Tennessee Valley Authority
Regulatory Submittal for Kingston Fossil Plant

Documents submitted:
North Embayment Underpass Work Plan, Revision 1

Date Submitted:
04/07/2010

Submitted to whom
Leo Francendese

Concurrence

Received	Not Applicable	TVA
☐	☒	Mike Scott
☐	☒	Steve McCracken
☒	☐	Kathryn Nash
☐	☒	Dennis Yankee
☒	☐	Michelle Cagley
☒	☐	Steve Cherry SK
☐	☐	_____

Received	Not Applicable	Jacobs
☒	☐	Steve Richardson
☒	☐	Jack Howard
☒	☐	Butch Parton
☐	☐	_____
☐	☐	_____
☐	☐	_____

Approvals

TVA Kathryn Nash Date 4/7/10

EPA Leo Francendese Date 4/7/10

consulted w/ TDEC

This WP is being conducted as a Time Critical Action to support transition WPs for Non Time Critical (4)

cc:

- ☒ Anda Ray, TVA
- ☒ Barbara Scott, TDEC
- ☒ Leo Francendese, EPA
- ☒ Mike Scott, TVA
- ☒ Dennis Yankee, TVA
- ☒ Kathryn Nash, TVA
- ☒ Cynthia Anderson, TVA
- ☒ Steve McCracken, TVA
- ☒ EDM
- ☒ Julie Pfeffer, Jacobs
- ☒ Steve Richardson, Jacobs
- ☒ Michelle Cagley, TVA
- ☒ Greg Signer, TVA
- ☒ KIF Incident Document Control
- ☒ Katie Kline, TVA
- ☒ Gretchen Wahl, Jacobs
- ☒ Dannena Bowman, EPA
- ☒ Jeff Gary, Jacobs
- ☒ Robert Pullen, Jacobs

North Embayment Underpass Work Plan, Revision 1

1.0 Purpose of Work

This work plan is to construct an underpass on Swan Pond Circle Road and a haul road to allow ash movement from the North Embayment to disposal without crossing a public road.

2.0 Design Components

The underpass will consist of a box girder bridge constructed on Swan Pond Circle Road to allow haul vehicles to pass from the North Embayment to the Swan Pond Embayment without crossing public roads. A haul road will be constructed from the underpass to the East West Haul Road to allow traffic to tie into the site road system. The project will also require the construction of a drive around road to allow Swan Pond Circle to remain open to the public during construction. The roadway is being designed by Jacobs Engineering Group who is also preparing performance specifications for the box girders and reinforced earth wall design. A small discussion on each component follows:

Geotechnical Borings and Evaluation – A series of geotechnical borings are being performed along the haul road alignment from Swan Pond Circle to the East West Haul Road and at the bridge locations. The borings will provide data for the bridge design and the haul road design. A report will be prepared by Stantec to provide recommended design parameters. MACTEC is performing the borings under an existing site contract.

Drive around road – A two lane road will be constructed north of Swan Pond Circle Road to allow traffic to drive around the construction with minimal interruption. Swann Pond Circle will be closed for approximately 5 days to allow tie in to the drive around road. The drive around road will be constructed on ash material in the North Embayment and will consist of 2 feet of shot rock, 6” of crusher run and 2” of asphaltic pavement. The road will be lined with jersey barriers.

Excavation and reinforced earth wall – After completion and tie-in of the drive around road Swan Pond Circle will be excavated to a depth of 735. A reinforced earth wall will be constructed on each side to form the foundation for the bridge abutments. An independent company will be contracted to design and supervise the construction of the reinforced earth wall. The wall will consist of geogrid materials, steel tie down bands and aggregate materials and will be faced with concrete panels. The reinforced earth wall will have a 75 year design life.

Box Girders – While the excavation is underway a contract will be issued to design and fabricate the pre-stressed box girders. The box girders will be delivered to the site once the abutments are ready to receive them. The box girder bridge will be designed for a HS25 loading.

Remainder of Project – A third contract will be issued to a general contractor to construct the concrete abutments, install the box girders, pour the bridge slab, install guard rail, install the asphaltic pavement and to perform all other items required to finish the road. The roadway will be designed and constructed to Roane County requirements.

Haul Road – As a separate task Civil Projects will construct a haul road from the Swan Pond Circle underpass to the East West Haul Road. This road will tie the North Embayment to the site road system and allow the ash materials to be moved to disposal. The road will consist of shot rock and crusher run materials. Construction of this road will not begin until the stability analysis is completed by Stantec.

3.0 Construction Management

The construction will be accomplished with the use of Civil Project equipment and personnel along with the award of 3 contracts. Civil Projects will perform the excavation for the box bridge, construct the reinforced earth walls and construct the drive around road. A contract will be issued for the design and construction supervision of the reinforced earth wall. A second contract will be issued for the design and fabrication of the box girders for the bridge. A third contract will be issued to set the box girders, install the bridge slab, asphalt paving, guardrail installation and all other items required to finish the project.

The TVA Cultural Resources group shall be notified 1 week in advance of any excavation in the hill at the intersection of Berkshire Road and Swan Pond Circle Road.

4.0 Schedule

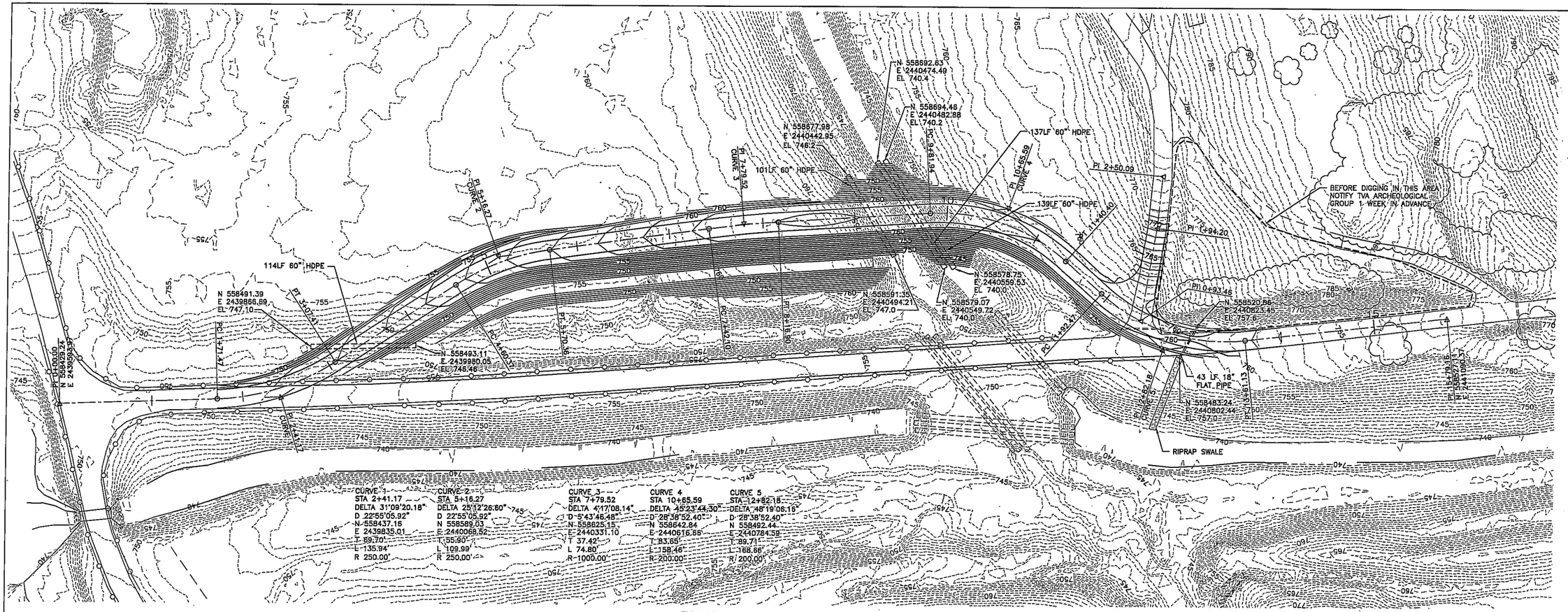
The design portion of this activity is underway. Construction activities will begin as required to tie-in with the delivery of the box girders. The excavation will not start until its completion will dovetail with the setting of the box girders. It is anticipated that the drive around road will be in operation for approximately 8 weeks. This task is being expedited to assist in ash removal activities.

5.0 Waste Management

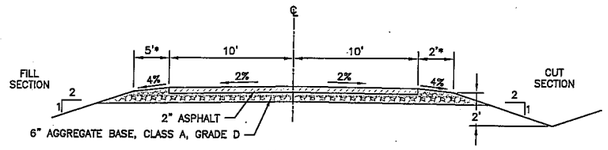
This project will require the disposal of asphaltic pavement off site. All water collected in excavations shall be pumped to the dirty water ditch.

6.0 Health and Safety

All construction activities will be done in accordance with the site-wide Health and Safety Plan.



PLAN
SCALE: 1"=50'



NOTE:
* ALL SHOULDERS SHALL BE 5' WIDE EXCEPT FOR EAST SIDE OF BERKSHIRE ROAD AND NORTH SIDE OF SWAN POND CIRCLE TO THE EAST OF BERKSHIRE ROAD. ALL SHOULDERS 5' WIDE SHALL HAVE JERSEY BARRIERS PLACED ON THEM.

ROADWAY SECTION
NOT TO SCALE

0 50' 100' 150'

