

Beaver Slough Drainage District
China Camp Creek Tidegate System
2016

SHEET NUMBER	DESCRIPTION
1	TITLE PAGE
2	VICINITY MAP
3	ESTIMATE OF QUANTITIES SHEET
4-A	SITE PLAN -Original Topography
4-B	SITE PLAN -Finish Topography
5	Site Plan Structure
6	Levee Road Profile
7	North Canal Structure - to Unit three - Profile and Details
8	Middle Canal Structure-to Unit Two -Profile and Details
9	East Canal Structure - to unit one- Profile and Details
10	Access Road Levee Road to Unit One East- Profile and Sections
11	Access Road Levee Road to Unit One East- Sections
12	Access Road Levee Road to Unit Two North - Sections and Profile
13	Access Road Levee Road to Unit Two Sections
14	Riprap Slope Protection Plan
15	Foundation Rock and Structural Sheet Pile Plan
16	Typical Road Sections
17	Typical Channel Sections-Middle and East Channel
18	Typical Channel Sections-North Channel
19	Field Side Wing Wall Plans
20	Concrete Foundation Plan
21	General Notes
22	Quantity Calculations Page 1 of 2
23	Quantity Calculations Page 2 of 2
24	Structural Dwg Sheet S2
25	Structural Dwg Sheet S2.1
26	Structural Dwg Sheet S2.2
27	Structural Dwg Sheet S2.3
28	Structural Dwg Sheet S2.4
29	Structural Dwg Sheet S3
30	Structural Dwg Sheet S4
31	Structural Dwg Sheet S5

ATTENTION: Oregon law requires you to follow rules adopted by the Oregon Utility Notification Center. Those rules are set forth in OAR 952-001-0010 through OAR 952-001-0090. You may obtain a copy of the rules by calling the Oregon Notification Center at 1-800-332-2344.

REVISIONS			Beaver Slough Drainage District China Camp Creek Tidegate System
			TITLE SHEET
DESIGN	CHECK	REVIEW	Mr. Fred Messerle Drainage District Project Manager
DIVISION APPROVED			13 May 2016



Google earth

miles

1



NO SCALE

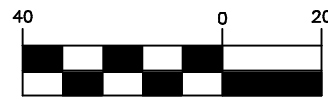
China Camp Creek Tidegate System
VICINITY MAP

13 May 2016

Sheet 2

	China Camp Tidegate System - Quantity Summary Sheet -			Estimated quantities by site				Revised 13 May 2016Sheet 3
				Brigs Ranch Site One		SITE 2	total	
Pay Item	Specifications 2015 ODOT	Method of Measure	Units	Middle Canal- Unit Two	North Canel -Unit Three	East Canel - Unit One	total	Notes
0210-0100000A	mobilization	LSQ	LS	0.50	0.17	0.33	1.00	
0280-0100000A	EROSION CONTROL	LSQ	LS	0.33	0.33	0.33	1.00	
0280-0104020R	TEMPORARY MULCHING, STRAW	DQ	ACRE				2.00	
0280-0105050J	MATTING, TYPE E	AQ	SQYD				128.78	
0305-0100000A	CONSTRUCTION SURVEY WORK	LSQ	LS	0.33	0.33	0.33	1.00	
0310-0106000A	REMOVAL OF STRUCTURES AND OBSTRUCTIONS	LSQ	LS	0.33	0.33	0.33	1.00	Remove existing culverts and tide gates at North and East Canal
0320-0100000A	CLEARING AND GRUBBING	LSQ	LS	0.33	0.33	0.33	1.00	
0350-0107000J(01)	SUBGRADE REINFORCEMENT GEOGRID	DQ	SQYD				3610.33	
0350-0107000J(02)	WINGWALL REINFORCEMENT GEOGRID	DQ	SQYD	151.67	208.00	208.00	567.67	TENSAR GEOGRID REINFORCEMENTS
0350-0107000J(03)	DRAIN FABRIC BEHIND TOP FACE WALL	DQ	SQYD	60.00	16.00	30.00	106.00	Fabric for "18 " x 24" drainrock wrapped in fabric"
0390-0111000M	LOOSE RIPRAP, CLASS 200	AQ	TON				538.28	
0390-0114000M	LOOSE RIPRAP, CLASS 700	AQ	TON				2031.31	
0510-0100000A	SHORING, CRIBBING AND COFFERDAMS	LSQ	LS				1.00	
0510-0101000A	STRUCTURE EXCAVATION	LSQ	LS				1.00	See Excavation Summary sheet 22
0510-0108000K (01)	PLACE GRANULAR STRUCTURE BACKFILL- SUPPLIED BY OWNER	DQ	CUYD				832.44	in place quantities, along structure, behind wingwalls
0510-0108000K (02)	PLACE DRAIN ROCK - SUPPLIED BY OWNER	DQ	CUYD	8.33	2.22	4.17	14.72	Drain Rock for "18 " x 24" drainrock wrapped in fabric"
0520-0100000A	FURNISH PILE DRIVING EQUIPMENT	LSQ	LS				1.00	
0520-0105000F	FURNISH PZ 22 STEEL SHEET PILES	AQ	Foot				3900.00	
0520-0204000E	DRIVE PZ22 STEEL SHEET PILES	AQ	Each				156.00	
0540-0312000K	GENERAL STRUCTURAL CONCRETE, CLASS 4000	DQ	CUYD				1146.08	
0641-0117000K	1-1/2 INCH - PLACE PIT RUN SHALE ROCK ROAD SURFACING - SUPPLIED BY OWNER	DQ	CUYD				184.17	Farm Road Surfacing -In place cubic yards
0641-0123000K	3 INCH - 0 PLACE AGGREGATE BASE- SUPPLIED BY OWNER	DQ	CUYD				1203.11	Foundation Rock-In place cubic yards
1030-0103000R	TEMPORARY SEEDING	DQ	ACRE				2.00	

GRAPHIC SCALE



(IN FEET)
1 inch = 40 ft.

Centerline of Existing North Canal

Remove Existing Tidegates and
abutment walls,Reconstruct Levee
to new road alignment

New Tide Gate Structure to North Canal

Control Point 1800

New Tide Gate Structure to Middle Canal
Restoration Area

Sheet Pile Driven Cofferdam for
temporarily dewatering during construction.
Drive Piles to top of elevation of 10.0 feet.

New Tide Gate Structure to East Canal

Remove Existing Tidegate structure and
abutment walls, Reconstruct
Levee to new alignment.

C
17 Reroute Canal to New Tidegate Structure

12 Construct New Access Road from Levee
to farm pastures

A
17 New Canal to Restoration Area Two

10 Construct New Access Road from Levee
to farm pastures

B
17 Reroute East Canal into new structure

Centerline of Existing East Canal

New Utility Building
Supplied by Others

N 579599.8662
E 3919166.9572

CHINA CREEK TIDEGATE SYSTEM
DEVELOPMENT PLAN WITH ALL CONTOURS

Revised: 13May 2016 Sheet 4-A

GRAPHIC SCALE



(IN FEET)
1 inch = 40 ft.

Centerline of Existing North Canal

Remove Existing Tidegates and
abutment walls,Reconstruct Levee
to new road alignment

New Tide Gate Structure to North Canal

Control Point 1000

New Tide Gate Structure to Middle Canal
Restoration Area

Sheet Pile Driven Cofferdam for
temporary dewatering during construction.
Drive Piles to top of elevation of 10.0 feet.

New Tide Gate Structure to East Canal

Remove Existing Tidegate structure and
abutment walls, Reconstruct
Levee to new alignment.

C
17 Reroute Canal to New Tidegate Structure

12 Construct New Access Road from Levee
to farm pastures

A
17 New Canal to Restoration Area Two

10 Construct New Access Road from Levee
to farm pastures

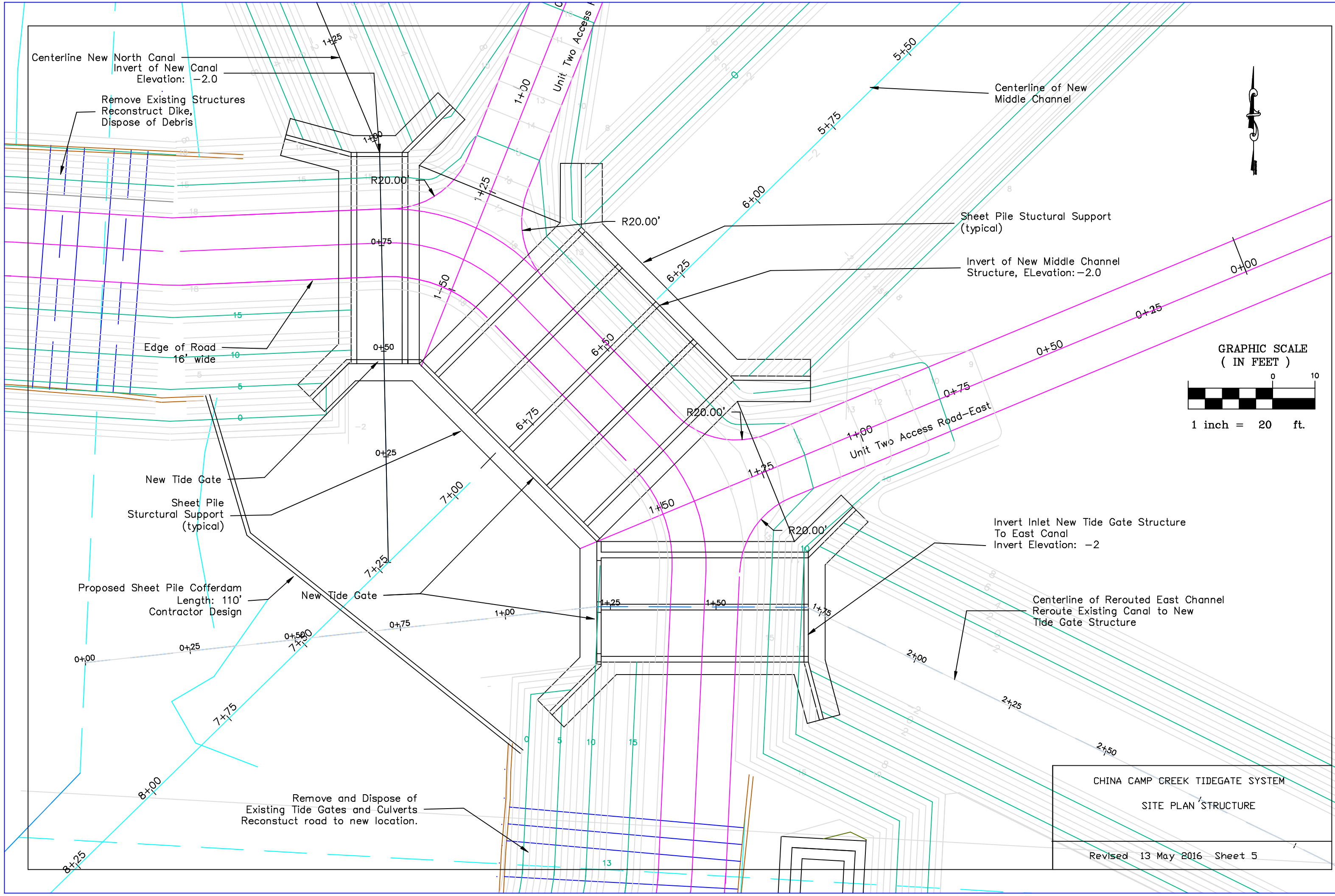
B
17 Reroute East Canal into new structure

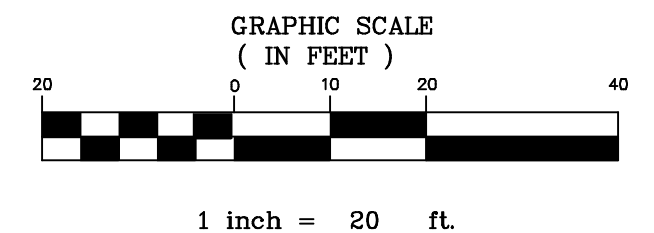
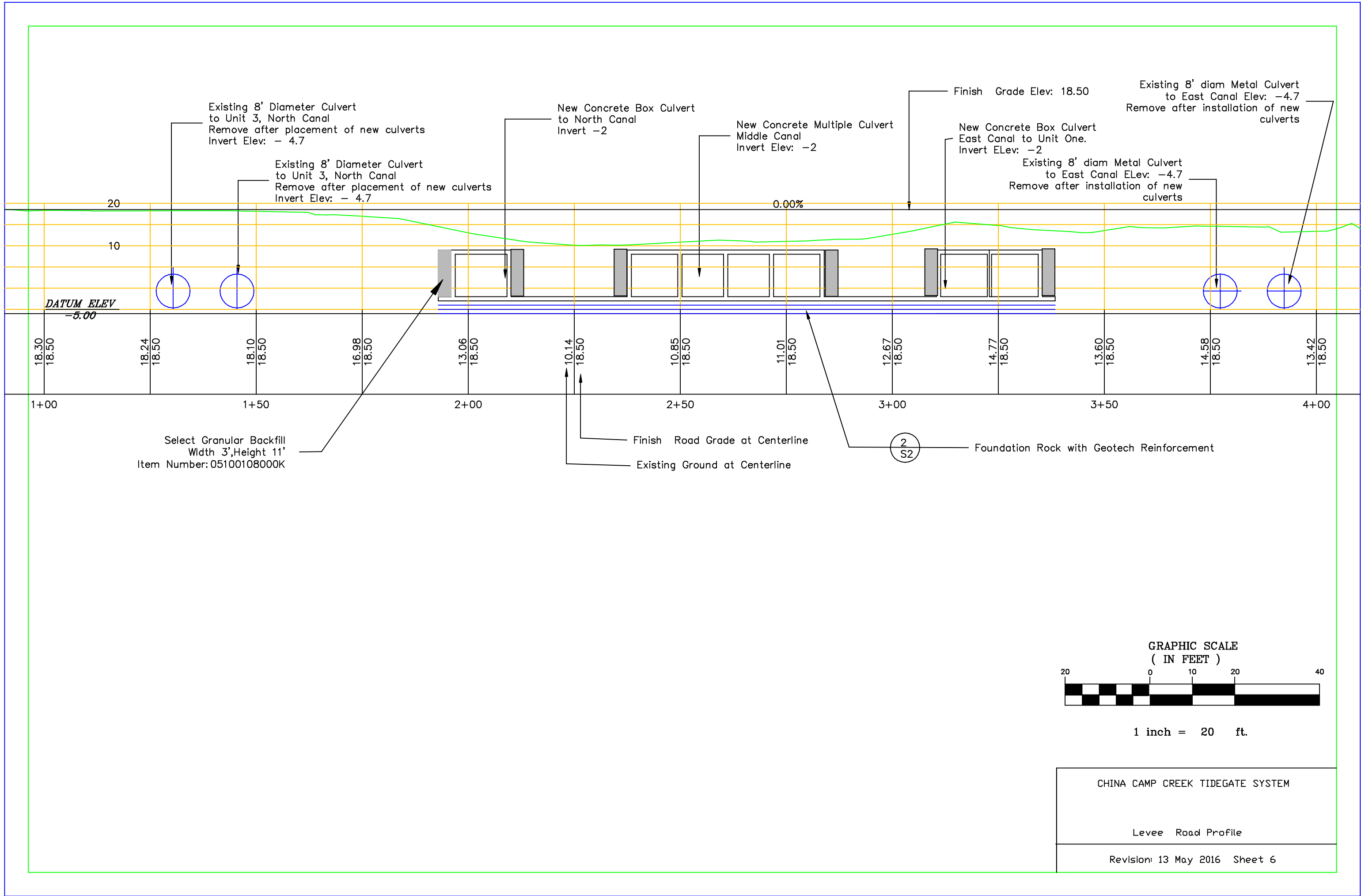
Centerline of Existing East Canal

