

HISTORY OF CONSTRUCTION

CFR 257.73(c)(1)

Pond 21, Pond 22, Pond 23 & WWSP

Oklahoma Power Plant
Vernon, Texas

October, 2016

Prepared for : Public Service Company of Oklahoma

Prepared by: American Electric Power Service Corporation

1 Riverside Plaza

Columbus, OH 43215



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- Attachment A – Location Map
- Attachment B – Construction Specifications
- Attachment C – Design Drawings
- Attachment D – Instrumentation Location Map

1.0 OBJECTIVE

This report was prepared by AEP- Geotechnical Engineering Services (GES) section to fulfill requirements of CFR 257.73(c)(1).

2.0 DESCRIPTION OF CCR THE IMPOUNDMENT

The Oklaunion Power Station is located near the City of Vernon, Texas. It is owned and operated by Public Service Company of Oklahoma (PSO). Oklaunion Ponds for storing CCR include two, 5+ acre ponds for bottom ash storage and dewatering (Pond 21 and Pond 22), a 13+ acre pond for fly ash storage and dewatering (Pond 23), and a 22+ acre pond for Waster Water and Sludge (WWSP) storage and dewatering pond. These ponds are located at the south- central edge of the main evaporation pond complex of the generating station. The ponds were constructed as a continuous upground earthen embankment with 3H:1V inboard and outboard slopes and crest width of 20 feet. The design elevation of the crest is 1215 feet. These evaporation ponds do not have any outlet structures or spillways and relies on evaporation to remove water from the impoundments. These impoundments retain the wastes until it is sufficiently dry to be hauled away and landfilled.

3.0 SUMMARY OF OWNERSHIP 257.73(c)(1)(i)

[The name and address of the person(s) owning or operating the CCR unit: the name associated with the CCR unit: and the identification number of the CCR unit if one has been assigned by the state.]

The Oklaunion Power Station is located at 12567 FM Rd 3430, Vernon, TX 76384. The plant is owned and operated by Public Service Company of Oklahoma and is a coal fired facility. The Oklaunion CCR Ponds are located at the south-central edge of the main evaporation pond complex of the generating station. The embankment dams within this report do not fall under the Texas Dam Safety Jurisdiction therefore they do not contain a state identification number.

4.0 LOCATION OF THE CCR UNIT 257.73 (c)(1)(ii)

[The location of the CCR unit identified on the most recent U.S. Geological Survey (USGS) 7 ½ minute or 15 minute topographic quadrangle map, or a topographic map of equivalent scale if a USGS map is not available.]

A location map is included in Attachment A.

5.0 STATEMENT OF PURPOSE 257.73 (c)(1)(iii)

[A statement of the purpose for which the CCR unit is being used.]

Pond 21, Pond 22, Pond 23 & WWSP are surface impoundments for the purpose of disposal of CCR.

6.0 NAME AND SIZE OF WATERSHED THE CCR UNIT IS LOCATED 257.73 (c)(1)(iv)

[The name and size in acres of the watershed within which the CCR unit is located.]

Pond 21, Pond 22, Pond 23 & WWSP are located within the Southern Beaver watershed (HUC:293487543) which has a listed acreage of approximately 445,120 acres. Pond 21, Pond 22, Pond 23 & WWSP only receive direct rainfall and there are no other flows into the pond area.

7.0 DESCRIPTION OF THE FOUNDATION AND ABUTMENT MATERIALS

257.73(c)(1)(v)

[A description of the physical and engineering properties of the foundation and abutment materials on which the CCR unit is located.]

The dikes within Pond 21, Pond 22, Pond 23 & WWSP contain cohesive fill above native cohesive soils underlain by bedrock. In general, the fill consisted of lean clay. The native soils underlying the fill generally consisted of lean clay with similar strength properties of the embankment fill. The bedrock consisted predominantly of claystone, and to less extent siltstone. See the table below for the engineering properties of the foundation material.

Table 1 – Material Parameters

Material Layer	Unit Weight (pcf)	Cohesion (psf)	Friction Angle (deg)
Lean Clay	115	260	26
Claystone Bedrock	IP	IP	IP

Notes: IP- Impenetrable material

8.0 DESCRIPTION OF EACH CONSTRUCTED ZONE OR STAGE OF THE CCR UNIT

257.73 (c)(1)(vi)

[A statement of the type, size, range, and physical and engineering properties of the materials used in constructing each zone or stage of the CCR unit; and the approximate dates of construction of each successive stage of construction of the CCR unit.]

The original dikes were constructed in 1987. The ponds were constructed as a continuous above-ground earthen embankment with 3H:1V inboard and outboard slopes and crest width of 20 feet. The elevation of the dam crests is about 1215 ft- msl. The original construction specifications are located in Attachment B. Based on soil borings taken in June of 2016 and original construction specifications, the embankment generally consists of lean clay fill; see Table 1 for embankment material engineering properties. Beneath the fill is a layer of native soils that consist of mostly lean clay until claystone bed rock is reached at about 25ft below the crest surface elevation. The construction design drawings indicate that the inboard slopes were lime stabilized to a minimum depth of two feet above the maximum water level, to approximately 8 feet beyond the inboard toe. The design drawings are located in Attachment C.

There has not been additional construction to the dikes of these ponds since the original construction in 1987.

9.0 ENGINEERING STRUCTURES AND APPURTENANCES, 257.73 (c)(1)(vii)

[At a scale that details engineering structures and appurtenances relevant to the design, construction, operation, and maintenance of the CCR unit, detailed dimensional drawings of the CCR unit, including a plan view and cross sections of the length and width of the CCR unit, showing all zones, foundation improvements, drainage provisions, spillways, diversion ditches, outlets, instrument locations, and slope protection...]

Other than the plant process water, Pond 21, Pond 22, Pond 23 & WWSP receives direct rainfall and there are no other flows into the pond area. Water is diverted away from the impoundments by natural drainage channels. There are no outlet structures for each of the ponds as they function purely as evaporation ponds. For slope protection the inboard slopes were lime stabilized to a minimum depth of two feet above the maximum water level, to approximately 8 feet beyond the inboard toe. Design drawings are located in Attachment C. A map with instrumentation is located in Attachment D.

10.0 SUMMARY OF POOL SURFACE ELEVATIONS, AND MAXIMUM DEPTH OF CCR, 257.73 (c)(1)(vii)

[...in addition to the normal operating pool surface elevation and the maximum pool elevation following peak discharge from the inflow design flood, the expected maximum depth of CCR within the CCR surface impoundment.]

The table below describes the normal pool elevations and maximum pool elevations as well as maximum depth of CCR within the impoundment.

Table 2 – Summary of Pool Surface Elevations

	Pond 21, Pond 22, Pond 23 & WWSP
Normal Pool Elevation	1213
Maximum Pool Elevation following peak discharge from inflow design flood	1213.75
Expected Maximum depth of CCR within impoundment	25ft

11.0 FEATURES THAT COULD ADVERSELY AFFECT OPERATION DUE TO MALFUNCTION OR MIS-OPERATION 257.73 (c)(1)(vii)

[...and any identifiable natural or manmade features that could adversely affect operations of the CCR unit due to malfunction or mis-operation]

Other than the plant process water, Pond 21, Pond 22, Pond 23 & WWSP receive only direct rainfall and there are no additional flows into the pond area. Water is diverted away from the impoundments by natural drainage channels. There is no outlet structure for the pond as it functions purely as an evaporation pond. Because there is no outlet structure, the ponds could be susceptible to overfilling by mis-operation of inflows.

12.0 DESCRIPTION OF THE TYPE, PURPOSE AND LOCATION OF EXISTING INSTRUMENTATION 257.73 (c)(1)(viii)

[A description of the type, purpose, and location of existing instrumentation.]

Six piezometers were installed in June 2016 to monitor phreatic surface elevations within the embankment of the Oklaunion CCR Ponds. See Attachment D for instrumentation locations.

13.0 AREA – CAPACITY CURVES FOR THE CCR UNIT 257.73 (c)(1)(ix)

[Area-capacity curves for the CCR unit.]

The area capacity curves are shown in the figures below.