REVISION NO.	DATE	DESCRIPTION	DRAWN BY	CHECKED BY
A	3/26/10	ISSUED FOR REVIEW		

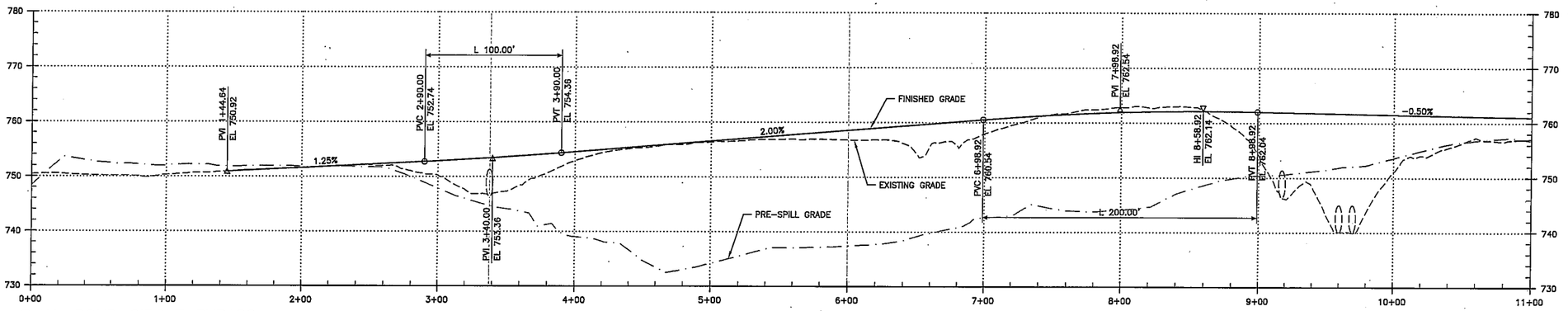
SEAL

JACOBS

KINGSTON FOSSIL PLANT
TENNESSE VALLEY AUTHORITY

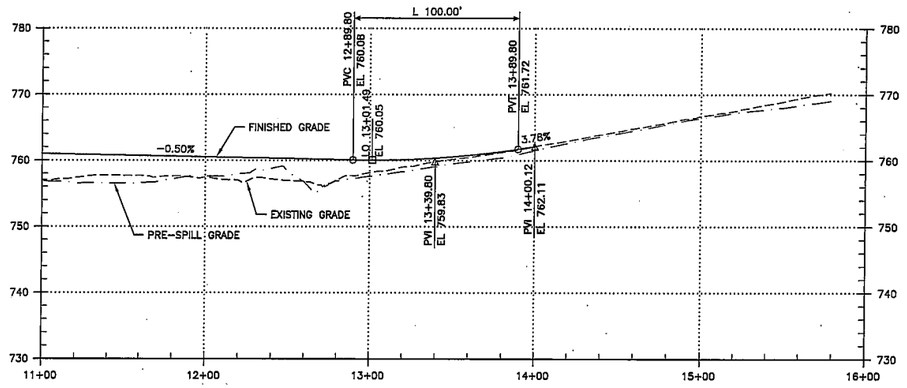
SWAN POND CIRCLE
DRIVE AROUND ROAD

SCALE	DRAWING NO.	REV.
SHOWN	INF-SK-078	A



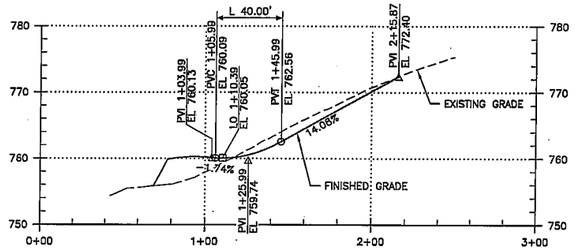
SWAN POND CIRCLE BYPASS

SCALE: 1"=40' HORIZ
1"=10' VERT



SWAN POND CIRCLE BYPASS

SCALE: 1"=40' HORIZ
1"=10' VERT



BERKSHIRE ROAD

SCALE: 1"=40' HORIZ
1"=10' VERT

REVISION NO.	DATE	DESCRIPTION	DRAWN BY	CHECKED BY	APPROVAL
A	3/26/10	ISSUED FOR REVIEW	SA	SW	

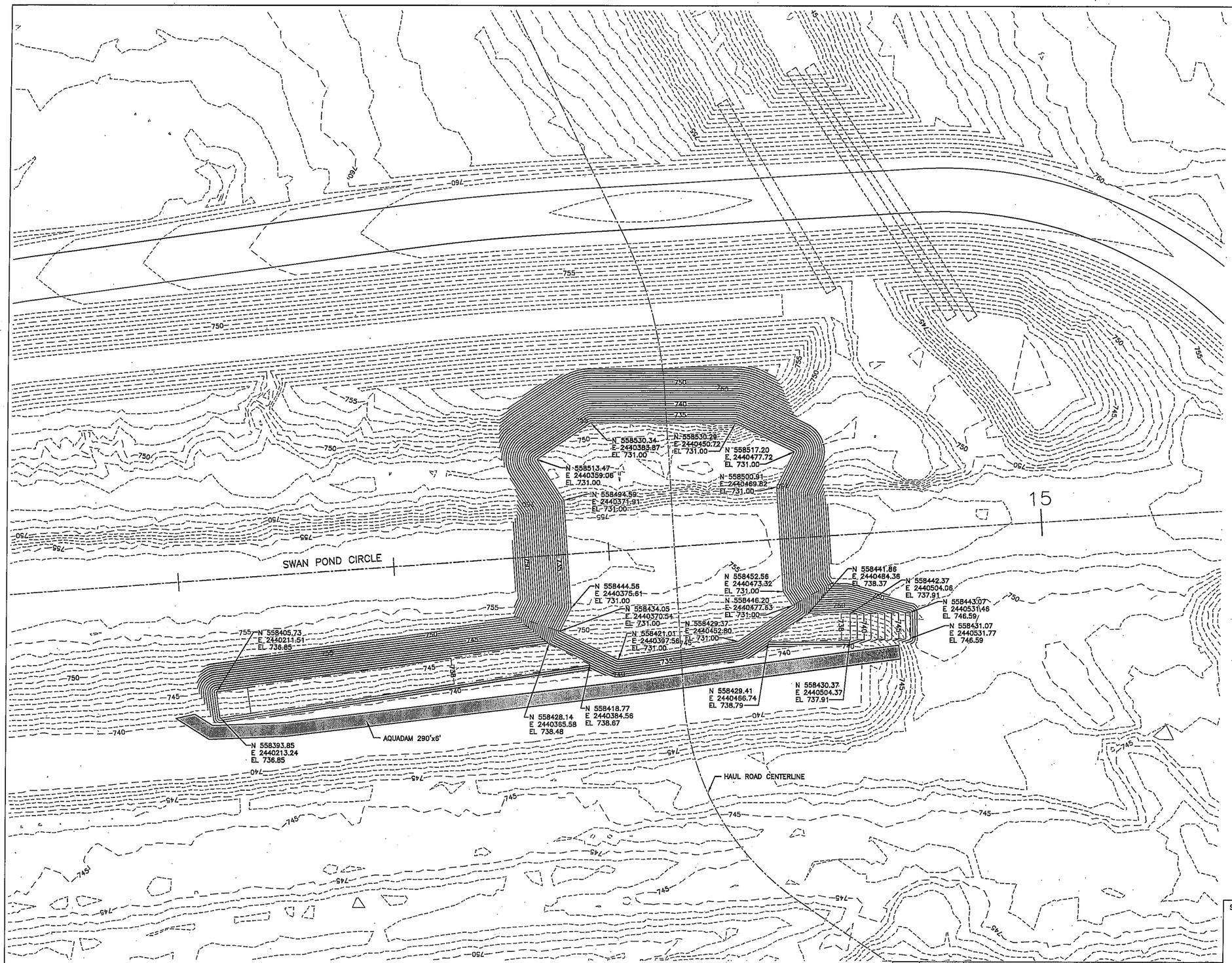
SEAL

JACOBS

KINGSTON FOSSIL PLANT
TENNESSE VALLEY AUTHORITY

SWAN POND CIRCLE DRIVE AROUND
ROAD PROFILES

SCALE	DRAWING NO.	REV.
SHOWN	INF-SK-079	A



PLAN
SCALE: 1"=20'

REVISION NO.	DATE	DESCRIPTION	DRAWN BY	CHECKED BY
A	3/26/10	ISSUED FOR REVIEW	JG	SD

SEAL

JACOBS

KINGSTON FOSSIL PLANT
TENNESSE VALLEY AUTHORITY

SWAN POND CIRCLE
WALL EXCAVATION PLAN

SCALE	DRAWING NO.	REV.
SHOWN	INF-SK-075	A

SCOPE OF WORK FOR REINFORCED EARTH BRIDGE APPROACHES

1 GENERAL

This Scope of Work is for the procurement of mechanically stabilized earth (MSE) walls associated with construction of the approaches for the proposed SWAN POND ROAD BRIDGE at TVA's Kingston Steam Plant, Kingston, TN. The bridge will serve as a means to separate public traffic crossing the bridge from transport trucks hauling ash beneath the bridge as part of the clean-up project.

Tennessee Valley Authority (TVA), hereinafter referred to as the BUYER, is currently managing the design and construction of the proposed bridge. TVA is requesting fixed-price bids for the design, fabrication, and delivery of the materials required for constructing the MSE bridge approach walls.

1.1 WORK DESCRIPTION

Work shall include the design (including stability calculations and shop drawings), shop fabrication, material supply, technical support, and delivery to the site of associated materials as noted on the attached drawings:

- MSE WALL SECTIONS & DETAILS; INF-SK-070
- BRIDGE APPROACHES ROUGH GRADING PLAN; INF-SK-076

Refer to INF-SK-070 for typical details/notes and INF-SK-076 for limits of the MSE walls, including horizontal limits and top and bottom elevations.

Delivery of the fabricated materials shall be coordinated and shall be transported to a designated area near the site as directed by the TVA Procurement Representative. It is envisioned that the delivery of the fabricated bridge components will not require any special DOE permits or passes.

Issued for Construction (IFC) engineering documents for the bridge construction are being prepared by Jacobs Engineering (JE), including the final grading plans and the design of the bridge abutments.

1.2 TECHNICAL REQUIREMENTS

All Work conducted under this Purchase Order shall be conducted in compliance with all applicable technical requirements per Tennessee Department of Transportation (TDOT) and American Associated of State Highway and Transportation Officials (AASHTO) specifications.

1.3 SUBMITTALS

The minimum submittals required are: Design calculations, shop drawings, Installation Procedures Manual(s), and other manufacturer's QA/QC documents. All design submittals are required to be completed by a Licensed Engineer approved prior to starting any shop fabrication.

SCOPE OF WORK FOR REINFORCED EARTH BRIDGE APPROACHES

1.4 MSE DESIGN, FABRICATION, AND DELIVERY

Work is summarized as follows:

1.4.1 MSE Approach Designs – provide detailed design calculations in accordance with latest edition of TDOT and AASHTO Specifications for resisting applied traffic loadings and lateral earth pressures. As noted on Drawing INF-SK-070, a geotechnical investigation is in progress and information will be provided to the SELLER as soon as sample information and lab test results are received. However in preparation of bids, SELLER shall utilize the assumed information as presented and shall consider live-load surcharge loadings that would be associated with an equivalent HS25 loads. SELLER shall provide design analyses for both the main MSE wall structure and the related MSE side embankment walls.

1.4.2 MSE Shop Drawings – prior to fabrication provide detailed shop drawings for all MSE components to be furnished. All shop drawings shall be prepared in accordance with standard shop practices and all submittals shall be accompanied with a shop submittal form along with three full-sized prints.

1.4.3 Fabricate and Deliver MSE materials – provide all shop fabrication, other associated materials, quality control/quality assurance, and delivery to the site. All materials shall be delivered to the site, and all deliveries shall be coordinated with TVA prior to shipping. All deliveries will be off-loaded by Others.

1.4.4 Technical Support – SELLER will be required to provide a company technical representative during the field erection as noted on Drawing INF-SK-070.

1.5 WORK EXECUTION REQUIREMENTS

All shop work shall be performed in accordance with the SELLERS Quality Assurance Program Plan. The SELLER shall be capable of providing equipment and personnel to perform the specified work in the allotted time frame and to the level of accuracy specified in their plans.

1.6 SCHEDULE

The project is required to be completed within a very aggressive schedule. As such, the SELLER must be capable of accomplishing the work (at a minimum) in accordance with the following schedule:

Activity/Task	Milestone[1]
Notice to Proceed (start of schedule)	0
Coordination Meeting	3 days
Design Calculations	1 week

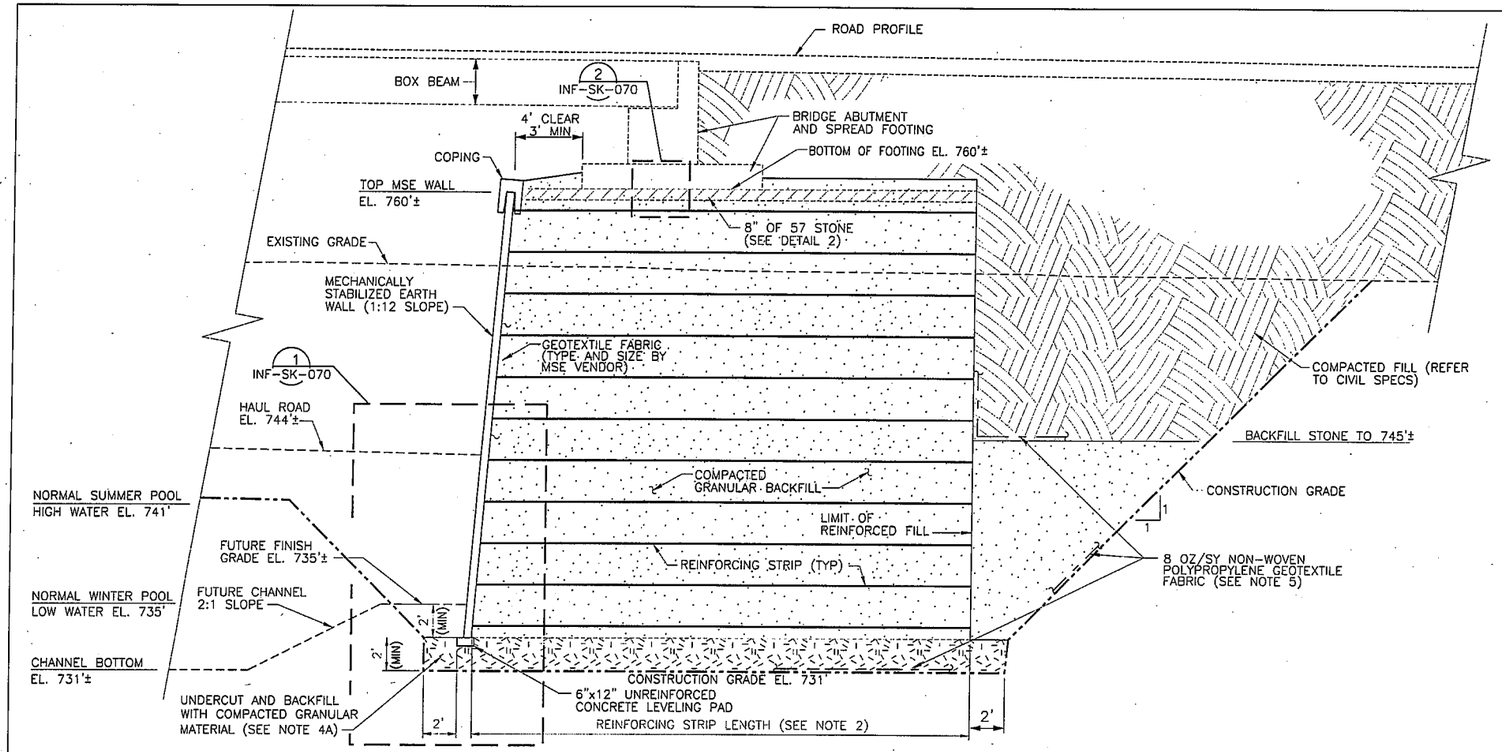
Shop Drawings	1 week
Shop Drawing Approval	2 days
Delivery (partial delivery of face panels is acceptable to begin construction as long as the final face panel shipment can be accomplished without delaying the MSE wall construction)	4 weeks

Note 1 – The milestone duration is measured by the number of calendar weeks after receipt and acceptance by the SELLER of the BUYER's Purchase Order.

