED HARDWARE. DIG GUY ANCHORS OUT AND RETURN GRADE TO LEVEL.

LEGEND:

NEW / OLD
WP#000(P000) — UTILITY POLE AND IDENTIFIER

NEW / OLD
POLE#000(P000) — 13.2 KV UTILITY POLE AND IDENTIFIER

× × × × × — REMOVE ALL ITEMS AS SHOWN AND NOTED

REMOVE ALL ITEMS AS HIGHLIGHTED AND NOTED

EXST AERIAL CABLE

ELECTRICAL DUCT BANK

EXISTING ELECTRICAL LINE

REF. DWG. NO.	DRAWING TITLE
40A-5500-E-00036	POLE MOUNTED ELEC. DIST. SYSTEM FOR THE WASTE PITE AREA

REV. NO.	ISSUE OR REVISION PURPOSE - DESCRIPTION	A-E	FDF	DATE
1	MODIFIED PER DCN 40315-006	8/17/98	8/17/98	
0	ISSUED FOR CONSTRUCTION	JS 6-30-98	RM 7-1-98	

INITIALS AND DATE

UNITED STATES DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

THIS DRAWING PREPARED BY
FLUOR DANIEL NORTHWEST, INC.
1100 JADWIN, P.O. BOX 1050
RICHLAND, WASHINGTON

PROJECT NAME
SILOS INFRASTRUCTURE

DRAWING TITLE
EXISTING OVERHEAD UTILITIES
SILO INFRASTRUCTURE - SITE PLAN (DEMOLITION)

DRAWN BY	DATE	LEAD ENGINEER	DATE	CHECKED BY	DATE
GJ KUBINSKI	6-29-98	DAN LARSON	6-29-98	ROSCOE BLACK	6-29-98

PLANT/BLDG. NO.	FLOOR	SCALE	CLASS
OU4		1"=50'	

SUBMITTED FOR APPROVAL	FDF APPROVAL	
A-E DATE	JOHN SMETS DATE 6-30-98	40315

DOE PROJECT NO.	FEMP PROJECT NO.	DRAWING INDEX CODE NO.	SHEET NO.	REV. NO.
	WBS 2.1.3.G.R.	94X-6100-E-02229	1	1

000168

FILENAME: E-02229

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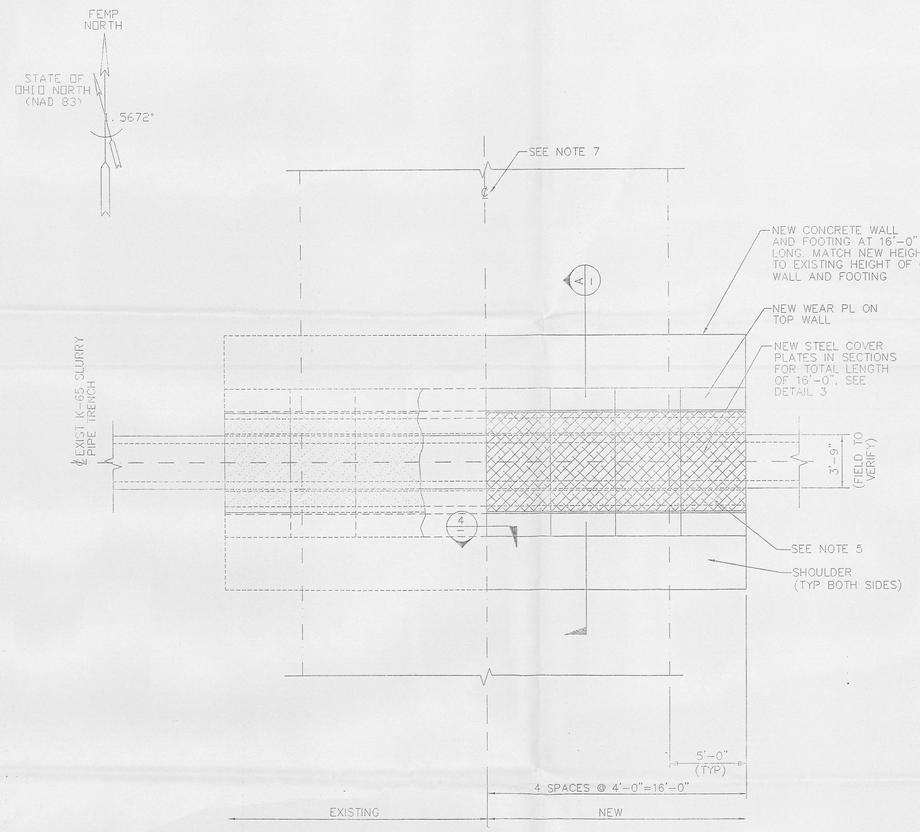
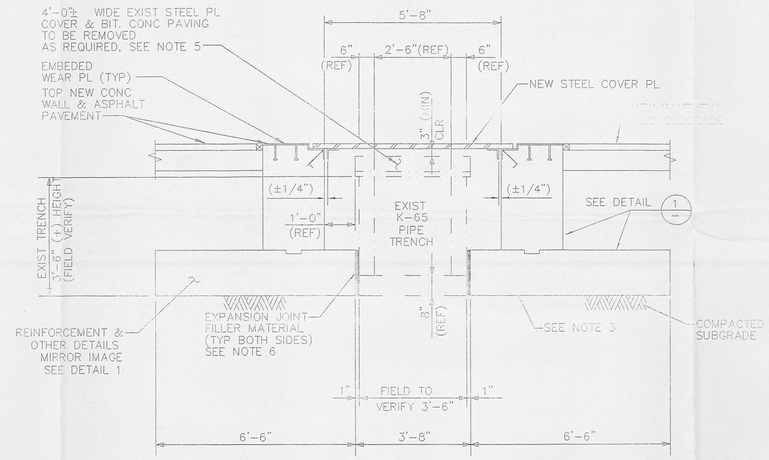