New Utility Building
Supplied by Others

CHINA CAMP CREEK TIDEGATE SYSTEM
DEVELOPMENT PLAN

Revised: 13 May 2016 Sheet 4-B

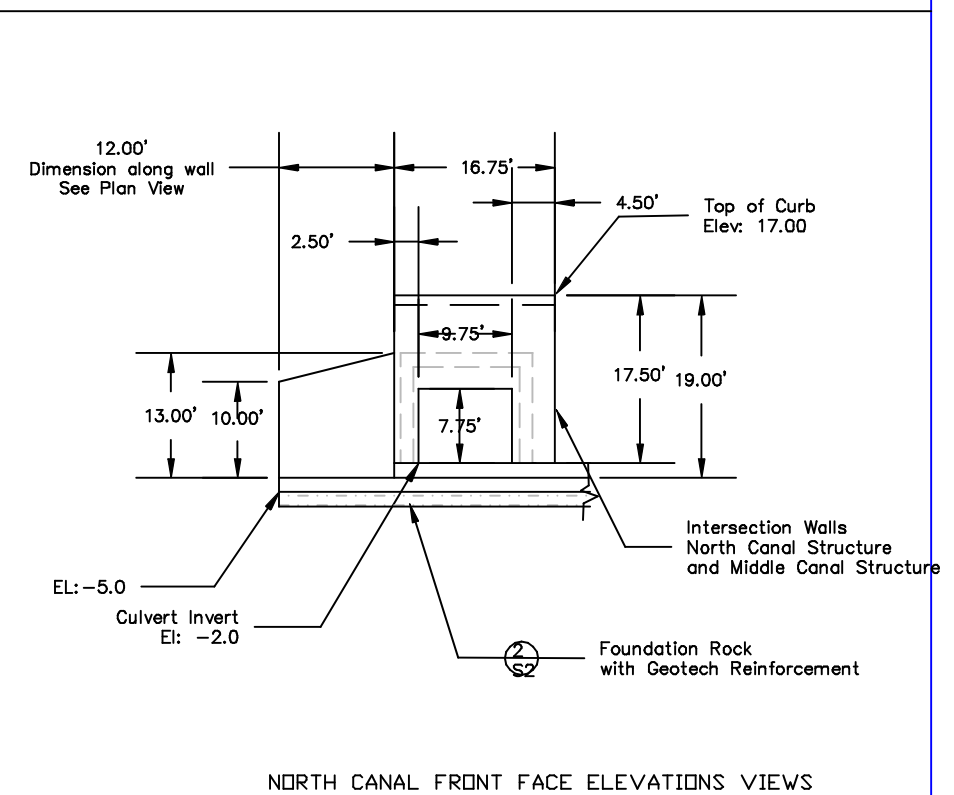
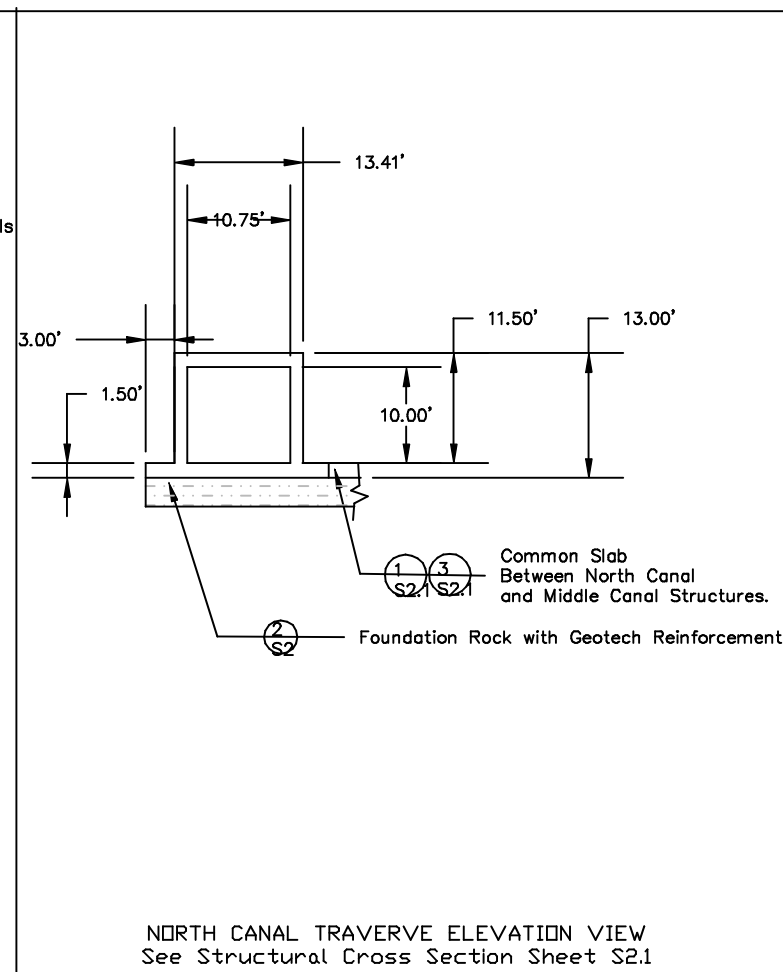
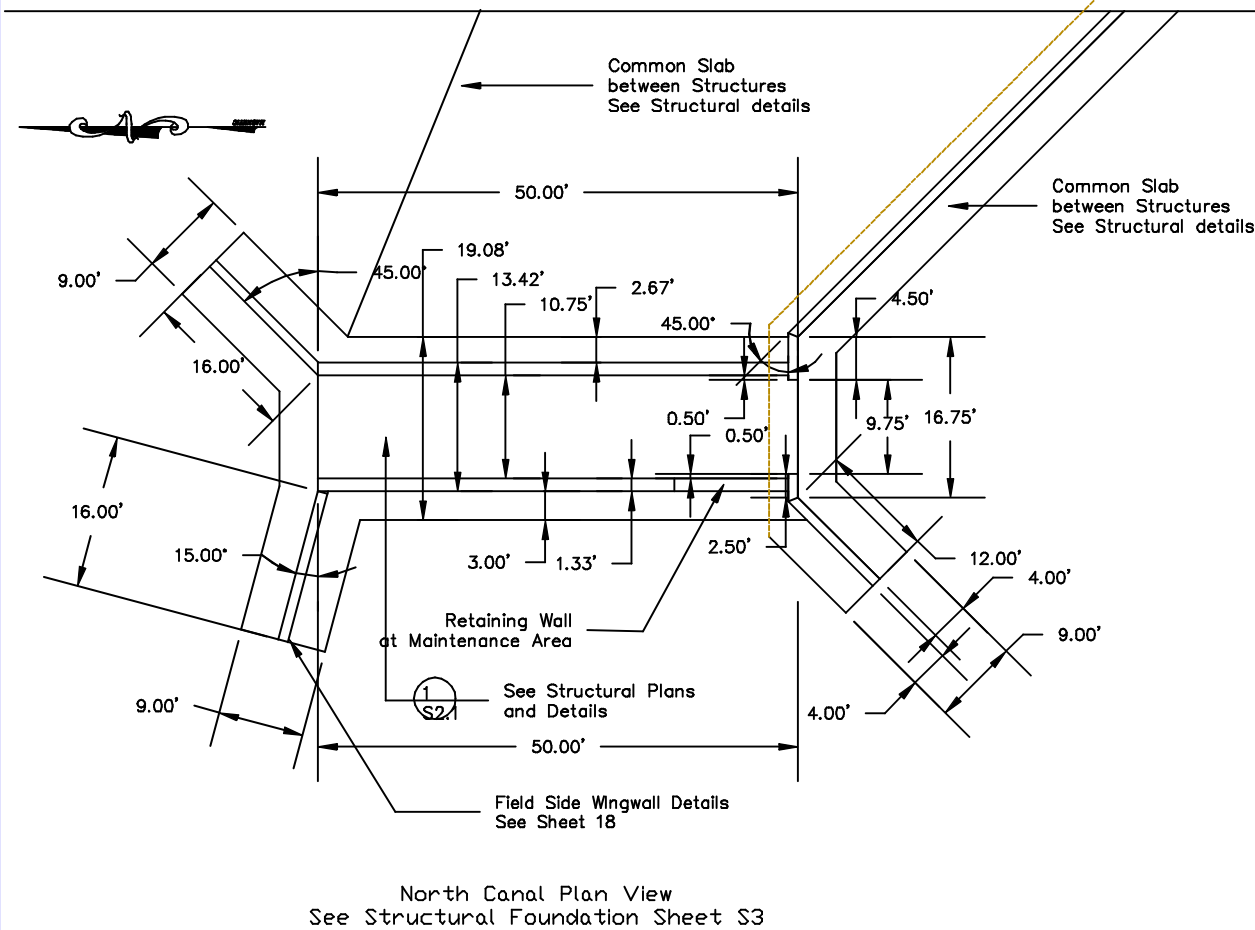
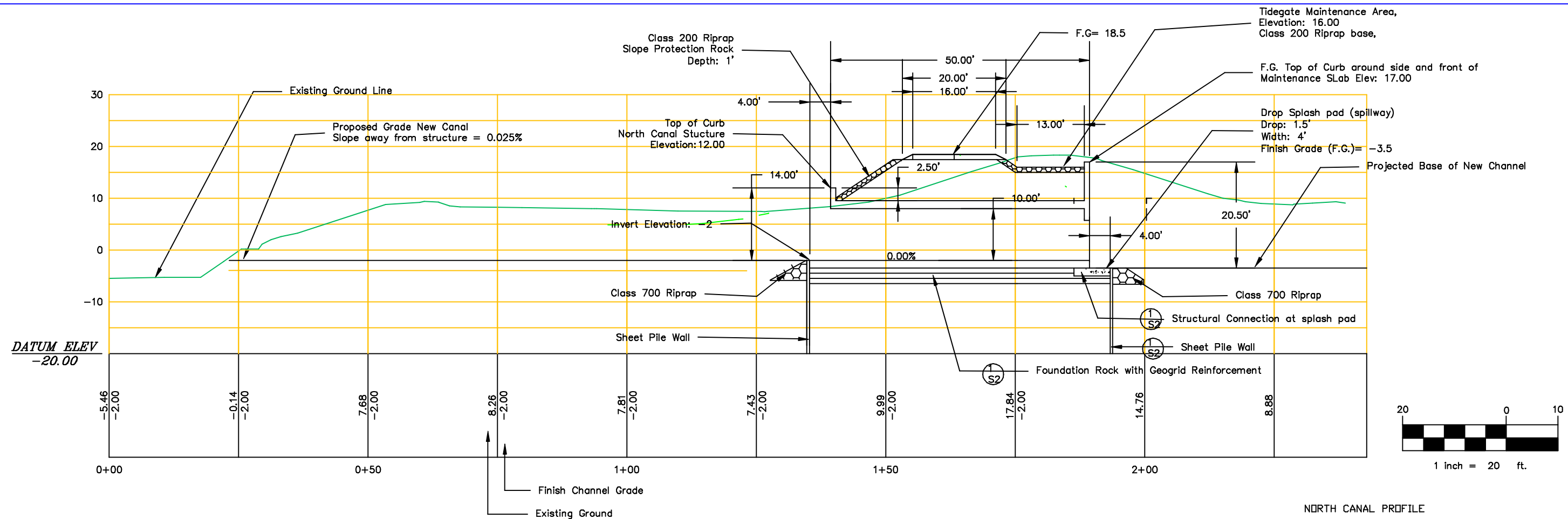




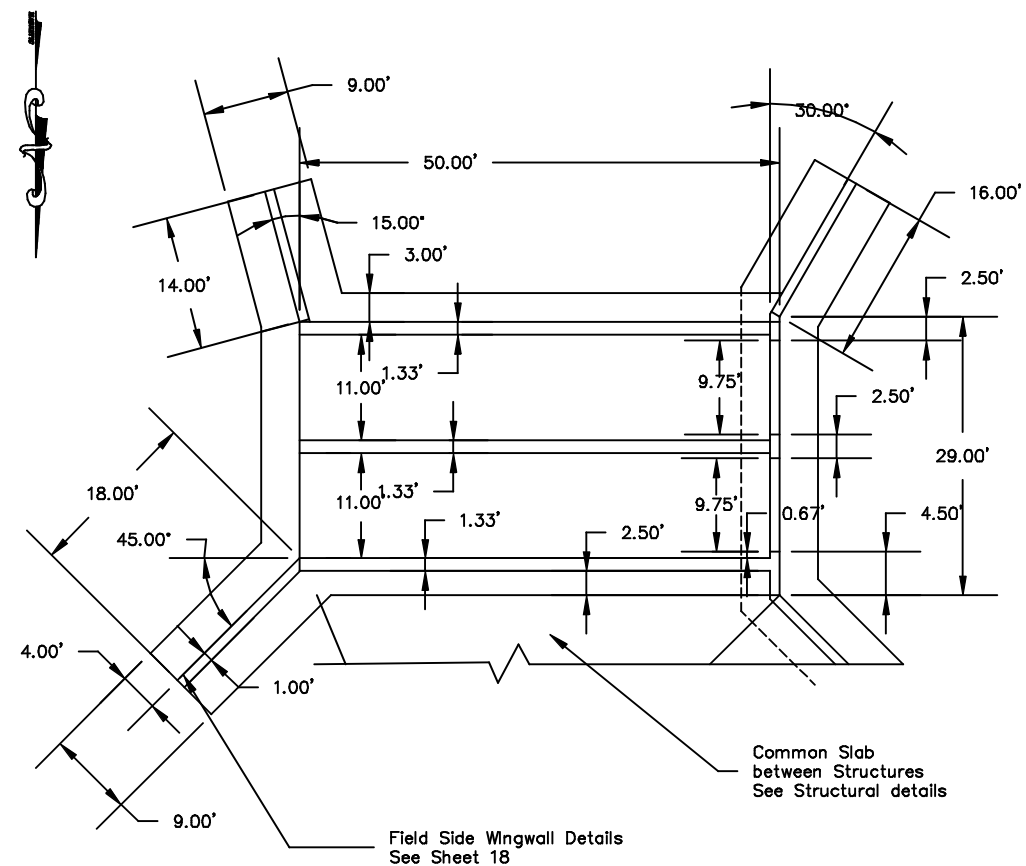
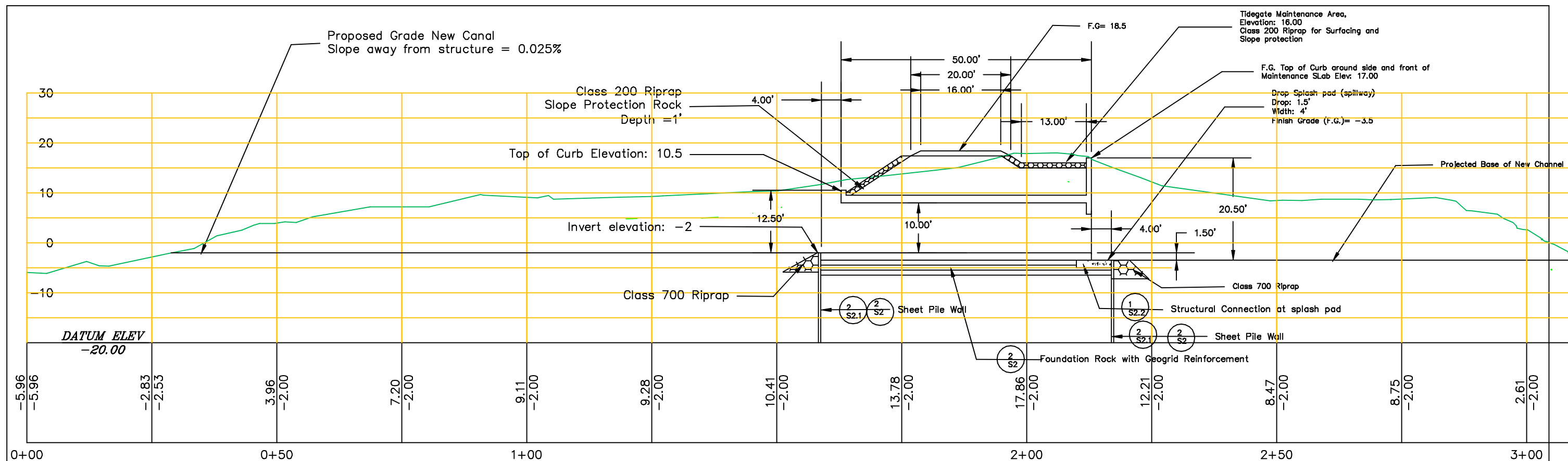
CHINA CAMP CREEK TIDEGATE SYSTEM

Levee Road Profile

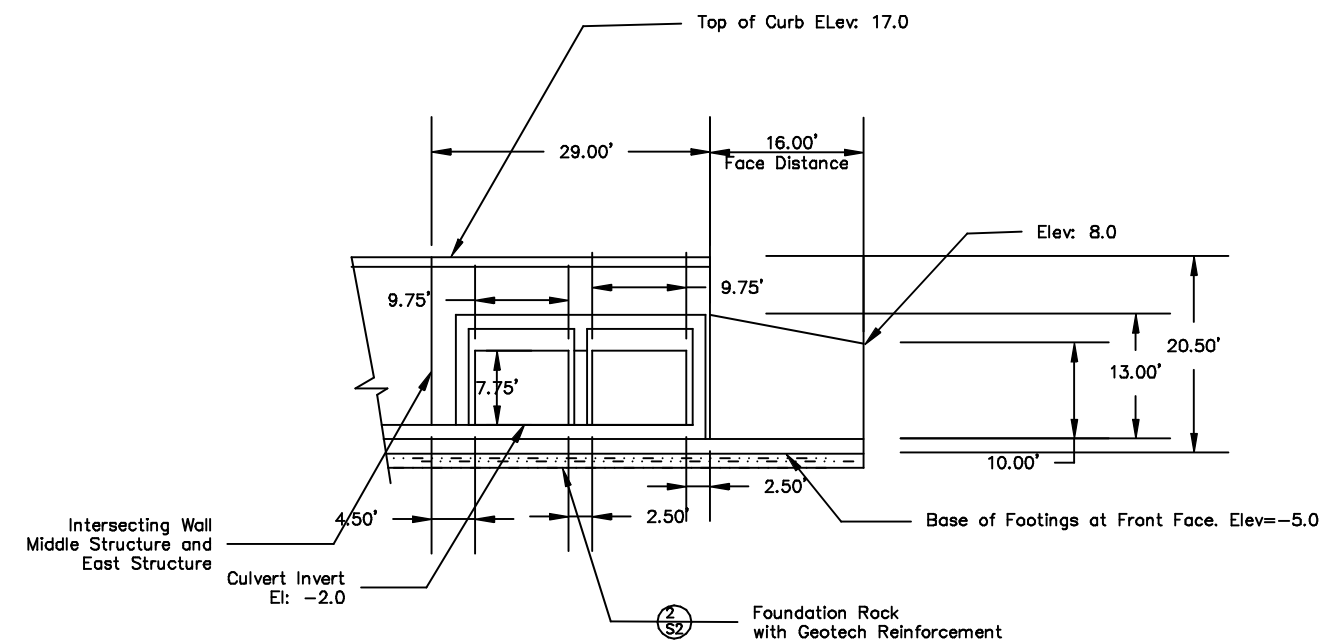
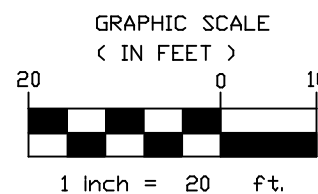
Revision: 13 May 2016 Sheet 6