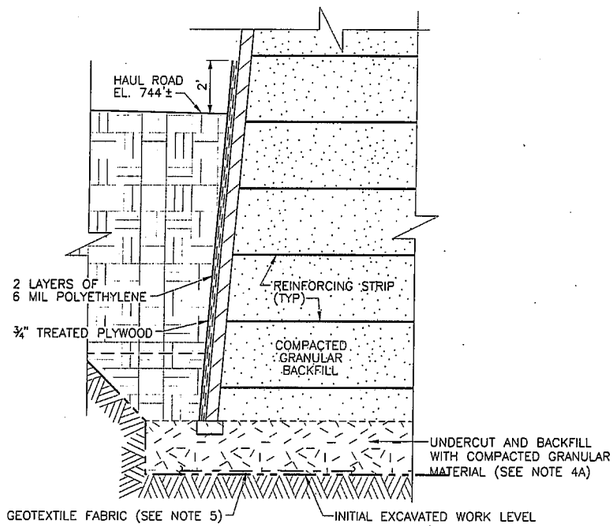
1.7 WORK NOT INCLUDED

The following items shall not be considered as part of this contract:

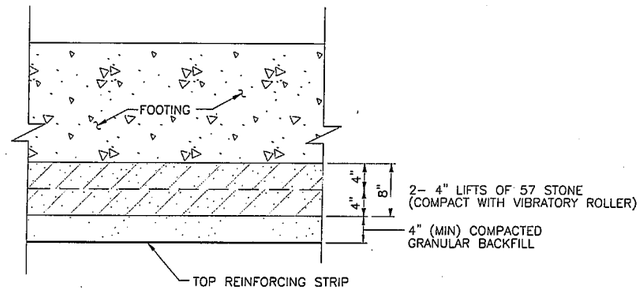
A. Off-loading of materials
B. Construction of the MSE walls



TYPICAL MSE WALL SECTION
SCALE: 1" = 4'-0"



1 INF-SK-070 DETAIL SCALE:NTS



2 INF-SK-070 DETAIL SCALE:NTS

NOTES:

1. MECHANICALLY STABILIZED EARTH (MSE) RETAINING WALL SYSTEM SHALL CONSIST OF RECTANGULAR PRECAST CONCRETE SMOOTH FACING PANELS, STEEL SOIL REINFORCEMENTS AND GRANULAR COMPACTED BACKFILL. THE CONCRETE FACING OF THE WALL SHALL HAVE A SLOPE OF NO MORE THAN 1:12.
2. THE MSE VENDOR SHALL PROVIDE COMPLETE DESIGNS INCLUDING CALCULATIONS, MATERIAL SPECIFICATIONS, REINFORCEMENT STRIP LENGTH, NUMBER, AND LOCATIONS AND SHOP DRAWINGS SEALED BY A TENNESSEE PROFESSIONAL ENGINEER.
3. THE DESIGN SHALL BE BASED ON THE FOLLOWING DESIGN PARAMETERS:
   - A. DESIGN PER LATEST TENNESSEE DEPARTMENT OF TRANSPORTATION (TDOT) SPECIFICATIONS.
   - B. DESIGN SHALL INCLUDE BOTH GLOBAL AND INTERNAL STABILITY CALCULATIONS.
   - C. DESIGN LIFE = 75 YEARS (MINIMUM)
   - D. ABUTMENT SURCHARGE LOAD = 4000 PSF UNDER THE CONCRETE BRIDGE ABUTMENTS.
   - E. SEISMIC DESIGN SHALL HAVE A MINIMUM FS = 1.1
   - F. A GEOTECHNICIAL INVESTIGATION IS BEING CONDUCTED TO DETERMINE SOIL CHARACTERISTICS FOR THE EXISTING FOUNDATION MATERIAL. THESE RESULTS WILL BE PROVIDED WHEN AVAILABLE. CONTRACTOR MAY CONSIDER THE FOLLOWING VALUES FOR PRELIMINARY DESIGN:
     - δ = 120 PCF
     - C = 500 PSF
     - ϕ = 20°
4. CONSTRUCTION – THE FOLLOWING REQUIREMENTS SHALL BE MET DURING CONSTRUCTION OF THE REINFORCED SOIL WALL:
   - A. EXCAVATION – SUBGRADE SHALL BE EXCAVATED TO THE PLAN ELEVATION AND UNDERCUT A MINIMUM OF 2 FEET (SEE TYPICAL MSE WALL SECTION).
   - B. FOUNDATION PREPARATION – CONTRACTOR SHALL VERIFY LINE AND GRADE, AND ANY OVER-EXCAVATED OR FILLED AREAS SHALL BE WELL COMPACTED AND INSPECTED BY THE GEOTECHNICAL ENGINEER.
   - C. QUALITY CONTROL – CONTRACTOR SHALL ENSURE THAT ON-SITE PERSONNEL ARE IN POSSESSION OF AND ARE FAMILIAR WITH THE APPROVED SHOP DRAWINGS AND THE VENDOR'S CONSTRUCTION AND QUALITY CONTROL PROCEDURES MANUAL.
   - D. FACING UNIT AND REINFORCING INSTALLATION – CONTRACTOR SHALL PLACE FACING UNITS IN ACCORDANCE WITH SHOP DRAWINGS AS SUPPLIED BY THE MSE VENDOR. VENDOR'S TECHNICAL REPRESENTATIVE SHALL BE PRESENT AT THE BEGINNING OF THE WALL INSTALLATION (MINIMUM OF FIRST 3 DAYS) AND SHALL CONDUCT PERIODIC INSPECTIONS DURING THE WALL CONSTRUCTION. THE FACING WALL UNITS SHALL BE SET BACK TO ALLOW FOR MOVEMENT DURING FILL PLACEMENT AND COMPACTION.
   - E. BACKFILL – THREE MATERIALS SHALL BE USED FOR BACKFILL:
     1. FOR THE TWO FEET UNDERCUT BENEATH THE MSE WALL FILL AND FOR THE MSE RETAINING WALL SYSTEM, BACKFILL SHALL BE #3 OR #4 STONE IN ACCORDANCE WITH SECTION 903.22 OF THE TENNESSEE DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATION FOR ROAD AND BRIDGE CONSTRUCTION (TDOT STANDARD SPEC). STONE SHALL BE PLACED IN LAYERS NOT TO EXCEED 9 INCHES LOOSE AND COMPACTED WITH A VIBRATORY ROLLER OR BY A MINIMUM OF 3 PASSES OF DOZER TRACKS WITH A MINIMUM GROUND PRESSURE OF 1,500 PSF.
     2. FOR THE BACKFILL ABOVE THE TOP LAYER OF THE MSE WALL SYSTEM AND BENEATH THE BRIDGE ABUTMENT FOOTING, BACKFILL SHALL BE #57 STONE IN ACCORDANCE WITH SECTION 903.22 OF THE TDOT STANDARD SPEC. BACKFILL SHALL BE PLACED IN LAYERS NOT TO EXCEED 5 INCHES LOOSE AND COMPACTED WITH A VIBRATORY ROLLER.
     3. FOR THE BACKFILL WEDGE BETWEEN THE MSE WALL SYSTEM AND THE SLOPED EXCAVATION, BACKFILL SHALL BE AS FOLLOWS:
        - a. FROM THE TOP OF THE UNDERCUT BACKFILL (ELEV. 733') TO ELEVATION 745' BACKFILL SHALL BE #3 OR #4 STONE. STONE SHALL BE PLACED IN LAYERS NOT TO EXCEED 9 INCHES LOOSE AND COMPACTED WITH A VIBRATORY ROLLER OR BY A MINIMUM OF 3 PASSES OF DOZER TRACKS WITH A MINIMUM GROUND PRESSURE OF 1,500 PSF.
        - b. ABOVE ELEVATION 745', BACKFILL SHALL BE EXCAVATED SOIL OR BORROW SOIL PLACED IN LAYERS NOT TO EXCEED 8 INCHES LOOSE THICKNESS AND COMPACTED WITH A HEAVY FOOTED-ROLLER. SOIL SHALL BE COMPACTED TO 95% OF THE SOIL'S RELATIVE DENSITY AS DETERMINED BY ASTM D698, STANDARD TEST METHODS FOR LABORATORY COMPACTION CHARACTERISTICS OF SOIL USING STANDARD EFFORT.
5. FILTER FABRIC SHALL BE INSTALLED AS A FILTER AND SEPARATOR IN ALL LOCATIONS WHERE STONE BACKFILL AND SOIL ARE ADJACENT. FABRIC SHALL BE AN 8 OZ./SQ.YD., NON-WOVEN, POLYPROPYLENE GEOTEXTILE WITH AN AOS OF 0.180mm.
6. ALTERNATE MSE SYSTEMS AND MATERIALS WILL BE ALLOWED IF SUBMITTED TO THE OWNER'S REPRESENTATIVE AND PRE-APPROVED IN WRITING.