Figure 1 - Pond 21 and Pond 22 Capacity Curve

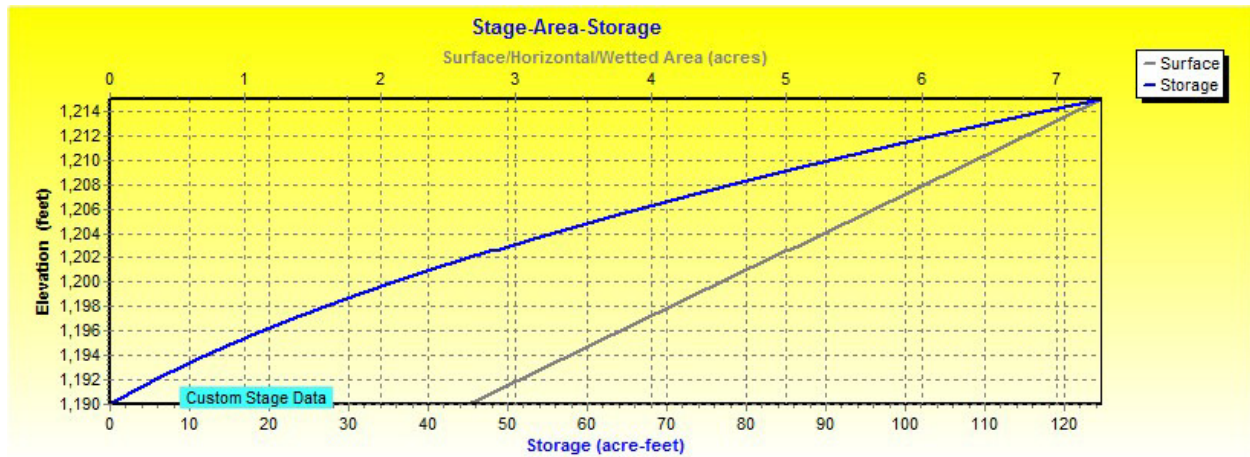


Figure 2 - Pond 23 Capacity Curve

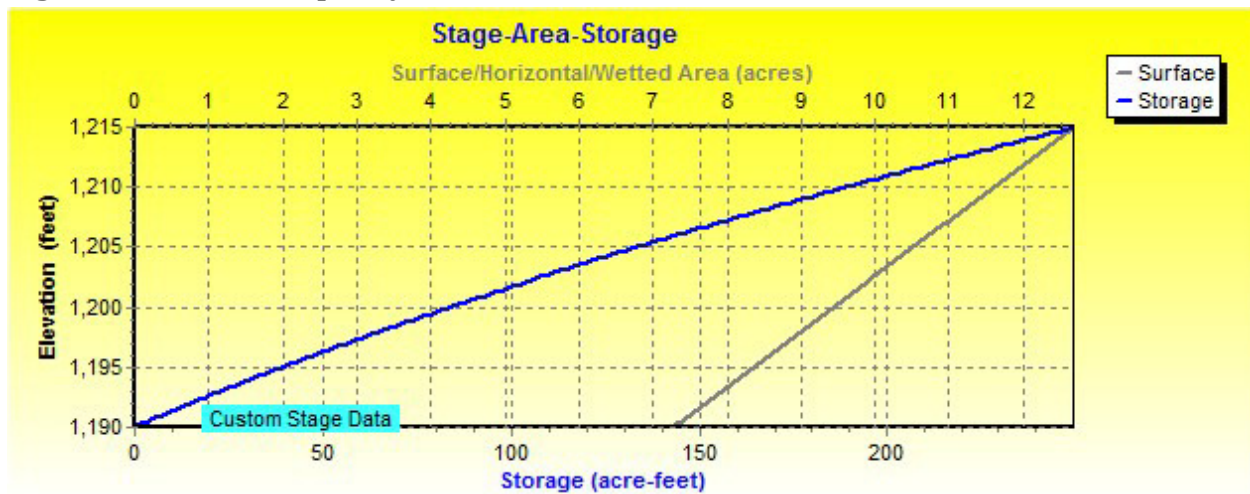
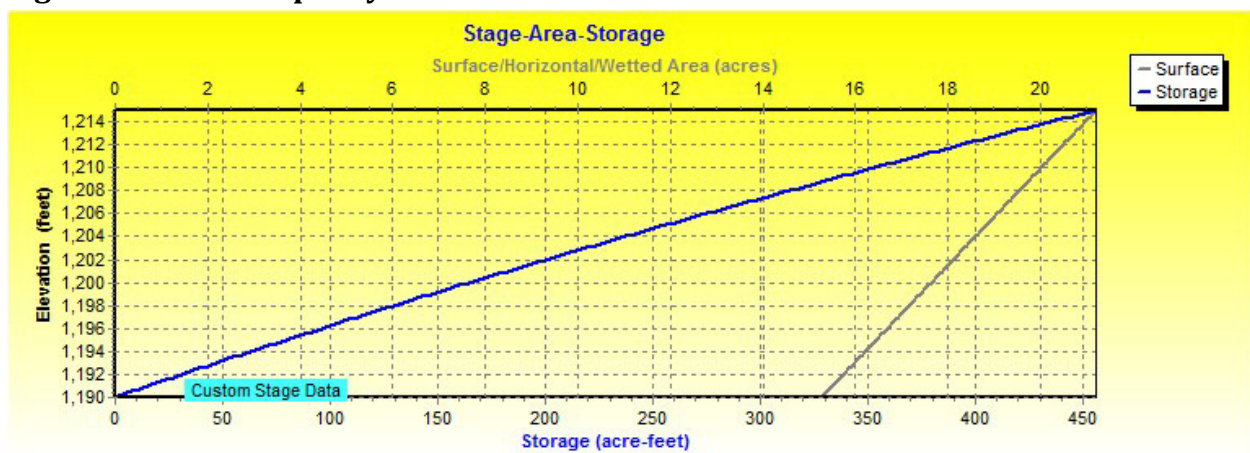


Figure 3 - WWSP Capacity Curve



14.0 DESCRIPTION OF EACH SPILLWAY AND DIVERSION 257.73 (c)(1)(x)

[A description of each spillway and diversion design features and capacities and calculations used in their determination.]

Pond 21, Pond 22, Pond 23 & WWSP receive only direct rainfall and there are no other flows into the pond area. Rainfall is diverted away from the impoundment by natural drainage channels. There is no outlet structure for the pond as it functions purely as an evaporation pond.

15.0 SUMMARY CONSTRUCTION SPECIFICATIONS AND PROVISIONS FOR SURVEILLANCE, MAINTENANCE AND REPAIR 257.73 (c)(1)(xi)

[The construction specifications and provisions for surveillance, maintenance, and repair of the CCR unit.]

The original dikes were constructed in 1987. The construction specifications were developed as part of the construction site preparation of Oklaunion Power Station and are included in Attachment B

As required by the CCR rules the Pond 21, Pond 22, Pond 23 & WWSP is inspected at least every 7 days by a qualified person. Also as a requirement of the CCR rules the impoundment is also inspected annual by a professional engineer. If repairs are found to be necessary during any inspection they will be completed as needed.

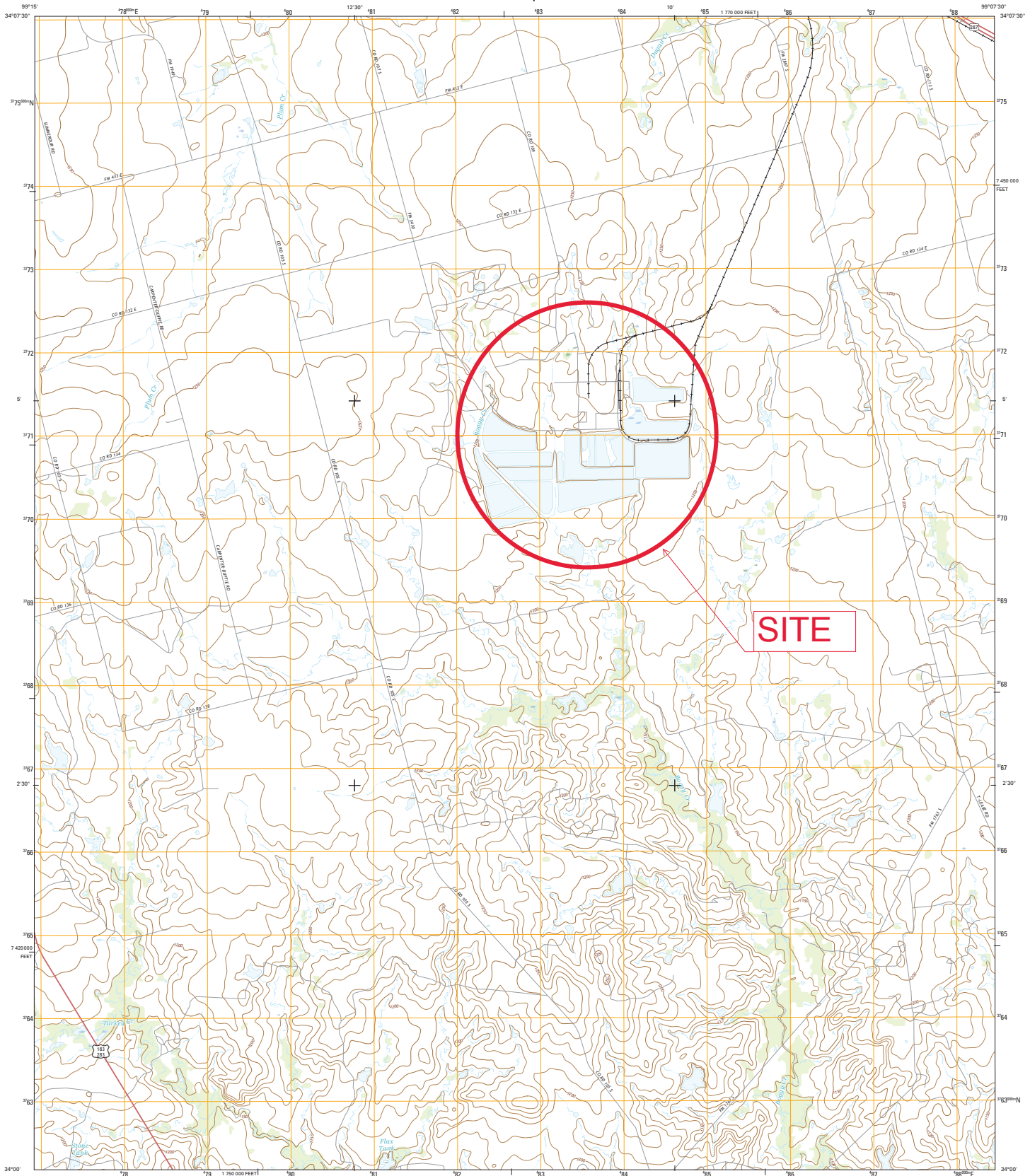
16.0 RECORD OR KNOWLEDGE OF STRUCTURAL INSTABILITY 257.73 (c)(1)(xii)

[Any record or knowledge of the structural instability of the CCR unit.]