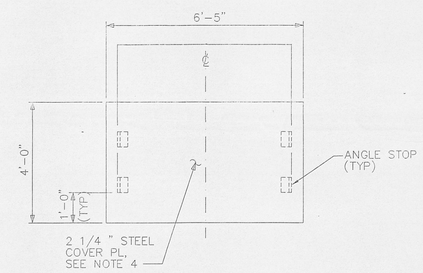
PLAN – K-65 PIPE TRENCH

1/4 " = 1'-0"



SECTION A

1/2 " = 1'-0"



COVER PLATE

(4 REQ'D)

DETAIL 3

1/2 " = 1'-0"

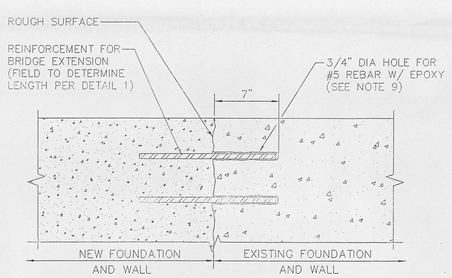
NOTES

1. NOT USED.
2. TOP OF STEEL COVER PLATE ELEVATION TO MATCH EXISTING BRIDGE PAVEMENT ELEVATION.
3. FOUNDATION DESIGN IS BASED ON BEARING PRESSURE ALLOWABLE OF 1200 PSF, BASED ON EXISTING BLOW COUNT DATA FROM THE NEAREST BORINGS, IF ANY SOFT, WET, ORGANIC, OR LOOSE SOIL, OR ANY OLD FILL IS ENCOUNTERED, FERMCO SHALL BE INFORMED AND THE CONDITIONS RESOLVED BEFORE CONTINUATION OF CONCRETE WORK.
4. FABRICATOR TO FURNISH SLOTTED LIFTING DEVICE, AS REQUIRED, FOR STEEL COVER PLATES.
5. REMOVE EXISTING STEEL PLATE AND PLATE OVER TRENCH AS REQUIRED. DETERMINE EXISTING FIELD CONDITIONS BEFORE FABRICATION OF NEW STEEL COVER.
6. USE CONFLEX, FIBER EXPANSION JOINT FILLER MATERIAL AS MANUFACTURED BY MASONITE BUILDING AND INDUSTRIAL PRODUCT GROUP OR APPROVED EQUAL.
7. APPROXIMATE CENTERLINE OF ROAD.
8. FOUNDATION CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 3000 PSI AT 28 DAYS.
9. EPOXY TO BE GRANITE 5 FORMULA BY ITW RAMSET/RED HEAD OR EQUIVALENT.