CHINA CAMP CREEK TIDEGATE SYSTEM
North Canal Structure Plan and Profile



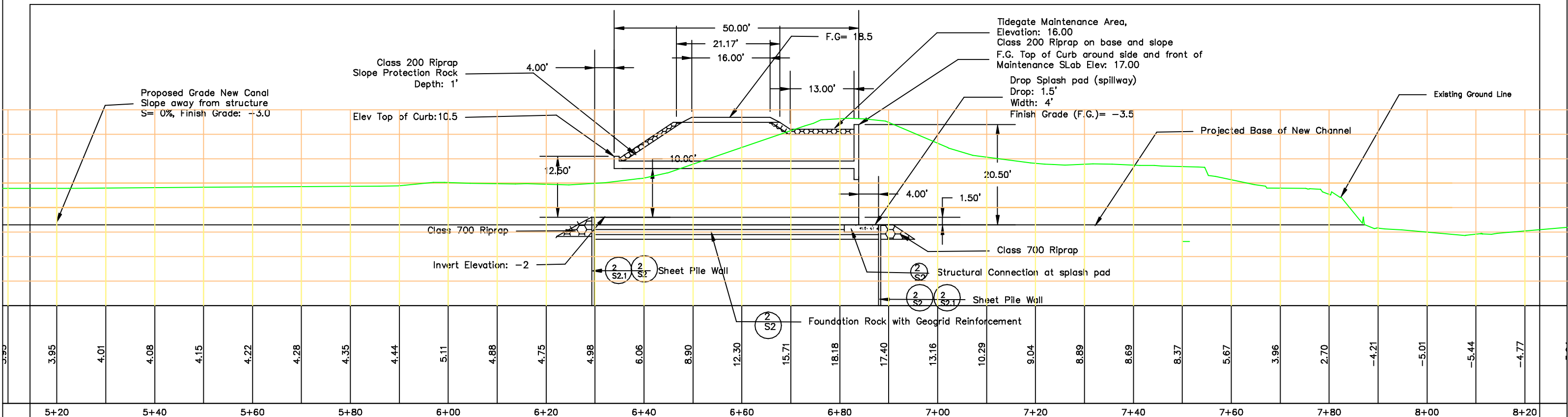
EAST CANAL STRUCTURE PLAN VIEW



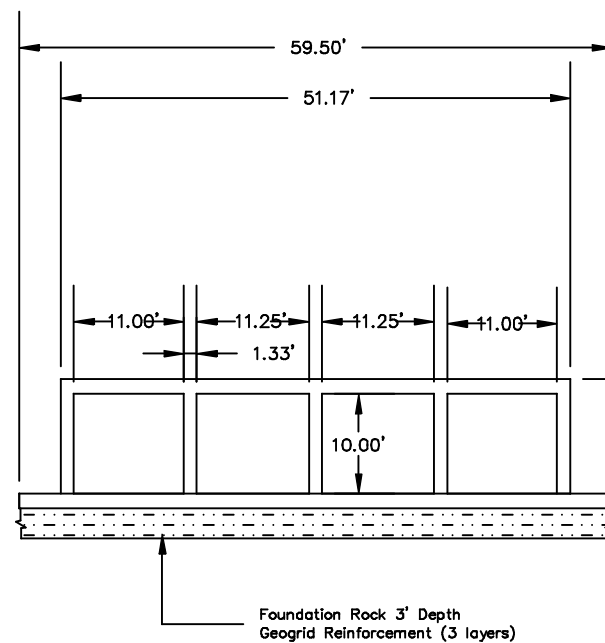
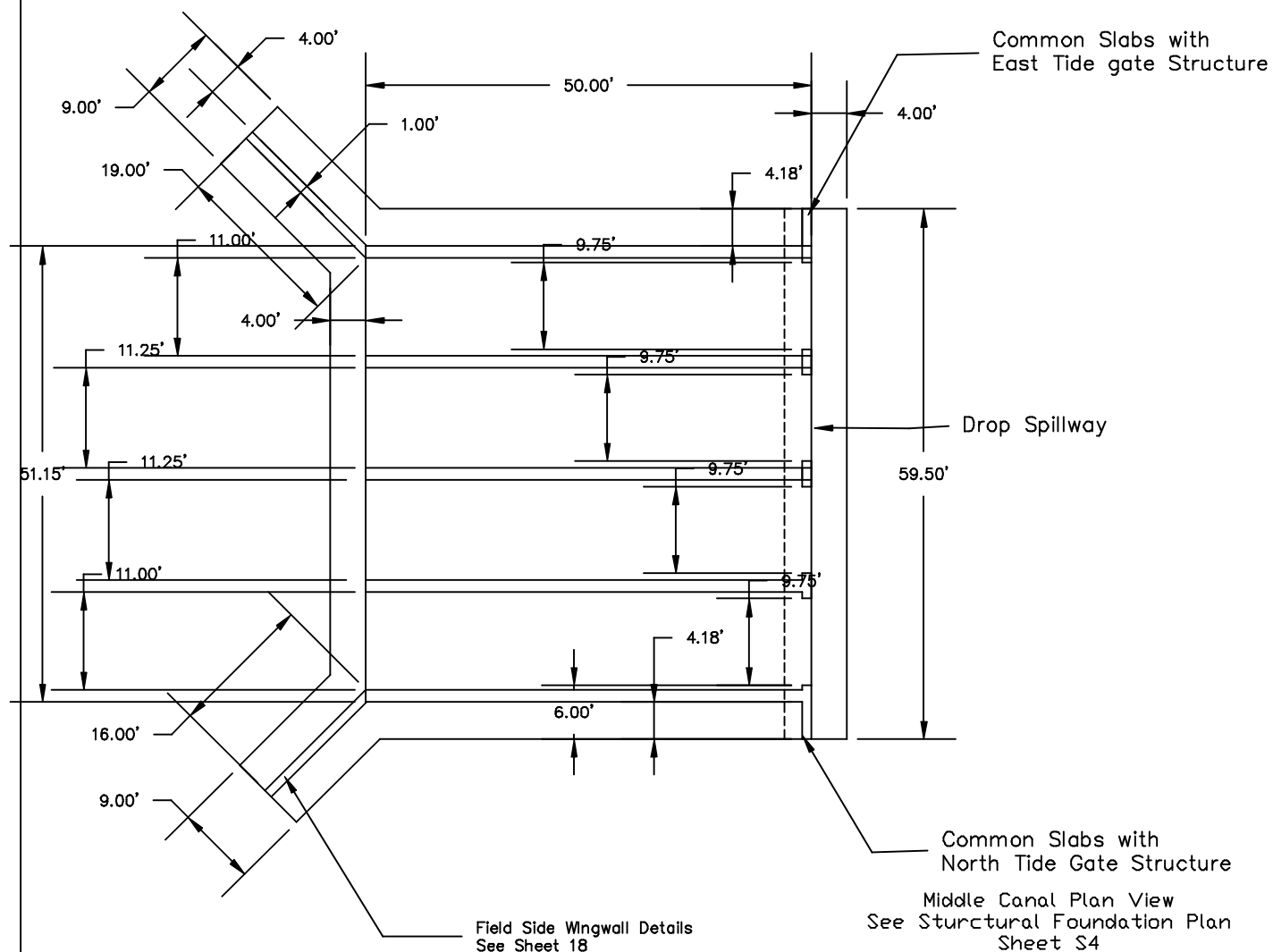
EAST CANAL FRONT FACE ELEVATIONS VIEWS

CHINA CAMP CREEK TIDEGATE SYSTEM
East Canal Structure- PLAN, PROFILE,
ELEVATION VIEW