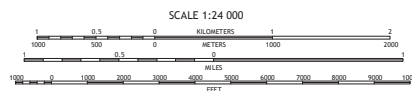
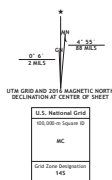
To date there has been no record or knowledge of structural instability of the CCR unit.

ATTACHMENT A

LOCATION MAP



Produced by the United States Geological Survey
North American Datum of 1983 (NAD83)
World Geodetic System of 1984 (WGS84) Projection and
1 000 meter grid. Universal Transverse Mercator, Zone 14S
10 000 foot ticks. Texas Coordinate System of 1983 (north
central zone)
This map is not a legal document. Boundaries may be
generalized for this map scale. Private lands within government
reservations may not be shown. Obtain permission before
entering private lands.
Imagery.....NAIP, August, 2014
Roads.....U.S. Census Bureau, 2014
Names.....National Hydrography Dataset, 2014
Hydrography.....National Hydrography Dataset, 2014
Contours.....National Elevation Dataset, 2005
Boundaries.....Multiple sources; see metadata file 1972 - 2015
Wetlands.....FWS National Wetlands Inventory 1977 - 2014



SCALE 1:24 000
CONTOUR INTERVAL 10 FEET
NORTH AMERICAN VERTICAL DATUM OF 1988
This map was produced to conform with the
National Geospatial Program US Topo Product Standard, 2011.
A metadata file associated with this product is draft version 0.6.19

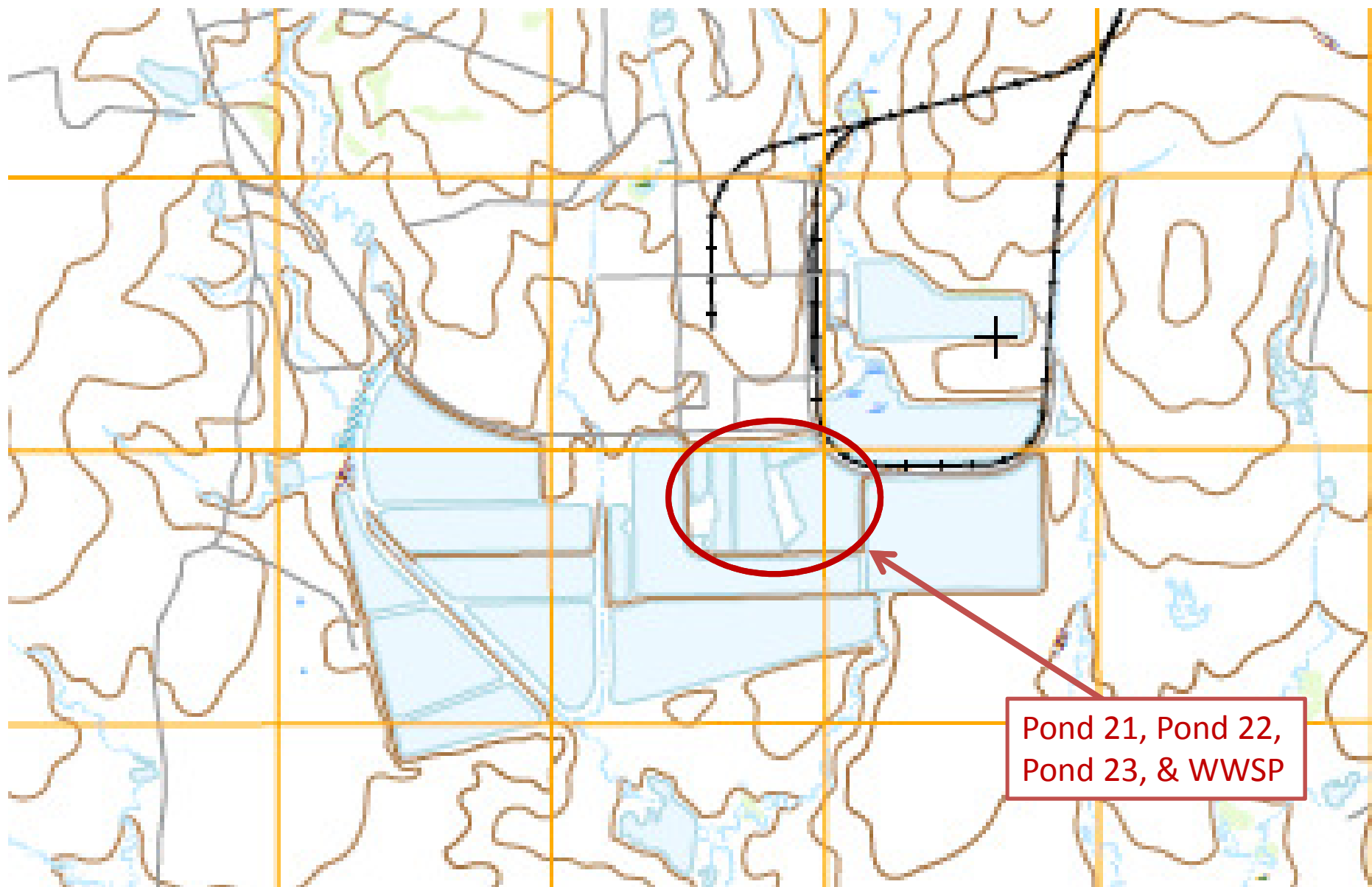


ROAD CLASSIFICATION	
Expressway	Local Connector
Secondary Hwy	Local Road
Ramp	4WD
Interstate Route	US Route
	State Route

1	2	3	1 Vernon
4	5	6	2 Oklahoma
7	8	9	3 Davidson
10	11	12	4 Lockett
13	14	15	5 Harrell
16	17	18	6 Santa Rosa Lake
19	20	21	7 Grayback
22	23	24	8 Lake Electra

BOGGY CREEK, TX
2016



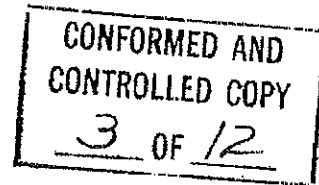


ATTACHMENT B

CONSTRUCTION SPECIFICATIONS

TIPPETT & GEE, INC.
CONSULTING ENGINEERS
ABILENE, TEXAS

OK1-559.10
(OPS-1022)



S P E C I F I C A T I O N S
F O R
PHASE I CONSTRUCTION (SITE PREPARATION)
OKLAUNION POWER STATION
UNIT NO.1

DIVISION 1 - GENERAL

101. PROJECT DESCRIPTION

Central and South West Services, Inc., will construct a plant to be located in Wilbarger County, approximately four miles south of Oklaunion, Texas. The Jobsite may be reached by a fair-weather road. A vicinity map showing both road and railroad locations is given on page 1-2.

102. PROJECT DATES

The unit is scheduled for Commercial Operation on December 1, 1986.

103. EQUIPMENT/MATERIALS SUBSTITUTION

Where specific brand names are used, they are a measure of quality only and equipment accepted as equal by Agent or Engineer may be substituted.

104. SITE CONDITIONS

Existing elevations are shown on the drawings. Solid lines are existing contours and dashed lines are proposed contours. Ambient temperature range is -5°F to 115°F. Seismic zone is "1".

SCOPE OF WORK

OK1-559.10
(OPS-1022)

201.02

<u>Drawing Number</u>	<u>Revision</u>	<u>Title</u>
C-102-073	0	Culvert Details
C-102-074	0	Collection Pond Overflow Details
C-102-075	0	Collection Pond Overflow Details
C-103-023	0	Barbed Wire Fence Details
C-103-024	0	Project Sign Elevation Sects. & Dets.
C-103-025	0	Fence Details
C-103-026	0	Fence Details
A-110-001	0	Prefabricated Guard Building

202.

GENERAL SCOPE DEFINITION (CONTRACTOR)

The following is intended to provide a general definition of the scope of the Work under this Contract and shall not be construed as an itemized listing. Contractor shall be responsible for construction of complete facilities conforming in all respects to the details and requirements of this Specification, Drawings and other Contract Documents.

202.01

Clearing and grubbing of ground surfaces within the construction areas as delineated on the Drawings.

.02

Excavation, backfill, compaction and grading of generation plant area, chimney area, cooling tower area, switchyard area, perimeter fence area, pond areas, coal storage and handling areas.

.03

Construction of one (1) upper collection pond, one (1) lower collection pond, one (1) make up water supply pond, five (5) storage ponds and ten (10) evaporation ponds. Pond construction includes all excavation, backfills, embankments, slope protection, miscellaneous spillway and outfall structures, and any required linings.

.04

Construction of Jobsite railroad subgrade, plant access roads, roads and construction parking lot including all excavation, fills, subgrade preparation, lime stabilization, fly ash stabilization, surfacing, embankments and culverts.

.05

Final grading of all ground surface areas disturbed by the construction to provide uniform surfacing and effective drainage of ground areas.

.06

Construction of diversion ditches and required construction containment areas.

.07

Supply and erect one (1) prefabricated guard building complete with concrete slab foundations.