CONSTRUCTION AND MATERIAL SPECIFICATION – 1/1/97

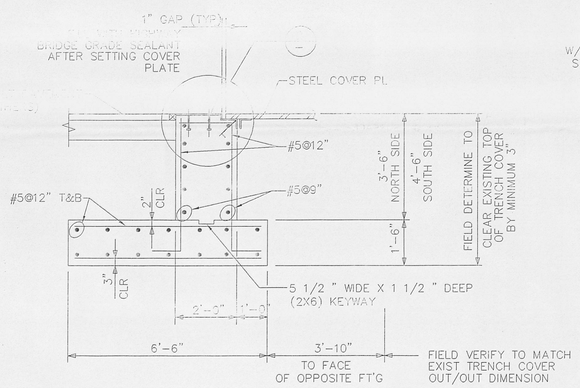
ODOT (OHIO DEPARTMENT OF TRANSPORTATION)

ODOT 705	CONCRETE PAVEMENT INCIDENTALS (SEALANT)
ODOT 514	PAINTING (PRIMER COAT)
ODOT 708	PAINT (PRIMER COAT)
ODOT 499	CONCRETE GENERAL (FOOTING)
ODOT 511	CONCRETE FOR STRUCTURES (FOOTING)
ODOT 709	REINFORCING STEEL (REBAR)
ODOT 711	STRUCTURAL STEEL AND STRUCTURAL INCIDENTALS (PLATE – BOLTS)



DETAIL 4

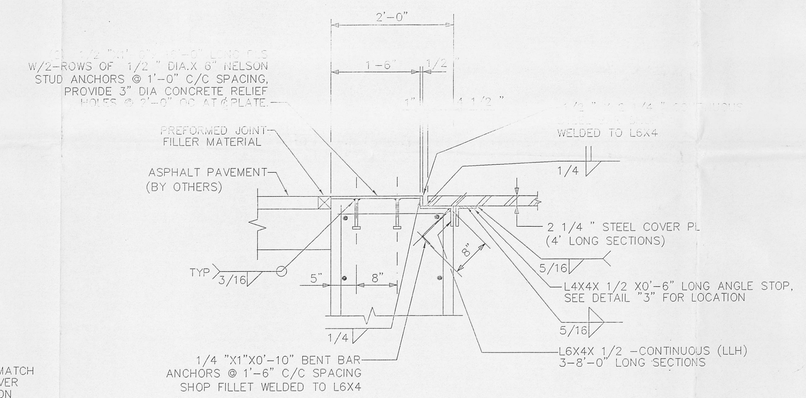
NOT TO SCALE



DETAIL 1

1/2 " = 1'-0"

(TYP BOTH SIDES OF TRENCH)



DETAIL 2

1" = 1'-0"

DOFILE SK-1031	CADCODE ACAD		
UNITED STATES DEPARTMENT OF ENERGY FERNALD ENVIRONMENTAL MANAGEMENT PROJECT THIS DRAWING PREPARED BY FLUOR DANIEL FERNALD SILOS PROJECT CINCINNATI, OHIO			
DRAWING TITLE STRUCTURAL FOUNDATION PLAN, SECTIONS, AND DETAILS K-65 UTILITY TRENCH ROAD CROSSING 000155			
DRAWN BY R. C. STENSBY	DATE 05/22/98	DESIGNED, CHECKED BY J. THOMPSON	DATE 05/27/98
CHECKED BY	DATE		
PLANT/BLDG. NO. OU4	FLOOR	SCALE 1/4"=1'-0"	CLASS
SUBMITTED FOR APPROVAL A-E DATE	APPROVAL RECOMMENDED OPERATING CONTRACTOR DATE	40315	
DOE PROJECT NO.	OPER. CONTR. PROJ. NO. 2.1.3.G.R.	DRAWING NO. 94X-5500-S-SK-1031	SHEET NO. 1 / REV. NO. B

DISTRIBUTION CODE: XXX

ACAD

INITIALS: RCS II

DATE: 05/27/98

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