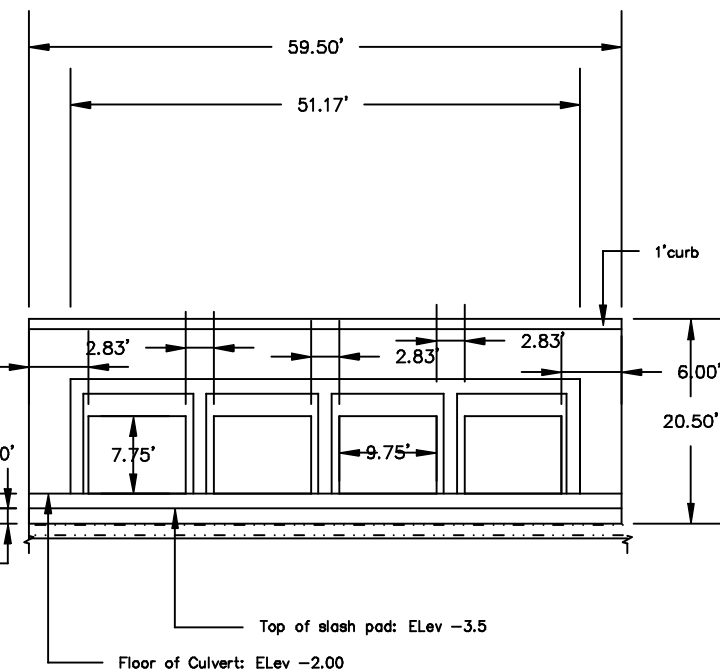
Rev: 13 May 2016 Sheet 9



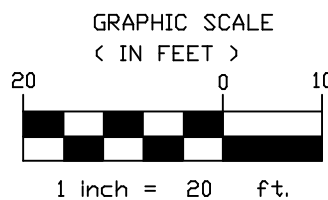
"Middle Canal" Profile



MIDDLE CANAL TRAVERSE ELEVATION VIEW
See Structural Cross Section Sheet S2.2

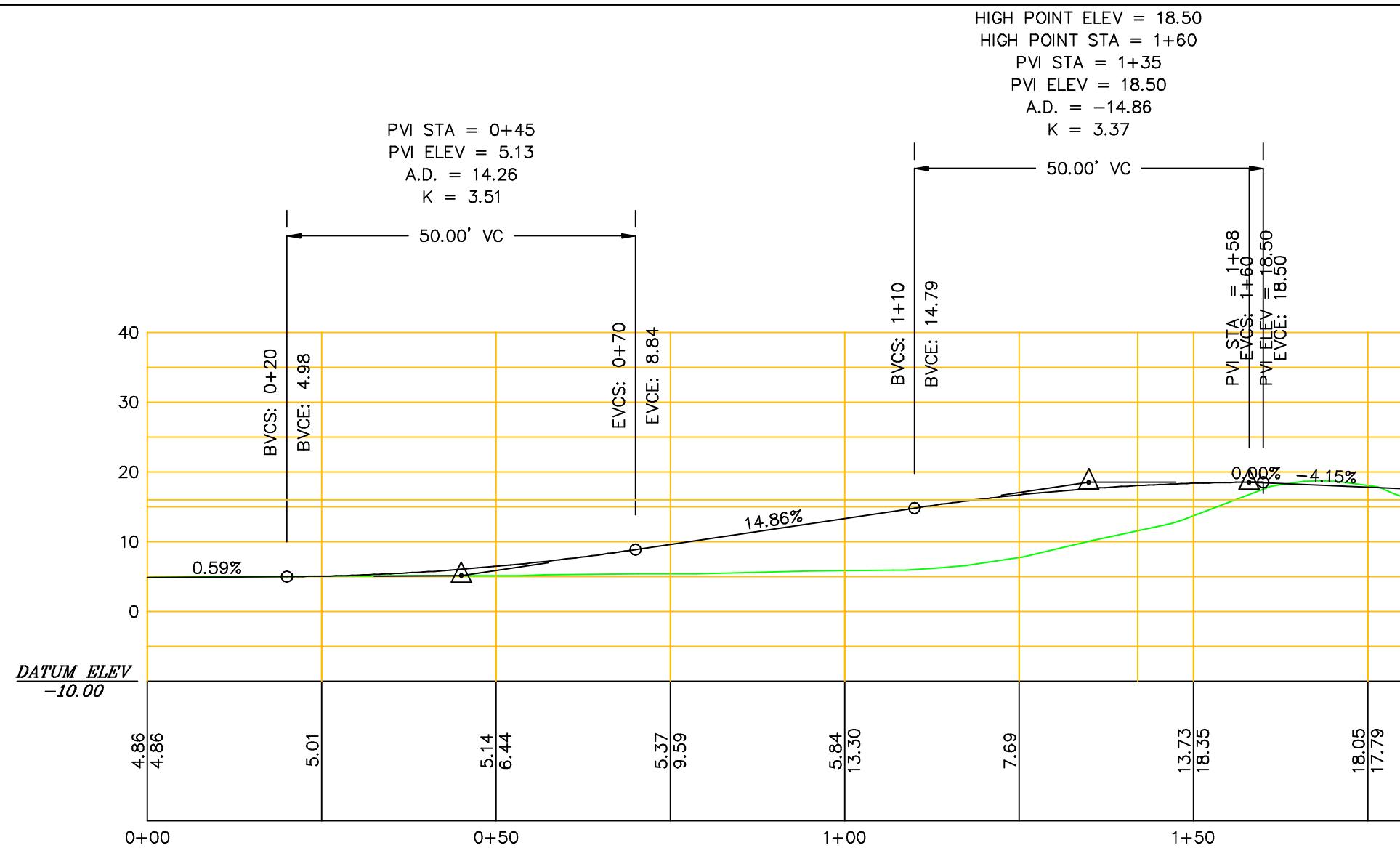


MIDDLE CANAL FRONT FACE ELEVATIONS VIEWS

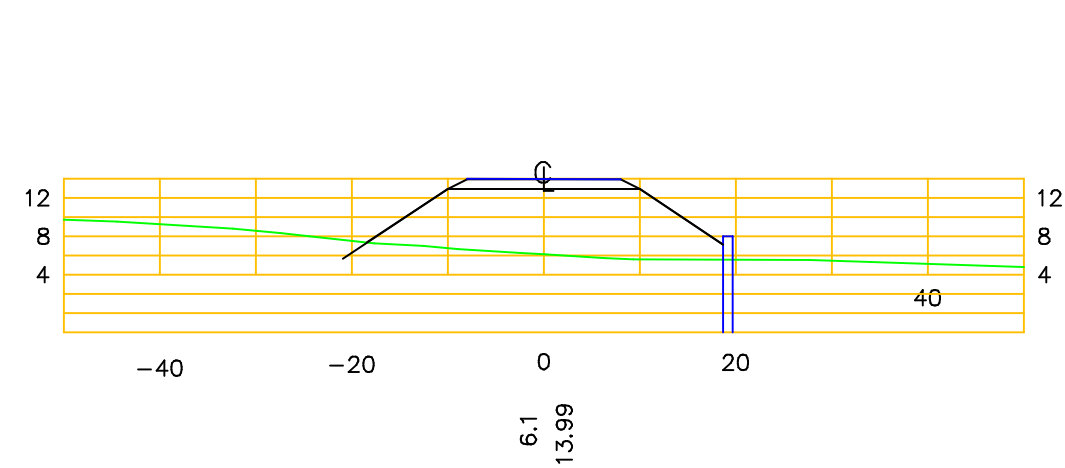


CHINA CAMP CREEK TIDEGATE SYSTEM
Middle Canal Structure Profile and Details

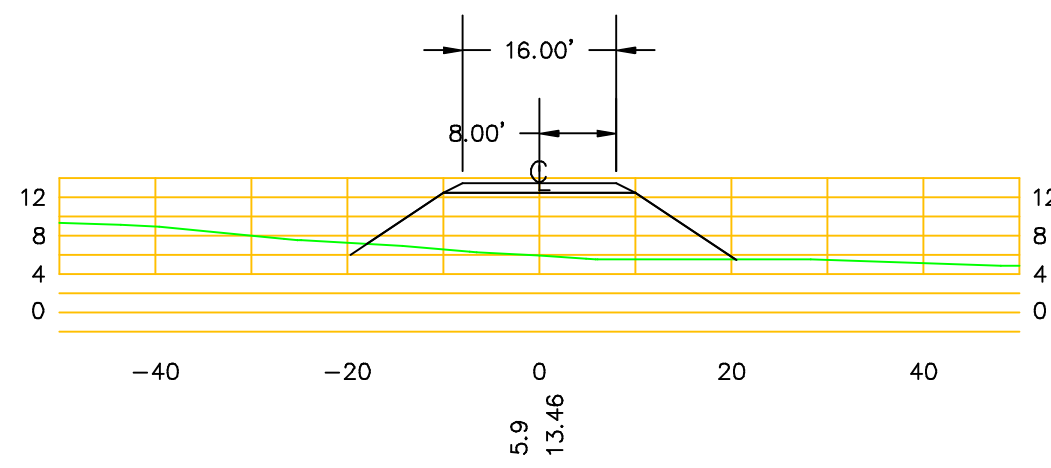
Rev 25 July 2016 Sheet 8



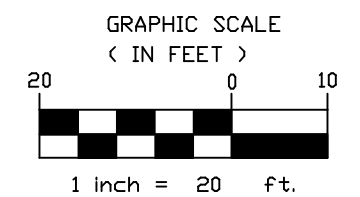
Profile Access Road to Area Two East



Driveway Section station 1+12



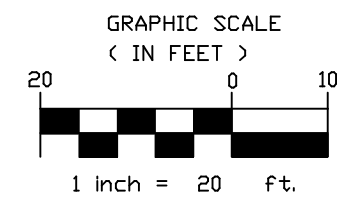
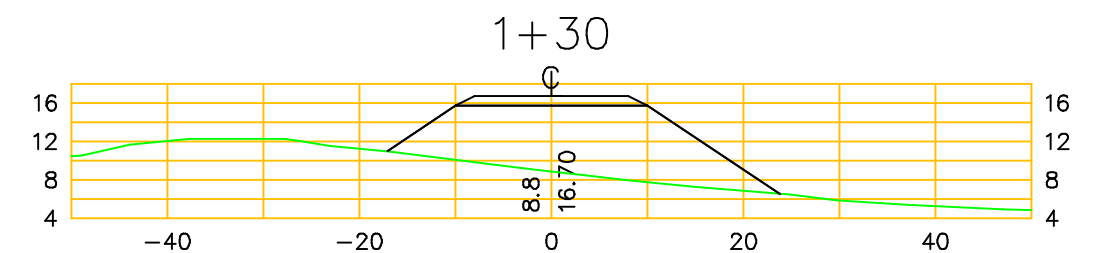
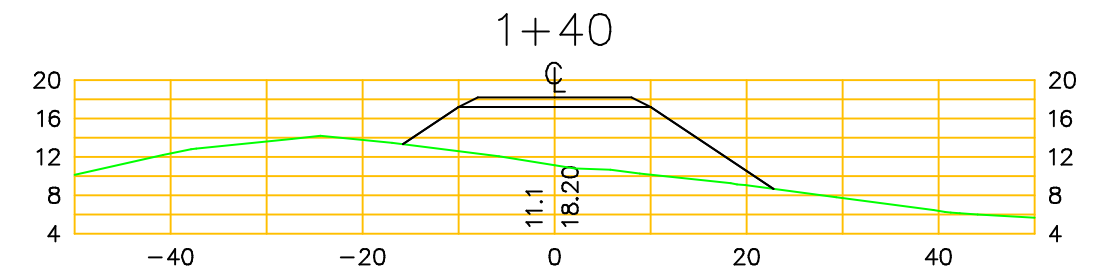
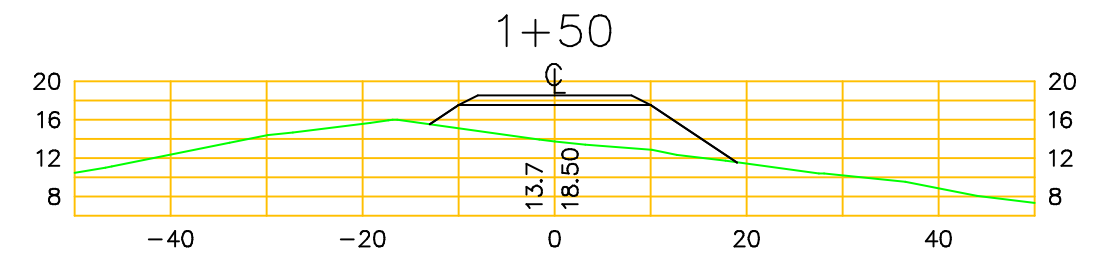
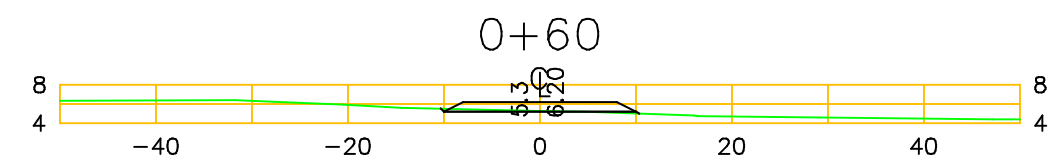
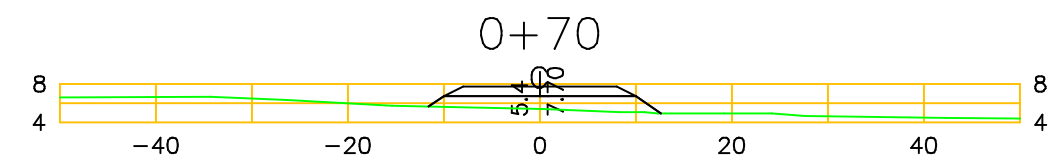
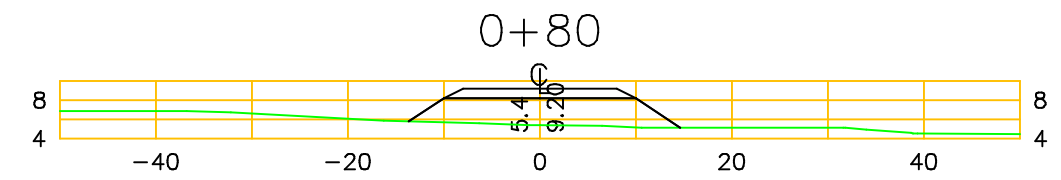
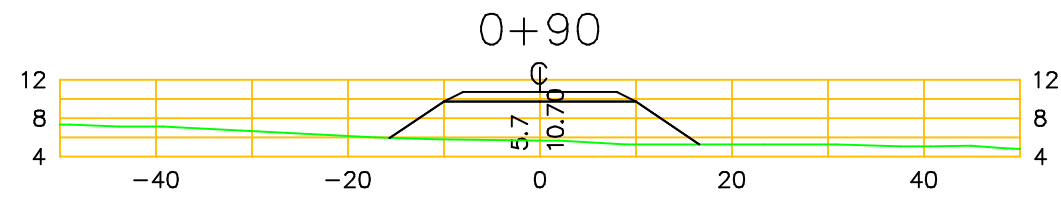
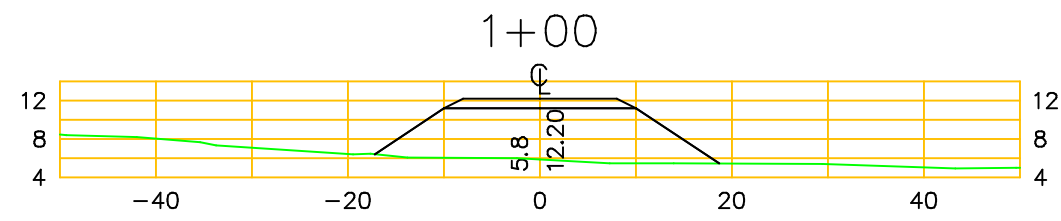
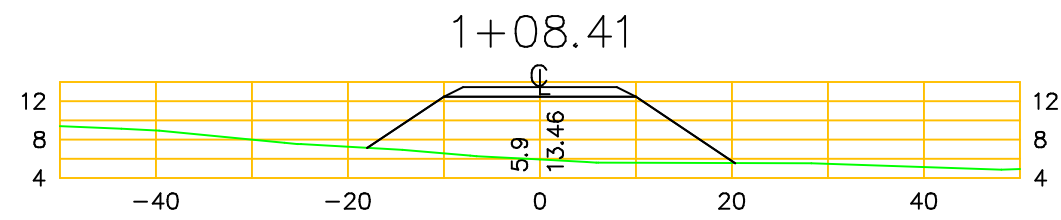
Driveway Section 1+08

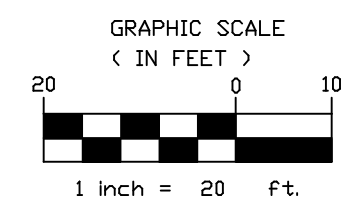
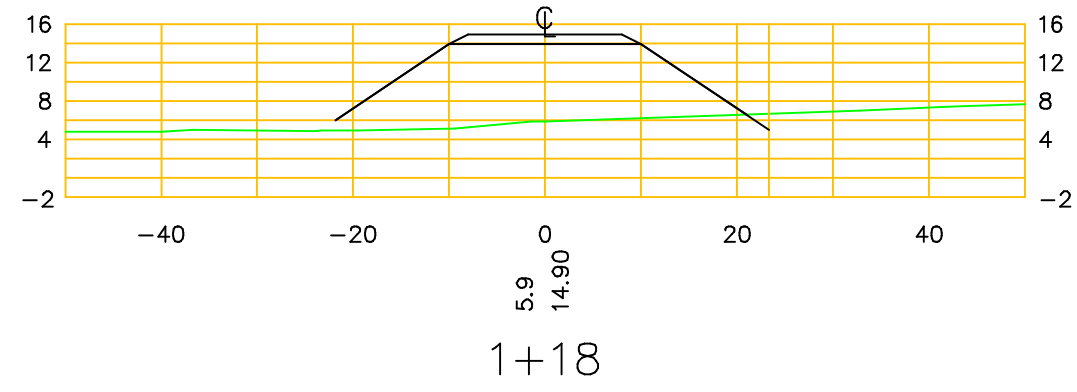
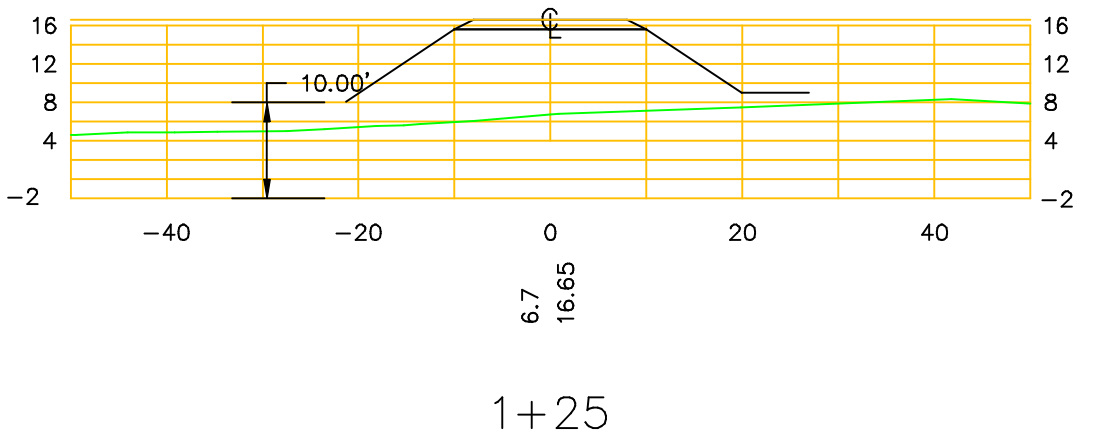
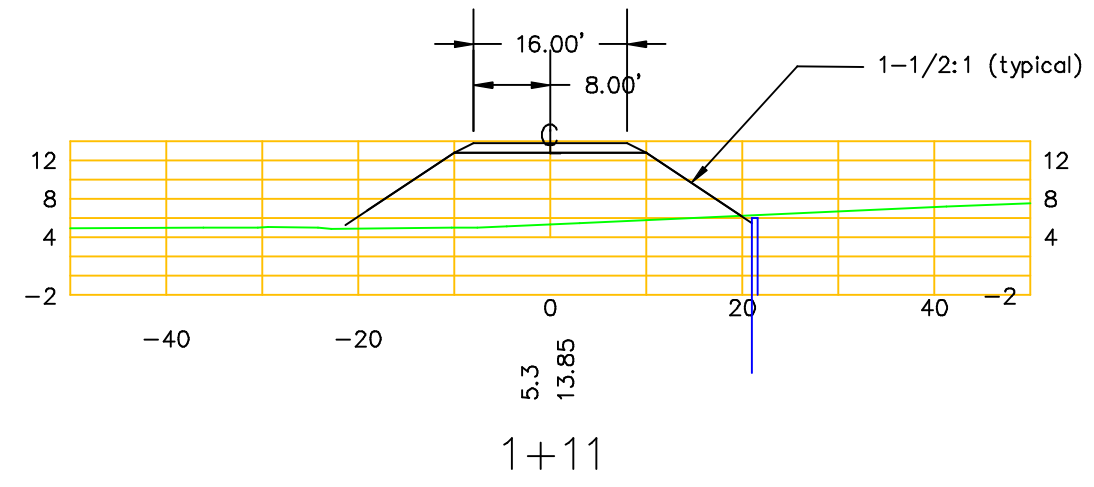
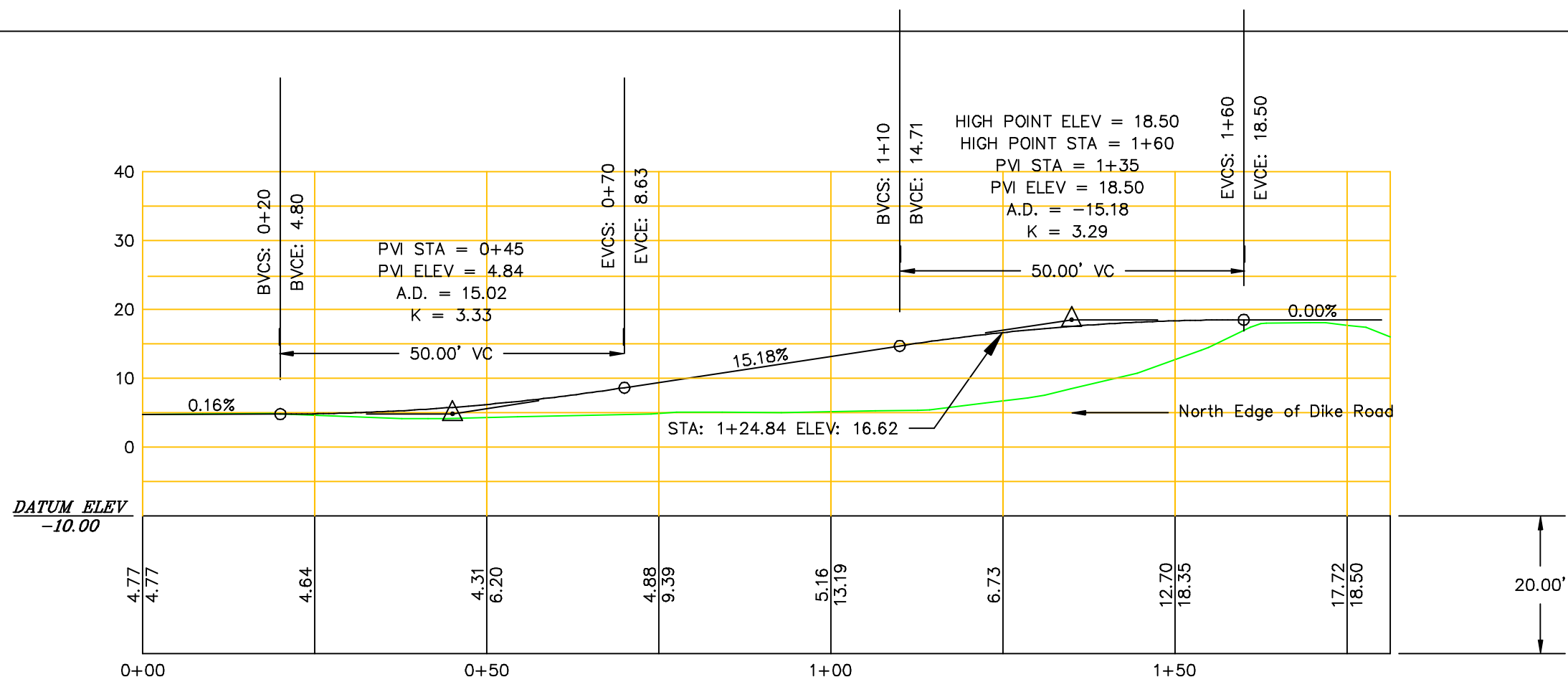


CHINA CAMP CREEK TIDEGATE SYSTEM
Access Road from Dike to Area Two East
Road and Critical Sections

Rev: 13 May 2016

Sheet 10



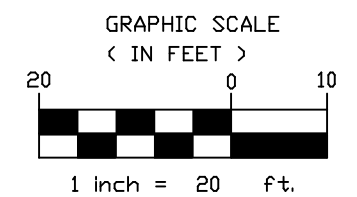
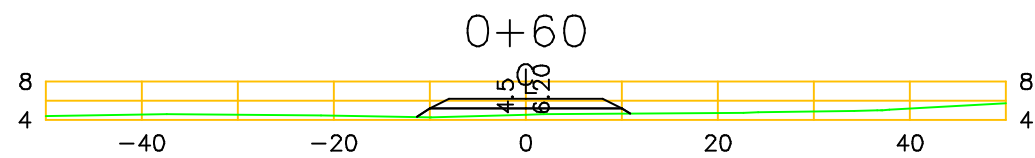
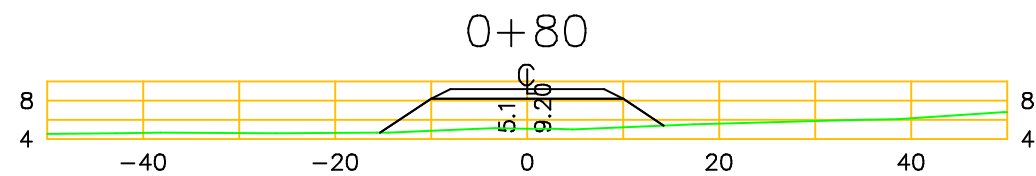
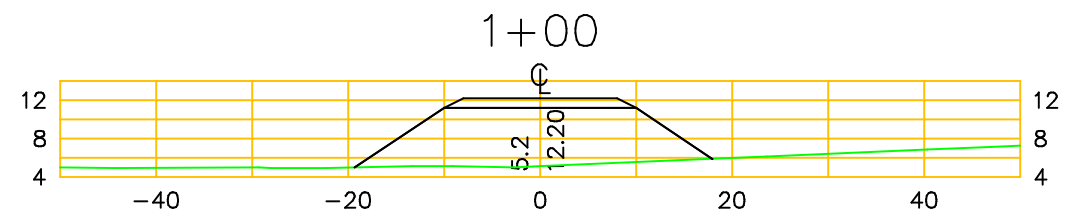
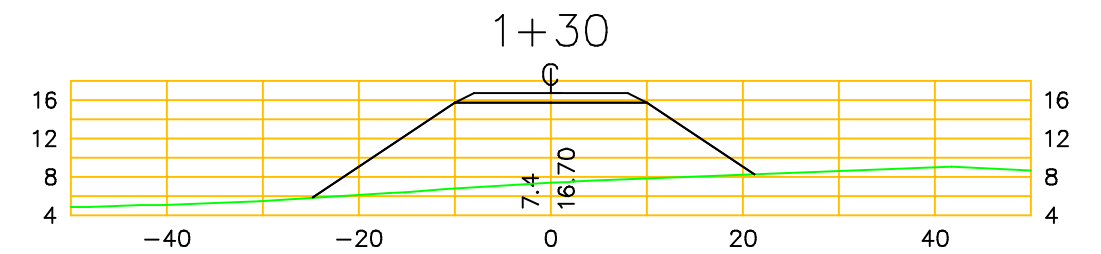
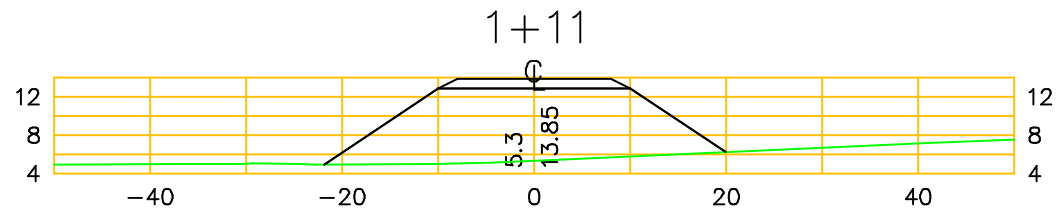
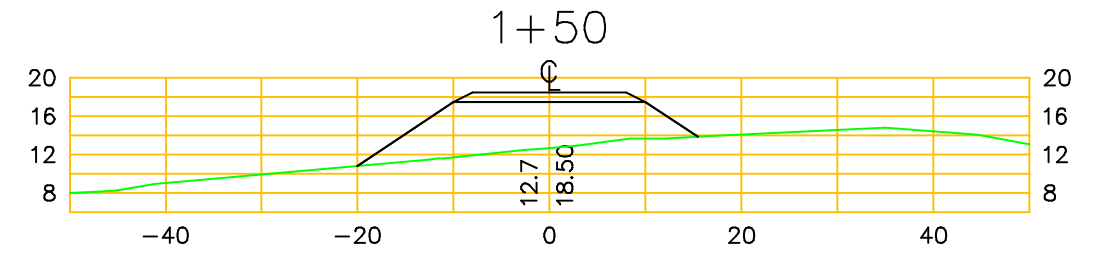
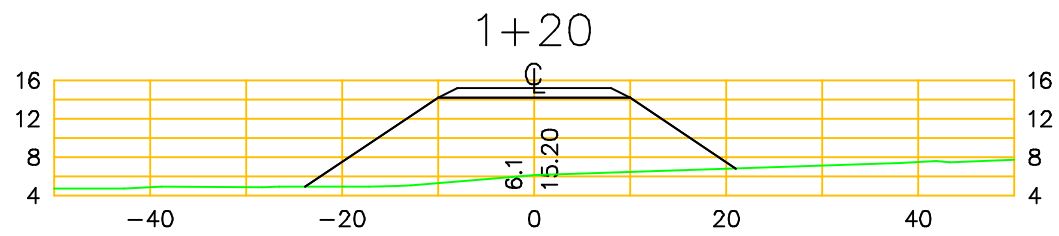