DIVISION 4 - TECHNICAL REQUIREMENTS

OK1-559.10
(OPS-1022)

401. JOBSITE WORK

401.01 Applicable Codes and Standards:

All references to the following publications are to be latest issue of each, together with the latest additions and/or amendments thereto, as of the effective date of Contract. References to the sponsoring agencies will be made in accordance with the abbreviations indicated.

ASTM - American Society for Testing and Materials Standard Specifications

ACI - American Concrete Institute

AASHTO - American Association of State Highway and Transportation Officials Standard Specifications

THD - Texas State Department of Highways and Public Transportation

TEX - Standard Specifications Texas State Department of Highways and Public Transportation, Test Method

.02 Lines and Grades:

Contractor shall employ a competent, licensed land surveyor to determine lines and elevations.

Contractor shall lay out lines and grades from existing property lines and bench marks on the Jobsite and be fully responsible for correctness of such lines and grades and for proper execution of the Work to such lines and grades. Contractor shall correct at its own expense all errors in the Work arising from its inaccuracy.

Agent reserves right to verify correctness of lines and grades during progress of the Work. Such verification by Agent will not relieve Contractor of its responsibility.

Contractor shall preserve and maintain all bench marks and reference points established by Agent. Should Contractor, during execution of the Work, destroy or remove any bench marks and/or reference points established by Agent, the cost to Agent of reestablishing these bench marks and/or reference points will be charged to Contractor.

401.03 Surface Preparation:

Prior to performing excavation or fill work, the ground surfaces within the construction area shall be cleared, grubbed and the topsoil removed.

TECHNICAL REQUIREMENTS

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(OPS-1022)

401.03

a. Clearing:

Clearing is defined as removal and disposal of all trees, down timber, snags, brush, hedges, bushes and all other vegetation or organic materials, and also all rubbish, debris or other foreign or objectionable materials above ground surface, except removal of sod and topsoil.

b. Grubbing:

Grubbing is defined as removal and disposal of all stumps, large roots, buried logs and all other objectionable material from below ground surface. Explosives may be used only if specifically approved and their use shall conform to all applicable laws and safety regulations.

c. Disposal:

All materials from clearing and grubbing operations shall be promptly removed from the construction area and disposed of by and at the expense of Contractor. Accumulation of such materials on premises is not permitted. If Contractor desires to burn materials, the obtaining of a burning permit from the appropriate regulatory authorities shall be Contractor's responsibility.

d. Removal of Topsoil:

Topsoil in areas to be excavated or filled shall be removed, stockpiled and saved at various locations on the Jobsite near where it is to be reused. The depth of topsoil to be excavated or stripped is estimated to be six to twelve inches in depth. Stockpile locations shall be approved by Agent. Topsoil shall be carefully stripped, placed in stockpiles and kept clean and free of all foreign material. Topsoil shall be utilized where indicated on the Drawings and required by this Specification (reference Section 404.02, c.).

401.04

Excavation:

Excavation is defined to include all incidental clearing, all disposal of excavated materials, all protection, sheeting, shoring, bracing, all dewatering, and preparation of bearing areas as required to properly install and complete the Work, regardless of portions of Work for which required, and regardless of nature of materials, encountered in excavating.

TECHNICAL REQUIREMENTS

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(OPS-1022)

401.04

a. Protection and Support:

Banks at excavations shall be protected and supported, where necessary or where requested, so that the banks and bottoms will be maintained and adjacent structures or other construction will be protected from damage caused by an earth movement.

b. Bearing Areas:

b.01 Bearing areas for all foundations shall be inspected and approved by Agent before any concrete is placed. If bearing areas are not suitable, Contractor may be requested to carry the excavations deeper to more suitable bearing material.

.02 All foundations shall be placed on undisturbed soil unless otherwise indicated or approved.

401.05

Structural Backfill:

Structural backfill includes general backfilling around all Work excavated by Contractor, and also all other backfill indicated on Drawings as by Contractor. All backfill or ordinary fill shall be classified as structural backfill as defined herein unless indicated otherwise on the Drawings.

a. Material:

Unless indicated otherwise on the Drawings, all backfill material shall be approved materials previously excavated at the Jobsite or materials obtained from approved borrow pits and shall be free of sod and topsoil or other deleterious or foreign matter. This material shall be approved by Agent.

b. Compaction:

Backfill shall be built up to the grade elevations indicated on the Drawings or as directed, with suitable moisture control and compaction throughout placing. All backfill soils and embankments, unless indicated otherwise on the Drawings, shall be compacted equal to or greater than 95 percent of the maximum dry unit weight as defined by the Standard Compaction Test (ASTM D-698) for plastic clays and the THD Method (TEX-113E) for sandy clays, clayey sands, silty sands and sands. The moisture content may vary from two percent dry of optimum to four percent wet of the optimum when compacted. The thickness of backfill lifts shall not exceed 9".

TECHNICAL REQUIREMENTS

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401.05.

c. Inspection and Testing:

Contractor shall perform all backfill testing necessary to ensure the Work meets the specified requirements. Agent will conduct a quality control test monitoring program in addition to Contractor's basic testing program. Failure of backfill to meet the specified densities will be cause for rejection, and Contractor will be required to remove and replace all backfill not meeting these requirements at no additional cost to Agent.

d. Backfill Sand:

Backfill sand shall be a free-flowing clean sand of fairly uniform gradation. Clay and soil content shall be absent in any quantities that in the opinion of Agent makes use of the material undesirable. The sand shall be vibratory compacted greater than 95 percent of the maximum dry unit weight obtained using THD Compaction Test Method (TEX-113E).

e. Embankments:

Embankments are defined as any fill section. This definition includes the pond embankments, railroad embankments, road embankments or any area requiring a build-up of soil.

Prior to construction of any embankment, the foundation area shall be stripped to remove the topsoil, roots and weak surface soils. The stripping depth will be six to twelve inches, except in areas of uneven topography or in existing stock ponds and gullies. For these areas it will be necessary to strip to a deeper depth to remove the excessively wet and weak soils. All stumps and large roots shall be removed to a depth of two feet. All stripped areas shall be inspected by the on site testing laboratory and Agent's representative to determine if additional excavation is required to remove weak or otherwise objectionable materials that would adversely affect the intended integrity of the embankment.

After completion of stripping, the exposed soils shall be scarified to a depth of nine inches; the moisture shall be adjusted to two to four percentage points above optimum, and the soils recompacted. The optimum moisture value, compaction density and construction of embankment shall be as defined in the Structural Backfill Section 401.05 of this Specification.

f. Cut and Fill Slopes:

All slopes except pond slopes shall have a maximum inclination of 2.5 horizontal to 1.0 vertical or as indicated on the Drawings.

TECHNICAL REQUIREMENTS

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401.05

f.

All exposed slope surfaces shall be cultivated, seeded and mulched as defined in the Seeding Section 404.02.

401.06

Grading:

Consists of rough grading and finish grading as follows:

a. Rough Grading:

Cut, fill, spread and level during course of Work to elevations indicated.

b. Finish Grading:

After all excavation, backfill, compaction and rough grading has been completed, all ground surface areas disturbed by Contractor shall be finish graded. The grading shall be finished to the contours and elevations indicated on the Drawings and shall provide a smooth uniform surfacing free of debris, foreign matter, objectionable stones, clods, lumps, pockets or high spots and properly drained to provide effective drainage of the ground areas. Finish elevations shall be within two inches (plus or minus) of those elevations shown on the Drawings in all areas except the power block (turbine generator area, boiler, scrubber, and chimney) and the switchyard area. Finish elevation for the power block and switchyard area shall be within one inch (plus or minus).

c. An excess of backfill materials is anticipated. This excess material shall be utilized in a manner acceptable to Agent. The excess backfill shall be placed at locations approved by Agent. Disposal areas that are proposed by Contractor and approved by Agent shall be shaped, compacted and seeded as directed by Agent. Disposal areas that affect pond capacities or plant operations will not be approved. Seeding and compaction of backfill shall be included in the total Contract Price. Unit prices are not applicable to the disposal of excess backfill.

401.07

Pond Construction:

Pond construction shall conform to the shapes, locations and dimensions as shown on the Drawings, to this Specification and the items described as follows:

a. Criteria:

Construction of all ponds shall conform to current criteria established by the Texas Department of Water Resources (TDWR) relative to waste ponds.

TECHNICAL REQUIREMENTS

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(OPS-1022)

401.07

b. Slopes:

Interior and exterior slopes shall be no steeper than 3.0 horizontal to 1.0 vertical.

c. Pond Bottoms:

Elevation of pond bottoms for the evaporation ponds, makeup supply pond and the collection ponds are indicated by existing contours or excavated to elevations shown on the Drawings - whichever is lowest. The finish grades or elevations of pond bottoms for the five (5) storage ponds shown on the Drawings reflect finish grades.

Pond bottoms in cut areas shall be scarified to a depth of nine inches. The moisture content shall be adjusted to between two to four percentage points above the optimum value. Then the scarified subgrade shall be compacted. The optimum moisture value and compaction density shall be as defined in the Structural Backfill Section 401.05. Within 48 hours of compacting the pond bottom, a 12-inch layer of semi-compacted clay shall be spread over the entire bottom of each pond bottom in cut areas only to preserve the moisture content of the subgrade. Semi-compacted clay is defined as being greater than 90 percent of the maximum dry unit weight as defined by THD test method TEX-113E. The top of the semi-compacted clay shall be set at finish grade; therefore, for cut areas, Contractor shall overexcavate pond bottoms one foot to properly achieve finish grade.

d. Pond Embankments:

Pond embankments shall be constructed as defined in the Embankments Section 401.05.

e. Lime Stabilization of Slopes:

The slopes shall be lime stabilized as indicated on the Drawings. The percent lime and method of placement of lime shall be as defined in the Lime Stabilization Section 404.03. The lime stabilized materials shall be placed in lifts such that the thickness of the lime stabilized materials is two feet measured perpendicular to the slope.

f. Seeding:

The pond slopes shall be seeded as indicated on the Drawings and as required by this Specification. The seeding shall be as defined in the Seeding Section 404.02.