REVISION NO	DATE	DESCRIPTION	DRAWN BY	DESIGNED BY
A	3-16-10	ISSUED FOR PROCUREMENT		

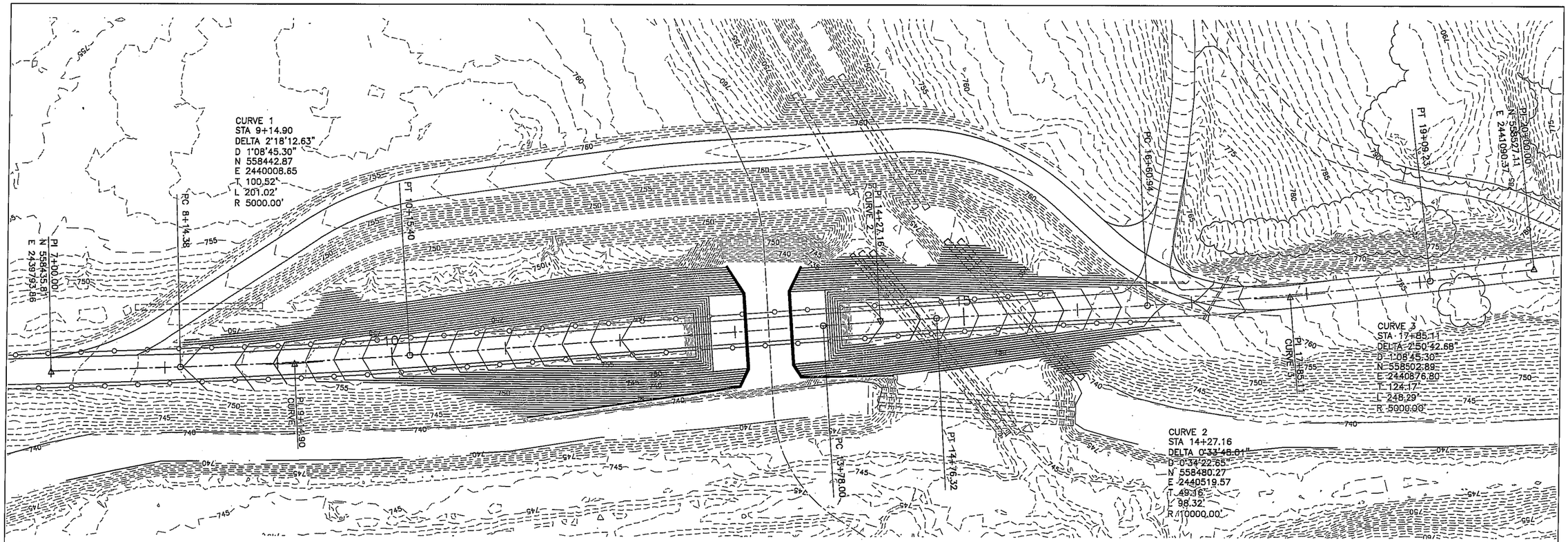
SEAL

JACOBS

KINGSTON FOSSIL PLANT
TENNESSEE VALLEY AUTHORITY

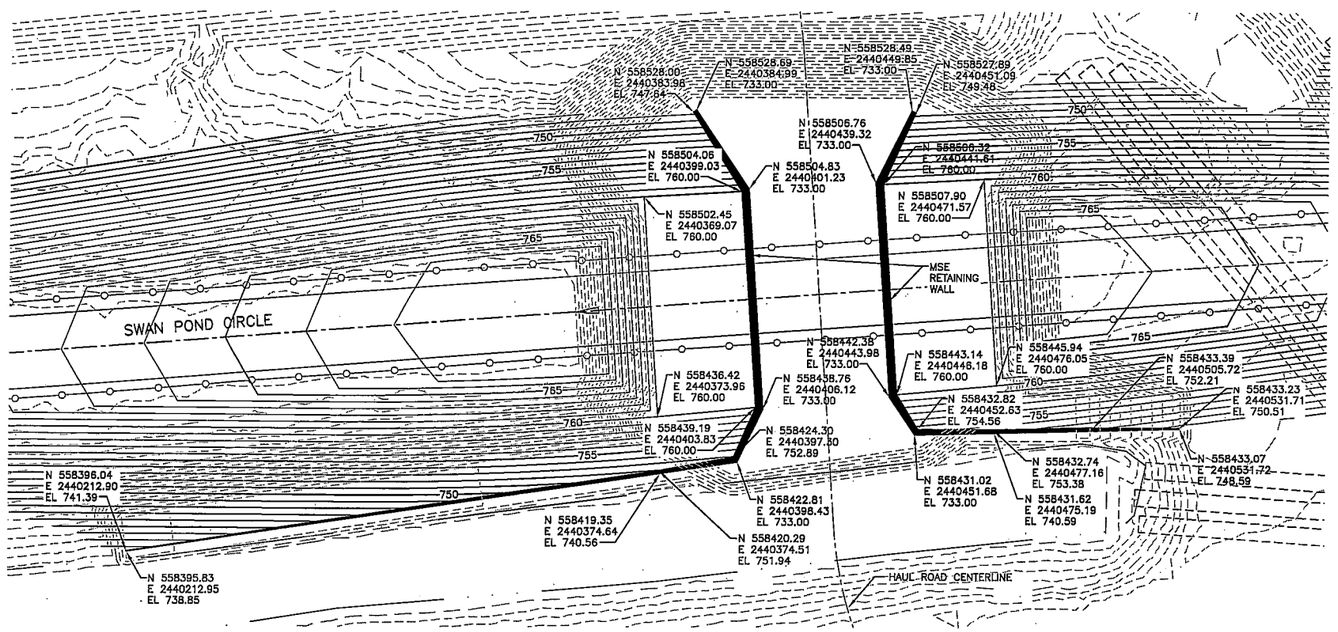
SWAN POND CIRCLE
MSE WALL SECTION AND DETAILS

SCALE	DRAWING NO.	REV.
AS SHOWN	INF-SK-070	A



SWAN POND CIRCLE SUBGRADE PLAN

SCALE: 1"=40'



MSE WALL LOCATION PLAN

SCALE: 1"=20'

NOTES:

1. PROPOSED CONTOURS SHOWN REPRESENT SUBGRADE ELEVATIONS PRIOR TO PLACEMENT OF ABUTMENT, BRIDGE AND ROADBASE (AGGREGATE AND ASPHALT).
2. SEE DRAWING INF-SK-077 FOR VERTICAL PROFILE OF SWAN POND CIRCLE OVERPASS.
3. SEE STRUCTURAL DRAWINGS INF-SK-070, INF-SK-071, INF-SK-072 AND INF-SK-073 FOR DETAILS OF MSE WALL.

0 20' 40' 60'

0 40' 80' 120'

REVISION NO.	DATE	DESCRIPTION	DRAWN BY	CHECKED BY	APPROVAL
B	3/26/10	ISSUED FOR REVIEW	JGA	FMP	
A	3/16/10	ISSUED FOR PROCUREMENT	JGA	FMP	

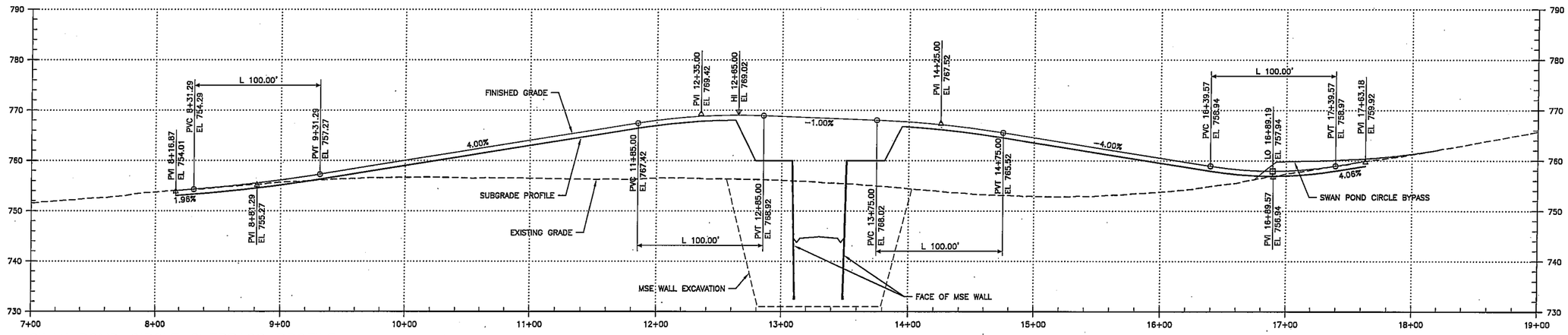
SEAL

JACOBS

KINGSTON FOSSIL PLANT
TENNESSEE VALLEY AUTHORITY

SWAN POND CIRCLE
BRIDGE APPROACHES
ROUGH GRADING (SUBGRADE) PLAN

SCALE:	DRAWING NO.	REV.
SHOWN	INF-SK-076	B



SWAN POND CIRCLE OVERPASS PROFILE

SCALE: 1"=40' HORIZ
1"=10' VERT

0 10' 20' 30'

0 40' 80' 120'

REVISION NO.	DATE	DESCRIPTION	DRAWN BY	CHECKED BY	APPROVED
A	3/22/10	ISSUED FOR REVIEW			

SEAL

JACOBS

KINGSTON FOSSIL PLANT
TENNESSEE VALLEY AUTHORITY

SWAN POND CIRCLE OVERPASS PROFILE

SCALE	DRAWING NO.	REV.
SHOWN	INF-SK-077	A

SCOPE OF WORK FOR PRESTRESSED BRIDGE BEAMS

1 GENERAL

This Scope of Work is for the procurement of seven (7) prestressed side-by-side box beams for the construction of a Roane County, TN county bridge associated with the proposed clean-up action at TVA's Kingston Steam Plant, Kingston, TN. The bridge will serve as a means to separate public traffic crossing the bridge from transport trucks hauling ash beneath the bridge.

Tennessee Valley Authority (TVA), hereinafter referred to as the BUYER, is currently managing the design, procurement and construction of the proposed bridge. TVA is requesting fixed-price bids for the design, fabrication, and delivery of the seven side-by-side box beams and associated materials required for bridge construction.

1.1 WORK DESCRIPTION

Work shall include the design (including calculations and shop drawings), shop fabrication, material supply, technical support, and delivery to the site of associated beams and related components as noted on the attached drawings and specification:

- Bridge Plan and Site Section; INF-SK-071
- Miscellaneous Sections and Details; INF-SK-072
- Engineered Prestressed Concrete Bridge Beams; Section 13 12 60

Delivery of the fabricated beams shall be coordinated and shall be transported to a designated area near the site as directed by the TVA Procurement Representative. It is envisioned that the delivery of the fabricated bridge beams may require special permits or passes and will be coordinated with the bridge erector for timely shipments.

Issued for Construction (IFC) engineering documents for the bridge construction are being prepared by Jacobs Engineering (JE), including the final grading plans and the design of the bridge abutments.

1.2 TECHNICAL REQUIREMENTS

All Work conducted under this Purchase Order shall be conducted in compliance with all applicable technical requirements per the attached performance specification, Section 13126, Engineered Prestressed Concrete Bridge Beams.

1.3 SUBMITTALS

All submittals noted in Specification Section 13 12 60 are required to be approved prior to starting any shop fabrication.

SCOPE OF WORK FOR PRESTRESSED BRIDGE BEAMS

1.4 PRESTRESSED BEAM DESIGN, FABRICATION, AND DELIVERY

Work is summarized as follows:

1.4.1 Prestressed Beam Designs – provide detailed design calculations in accordance with referenced AASHTO Specifications for resisting all loadings. Prior to performing any design, a design coordination meeting will be held to discuss final details prior to beginning work.

1.4.2 Prestressed Beam Shop Drawings – prior to fabrication provide detailed shop drawings for all fabricated and/or supplied components. All shop drawings shall be stamped by a PE, prepared in accordance with standard shop practices and all submittals shall be accompanied with a shop submittal form along with three full-sized prints.

1.4.3 Fabricate and Deliver Beams – provide fabricated prestressed box beams, other associated materials, and delivery to the site. All deliveries shall be coordinated with TVA prior to shipping. All deliveries will be off-loaded by Others.

1.4.4 Technical Support – SELLER will be required to provide an erection procedure (drawing and/or manual) for the erector's use.

1.5 WORK EXECUTION REQUIREMENTS

All shop work shall be performed in accordance with the SELLERS Quality Assurance and Quality Control Program. The SELLER shall be capable of providing equipment and personnel to perform the specified work in the allotted time frame and to the level of accuracy specified in their plans.

1.6 SCHEDULE

The project is required to be completed within a very aggressive schedule. As such, the SELLER must be capable of accomplishing the work (at a minimum) in accordance with the following schedule:

Activity/Task	Milestone[1]
Notice to Proceed (start of schedule)	0
Coordination Meeting	3 days
Design Calculations	1 week
Shop Drawings	1 week
Shop Drawing Approval	4 days
Delivery	8 weeks

Note 1 – The milestone duration is measured by the number of calendar weeks after receipt and acceptance by the SELLER of the BUYER's Purchase Order and is additive, e.g. total duration is 11 weeks.

SCOPE OF WORK FOR PRESTRESSED BRIDGE BEAMS

1.7 WORK NOT INCLUDED

The following items shall not be considered as part of this contract:

A. Off-loading of materials
B. Erection or Construction of the Bridge

Jacobs
125 Broadway Avenue
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TVA PROJECT **KINGSTON, TN** **PROJECT NO: 05DJ5400**	DOCUMENT NO.: 05DJ5400-SPEC-13 12 60
	SECTION NO.: 13 12 60
	ENGINEERED PRESTRESSED CONCRETE BRIDGE BEAMS

This title sheet is the first page of the specification and a record of each issue or revision. The pages revised and the description of the revision should be noted under remarks.