CHINA CAMP CREEK TIDEGATE SYSTEM

Access Road from Levee to Unit Two North

Road and Critical Sections

Rev: 13 May 2016 Sheet 12

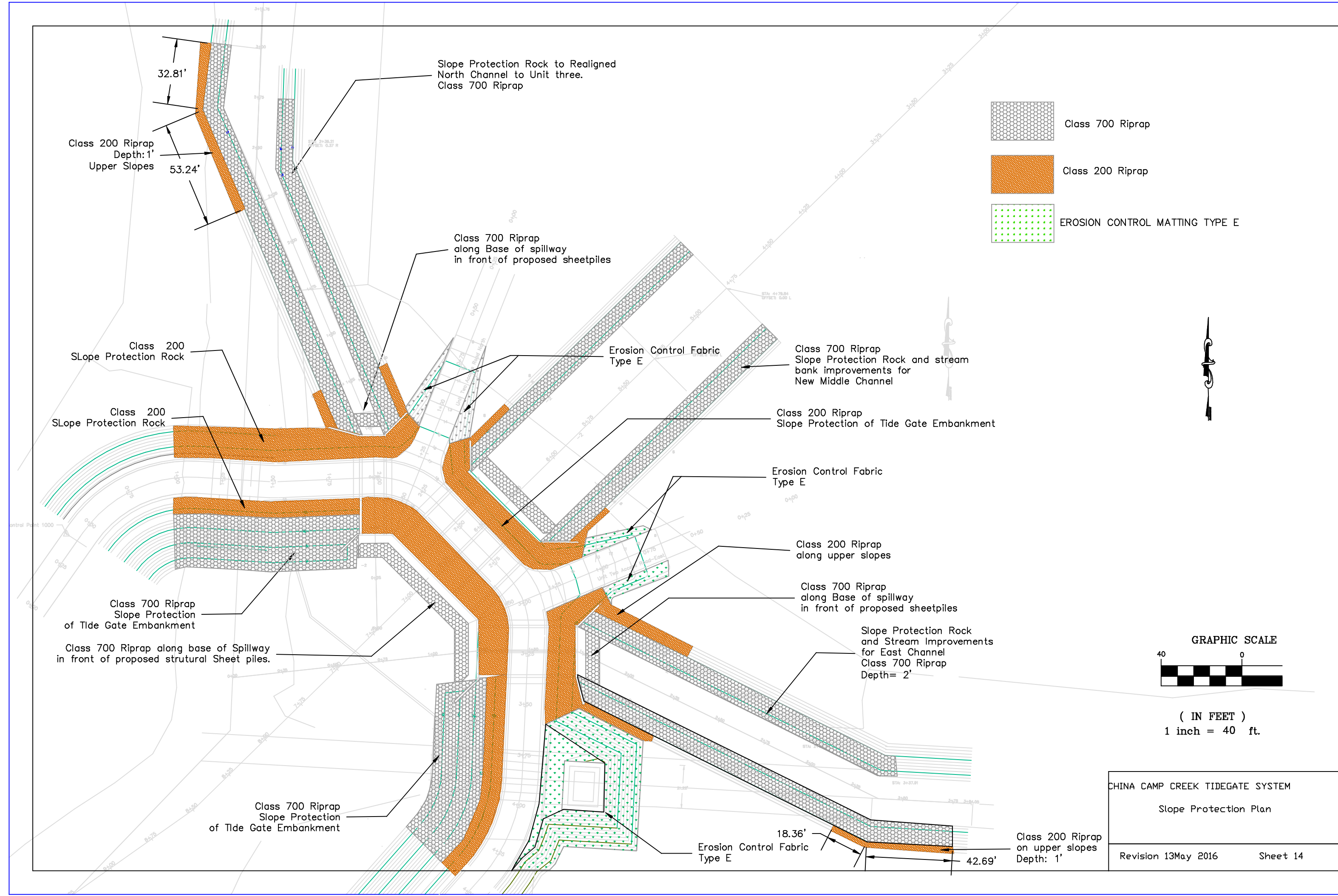


CHINA CAMP CREEK TIDEGATE SYSTEM
Access Road from DiKE to Area Two North

Road and Critical Sections

Rev: 13 May 2016

Sheet 13



Sheet Pile Wall
Length: 40'
Depth below foundation rock= 20'
Type: PZ22

Perimeter of Concrete Foundation

Sheet Pile Wall
Length: 76'
Depth Below Foundation Rock :20'
Type: PZ22

Perimeter of Concrete Foundation

Perimeter of Reinforced Foundation

Unit Two Access Road—East

Area of Reinforced Foundation
Material= 10,828 sq ft

Sheet Pile Wall Traverse Length= 55'
Depth below foundation rock= 20'
Type: PZ22

Perimeter of Foundation Rock



GRAPHIC SCALE
(IN FEET)



1 inch = 20 ft.

34.39'

Sheet Pile Wall
Traverse Length : 135'
Depth below foundation Rock Pad : 20'
Type: PZ22
See Stuctural notes Sheet S2

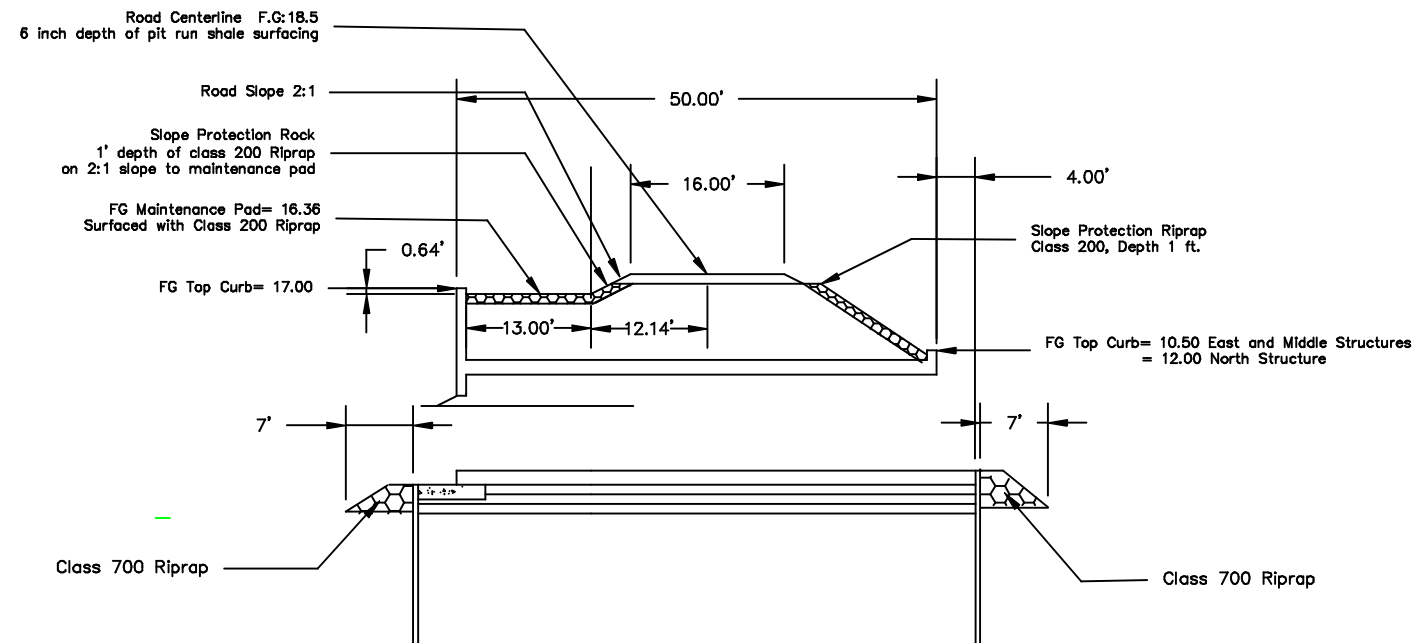
82.80'

CHINA CAMP CREEK TIDEGATE SYSTEM

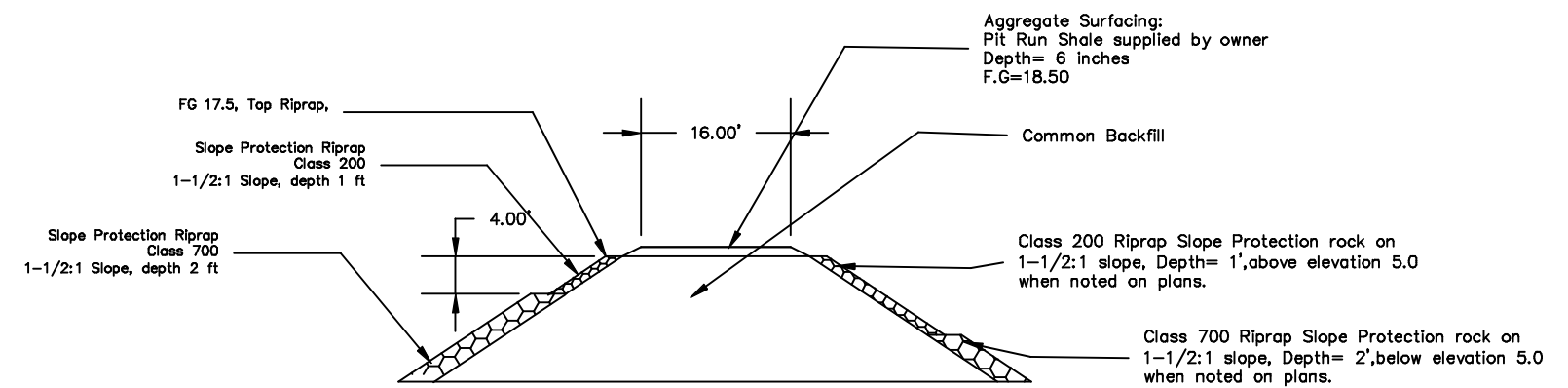
Foundation Rock and
Sheet Pile Plan

REVISION 13 May 2016

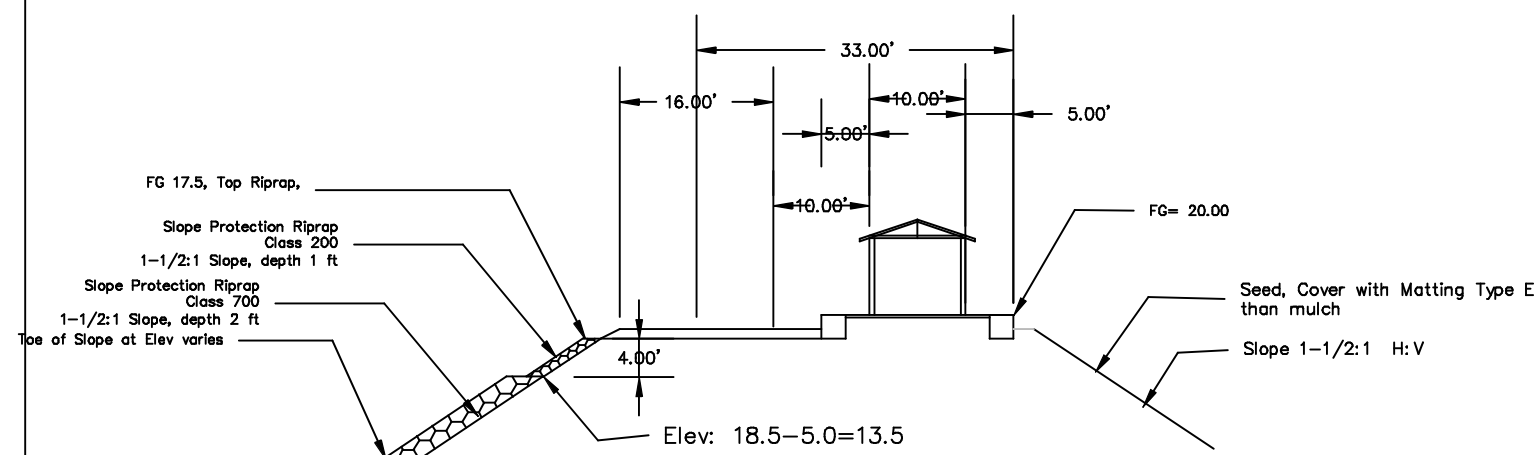
Sheet 15



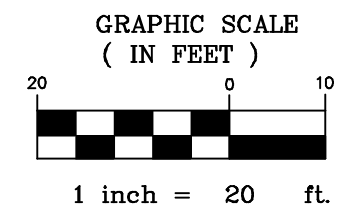
Typical Section Thru Tidegate Structures



