UCT THE UNDERGROUND UTILITIES EVENT
Underground Construction Technology | Jan. 29-31, 2019 | Fort Worth, TX

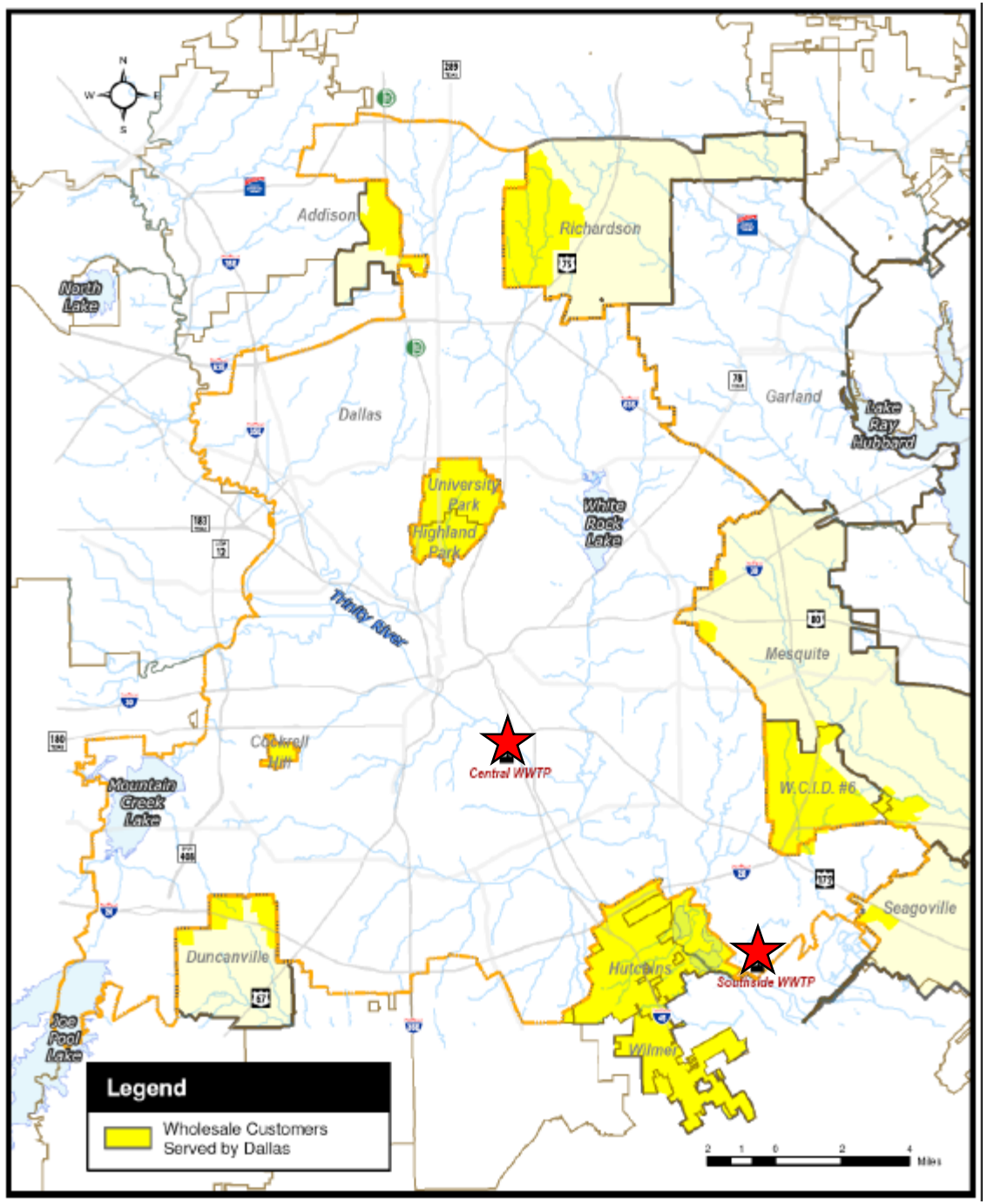
Sliplining 120-Inch RCP Wastewater in Dallas

Track I-D Sewer Construction and Rehabilitation

Speakers: Marty S. Paris, P.E.
Ashlyn Morgan, P.E.