REV.	DATE	BY	CKD	APPROVED	PAGES	REMARKS
A	3/22/10	BP			ALL	ISSUED FOR BEAM PROCUREMENT

SECTION 13 12 60

ENGINEERED PRESTRESSED CONCRETE BRIDGE BEAMS

PART 1 GENERAL

1.1 DESCRIPTION

This specification includes the performance requirements for the complete design, fabrication, and delivery of seven (7) fully engineered prestressed concrete side-by-side box beams, herein referred to as prestressed members. Prestressed members shall be the product of a manufacturer specializing in the production of prestressed concrete members. In using this specification in conjunction with the Scope of Work, the following terms are synonymous:

CONTRACTOR/BUYER - Tennessee Valley Authority (TVA)
SUBCONTRACTOR/SELLER - Prestressed Member Designer/Fabricator

1.2 REFERENCES

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

ACI INTERNATIONAL (ACI)

ACI 304R	(2000) Guide for Measuring, Mixing, Transporting, and Placing Concrete
ACI 305R	(1999; Errata 2006) Hot Weather Concreting
ACI 306.1	(1990; R 2002) Standard Specification for Cold Weather Concreting
ACI 309R	(2005) Guide for Consolidation of Concrete
ACI 318/318R	(2008; Errata 2008) Building Code Requirements for Structural Concrete and Commentary

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)

AASHTO HB-17	(2002; Errata 2003; Errata 2005) Standard Specifications for Highway Bridges

ASTM INTERNATIONAL (ASTM)

ASTM A 123/A 123M	(2009) Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
ASTM A 153/A 153M	(2009) Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware

ASTM A 185/A 185M	(2007) Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete
ASTM A 27/A 27M	(2008) Standard Specification for Steel Castings, Carbon, for General Application
ASTM A 36/A 36M	(1996) Carbon Structural Steel
ASTM A 307	(2007b) Standard Specification for Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strength
ASTM A 325	(2009) Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength
ASTM A 416/A 416M	(2006) Standard Specification for Steel Strand, Uncoated Seven-Wire for Prestressed Concrete
ASTM A 421/A 421M	(2005) Standard Specification for Uncoated Stress-Relieved Wire for Prestressed Concrete
ASTM A 47/A 47M	(1999; R 2009) Standard Specification for Steel Sheet, Aluminum-Coated, by the Hot-Dip Process
ASTM A 496/A 496M	(2007) Standard Specification for Steel Wire, Deformed, for Concrete Reinforcement
ASTM A 497/A 497M	(2007) Standard Specification for Steel Welded Wire Reinforcement, Deformed, for Concrete
ASTM A 563	(2007a) Standard Specification for Carbon and Alloy Steel Nuts
ASTM A 615/A 615M	(2009) Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement
ASTM A 706/A 706M	(2009) Standard Specification for Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement
ASTM A 722/A 722M	(2007) Standard Specification for Uncoated High-Strength Steel Bar for Prestressing Concrete
ASTM A 775/A 775M	(2007b) Standard Specification for Epoxy-Coated Steel Reinforcing Bars

ASTM A 82/A 82M	(2007) Standard Specification for Steel Wire, Plain, for Concrete Reinforcement
ASTM C 1202	(2009) Standard Test Method for Electrical Indication of Concrete's Ability to Resist Chloride Ion Penetration
ASTM C 1218/C 1218M	(1999; R 2008) Standard Specification for Water-Soluble Chloride in Mortar and Concrete
ASTM C 1260	(2007) Standard Test Method for Potential Alkali Reactivity of Aggregates (Mortar-Bar Method)
ASTM C 150/C 150M	(2009) Standard Specification for Portland Cement
ASTM C 260	(2006) Standard Specification for Air-Entraining Admixtures for Concrete
ASTM C 33/C 33M	(008) Standard Specification for Concrete Aggregates
ASTM C 330	(2005) Standard Specification for Lightweight Aggregates for Structural Concrete
ASTM C 494/C 494M	(2008a) Standard Specification for Chemical Admixtures for Concrete
ASTM C 618	(2008a) Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete
ASTM C 94/C 94M	(2009) Standard Specification for Ready-Mixed Concrete
ASTM F 436	(2009) Hardened Steel Washers
ASTM F 844	(2007a) Washers, Steel, Plain (Flat), Unhardened for General Use

PRECAST/PRESTRESSED CONCRETE INSTITUTE (PCI)

PCI MNL-116	(1999) Manual for Quality Control for Plants and Production of Structural Precast Concrete Products
PCI MNL-120	(2004) Design Handbook - Precast and Prestressed Concrete

1.3 SYSTEM DESCRIPTION

1.3.1 Design Requirements

Design prestressed members in accordance with AASHTO Standard Specifications for Highway Bridges, 17th Edition (AASHTO HB-17). Design prestressed members (including connections) for the design load conditions and spans indicated, and handling and erection stresses, and for additional loads imposed by openings and supports of the work of other trades. Design prestressed members for handling without cracking in accordance with the PCI MNL-120.

1.3.1.1 Loads

Loadings for members and connections shall include all dead load, live load, applicable lateral loads such as wind and earthquake, applicable construction loads such as handling, erection loads, and other collateral loads such as future resurfacing and utility loads.

1.3.1.2 Drawing and Design Calculation Information

Submit drawings and design calculations indicating complete information for the fabrication of the prestressed members. Drawings shall not be reproductions of contract drawings. Design calculations and drawings of prestressed concrete members (including connections) shall be made by a registered professional engineer that is also experienced in the design of prestressed concrete members and submitted for approval prior to fabrication. The drawings shall indicate, as a minimum, the following information:

a. Plans, elevations and other drawing views showing the following:

1) Member piece marks locating and defining products furnished by the manufacturer.

2) Location and size of openings.

3) Joints and openings between members and between members and other construction.

4) Dimensioned size and shape for each member with quantities, position and other details of reinforcing steel, anchors, inserts and other embedded items.

5) Surface finishes of each member.

6) Estimated cambers

7) Location of field installed anchors.

8) Erection sequences and handling requirements

9) Lifting and erection inserts

b. Magnitude, schedule and sequence of tensioning and detensioning prestressing strands.

c. Strength properties for concrete, steel and other materials.

d. Methods for storage and transportation.

e. Description of loose, cast-in and field hardware.

f. All dead, live, handling, erection and other applicable loads used in the design.

1.3.2 Performance Requirements

Prestressed members shall have a minimum design life of 75 years.

1.4 SCOPE OF WORK DESCRIPTION

1.4.1 Design Requirements

1.4.1.1 Design Analysis

Abutment and cast-in-place slab design will be provided by others using information supplied by the bridge fabricator; however, the bridge fabricator shall include information regarding the number, diameter, material strength and location of anchor dowels. All formulas and references used in the calculation shall be fully identified, assumptions and conclusions shall be explained, and cross-referencing shall be clear. Computer programmed designs shall be accompanied by stress values and a letter of certification, signed by a licensed Professional Engineer, stating the design criteria and procedures used and attesting to the adequacy and accuracy of the design. Critical load conditions used in the final sizing of the members shall be emphasized. The design analysis shall include the name and office phone number of the designer, who shall function as a point of contact to answer questions during the review.

1.4.1.2 Shop Drawings

The fabricator shall prepare appropriate shop drawings for all prestressed members.

1.4.1.4 Dimensions

Dimensions shall be as standard with the bridge fabricator, not less than those indicated, but exceeding the indicated dimensions only by the amount of the closest standard size thereto.

1.4.2 Performance Requirements

The design of all prestressed members shall be in accordance with AASHTO HB-17 for loading combinations, material design and deflection requirements.

1.4.2.1 Live Loads

The live load shall consist of a pro-rated HS AASHTO loading equivalent to an HS25 loading.

a. Uniform Lane Loads: Uniform live loads for an equivalent truck loading of 800 lbs/ft and a concentrated load of 22.5 kips shall be applied in accordance with AASHTO HB-17.

b. Truck Loads: Unless controlled by the uniform lane loads as described above, each bridge shall withstand the loads created by the placement of an HS25 truck load on the bridge per AASHTO HB-17. Utilize prorated axle loads of 10 kips, 40 kips, & 40 kips respectively and spaced as noted for the HS20-44 loading.

1.4.2.2 Impact Loads

Include full impact loads as determined and applied in accordance with AASHTO HB-17.

1.4.2.3 Wind Loads

Compute and apply wind pressures on superstructure and live load per AASHTO HB-17. Wind pressures given in AASHTO HB-17 are based on a wind velocity of 100 mph.

1.4.2.4 Longitudinal Force

Apply longitudinal forces as indicated in AASHTO HB-17.

1.4.2.5 Seismic Loads

Apply seismic forces as indicated in AASHTO HB-17.

1.4.2.6 Collateral Loads

Allow for an additional 100 pound/linear foot for collateral load, applied to the face of the deck, to account for future hanging utility loads.

1.4.2.7 Temperature

Bridges shall be designed to accommodate a temperature differential of 120 degrees F. One end of the bridge will be considered as fixed and the other as the expansion end. Suitable bearing devices shall be supplied by the bridge fabricator.

1.5 SUBMITTALS

Buyer approval is required for all submittals. The following shall be submitted in accordance with SUBMITTAL PROCEDURES as noted in the Scope of Work:

Shop Submittals

a) Drawings of prestressed concrete members

Submit shop drawings of all prestressed members for approval.

b) Product Data

Anchorage and lifting inserts and devices

Bearing pads

Design Data

a) Prestressed concrete members design calculations

Submit design calculations and analyses for the prestressed members. All calculations shall be prepared and stamped by a professional engineer registered in the State of Tennessee.

b) Concrete mix design; with cement type, aggregate, and all admixture data. Include verification statements stating aggregates shall be in accordance with ASTM C 1260 for potential alkali-silica reactions.

Test Reports

Submit copies of laboratory test reports showing that the mix has been successfully tested to produce concrete with the properties specified and that mix will be suitable for the job conditions. The laboratory test reports shall include mill test and all other test for cement, silica fume, aggregates, and admixtures. Provide maximum nominal aggregate size, gradation analysis, percentage retained and passing sieve, and a graph of percentage retained versus sieve size. Test reports shall be submitted along with the concrete mix design. Obtain approval before concrete placement.

Procedures

Quality control procedures

Submit quality control procedures established in accordance with PCI MNL-116 by the prestressed manufacturer.

Erection procedures

Recommended handling and erection procedures of the prestressed concrete members shall be submitted.

1.6 QUALIFICATIONS AND OTHER REQUIREMENTS

1.6.1 Qualifications

1.6.1.1 Bridge Fabricator

The bridge fabricator shall have at least 10 years of experience in designing and fabricating equal or greater type of structures.

Plants shall be certified by the PCI Plant Certification Program for bridge category work.

1.6.1.2 Designer Qualifications

The designer shall be a registered professional engineer in the State of Tennessee experienced in the design of prestressed concrete.

1.6.1.3 Independent Quality Assurance

Fabricator shall allow for the Buyer's Procurement Representative or his designee to perform independent quality assurance surveillance at the bridge fabricator's shop prior to shipping to the site. Bridge fabricator shall provide access to all structural components and adequate space in order to allow the independent inspection to take place without other shop work interferences.

1.6.2 Coordination Meeting

A coordination meeting shall be held within 3 to 7 days after purchase order award for mutual understanding of the prestressed concrete beams purchase order requirements. This meeting shall include representatives from the Buyer, the bridge designer, and the bridge fabricator. All items required by paragraph SUBMITTALS shall be discussed, including applicable standard fabricator shop drawings and the approval process. The Buyer's Procurement Representative shall coordinate time and arrangements for the meeting.

1.7 DELIVERY, STORAGE, AND HANDLING

1.7.1 Transportation

1.7.1.1 Transporting Members

In transporting members by truck, railroad car, or barge, provision shall be made for supporting the members as described above, except battens can be continuous over more than one stack of units, with adequate bracing to ensure their maintaining the vertical position and damping of dangerous vibrations. Trucks with double bolsters are satisfactory provided the members are fully seated on the outer bolsters at not more than 3 feet or the depth of the member from the end and the inner bolster is not more than 8 feet from the end of the member or the designated pickup point. Adequate padding material shall be provided between tie chains or cables to preclude chipping of concrete.

1.7.1.2 Lateral Deflection or Vibration

Any noticeable indication of lateral deflection or vibration during transportation shall be corrected by rigid bracing between members or by means of lateral trussing.

1.7.2 Handling of Members

The location of pickup points for handling of the members and details of the pickup devices shall be shown in shop drawings. Members shall be handled only by means of approved devices at designated locations. Members shall be

maintained in an upright position at all times and picked up and supported as shown in approved shop drawings.

PART 2 PRODUCTS

The information presented within this section applies to products associated with the shop fabrication requirements or to other product information allowed for the construction of the bridge decks and traffic barriers. Bridge fabricator shall be aware of the purchase order clause(s) to "Buy America" products where applicable.

2.1 SUBCONTRACTOR-FURNISHED MIX DESIGN

ACI 318/318R. The minimum compressive strength of concrete at 28 days shall be 6000 psi. Add air-entraining admixtures at the mixer to produce between 4 and 6 percent air by volume. Ensure a dense concrete free of shrinkage cracks, with a minimum degree of permeability. The maximum water cement ratio shall be 0.40.

2.2 MATERIALS

2.2.1 Cement

ASTM C 150/C 150M, Type I, II, or III with a maximum alkali content of 0.40 percent. Cement certificates shall include test results in accordance with ASTM C 150/C 150M, including equivalent alkalies indicated in the optional chemical requirements.

2.2.1.1 Fly Ash and Pozzolan

ASTM C 618, Type N, F, or C, except that the maximum calcium oxide content shall be 8.0 percent, the maximum available alkalies shall be 1.5 percent, and the maximum allowable loss on ignition shall be 6 percent for Type N and F. Class C shall not be used with reactive aggregates.