Typical Roadway Section



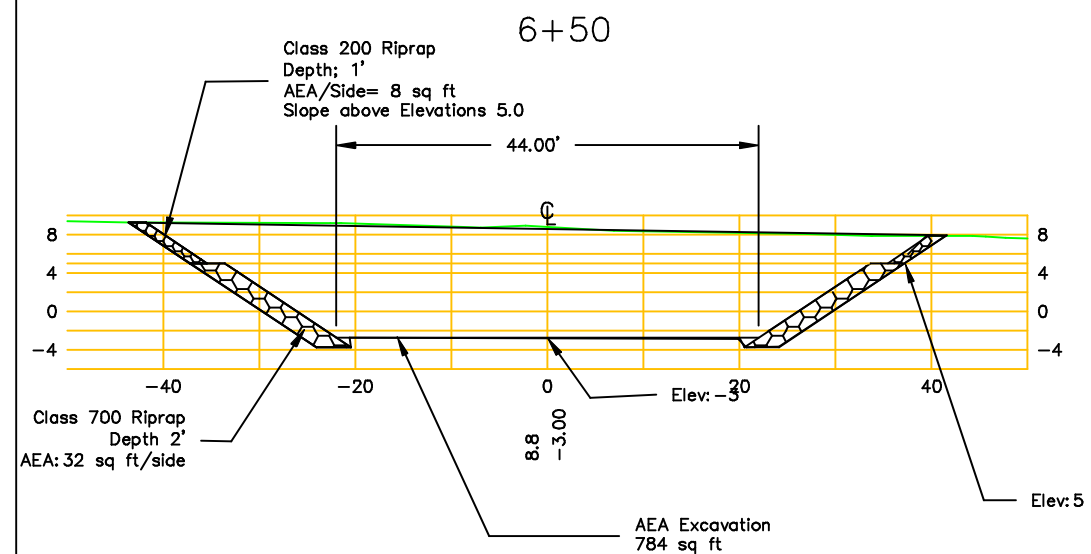
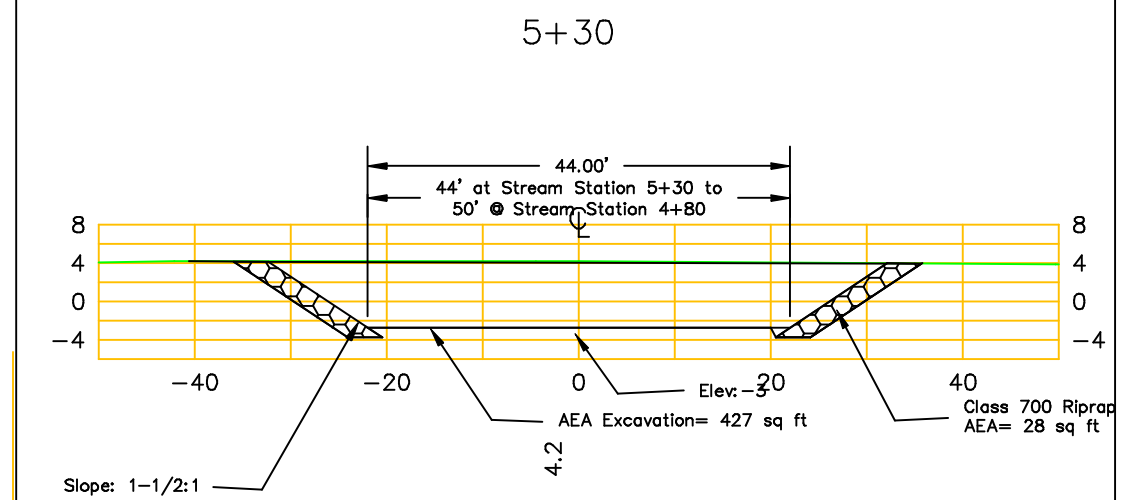
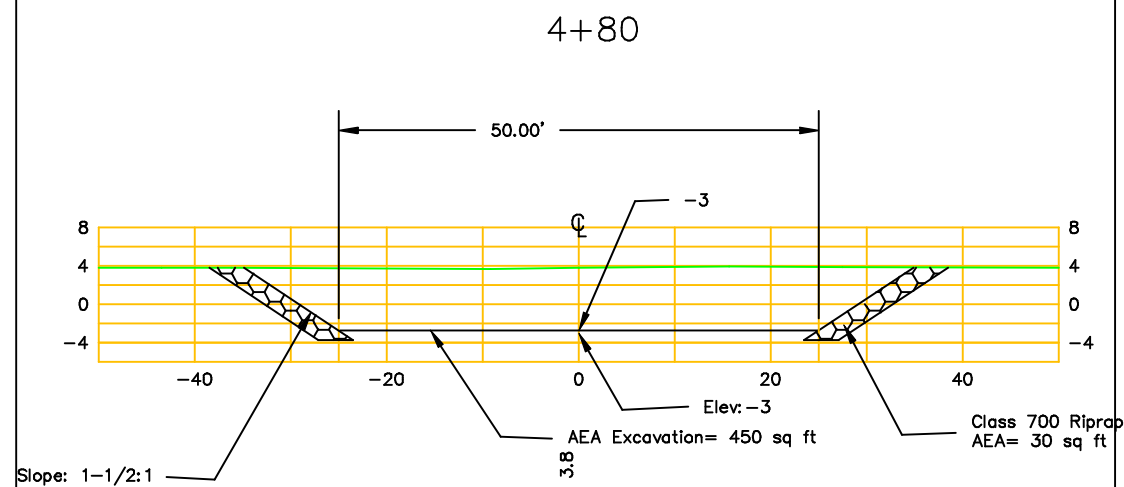
TYPICAL Section at Utility Building



CHINA CAMP CREEK TIDEGATE SYSTEM
Typical Sections

Revision: 13 May 2016

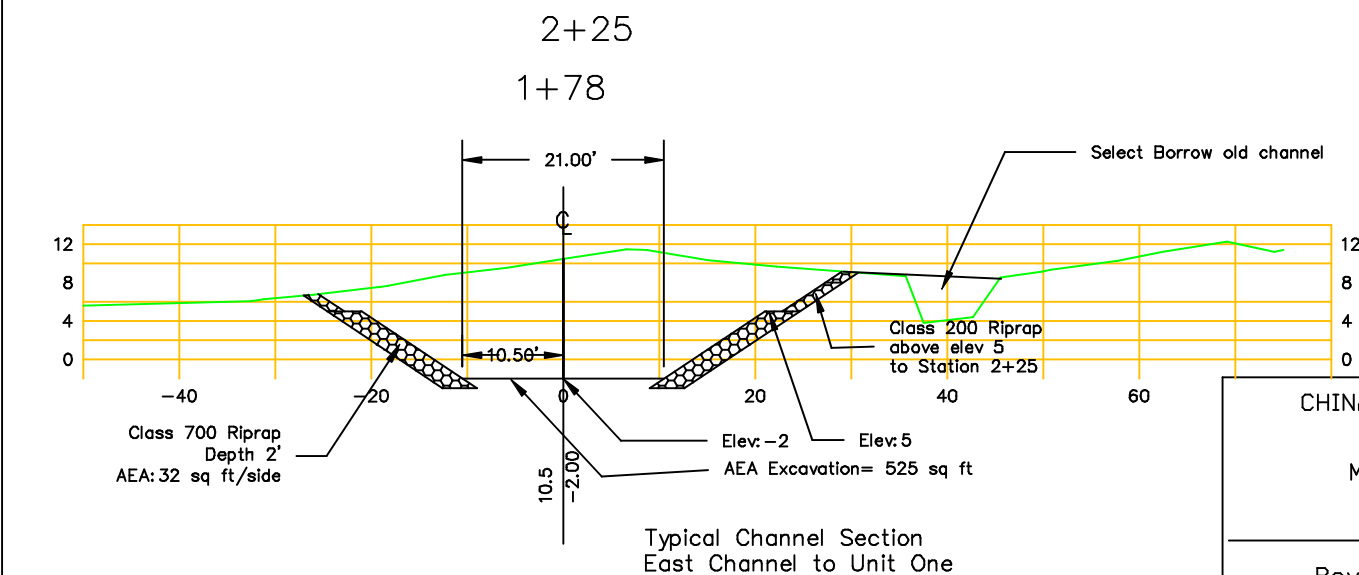
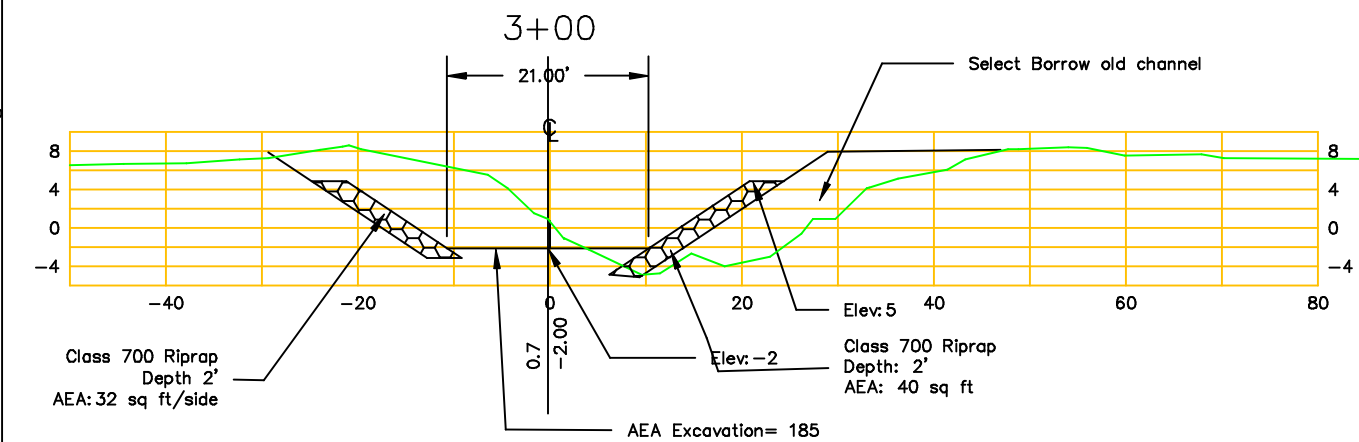
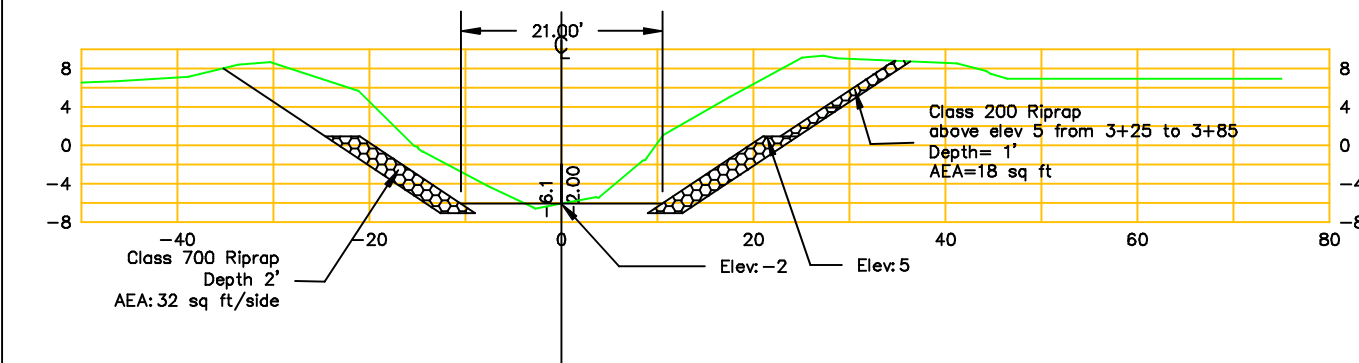
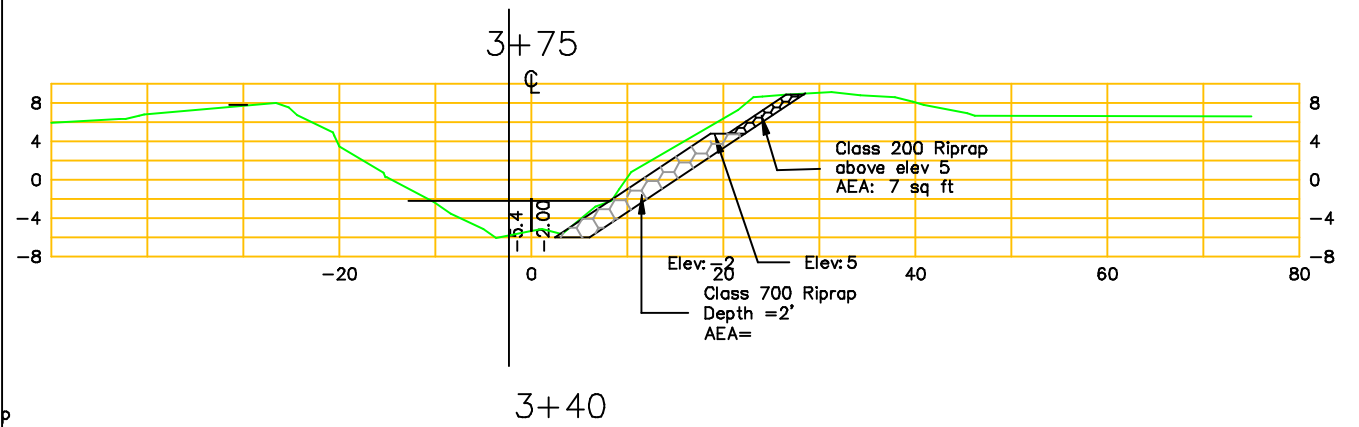
Page 16



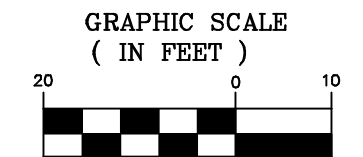
Typical Channel Section
Thru Middle Channel
From Culvert Invert 6+30 to 5+30

QUANTITY SUMMARY

EXCAVATION	3100 CUBIC YARDS
CLASS 700 RIPRAP	335 CUBIC YARDS
CLASS 200 RIPRAP	50 CUBIC YARDS



Typical Channel Section
East Channel to Unit One



1 inch = 20 ft.

QUANTITY SUMMARY- In Place Quantities

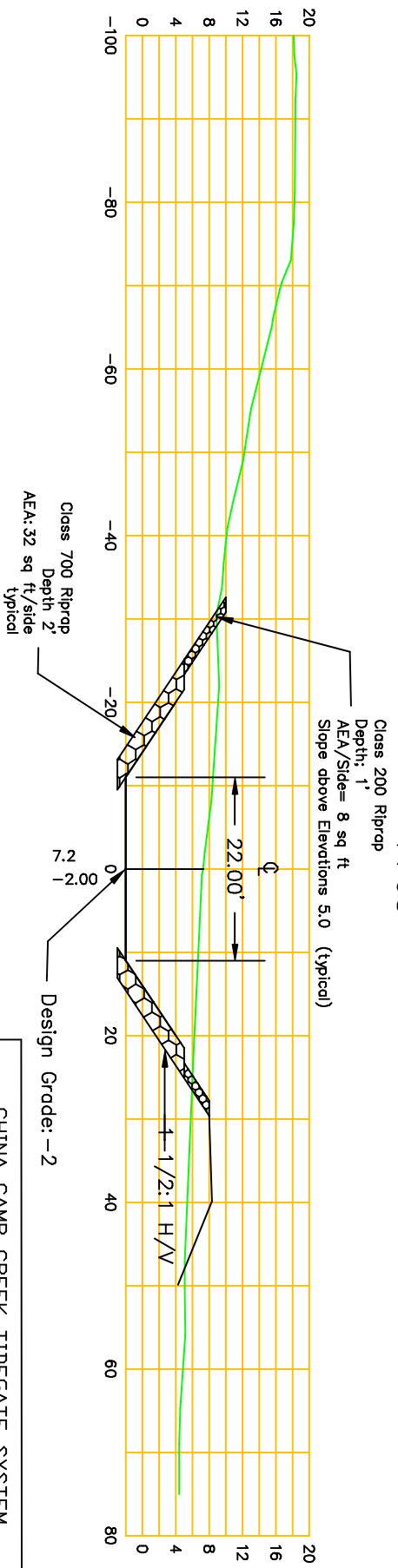
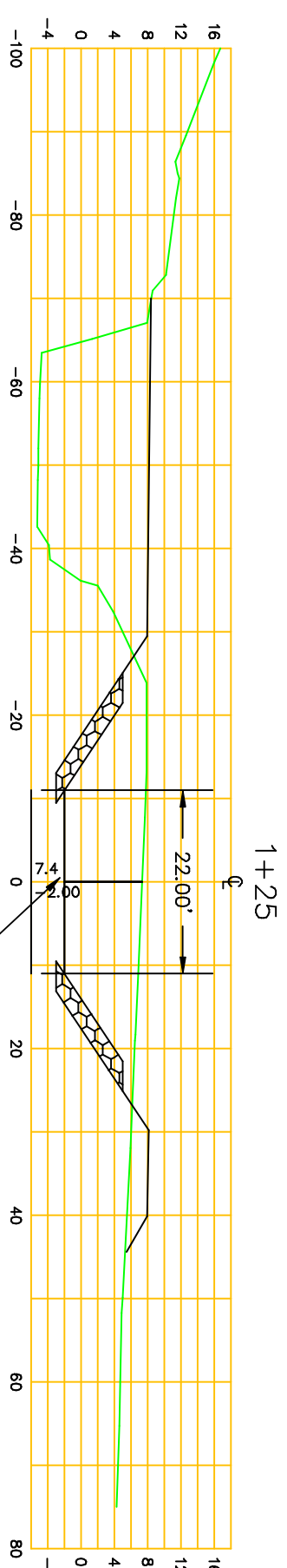
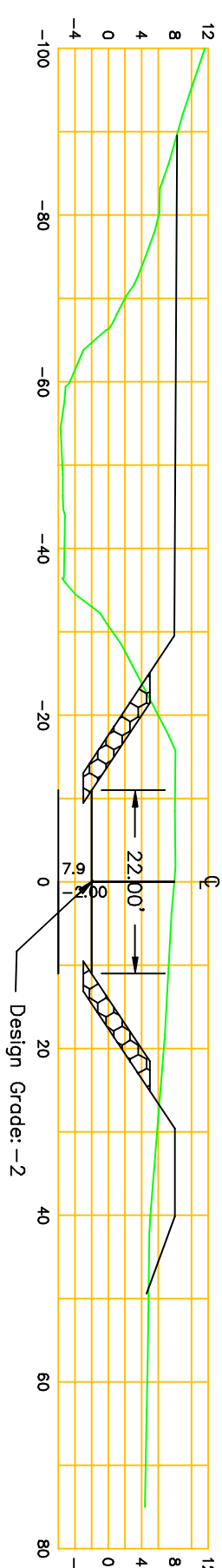
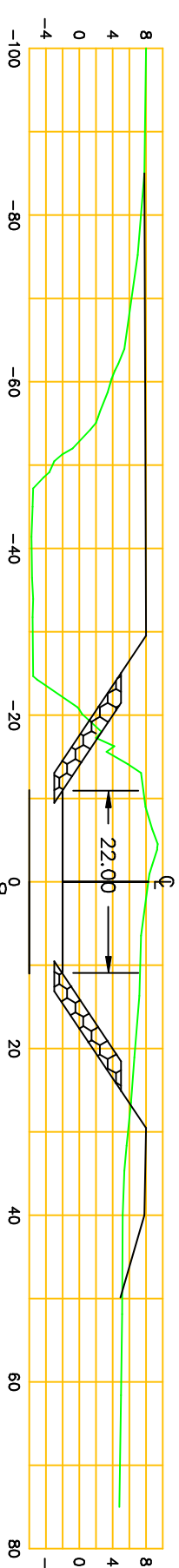
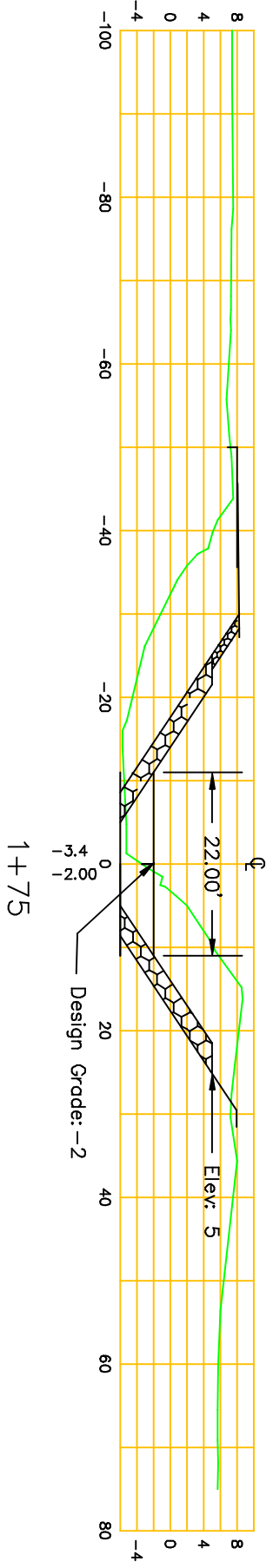
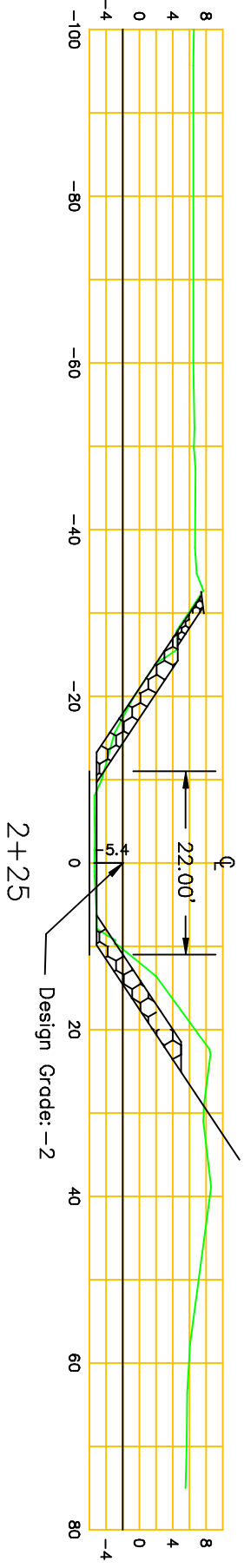
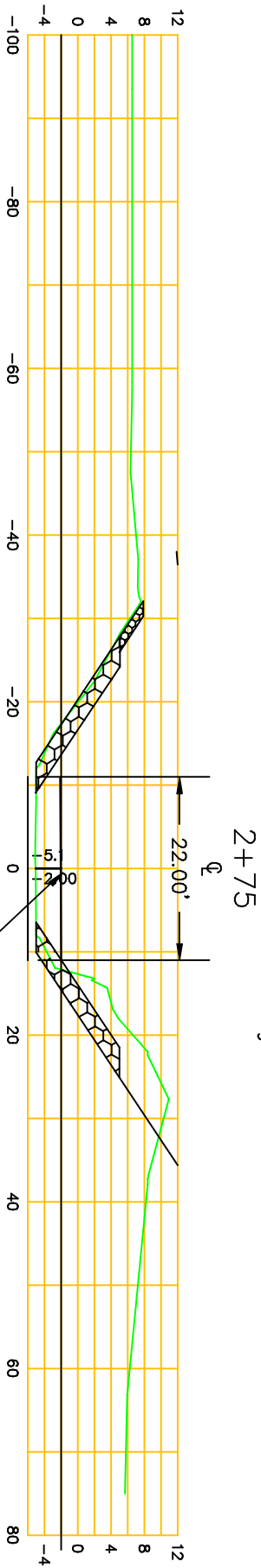
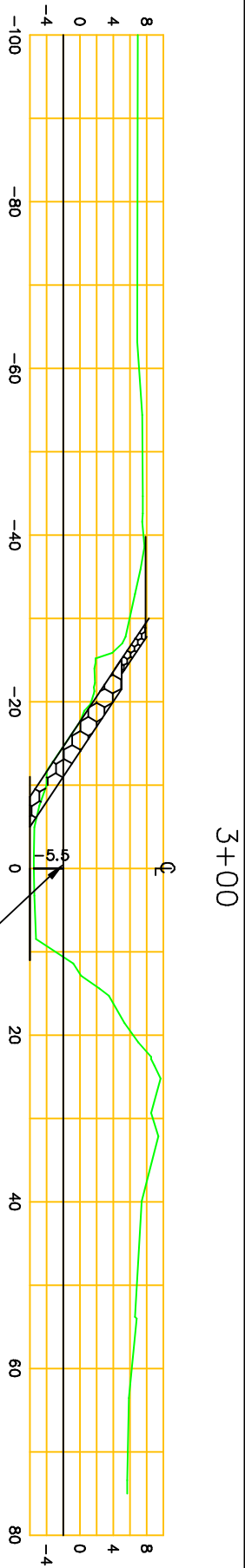
EXCAVATION	2570 CUBIC YARDS
CLASS 700 RIPRAP	435 CUBIC YARDS
CLASS 200 RIPRAP	50 CUBIC YARDS