TECHNICAL REQUIREMENTS

OK1-559.10
(OPS-1022)

401.07
g.

Pervious Soils:

All pond bottoms and side slopes must have a permeability coefficient less than 1×10^{-7} cm/sec. Out of numerous permeability tests conducted during the initial soils investigation only one site demonstrated a permeability coefficient greater than 1×10^{-7} cm/sec and was considered pervious.

In the event that zones of pervious soils are disclosed in the pond bottoms or side slopes, these pervious zones must be removed by overexcavation to a depth of two feet and replaced with impervious materials. The placement and compaction of these impervious materials shall be as defined in Structural Backfill Section 401.05. The total contract price shall provide for excavating 50,000 cubic yards of pervious materials and replacing with 50,000 cubic yards of impervious materials. Unit prices shall be utilized for quantities above or below the 50,000 cubic yards that is included in the total Contract Price. The unit prices per cubic yard means to excavate one cubic yard of pervious materials and replace with one cubic yard of impervious materials.

401.08

Erosion and Sediment Control Requirements:

Contractor shall implement erosion and sediment control procedures as defined herein and shown on the Drawings.

a. Limitations:

The rainfall runoff from construction activities has the following limitations: 1) Total suspended solids - daily maximum of 50 milligrams per liter and 2) pH - between 6.0 and 9.0.

Contractor is required to conduct earthwork operations in such a manner than these limitations are met. To meet these limitations, Contractor shall comply with the following procedures:

b. Procedures:

Contractor shall conduct earthwork operations in the following sequence:

b.01

First - Contractor shall construct the three diversion ditches. Currently, approximately 1500 acres of surface area off the Jobsite drain through the Jobsite. Also, there is considerable acreage in the Unit No. 2 evaporation pond area that will be unaffected by Contractor. These areas must be allowed to flow through the plant site unimpeded and unaltered.

TECHNICAL REQUIREMENTS

OK1-559.10
(OPS-1022)

401.08

b.02

Second - Secondly and concurrently to the first procedure, Contractor shall construct improvement to the diversion ditches to force certain area runoff into the diversion ditches. Accordingly, it is necessary to construct some of the access road with drainage structures to allow drainage of the Unit No. 2 evaporation pond area into diversion ditch number 2. It is also necessary to construct a portion of the railroad berm in Sections 42, 44, 45, 56, 57 and 58 to force runoff water from the north of the Jobsite to flow through diversion ditch number 1. Similarly, some of the west berms of evaporation ponds numbers 8, 9 and 10 must be constructed to force runoff water from the west of the Jobsite to flow into diversion ditch number 3. Contractor shall make all necessary improvements to the diversion ditches to allow areas that are unaffected by construction to flow through the plant site unimpeded and unaltered.

.03

Third - Contractor shall construct the makeup water supply pond, the upper and lower collection ponds, evaporation pond number 4 and other ponds sufficiently to allow their use as sediment ponds. Contractor shall add temporary construction berms and diversion ditches as required such that runoff from all earthwork activities would drain into one of these ponds. Contractor may also install permanent drainage features as necessary to achieve these drainage/collection requirements.

.04

Fourth - Contractor can then execute any required earthwork activity - if the rainfall runoff is directed into one of the sediment ponds.

c.

Pumping Requirements:

As water and sediment builds up in a particular sediment pond and the water has been clarified (contains less than 50 milligrams of suspended solids per liter) and as directed by Agent, it shall be pumped out by Contractor. The water shall be pumped into a diversion ditch or an existing stream that leaves the Jobsite.

Additionally, Contractor shall cooperate with Agent by pumping water between sediment ponds if required and as directed by Agent.

d.

Cleanout of Sediment Ponds:

When all Work has been completed, Contractor shall pump out sediment ponds after they meet the required limitations and remove sediment if necessary to establish the required pond bottom elevations. Spoil areas for sediment shall be determined by Agent.

TECHNICAL REQUIREMENTS

OK1-559.10
(OPS-1022)

404.02

d.

Sideoats Grama (El Reno) and 5 pounds per acre of Caucasian Bluestem.

e.

Fertilization:

Fertilizer rates, seed purity, and seed germination rates will be in accordance with current THD Specifications, Item 164 and Item 166. The fertilizer shall have an analysis of 16-20-0 and shall be applied uniformly at the average rate of 300 pounds per acre.

404.03

Lime Stabilization:

Where indicated on the drawings lime stabilized materials shall be provided in accordance with the following procedure:

Excavate the existing clay soils to the depth indicated on the drawing and stockpile the excavated material.

Scarify the top six inches of the subgrade to receive lime stabilized materials, add moisture as required and compact to a density not less than 95 percent of the maximum dry unit weight as defined by the THD Compaction test, (TEX-113E) and ASTM D-698. The moisture content should be between optimum and four percent above optimum at the time of compaction.

Treat the excavated clays with the required percentage of lime, (approximately 4% by dry weight) add water as necessary, and recompact at a moisture content between optimum and four percent above optimum, as defined by the THD compaction test, TEX-113E and ASTM D-698. The fills should be placed in loose lifts not exceeding nine (9) inches in thickness and compacted to a minimum density of 95 percent of the maximum as determined above. Failure to have adequate moisture content during mixing and compaction shall be cause for rejection of the Work.

Lime treatment (pulverization, incorporation of lime, repulverization, curing, etc.,) shall be accomplished in accordance with the applicable provisions of Item 260 of the THD Standard Specifications for Construction of Highways, Streets, and Bridges, 1972 Edition.

Seal the treated area of road beds and foundation areas with an asphalt membrane using .40 gallons of asphalt per square yard of surface - if the lime stabilized materials are to be left exposed for more than seven (7) days. Sealing with asphalt is not required for the lime stabilization areas on pond slopes.

Icon

DIVISION 6 - GEOTECHNICAL INFORMATION

OK1-559.10
(OPS-1022)

601. GENERAL

Agent has previously conducted a subsurface soil investigation. This section provides Contractor with information pertaining to the results of that investigation.

602. POSSIBLE HARD MATERIALS

The subgrade soils are hard. These soils may prove difficult to excavate and difficult to use as backfill materials. From the soil borings operations, it is anticipated that ordinary earth moving equipment can excavate the materials without blasting, even though blasting may prove advantageous to Contractor. It also appears that these hard soils should break down rapidly when exposed to sunlight and could then be broken apart and used as backfill material.

It is incumbent upon Contractor to satisfy himself as to his own ability to excavate and compact these hard soils. Arrangements can be made by Contractors to bring equipment on site to experiment with these soils prior to submitting proposals.

603. GEOTECHNICAL DATA

603.01 At the end of this section there are copies of the borings made at the Jobsite. The location of the borings are shown on the Drawings. This information is furnished for Contractor's convenience. Contractor will be permitted to make his own soil investigations, but same shall be made at no cost to Agent.

.02 From these logs, Contractor should determine the materials which Contractor will be excavating and compacting, apparent water table levels, possible sources of usable backfill materials and other pertinent information associated with his different construction techniques.

603.03 The following information is included hereinafter:

- a. Rock and soil classification.
- b. Maps of boring locations.
- c. Various soil profiles.
- d. Boring numbers.