2.2.2 Water

Water shall be fresh, clean, and potable; free from injurious amounts of oils, acids, alkalis, salts, organic materials, or other substances deleterious to concrete, ACI 318/318R.

2.2.3 Aggregates

2.2.3.1 Aggregates Selection

ASTM C 33/C 33M, Size 57 or 67. Obtain aggregates for exposed concrete surfaces from one source. Aggregates shall not contain any substance which may be deleteriously reactive with the alkalies in the cement, nor in an amount sufficient to cause excessive expansion of concrete. Prior to fabrication, submit certified test reports for the following tests specified in ASTM C 33/C 33M:

a. Grading

b. Amount of material finer than No. 200 sieve

c. Organic impurities

d. Soundness

e. Clay lumps and friable particles

f. Coal and lignite

g. Weight of slag

h. Abrasion of coarse aggregate

i. Fineness modulus

j. Reactive aggregates

k. Freezing and thawing

2.2.3.2 Aggregates for Lightweight Concrete

ASTM C 330.

2.2.4 Admixtures

2.2.4.1 Air-Entraining

ASTM C 260.

2.2.4.2 Accelerating

ASTM C 494/C 494M, Type C or E.

2.2.4.3 Water Reducing

ASTM C 494/C 494M, Type A, E, or F.

2.2.5 Reinforcement

2.2.5.1 Reinforcing Bars

ASTM A 615/A 615M, Grade 60; ASTM A 706/A 706M, Grade 60.

Epoxy-coated steel bars shall comply with the requirements of ASTM A 775/A 775M, including written certifications for coating material and coated bars, sample of coating material, and 700 g(0.5 pounds) of patching material.

2.2.5.2 Wire

ASTM A 82/A 82M or ASTM A 496/A 496M.

2.2.5.3 Welded Wire Fabric

ASTM A 185/A 185M or ASTM A 497/A 497M.

2.2.6 Prestressing Strands

Uncoated, 7-wire strand stressed relieved, ASTM A 416/A 416M, Grade 270, strand diameter as determined by Fabricator.

2.2.7 Metal Accessories

Provide ASTM A 123/A 123M or ASTM A 153/A 153M galvanized.

2.2.7.1 Inserts

ASTM A 47/A 47M, Grade 22010(32510 or 35018), or ASTM A 27/A 27M Grade 415-205(U-60-30).

2.2.7.2 Structural Steel

ASTM A 36/A 36M.

2.2.7.3 Bolts

ASTM A 307; ASTM A 325.

2.2.7.4 Nuts

ASTM A 563.

2.2.7.5 Washers

ASTM F 844 washers for ASTM A 307 bolts, and ASTM F 436 washers for ASTM A 325 bolts.

2.2.8 Bearing Pads

2.2.8.1 Elastomeric

AASHTO HB-17, for plain neoprene bearings.

2.3 PRODUCTION QUALITY CONTROL PROCEDURES

PCI MNL-116 unless specified otherwise.

2.3.1 Forms

Brace forms to prevent deformation. Forms shall produce a smooth, dense surface. Chamfer exposed edges of columns and beams 3/4 inch, unless otherwise indicated. Provide threaded or snap-off type form ties.

2.3.2 Reinforcement Placement

ACI 318/318R for placement and splicing. Reinforcement may be preassembled before placement in forms. Provide exposed connecting bars, or other approved connection methods, between prestressed and cast-in-place construction. Remove any excess mortar that adheres to the exposed

connections. Provide curvature or drape of the prestressing strands using approved hold-down devices.

2.3.3 Inserts

When the ends of the prestressed member will be exposed, recess the prestressing stands using inserts. After detensioning, remove inserts and fill the recess with nonshrink grout.

2.3.4 Concrete

2.3.4.1 Concrete Mixing

ASTM C 94/C 94M. Mixing operations shall produce batch-to-batch uniformity of strength, consistency, and appearance.

2.3.4.2 Concrete Placing

ACI 304R, ACI 305R for hot weather concreting, ACI 306.1 for cold weather concreting, and ACI 309R, unless otherwise specified.

2.3.4.3 Concrete Curing

Commence curing immediately following the initial set and completion of surface finishing. Provide curing procedures to keep the temperature of the concrete between 50 and 190 degrees F. When accelerated curing is used, apply heat at controlled rate and uniformly along the casting beds. Monitor temperatures at various points in a product line in different casts.

2.3.5 Prestressing

Do not transfer prestressing forces during detensioning until the concrete has reached a minimum compressive strength of 4000 psi, unless a higher strength is required by the Subcontractor furnished design.

2.3.6 Surface Finish

Repairs located in a bearing area shall be approved by the Contracting Officer prior to repairs. Prestressed members which contain honeycombed sections deep enough to expose prestressing strands shall be rejected. Prestressed members containing hairline cracks which are visible and are less than 0.01 inches in width, may be accepted, except that cracks larger than 0.005 inches in width for surfaces exposed to the weather shall be repaired. Defects that involve more than 36 square inches of concrete shall be grounds for rejection. Any prestressed member that is structurally impaired or contains honeycombed section deep enough to expose stressing tendons or reinforcing shall be rejected. Defects shall be repaired or rejected as specified in paragraph "Defects."

2.3.6.1 Unformed Surfaces

Provide a irregular surface for composite action between top of beam and cast-in-place slab.

2.3.6.2 Formed Surfaces

a. Unexposed Surfaces: Provide a standard grade surface finish.

b. Exposed Surfaces: Provide a standard grade surface finish. The combined area of acceptable defective areas shall not exceed 0.2 percent of the exposed to view surface area, and the patches shall be indistinguishable from the surrounding surfaces when dry. In addition surface finish of exposed fascia beams shall have a smooth rubbed finish.

2.3.7 Acceptance/Rejection of Defects

2.3.7.1 Minor Defects

All honeycombed areas, chipped corners, air pockets over 1/4 inch) in diameter, and other minor defects involve less than 36 square inches of concrete shall be repaired. Form offsets of fins over 1/8 inch shall be ground smooth. All unsound concrete shall be removed from defective areas prior to repairing. All surfaces permanently exposed to view shall be repaired by a blend of portland cement and white cement properly proportioned so that the final color when cured will be the same as adjacent concrete.

2.3.7.2 Major Defects

If one or more major defects appear in a member, it shall be rejected. Cracks of a width of more than 0.01 inch shall be cause for rejection of the member.

2.4 TESTS, INSPECTIONS, AND VERIFICATIONS

2.4.1 Chloride Ion Concentration Test

Sampling and determination of water soluble chloride ion content in accordance with ASTM C 1218/C 1218M. Maximum water soluble chloride ion concentrations in hardened concrete at ages from 28 to 42 days contributed from the ingredients including water, aggregates, cementitious materials, and admixtures shall not exceed 0.06 percent by weight of cement.

2.4.2 Chloride Ion Penetration Test

To ensure the durability of concrete in marine environment, concrete shall be proportioned to have the chloride ion penetration test in accordance with ASTM C 1202, and be below 1500 coulombs for concrete specimens tested at 28 days.

2.4.3 Factory Inspection

At the option of the Buyer, prestressed units shall be inspected by the QC Representative prior to being transported to the job site. The SUBContractor shall give notice 14 days prior to the time the units will be available for plant inspection. Neither the exercise nor waiver of inspection at the plant will affect the Government's right to enforce contractual provisions after units are transported or erected.

PART 3 EXECUTION

The information presented within this section applies to shop fabrication requirements.

3.1 FABRICATION

Box beam fabrication shall be accomplished in accordance with fabricator's written shop quality control and assurance program requirements and the following.

3.1.1 WORKMANSHIP

Workmanship, fabrication, and shop connections shall be in accordance with PCI MNL-116.

3.2 DELIVERY, STORAGE, AND HANDLING

Deliver and handle manufactured items so that materials remain undamaged. Do not store in contact with ground or materials that might cause deterioration or staining. Box beam materials shall be delivered to Buyer's designated erection sites and will be unloaded by the Erection Subcontractor. Delivery schedule shall be as specified in the Purchase Order.

3.3 EXHIBITS

The exhibits listed below form a part of this specification to the extent referenced.

3.3.1 Exhibit 1 - Drawings

Drawings referenced in this specification section are found in the attachments.

3.11 CONSTRUCTION RECORDS

Complete construction records shall be kept of the manufacturing, handling, and erection of the prestressed concrete members. Records shall be kept for, but not limited to, the following items:

a. Specifications of material used in the manufacture of the members.

b. Time-temperature history of the concrete members from casting to the transfer of the prestress force.

c. Records of the tendon stressing operation including initial prestress force, measured elongation, how it was measured, and how the tendons were stressed and destressed.

d. Records of inspection of the members before and after the prestress force is transferred to the members.

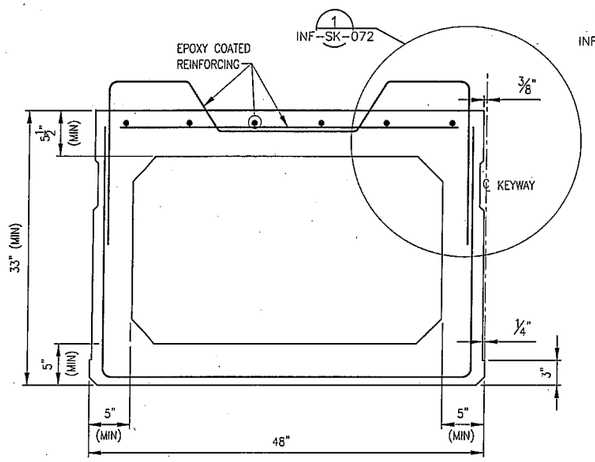
e. Records of the inspection of the members each time they are moved.

f. Records of any defects in the member and any corrective measures taken.

-- End of Section --

NOTES:

1. REFER TO DRAWING INF-SK-071 FOR APPLICABLE NOTES.



INTERIOR BOX BEAM SECTION
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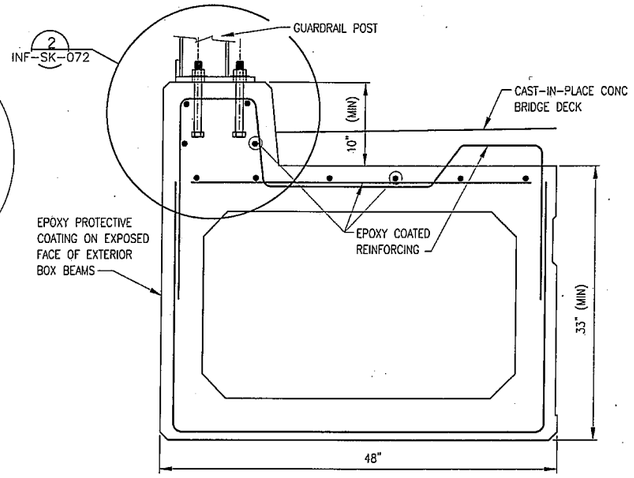

EXTERIOR BOX BEAM SECTION
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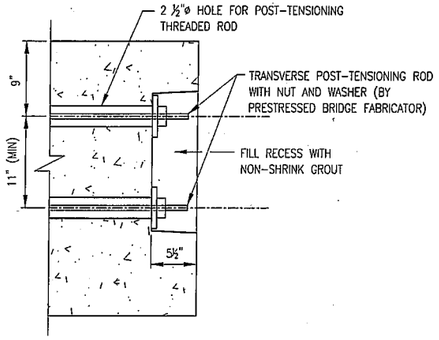

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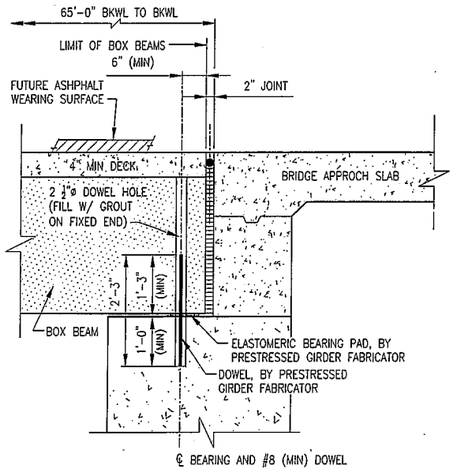

TYPICAL ABUTMENT SECTION
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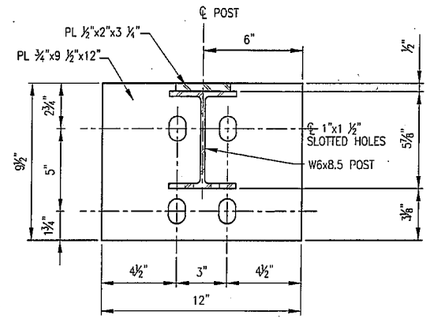