dallas water utilities
city of dallas

Kimley»Horn



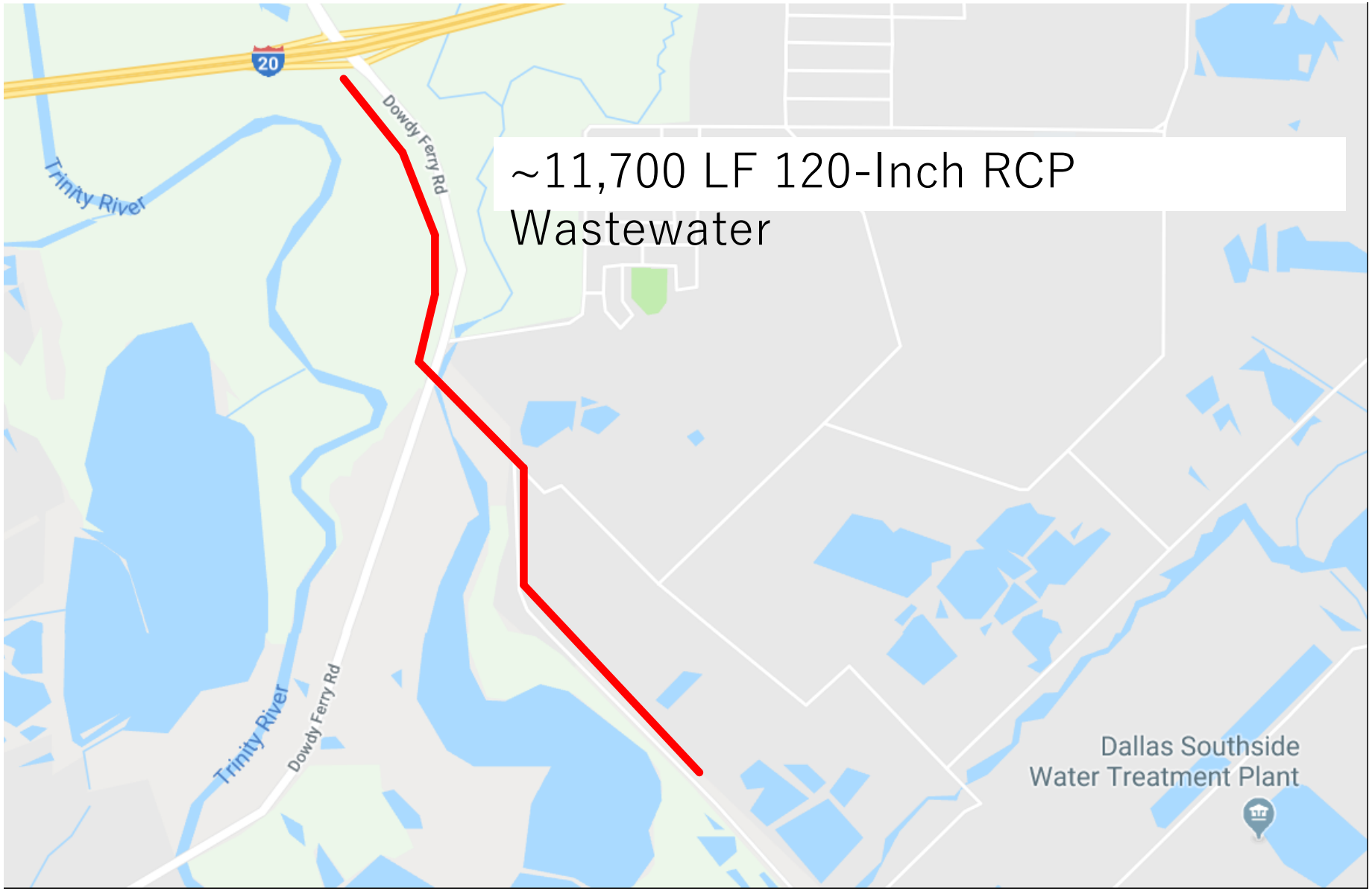
Dallas Water Utilities

- 2 Wastewater Treatment Plants
- 280 MGD WW Treatment Capacity
- 1.2 Million (population served)
- 4,000 miles of wastewater pipe
- 6”to 144”Diameters