GEOTECHNICAL INFORMATION

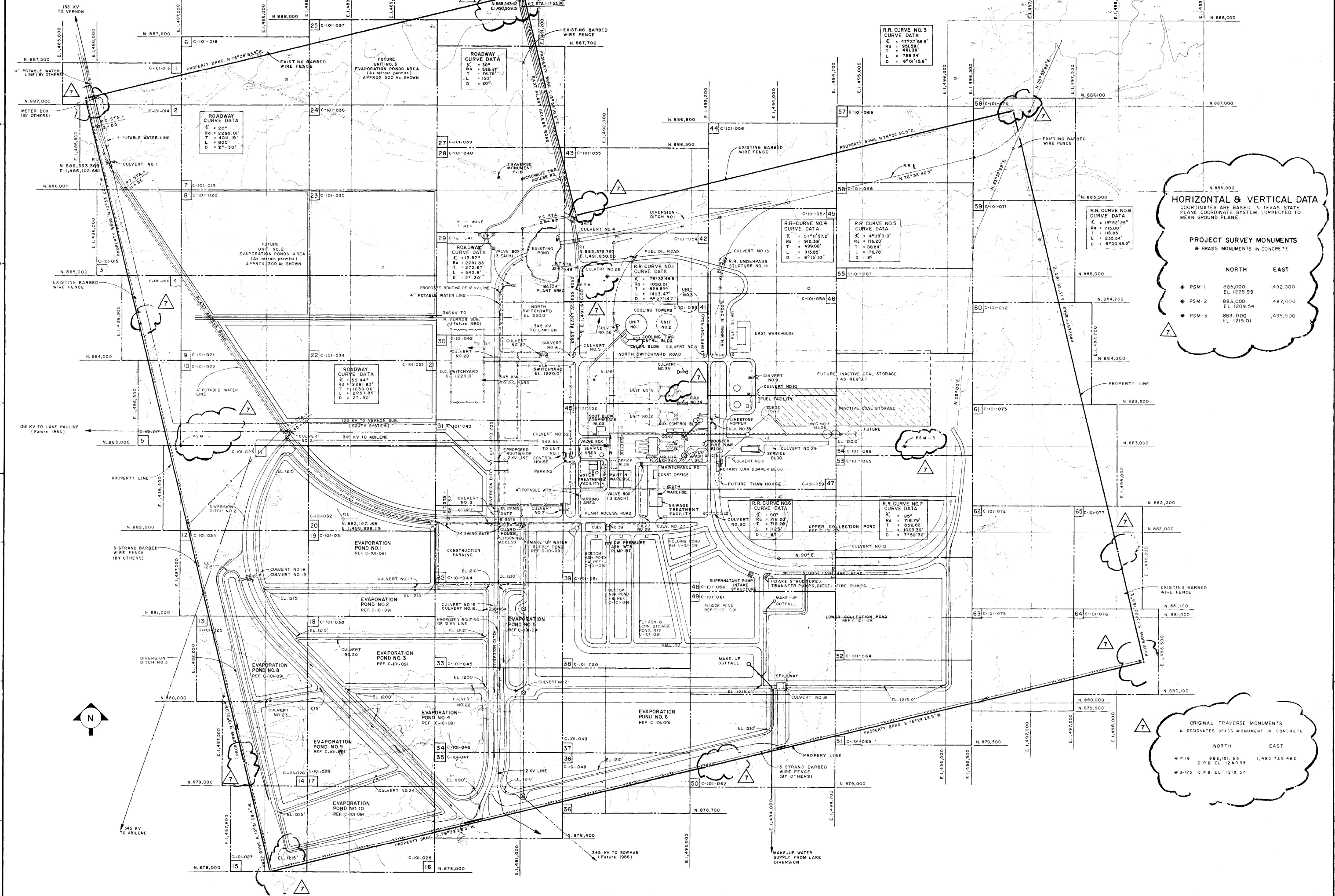
OK1-559.10
(OPS-1022)

603.04 The following is a listing of the boring logs which follow:

B-101P	B-155	B-203P
B-102	B-156	B-204
B-103P	B-157	B-205
B-104	B-158	B-206
B-105P	B-159	B-207
B-106	B-160	B-208
B-107P	B-161	B-209
B-108	B-162P	B-210
B-109P	B-163	B-211
B-114	B-164	B-212
B-116	B-165	B-213
B-117	B-166	B-214
B-118P	B-167	B-215
B-119	B-168	B-216
B-120	B-169P	B-217
B-122	B-170	B-218
B-123	B-171	B-219
B-125	B-172	B-220
B-126	B-173	B-221
B-129	B-174	B-222
B-131	B-175	B-223
B-132	B-176	B-224
B-134	B-177P	B-225P
B-135	B-178	B-226
B-136	B-179	B-227
B-137P	B-180	B-228
B-138	B-181	B-229
B-139	B-182	B-230
B-140	B-183	B-231
B-141	B-185	B-232
B-142	B-186	B-233
B-143	B-190	B-234
B-144	B-192	B-235
B-145	B-193	B-236
B-146	B-194P	B-237
B-147	B-195	B-239
B-149	B-196	B-240
B-150	B-198	B-241
B-151	B-199	B-242
B-152	B-200	B-243
B-153	B-201	B-244
B-154	B-202	

ATTACHMENT C

DESIGN DRAWINGS



HORIZONTAL & VERTICAL DATA
COORDINATES ARE BASED ON TEXAS STATE PLANE COORDINATE SYSTEM, CONNECTED TO MEAN GROUND PLANE.

PROJECT SURVEY MONUMENTS
* BRASS MONUMENTS IN CONCRETE

	NORTH	EAST
* PSM-1	885,000 EL 1225.95	1,492,300
* PSM-2	883,000 EL 1209.54	1,487,000
* PSM-3	883,000 EL 1219.01	1,495,500

ORIGINAL TRAVERSE MONUMENTS
* DESIGNATES BRASS MONUMENT IN CONCRETE

	NORTH	EAST
* P16	886,151.15	1,490,728.460
* C.P.B. EL 1240.95		
* B-125 C.P.B. EL 1218.37		

N. 881,400

E. 1,493,000

FOR CONTINUATION REFER DWG. C-101-051

N. 881,400

FOR CONTINUATION REFER DWG. C-101-060

SLUDGE
PIPE SUPPORTS
REF. C-150-020,
C-150-021

SLUDGE
STORAGE POND

FLY ASH & ECON.
STORAGE POND

ASH PIPE SUPPORTS
REF. C-150-018

BOTTOM ASH
STORAGE POND-B

BOTTOM ASH
STORAGE POND-A

MAKE-UP WATER SUPPLY POND

N. 881,000

FOR CONTINUATION REFER DWG. C-101-061

FOR SURFACE
IMPROVEMENT

N. 880,500

N. 880,400

FOR CONTINUATION REFER DWG. C-101-049

E. 1,492,500

E. 1,492,000

E. 1,491,500

N. 880,400

COORDINATE SYSTEM SHOWN ON MAPS IS BASED ON TEXAS STATE PLANE COORDINATE
SYSTEM, NORTH CENTRAL ZONE CORRECTED TO MEAN GROUND COORDINATES. TO CHANGE
TO TEXAS STATE PLANE SEA LEVEL COORDINATES BY 1,000,000.

FOR CONTINUATION REFER DWG. C-101-045

THESE AS-BUILTS OR RECORD DRAWINGS
HAVE BEEN PREPARED, IN PART, ON THE
BASIS OF INFORMATION COMPILED AND
FURNISHED BY OTHERS. THE ENGINEER WILL
NOT BE RESPONSIBLE FOR ANY ERRORS
OR OMISSIONS WHICH HAVE BEEN
INCORPORATED INTO THESE DOCUMENTS AS
A RESULT.

TIPPETT & GEE, INC.
ABILENE, TEXAS

DATE 6-1-87 BY J.L.W.

NOTE:
REFER TO ELECTRICAL (E) DRAWINGS &
MECHANICAL (M) DRAWINGS FOR EMBEDDED
ITEMS, PRIOR TO CONCRETE WORK.