POST PLATE DETAIL
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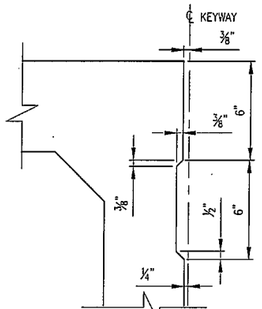

1 INF-SK-072 KEYWAY DETAIL
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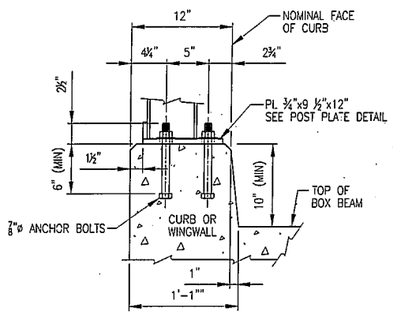

2 INF-SK-072 POST MOUNT DETAIL
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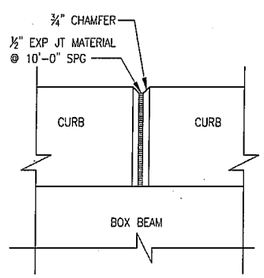


CURB EXPANSION DETAIL
NOT TO SCALE

0 3" 6" 9" 1' 2'
1 1/2" = 1'-0"

0 3" 6" 9" 1'
3" = 1'-0"

REVISION NO.	DATE	DESCRIPTION	DRAWN BY	CHECKED BY	APPROVED BY
A	3/22/10	ISSUED FOR PRESTRESSED BEAM PROCUREMENT			

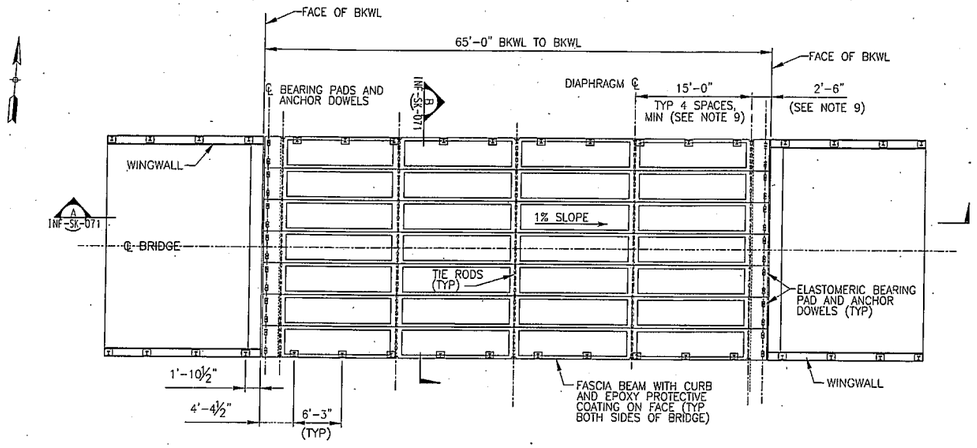
SEAL

JACOBS

KINGSTON FOSSIL PLANT
TENNESSEE VALLEY AUTHORITY

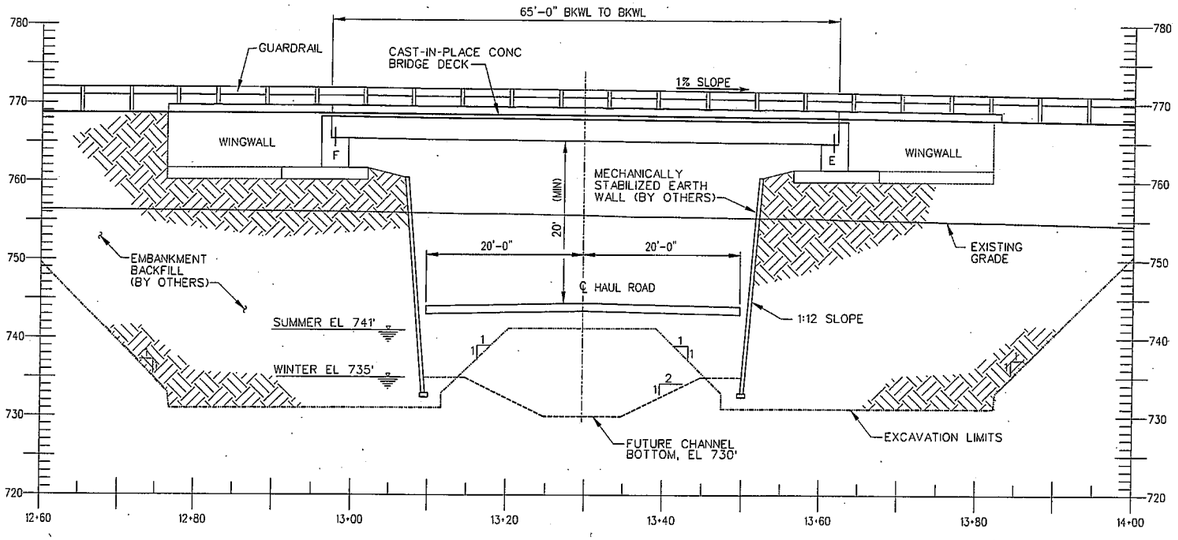
SWAN POND CIRCLE
MISCELLANEOUS
SECTIONS AND DETAILS

SCALE	DRAWING NO.	REV.
AS SHOWN	INF-SK-072	A



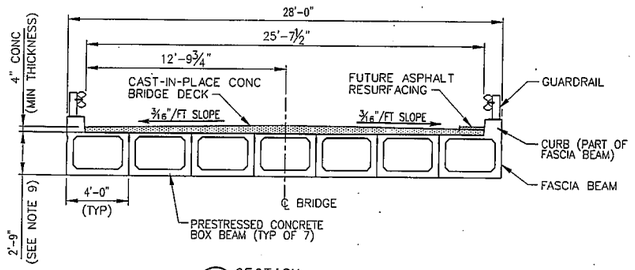
BRIDGE PLAN

SCALE: ⅛" = 1'-0"



A SECTION

INF-SK-071 SCALE: 1/8" = 1'-0"



B SECTION

INF-SK-071 SCALE: 1/4" = 1'-0"

NOTES:

1. REFER TO SPECIFICATION 13 12 60, ENGINEERING PRESTRESSED CONCRETE BRIDGE BEAMS.
2. THE MINIMUM ULTIMATE TENSILE STRENGTH OF THE PRETENSIONING STRANDS SHALL BE 270 KSI.
3. THE MINIMUM 28 DAY COMPRESSIVE STRENGTH SHALL BE 6000 PSI.
4. MINIMUM 28 DAY COMPRESSIVE STRENGTH FOR CAST-IN-PLACE CONCRETE SLAB SHALL BE 4000 PSI.
5. NO PRESTRESS SHALL BE TRANSFERRED TO THE CONCRETE UNTIL IT HAS ATTAINED THE REQUIRED COMPRESSIVE STRENGTH IDENTIFIED IN THE SPECIFICATION. STRENGTH SHALL BE VERIFIED BY CYLINDER TEST.
6. THE TOP OF ALL BEAMS SHALL BE GIVEN A RAKE FINISH (¼" AMPLITUDE) ACROSS THE WIDTH (PERPENDICULAR TO THE BEAMS AXIS)
7. THE FABRICATOR IS FULLY RESPONSIBLE FOR THE DESIGN OF THE LIFTING DEVICES, WHICH SHALL BE ADEQUATE FOR THE SAFETY FACTORS REQUIRED BY THE ERECTION PROCEDURE.
8. HOLES IN BEAMS FOR TRANSVERSE TIE RODS SHALL BE NOT LESS THAN 2" DIAMETER AND NOT MORE THAN 3" DIAMETER.
9. DIMENSIONS OF RECESSES IN FASCIA BEAMS, FINAL DIMENSIONS, SHEAR KEYS, AND LOCATION OF TRANSVERSE TIE RODS MAY VARY FROM THE DIMENSIONS SHOWN HEREON, SUBJECT TO APPROVAL.

LEGEND

BKWL-	BACKWALL
℄	CENTERLINE
CONC	CONCRETE
ø	DIAMETER
ELAST	ELASTOMERIC
EL	ELEVATION
E	EXPANSION END
EXP	EXPANSION
F	FIXED END
JT	JOINT
MIN	MINIMUM
TYP	TYPICAL

4 0 4 8 12 FT
SCALE: 1/4"= 1'-0"

8 0 8 16 24 FT
SCALE: 1/8"= 1'-0"

REVISION NO	DATE	DESCRIPTION	DESIGNED	DRAWN	CHECKED	APPROVED
A	3/22/10	ISSUED FOR PRESTRESSED BEAM PROCUREMENT				

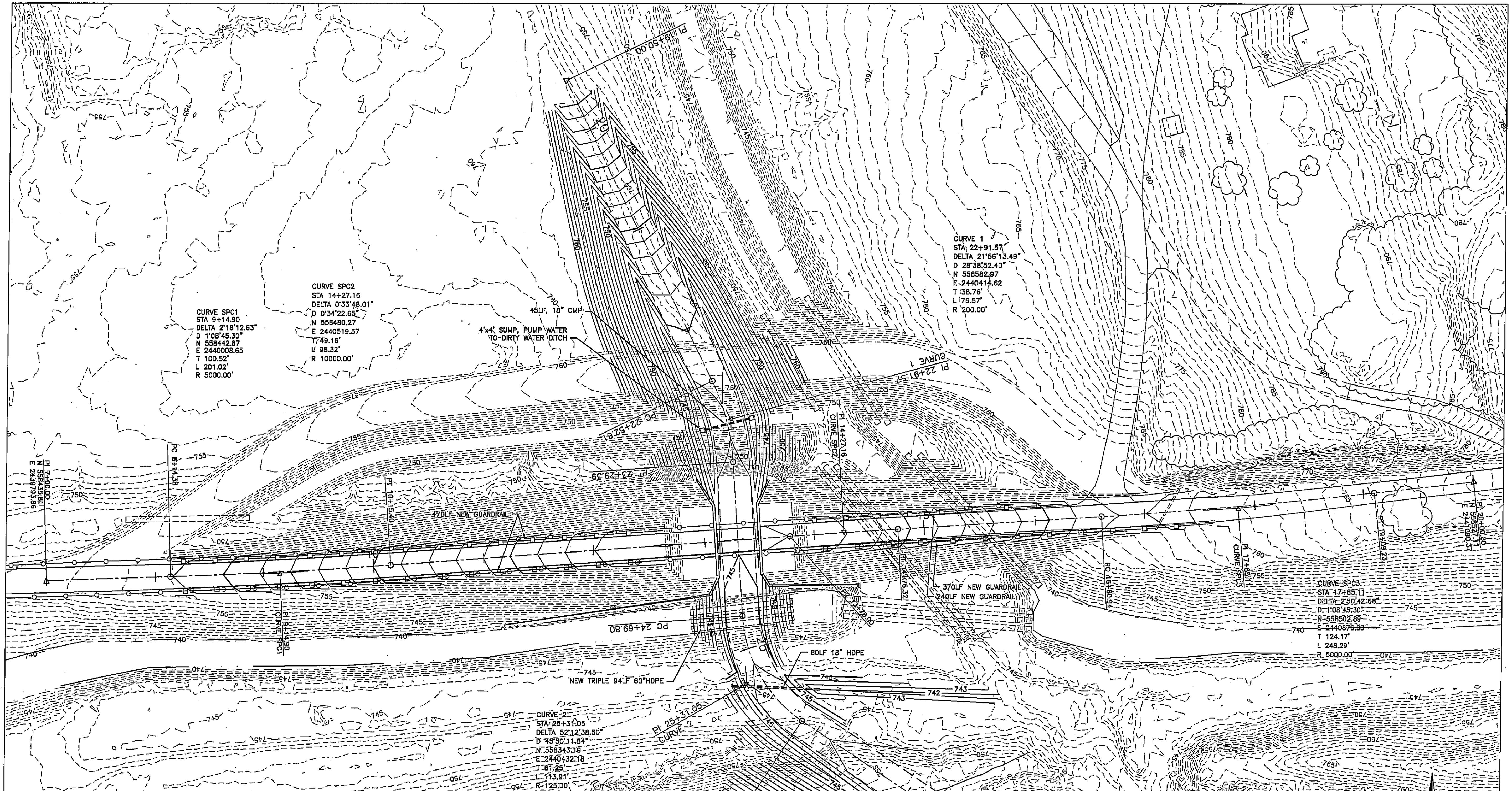
SEAL

JACOBS

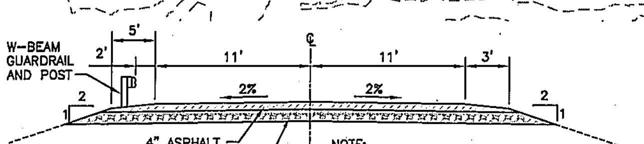
KINGSTON FOSSIL PLANT
TENNESSEE VALLEY AUTHORITY

SWAN POND CIRCLE
BRIDGE PLAN AND SITE SECTION

SCALE	DRAWING NO.	REV.
AS SHOWN	INF-SK-071	A

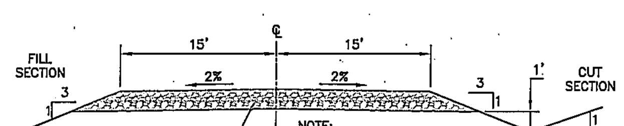


PLAN
SCALE: 1"=40'



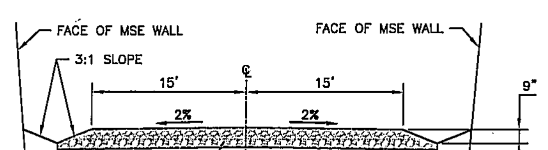
NOTE: THIS SECTION APPLIES TO SWAN POND CIRCLE AND BERKSHIRE RD.