CHINA CAMP CREEK TIDEGATE SYSTEM

Typical Channel Sections
Middle Channel and East Channel

Rev 13May 2016

Sheet 17

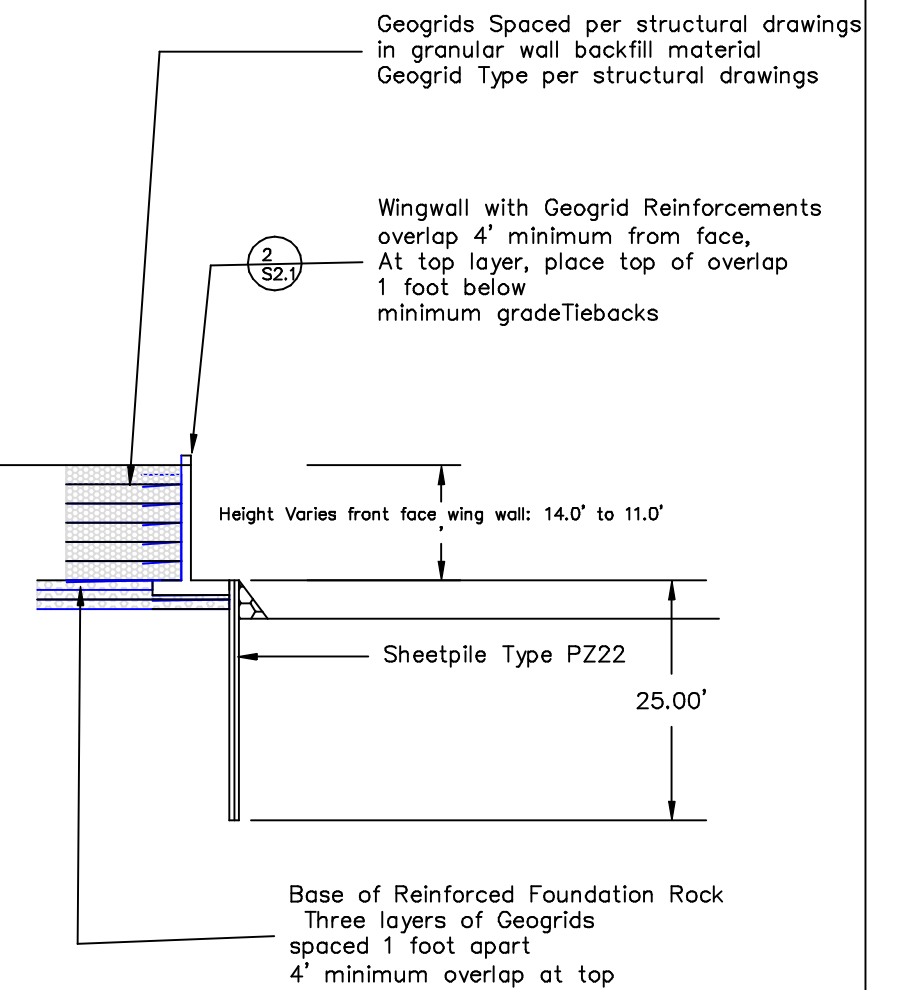
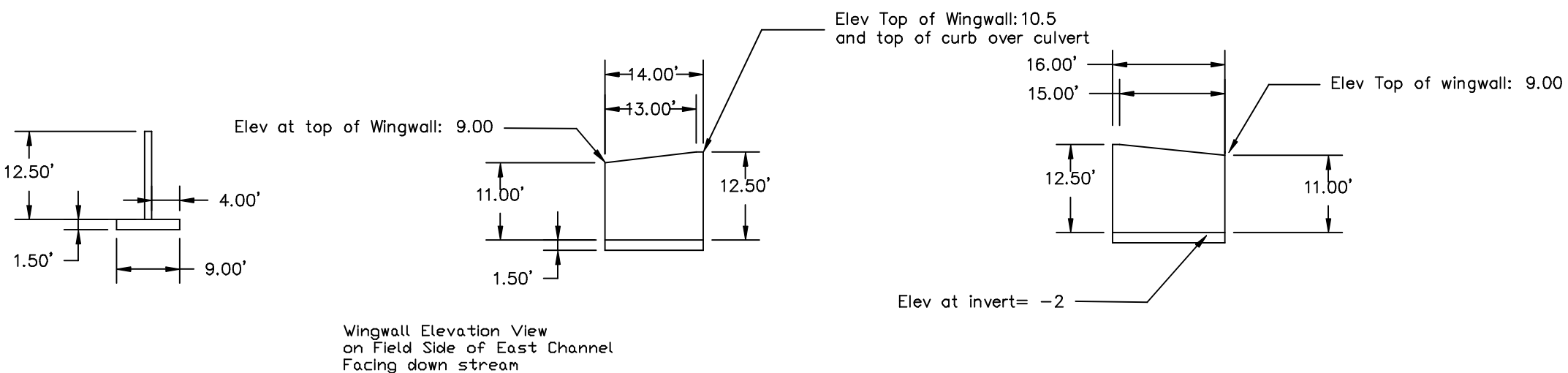
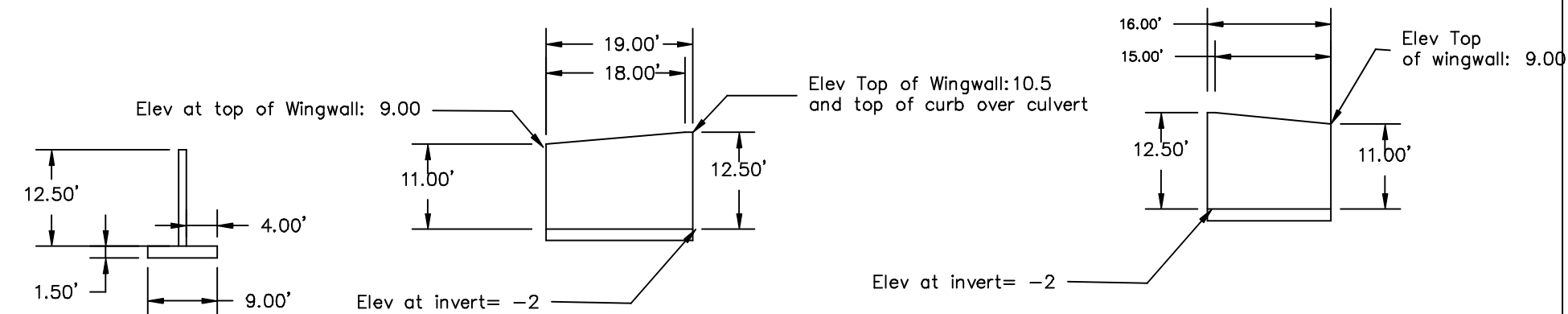
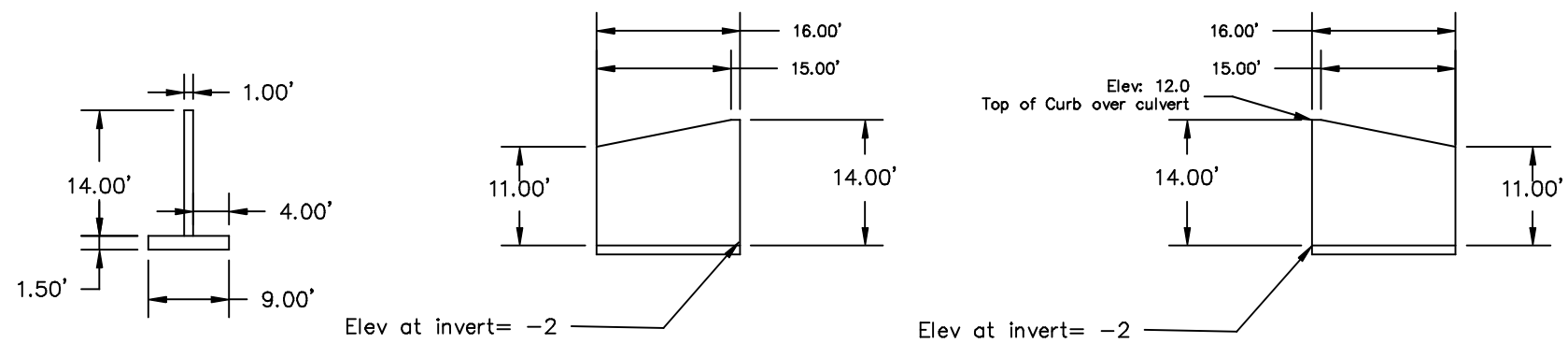


QUANTITY SUMMARY-- In Place Quantities

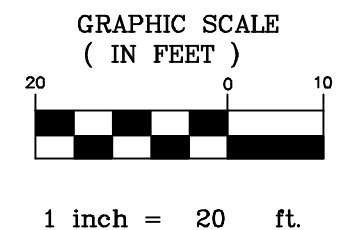
EXCAVATION NEW CHANNEL	1475	CUBIC YARDS
EMBANKMENT OLD CHANNEL	1220	CUBIC YARDS
CLASS 700 RIPRAP	510	CUBIC YARDS
CLASS 200 RIPRAP	20	CUBIC YARDS



CHINA CAMP CREEK TIDEGATE SYSTEM
Typical Channel Sections
North Channel



Typical Section Thru Wingwall
with reinforced backfill
See Structural Details Figure 2 Sheet S2.1

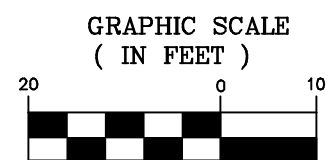
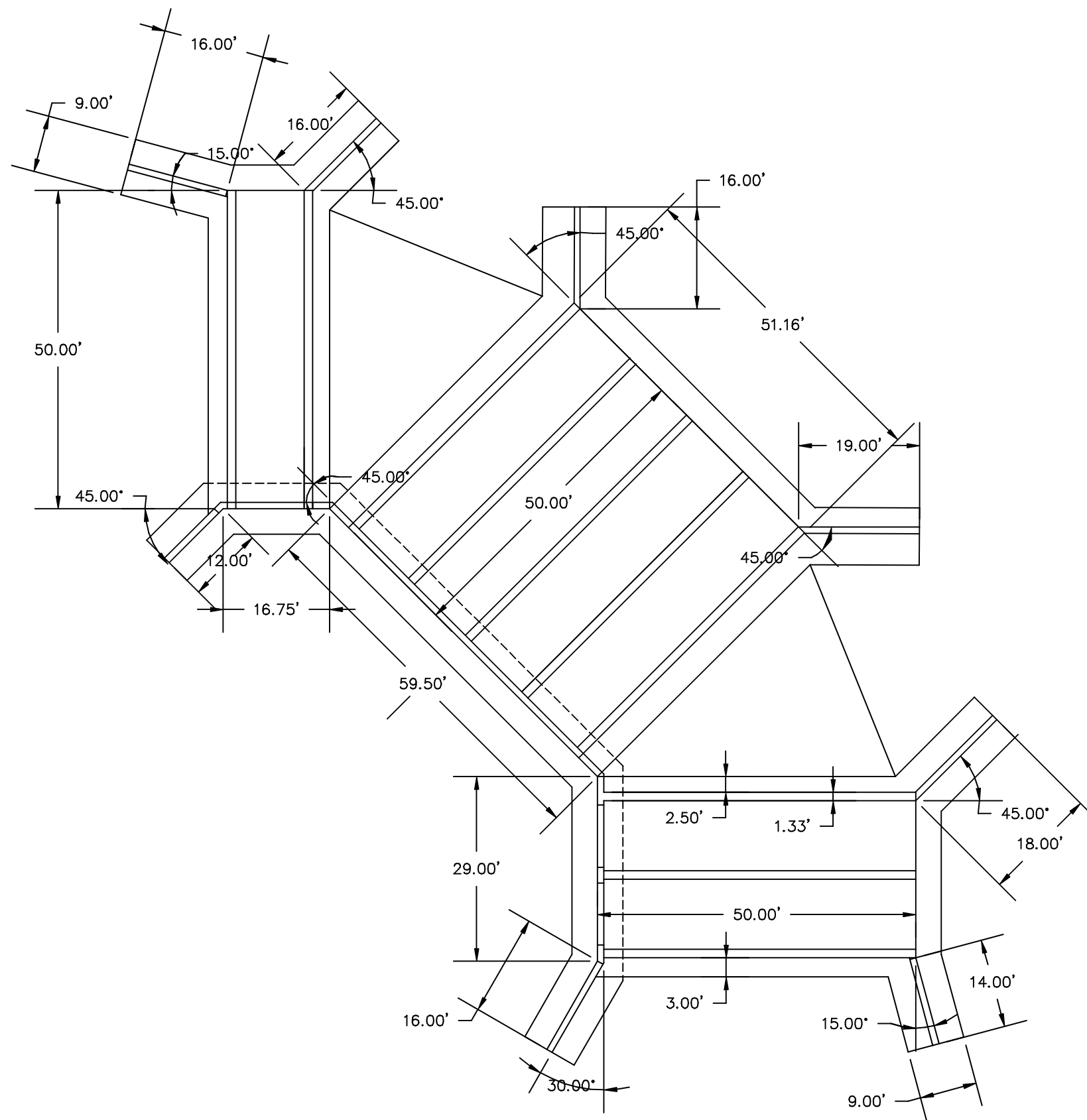


PRELIMINARY

CHINA CAMP CREEK TIDEGATE SYSTEM
Wingwall Details on Field Side of
Structures

13 May 2016

Sheet 19



1 inch = 20 ft.