TBC					
GP 38	FS 38				
CSN 38-B	CSS 38-A				
EL 38-A					

NOTES

REV	DATE	BY	DESCRIPTION
1	6-1-87	J.C.	AS BUILT - NO CHANGE

SCALE 1" = 50'
DRAWN MLB
DATE 3-1-83

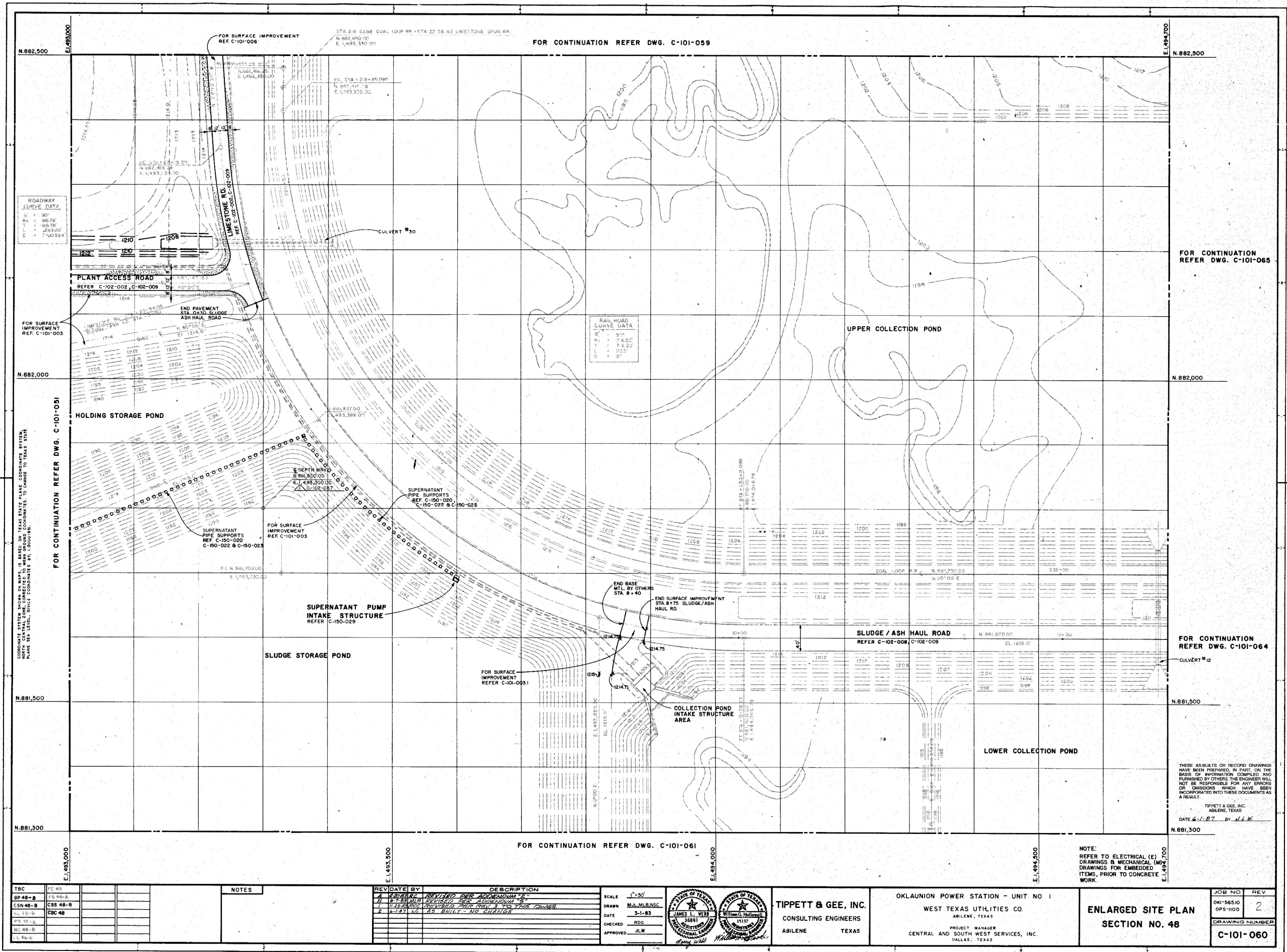


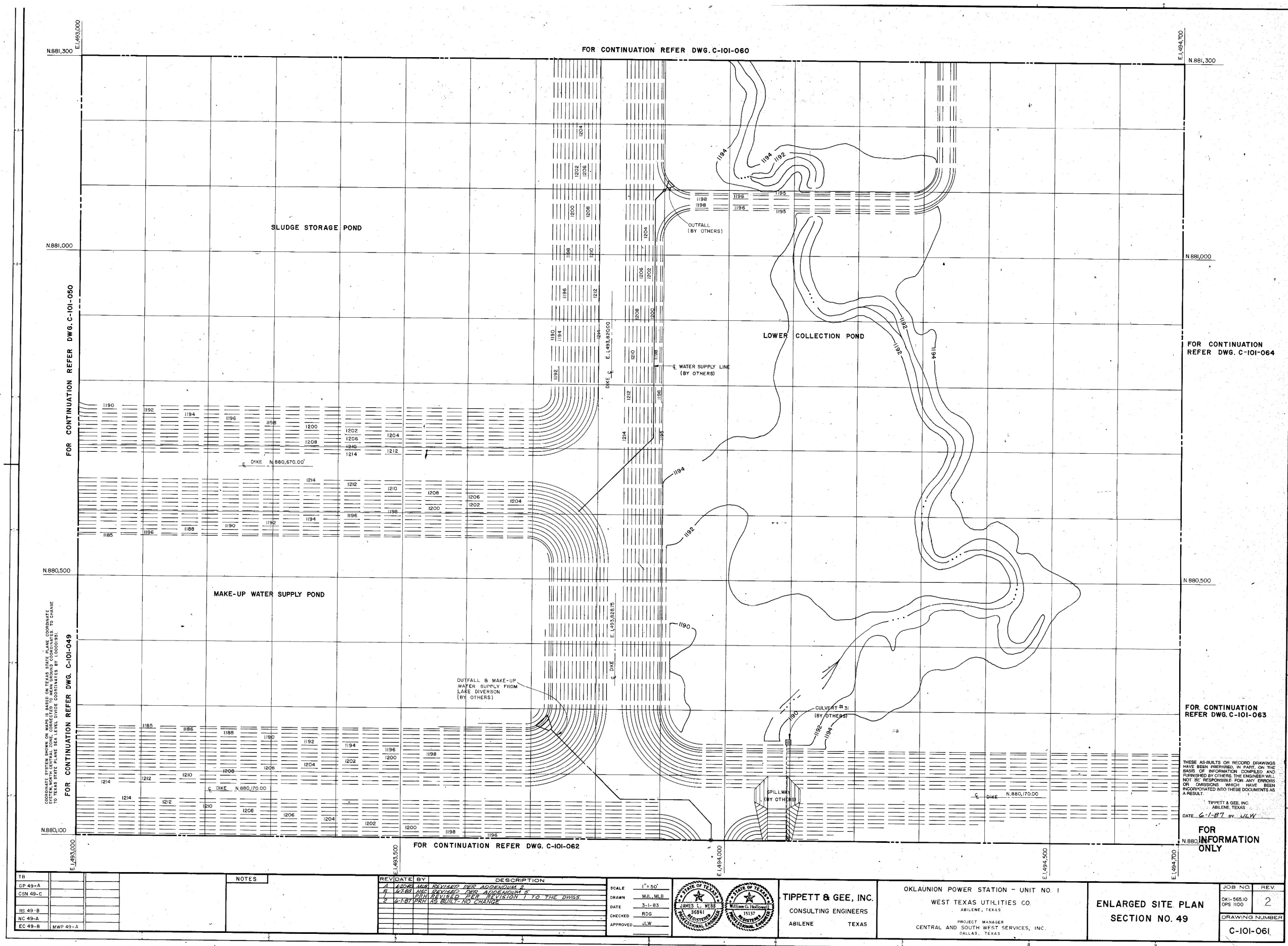
TIPPETT & GEE, INC.
CONSULTING ENGINEERS