ASPHALT ROADWAY SECTION
NOT TO SCALE



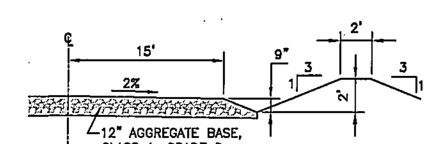
NOTE: SECTION IS APPLICABLE FROM STA. 19+50 TO STA. 22+95.

GRAVEL HAUL ROAD SECTION 1
NOT TO SCALE



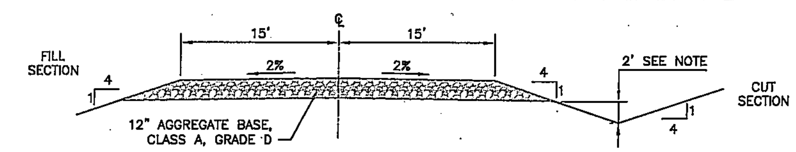
NOTE: SECTION IS APPLICABLE UNDER THE BRIDGE FROM STA. 23+67 TO STA. 24+39.

GRAVEL HAUL ROAD SECTION 2
NOT TO SCALE



NOTE: SECTION IS APPLICABLE FROM STA. 24+39 TO STA. 25+26. ONLY RIGHT SIDE SHOWN BUT IS APPLICABLE FOR BOTH SIDES.

GRAVEL HAUL ROAD SECTION 3
NOT TO SCALE



NOTE: SECTION IS APPLICABLE FROM STA. 25+26 AND CONTINUING TO END.

GRAVEL HAUL ROAD SECTION 4
NOT TO SCALE

0 40' 80' 120'

REVISION NO.	DATE	DESCRIPTION	DRAWN BY	CHECKED BY	APPROVED
A	3/26/16	ISSUED FOR REVIEW	JGA	[illegible]	[illegible]

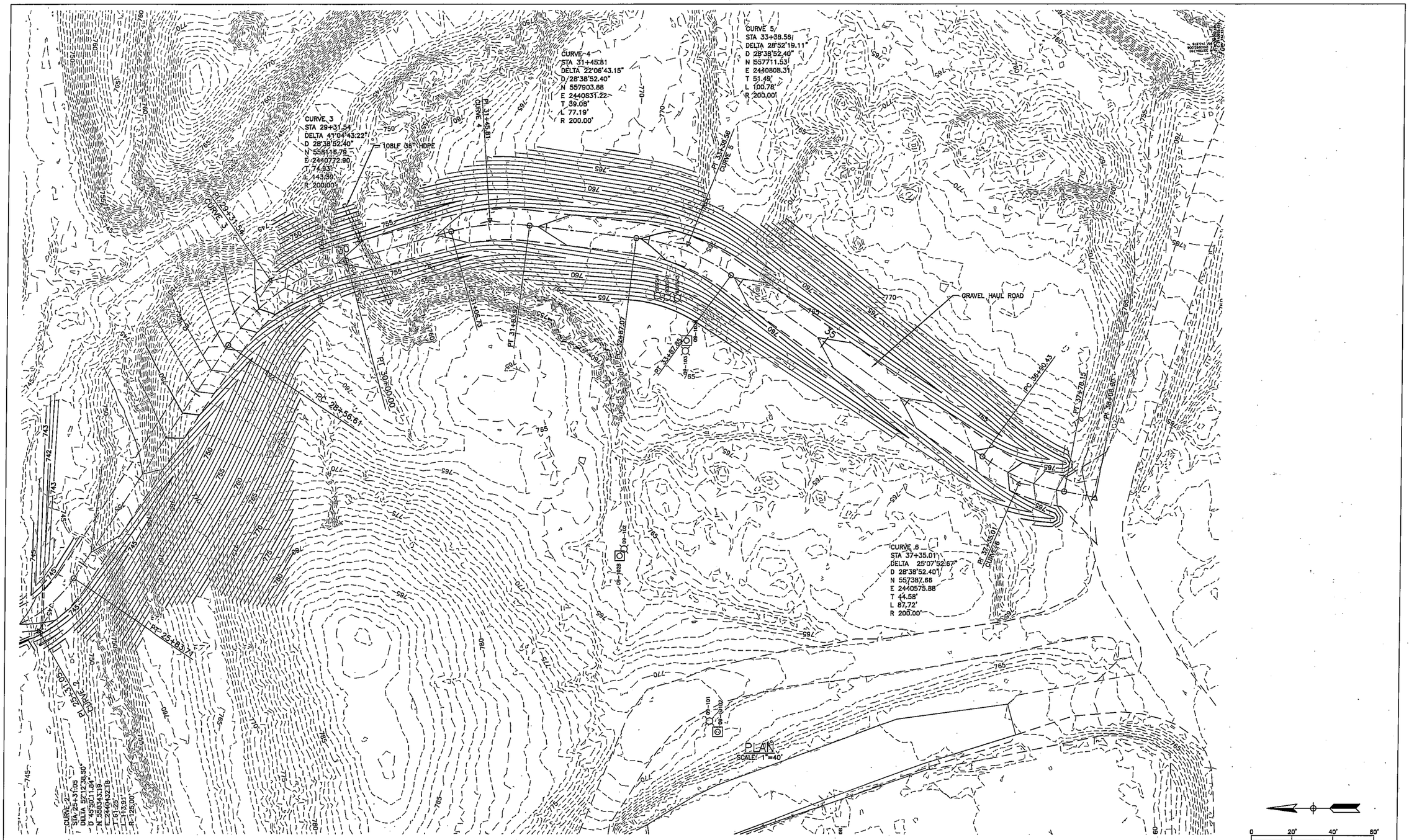
SEAL

JACOBS

KINGSTON FOSSIL PLANT
TENNESSEE VALLEY AUTHORITY

SWAN POND CIRCLE OVERPASS
HAUL ROAD UNDERPASS

SCALE	DRAWING NO.	REV.
SHOWN	INF-SK-080	A



REVISION NO.	DATE	DESCRIPTION	DRAWN BY	DESIGNED BY	CHECKED BY
A	3/26/10	ISSUED FOR REVIEW	JGR	GW	

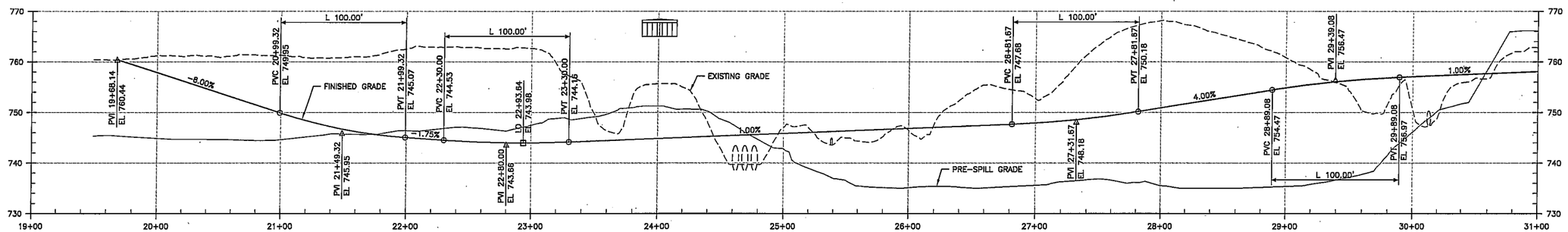
SEAL

JACOBS

KINGSTON FOSSIL PLANT
TENNESSE VALLEY AUTHORITY

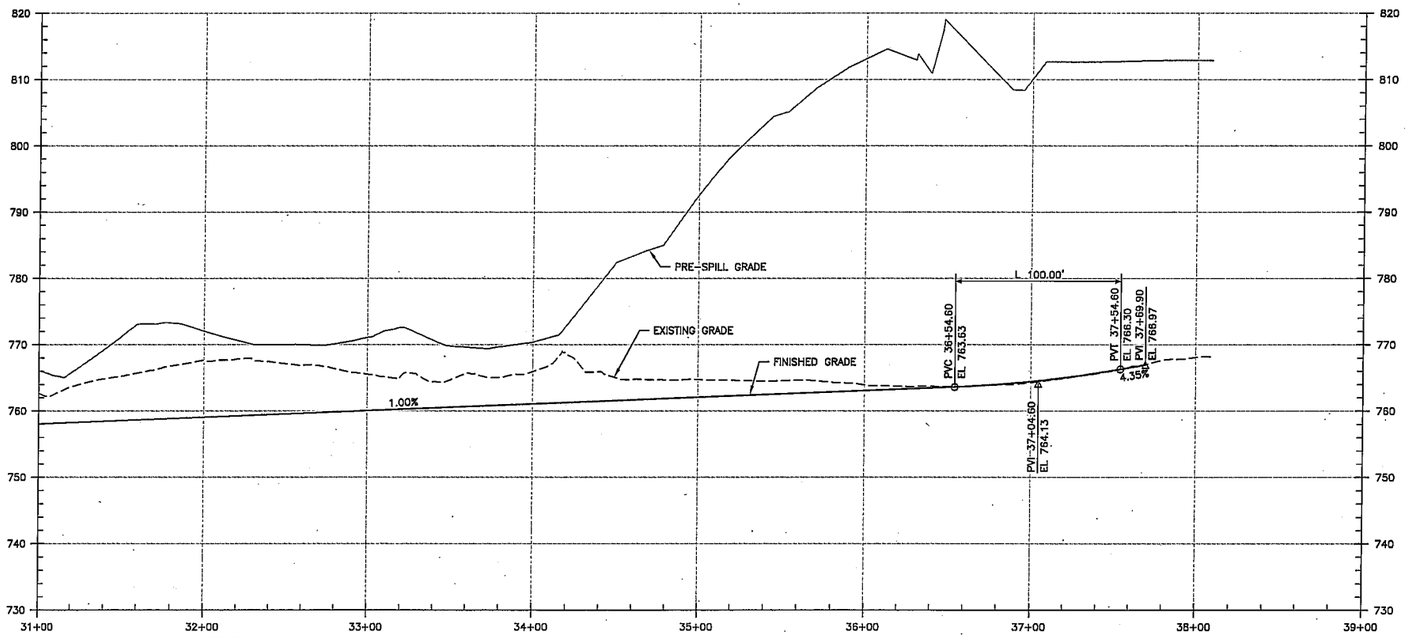
HAUL ROAD

SCALE	DRAWING NO.	REV.
SHOWN	INF-SK-081	A



HAUL ROAD UNDERPASS

SCALE: 1"=40' HORIZ
1"=10' VERT



HAUL ROAD UNDERPASS

SCALE: 1"=40' HORIZ
1"=10' VERT

REVISION NO.	DATE	DESCRIPTION	DRAWN BY	DESIGNED BY	CHECKED BY
A	3/20/10	ISSUED FOR REVIEW	JGA	GMD	JGA

SEAL

JACOBS

KINGSTON FOSSIL PLANT
TENNESSE VALLEY AUTHORITY

HAUL ROAD PROFILE

SCALE	DRAWING NO.	REV.
SHOWN	INF-SK-082	A