CHINA CAMP CREEK TIDEGATE SYSTEM
Concrete Floor Plan

Revised 13 May 2016

Page 20

GENERAL NOTES

1. Definitions:

Contracting Officer (CO) is also referred to as the Contract Administrator (CA).

2. Survey Controls and References:

Before beginning construction, the Contractor shall notify the Contract Administrator (CO) of any missing initial reference lines, control points, or offset stakes. The CO will reestablish initial reference lines and horizontal and vertical control points to include slope stakes for the culvert and road. These stakes will include offsets from the Culvert Invert with elevation bench marks for construction controls. Using these points, the Contractor shall establish any additional controls to accomplish the work. The Contractor shall protect the control points and construction stakes as necessary.

3. Notifications:

The Contractor shall notify the CO at least 10 days prior to the start-work date and/ in-stream work

4. OSHA Requirements:

The contractor shall follow Occupational Safety and Health Administration (OSHA) safety regulations (29 CFR, Part 1926, Subpart P, excavation), or OSHA approved state plan requirements for sloping the sides of excavations and for using shoring, bracing and other safety features. Excavation design quantities are based on cut slopes as shown on the plans and typical sections without shoring or bracing.

5. Traffic Control

Project is on private lands. Road closure shall be coordinated with CO in advance to accommodate normal field access.

6. Erosion Control and Dewatering:

An Erosion control plan must be approved by the CO prior to the start of construction. The plan shall be written and provide permanent and temporary erosion control measures to minimize erosion and sedimentation during and after construction. The Contractor shall not begin any other work until the necessary controls for that phase of work has been implemented. The contractor shall not modify the type, size or location of any control without approval of the CO. When erosion control measures are not functioning as intended, the contractor is expected to take immediate corrective actions.

A cofferdam with pumps is anticipated for dewatering of the existing channel. Contractor will furnish a plan on how he proposes to do this work and divert the water to the opposite side of the stream using a cofferdam and sediment collection mats thus eliminating the need to work in an active channel. Earthen cofferdams are not permissible.

The written erosion control plan shall include details of how the Contractor shall dewater the site.

The contractor will visually monitor in-stream turbidity and inspect all erosion controls daily or more often as necessary to ensure that erosion controls are working adequately.

7. Temporary Stockpile Areas

Temporary Stockpiles site on private lands shall be flagged and approved by the Contract Administrator prior to their use.

8. Clearing and Unsuitable Excavation

- A. Clearing and grubbing of existing surfaces is required.
- B. Excavated material unsuitable for use as backfill or embankment (none anticipated) shall be disposed of at an approved disposal site. Temporary waste areas shall be flagged in advance by Contracting Officer.

9. Excavation and Embankment

All material excavated and determined by the Contract Administrator to be suitable shall be preserved and used within the reconstructed fill. Excess excavation shall be disposed of at an approved disposal site.

10. Rocks for slope stabilization

Rock shall be first salvaged from excavation of existing site. Additional rock as needed shall be obtained from an approved commercial source.

11. Water Quality requirements

- A. Heavy equipment shall be inspected and cleaned before moving into the project site in order to remove oil, grease, noxious weeds and excessive soil.
- B. Hydraulic fluids and fuel lines on heavy mechanized equipment must be in proper working condition in order to minimize leakage into streams.
- C. Waste Diesel, oil, hydraulic fluid and other hazardous materials and contaminated soil near the stream should be removed from the site and disposed of in accordance with DEQ regulations. Areas that have been saturated with toxic materials should be excavated to a depth of 12 inches beyond the contaminated material or as required by the DEQ.
- D. Equipment refueling shall be conducted within a confined area outside the stream channel such that there is a minimal chance that toxic material could enter a stream. Refueling site shall be at least 100 feet from the edge of the stream channel.
- E. Use spill containment booms or other equipment as required by the DEQ.
- F. Equipment containing toxic fluids shall not be stored in a stream channel.

12. Spill Containment Kit:

The Contractor shall have on-site during operations, a spill containment kit. The Contractor's employees shall be trained in the kit's use. The kit shall be designed for petroleum products and as a minimum; each spill containment kit shall be required to contain the following:

- A. Two (2) Bales: [4 Booms/Bale, of 8 inch x 10 foot Absorbent Booms]
- B. Two (2) Bales: [100 Pads/Bale, of Absorbent Pad, (minimum 17" x 19" x 1/4")]
- C. One (1) Absorbent Sweep: [minimum of 18" x 100' x 3/8"]
- D. Gloves (PVC and Latex), Goggles, and Garbage Bags.

China Camp Tidegate System - Quantity Summary Sheet - Revision 13 May 2016								Page 22 and 23
Pay Item	Bid Item			middle channel	North Canal -Unit Three	East Canal -Unit One	PROJECT TOTALS	NOTES
0280-0105050J	MATTING, TYPE E	AQ	SQYD					
	sq ft of matting without slope adjustment		SF	2829.00			2829.00	2829.00
	slope adjustment from 1 to 1-1/2:1	Factor	1.20	3394.80			0.00	0.00
	sq ft of matting no slope		SF	1159.00			1159.00	1159.00
	sq yards of matting	total	SY	505.98			128.78	128.78
0350-0107000J(01)	SUBGRADE REINFORCEMENT GEOGRID	DQ	SQYD					
	sq ft of Foundation		SF	10828.00			10828.00	Sheet 15
	sq ft of 4' overlap per layer		SF	1224.00			1224.00	Traverse length of sheet piles x 4'= 306 x 4
	layers of geogrid		Each	3.00			3.00	
		total	SY	3610.33			3610.33	Quantity without overlay
0350-0107000J(02)	WINGWALL REINFORCEMENT GEOGRID	DQ	SQYD	TENSAR UX1500 UNIAXIAL				
	AVE WIDTH OF WALL BACKFILL + 5' OVERLAP		FT	13.00	13.00	13.00		Sheet 15
	LENGTH OF WALLS		EACH	35.00	48.00	48.00		Traverse length of sheet piles x 4'= 306 x 4
	layers of geogrid		Each	3.00	3.00	3.00		
	SQ FT OF GEOGRID	SQ FT	SF	1365.00	1872.00	1872.00		
	SQUARE YARDS OF GEOGRID	SQ YD	SY	151.67	208.00	208.00	567.67	
0350-0107000J(03)	DRAIN FABRIC BEHIND TOP FACE WALL	DQ	SQYD	TENSAR UX1500 UNIAXIAL				
	lengths of top face wall		FT	60.00	16.00	30.00		Sheet 15
	Length of fabric wrapped and overlapped		ft	9.00	9.00	9.00		Traverse length of sheet piles x 4'= 306 x 4
	layers of geogrid		Each	3.00	3.00	3.00		
	SQ FT OF DRAIN FABRIC	SQ FT	SF	540.00	144.00	270.00		
	SQUARE YARDS OF DRAIN FABRIC	SQ YD	SY	60.00	16.00	30.00	106.00	
0390-0111000M	LOOSE RIPRAP, CLASS 200	AQ	TON					
	AREA OF RIPRAP ON SLOPES	SF	SF				8601.00	SHEET 14
	ADJUSTED AREA OF RIPRAP HORIZONTAL TO SLOPE	FACTOR:1.2	SF				10321.20	
	AREA OF RIPRAP NOT ON SLOPE	SF	SF				60.00	
	TOTAL AREA OF RIPRAP IN SQ YARDS		SY				1153.47	
	DEPTH OF RIPRAP		FT				1.00	
	TOTAL VOLUME OF RIPRAP IN CUBIC YARDS		CY				384.49	
	TOTAL VOLUME OF RIPRAP IN TONS	FACTOR: 1.4	TONS				538.28	
0390-0114000M	LOOSE RIPRAP, CLASS 700	AQ	TON					
	AREA OF RIPRAP ON SLOPES	SF	SF				16323.00	SHEET 14
	ADJUSTED AREA OF RIPRAP HORIZONTAL TO SLOPE	FACTOR:1.2	SF				19587.60	
	AREA OF RIPRAP NOT ON SLOPE	SF	SF				0.00	
	TOTAL AREA OF RIPRAP IN SQ YARDS		SY				2176.40	
	DEPTH OF RIPRAP		FT				2.00	
	TOTAL VOLUME OF RIPRAP IN CUBIC YARDS		CY				1450.93	
	TOTAL VOLUME OF RIPRAP IN TONS	FACTOR: 1.4	TONS				2031.31	
0510-0100000A	SHORING, CRIBBING AND COFFERDAMS	LSQ	LS					
	Sheet Pile Characteristics							PZ27, Section Modulus=30.2,wt/ sq ft =27 lbs
	Linear feet of cofferdam	lin Ft					118	
	Average depth of Sheet Pile	ft					40	
	Weight per sq/ foot of sheet piles	lbs					27	
	Estimated lbs of Sheet Pile	Tons	tons/ft				127440	Depth =20',wt/ft for three ft= 80 #/ft, wt per foot=26.6 X 20/ 2000= 0.01 tons
	Estimated tons of sheet piles						63.72	
	Estimated cost of piling using rented piling for two months	cost/ton	420.00				\$ 26,762.40	New piling costs approximately \$1600/ton,good used at \$950/ton
	Estimated days to drive sheet piling, install supports and remove in two months	days					\$ 8.00	
	Estimated cost to drive and remove sheet piling	subcontract rate	\$6000/day				\$ 48,000.00	
	Total Estimated cost for sheet piling installed	Tons	each				\$ 74,762.40	1173.30
0510-0101000A	STRUCTURE EXCAVATION	LSQ	LS					
	Quantities of Excavation and Embankment - in place Cubic Yards		Excavation	Embankment				in place quantities
	North Channel	CY	1475.00	1220.00				Sheet 17
	Middle Channel	CY	3100.00					Sheet 17
	East Channel	CY	2570.00					Sheet 18
	Approach Road , side roads, removal of tidegates, Embankment East Channel		14040.00	8300.00				Excavation Work Sheets - 3 pages
	Channel Excavation Tidegate side	CY	2180.00					Excavation Work Sheets - 3 pages
	Subtotal	CY	23365.00	9520.00				INPLACE QUANTITIES
0510-0108000K(01)	PLACE GRANULAR STRUCTURE BACKFILL-OWNER FURNISHED	DQ	CUYD					SIDES OF STRUCTURES AND BEHIND WINGWALLS
	Granular material 3 feet from Culvert walls	length	ft	50.00	50.00	50.00		
		width	ft	3.00	3.00	3.00		
		height	ft	11.00	11.00	11.00	33.00	
		number	sides	2.00	2.00	2.00	6.00	
		Cubic Yards	Culvert	122.22	122.22	122.22	366.67	
	Granular Backfill behind wingwalls							
	length of wingwalls	ft	ft	35.00	48	48		
	Average height of wingwalls	ft		12.00	12	12		
	Width of granular fill			8.00	8	8		
	Cubic Yards- wingwalls	Subtotal	122.22	124.44	170.67	170.67	465.78	
	Total Cubic yards Granular Backfill	Cy		246.67	292.89	292.89	832.44	
0510-0108000K(02)	PLACE DRAIN ROCK SUPPLIED BY OWNER	DQ	CUYD					Drain Rock for "18 " x 24" drainrock wrapped in fabric"
	LENGTH OF WRAPPED DRAIN		FT	60.00	16.00	30.00		
	AREA OF WRAPPED DRAIN		SF	3.00	3.00	3.00		
	ADJUSTMENT FOR LOSS AND FABRICATION	FACTOR	1.25	1.25	1.25	1.25		
	VOLUME OF WRAPPED DRAIN IN CUBIC FT	Cubic Ft	CF	225.00	60.00	112.50		
	VOLUME OF WRAPPED DRAIN IN CUBIC YARDS	Cubic Yards	CY	8.33	2.22	4.17	14.72	
0520-0105000F	FURNISH PZ 22 STEEL SHEET PILES	AQ	Foot					
	Type of Sheet Pile		ft	35.00	48	48		PZ22, Section Modulus=18,wt/ft of width=22#
	Linear feet of sheet pile	lin Ft		190.00	40.00	55.00		See Sheet 16 of plans
	Average depth of Sheet Pile	ft		25.00	25.00	25.00	25.00	
	width of sheet pile: 22 inches	ft		1.83	1.83	1.83		
	number of sheet pile	Each		103.64	21.82	30.00	156.00	

China Camp Tidegate System - Quantity Summary Sheet - Revision 13 May 2016								Page 22 and 23
Pay Item	Bid Item			middle channel	North Canal -Unit Three	East Canal -Unit One	PROJECT TOTALS	NOTES
	Furnished Piles	lin Ft					3900.00	
	Weight per foot of sheet piles	lbs		22	22	22		
	Estimated lbs of Sheet Pile	Tons	tons/ft	104500	22000	30250	126500.00	Depth =20',wt/ft for three ft= 80 #/ft, wt per foot=26.6 X 20/ 2000= 0.01 tons
	Estimated tons of sheet piles			52.25	11	15.125	63.25	
	Estimated cost of piling using used piling	cost/ton	950.00				\$ 60,087.50	New piling costs approximately \$1600/ton,good used at \$950/ton
	Estimated days to drive sheet piling	days					3.00	
	Estimated cost to drive sheet piling	subcontract rate	6000.00				\$ 18,000.00	
	Total Estimated cost for sheet piling installed	Tons	each	\$ -	\$ -	\$ -	\$ 78,087.50	\$1,234.58
0540-0312000K	GENERAL STRUCTURAL CONCRETE, CLASS 4000	DQ	CUYD					
	Floor of Culverts structure	area	sq ft	4433.50	2216.75	2216.75	8867.00	
		Depth floor	ft	1.50	1.50	1.50		
			Cubic Yards	246.31	123.15	123.15	492.61	
	splash slab on tide gate side extra width	area	sq ft				330	
		Depth floor	ft				1.50	
		number	each				1	
			Cubic Yards				18.33	
	Roof of Culverts	width	ft	48.00	13.75	24.50	86.25	
		length	ft	50.00	50.00	50.00	50.00	
		depth	ft	1.50	1.50	1.50	1.50	
		Cubic Yards	Cubic Yards	133.33	38.19	68.06	239.58	
	Roof Curb on field side	height	ft	1.00	2.00	1.00		
		length	ft	48.00	13.75	24.50		
		depth	ft	1.00	1.00	1.00		
		Cubic Yards	Cubic Yards	1.78	1.02	0.91	3.70	
	Longitudinal Walls of Culvert	height	ft	10.00	10.00	10.00		
		length	ft	50.00	50.00	50.00		
		depth	ft	1.50	1.50	1.50		
		number	each	5.00	2.00	3.00		
		Cubic Yards	Cubic Yards	138.89	55.56	83.33	277.78	
	Front face walls Culvert							
		width of wall	ft	59.50	16.75	29.00		
		height of wall	ft	17.50	17.50	17.50		
		width of openings	ft	9.75	9.75	9.75		
		height of openings	ft	7.75	7.75	7.75		
		number of openings	ft	4.00	1.00	2.00		
		Area of wall	ft	1041.25	293.13	507.50		
		area of openings	ft	302.25	75.56	151.13		
		Area of wall less openings	ft	739.00	217.56	356.38		
		thickness of wall	ft	1.00	1.00	1.00		
		Cubic Yards	Cubic Yards	27.37	8.06	13.20	48.63	
	wing walls- Tide gate Side	Ave Height	ft	0.00	11.50	11.50		
		total lengths	ft	0.00	12.00	16.00		
		thickness	ft	0.00	1.00	1.00		
		number	each	0.00	1.00	1.00		
		Cubic Yards	Cubic Yards	0.00	5.11	6.81	11.93	
	Wing walls -field side	Ave Height	ft	11.75	12.50	11.75		See Details sheet 19
		total lengths	ft	35.00	32.00	30.00		
		thickness	ft	1.00	1.00	1.00		
		number	each	1.00	1.00	1.00		
		Cubic Yards	Cubic Yards	15.23	14.81	13.06	43.10	
	Sidewalls above roof	height	ft	0.00	7.50	7.50		
		length	ft	0.00	12.50	12.50		
		thickness	ft	0.00	1.50	1.50		
		Cubic Yards	Cubic Yards	0.00	5.21	5.21	10.42	
	Subtotal Structural Concrete	Cubic Yards	Cubic Yards				1146.08	
0641-0117000K	1-1/2 INCH - PLACE PIT RUN SHALE ROCK SURFACING- SUPPLIED BY OWNER	DQ	CUYD					
	Farm Access road over tide gate structures							
		length	ft				325.00	length 1+00 to 4+25
		width	ft				17.00	18.00
		depth	ft				0.50	
		number	sides				1.00	
		Cubic Yards	CY				102.31	
		Tons	factor 1.4				143.24	
	Side roads to fields							
		length	ft				260.00	
		Ave width	ft				17.00	
		depth	ft				0.50	
		number					1.00	
		Cubic Yards	CY				81.85	
		Tons	factor 1.4				114.59	
	Subtotal Aggregate for farm road surfacing	Cubic Yards					184.17	
		Tons	factor 1.4				257.83	
0641-0123000K	3 INCH - 0 PLACE AGGREGATE BASE- OWNER SUPPLIED	CUYD						
		area	sq ft				10828.00	
		Depth	ft				3.00	
		volume	Cubic Yards				1203.11	In place quantities
		Tons	factor 1.4				1684.36	