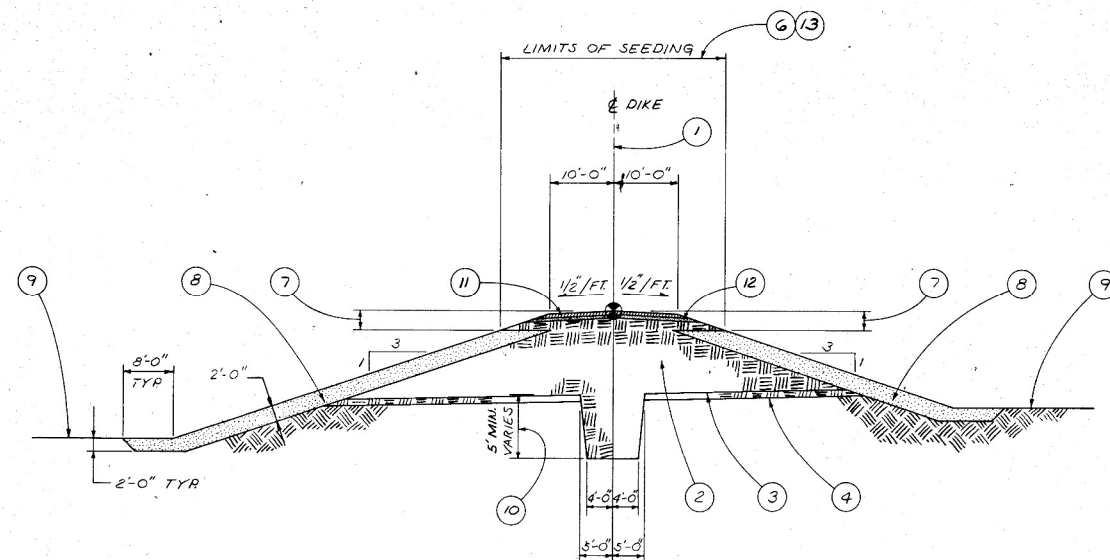
OKLAUNION POWER STATION - UNIT NO. 1
WEST TEXAS UTILITIES CO.
ABILENE, TEXAS

ENLARGED SITE PLAN
SECTION NO. 30

JOB NO.	REV.
OKI-56510	1
OPS-1100	



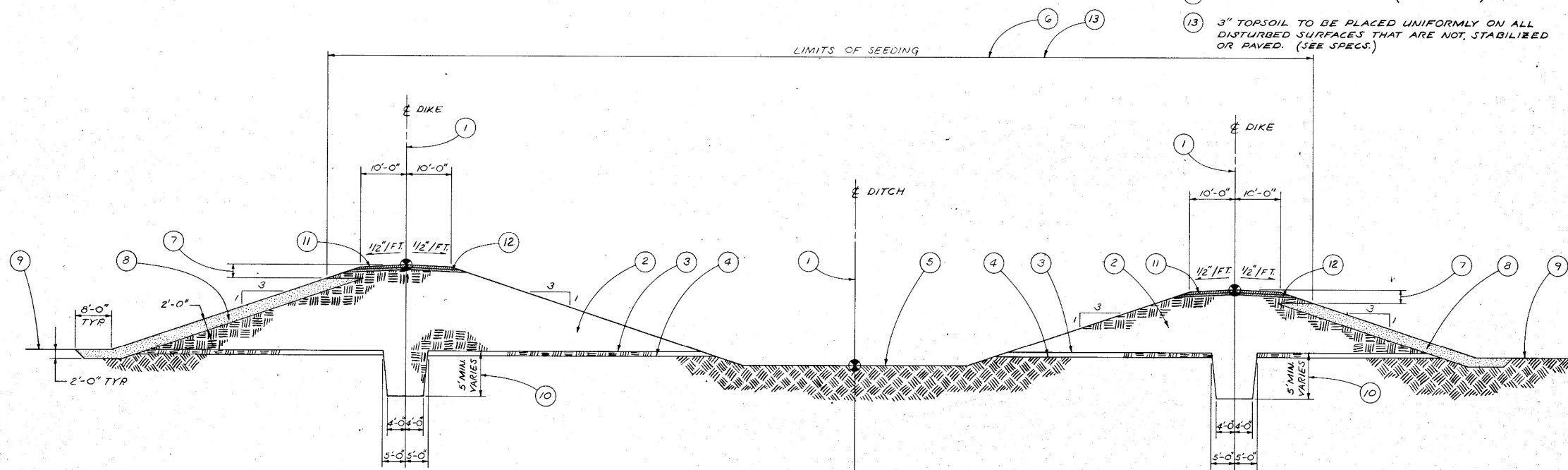




1 INTERIOR POND DIKE SECTION (TYPICAL)
SCALE: 1"=10'-0"

LEGEND

- 1 ALIGNMENT AND FINISH GRADE, SEE ENLARGED SITE PLAN SECTION
- 2 STRUCTURAL BACKFILL (SEE SPECS.)
- 3 STRIPPED SOIL PROFILE (SEE SPECS.)
- 4 6" SCARIFY & COMPACT TO DENSITY PRIOR TO STRUCTURAL BACKFILL (SEE SPECIFICATIONS)
- 5 50' FLAT BOTTOM DITCH NORMAL UNLESS OTHERWISE SHOWN ON ENLARGED SITE PLAN SECTION
- 6 CULTIVATE, SEED, FERTILIZE & MULCH ALL DISTURBED AREAS, EXCLUDING BASE COVERED & LIME STABILIZED AREAS (SEE SPECS.)
- 7 3" MIN. FREEBOARD ~ TOP OF WATER ELEV. = TOP OF LIME STAB. (SEE ENLARGED SITE PLAN SECTION & SPECS.) EXCEPTION AT COLLECT PONDS
- 8 THE INTERIOR SLOPES OF ALL PONDS WILL BE LIME STABILIZED TO A MIN. DEPTH OF 2'-0", PERPENDICULAR TO SURFACES (SEE SPECS., SECTIONS & DETAILS, AND ENLARGED SITE PLAN SECTION)
- 9 BOTTOM OF POND, REFER TO ENLARGED SITE PLAN SECTION FOR GRADE
- 10 KEY WAY TO BE CUT AS SHOWN, DEPTH WILL VARY TO PROJECT INTO SUITABLE IMPERVIOUS MATERIALS, AS DIRECTED BY AGENT'S REPRESENTATIVES & SPECS. FIVE FOOT MIN. DEPTH.
- 11 6" FLEX BASE (SEE SPECS.)
- 12 6" LIME STABILIZATION (SEE SPECS.)
- 13 3" TOPSOIL TO BE PLACED UNIFORMLY ON ALL DISTURBED SURFACES THAT ARE NOT STABILIZED OR PAVED. (SEE SPECS.)



2 DIKE SECTION THRU DIVERSION DITCH (TYPICAL)
SCALE: 1"=10'-0"

THESE AS-BUILTS OR RECORD DRAWINGS HAVE BEEN PREPARED, IN PART, ON THE BASIS OF INFORMATION COMPILED AND FURNISHED BY OTHERS. THE ENGINEER WILL NOT BE RESPONSIBLE FOR ANY ERRORS OR OMISSIONS WHICH HAVE BEEN INCORPORATED INTO THESE DOCUMENTS AS A RESULT.

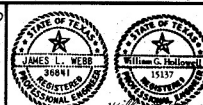
TIPPETT & GEE, INC.
ABILENE, TEXAS
DATE 6-1-87 BY J.L.W.

FOR INFORMATION ONLY

NOTES

REV	DATE	BY	DESCRIPTION
1	4-1-87	LP	REVISED PER ADDENDUM "2"
2	4-1-87	LP	AS BUILT - NO CHANGE

SCALE: AS NOTED
DRAWN: MFL
DATE: 3-1-83
CHECKED: RDS
APPROVED: J.L.W.



TIPPETT & GEE, INC.
CONSULTING ENGINEERS
ABILENE TEXAS

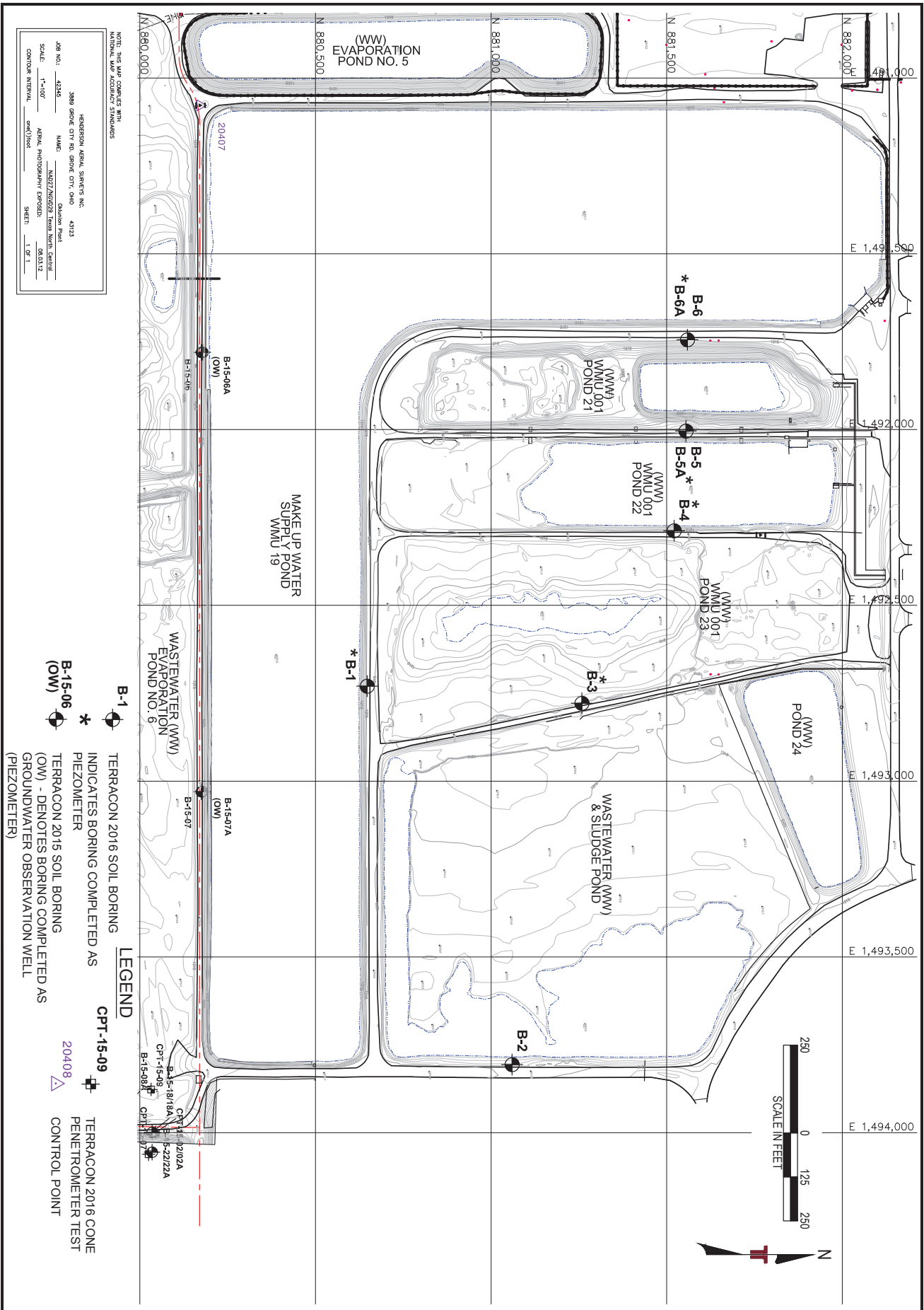
OKLAUNION POWER STATION - UNIT NO. 1
WEST TEXAS UTILITIES CO.
ABILENE, TEXAS
PROJECT MANAGER
CENTRAL AND SOUTH WEST SERVICES, INC.
DALLAS, TEXAS

EVAPORATION PONDS,
DETAILS & SECTIONS

JOB NO.	REV.
OKI-565.10	1
DRAWING NUMBER	C-101-086

ATTACHMENT D

INSTRUMENTATION LOCATION



NOTE: THIS MAP COMPLETES WITH
 NATIONAL MAP ACQUISITION STANDARDS

HENDERSON AERIAL SURVEYS INC.
 3889 GROVE CITY RD. GROVE CITY, OHIO 43123
 JOB NO.: 42345 NAME: OLAUNION POND
 SCALE: 1"=100' AERIAL PHOTOGRAPHY ENVOIERS: 08.03.12
 CONTOUR INTERVAL: 5' (100') SHEET: 1 OF 1

B-1 TERRACON 2016 SOIL BORING
 * INDICATES BORING COMPLETED AS
B-15-06 TERRACON 2015 SOIL BORING
 (OW) * TERRACON 2015 SOIL BORING
 (OW) - DENOTES BORING COMPLETED AS
 (PIEZOMETER) GROUNDWATER OBSERVATION WELL (PIEZOMETER)

LEGEND

CPT-15-09 TERRACON 2016 CONE
 PENETROMETER TEST
20408 CONTROL POINT

REV.	DATE	BY	DESCRIPTION

Terracon
 Consulting Engineers and Scientists

800 MORRISON ROAD COLUMBUS, OHIO 43230
 PH. (614) 863-3113 FAX. (614) 863-0475

BORING LOCATION PLAN

OKLAUNION PONDS AREA DIKES
 AMERICAN ELECTRIC POWER
 OKLAUNION POWER STATION
 12567 FM ROAD 3430

VERNON TEXAS

EXHIBIT A-2	
DESIGNED BY:	MAE
DRAWN BY:	DAB
APPROVED BY:	KME
SCALE:	1"=250'
DATE:	8/29/16
JOB NO.	N4165227
ACAD NO.	816boring1
SHEET NO.:	1 OF 1