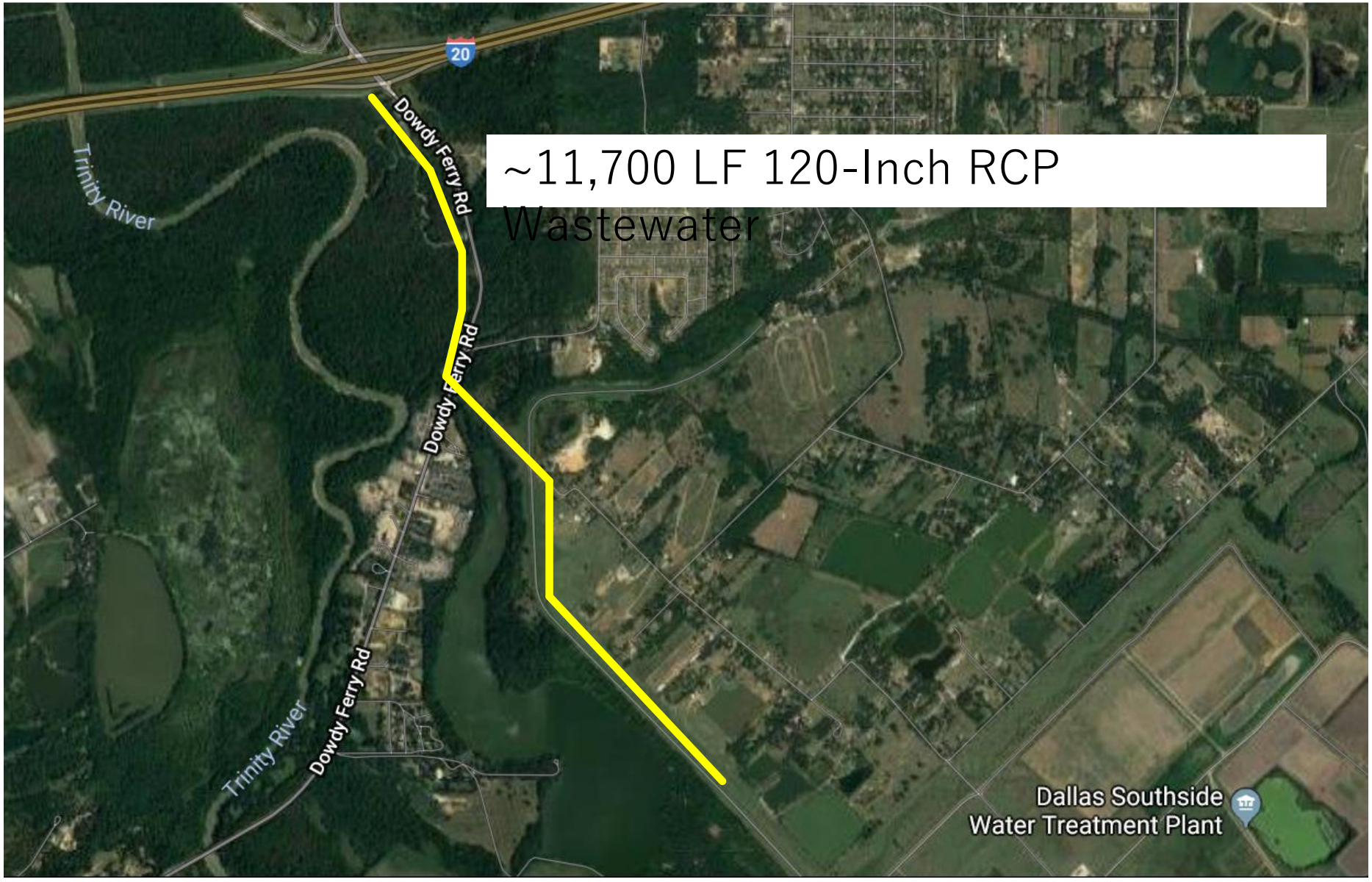
PROJECT HISTORY

- 72”RCP Main Constructed in 1966
- 120”RCP Main Constructed in 1989
- Heavy Rains in December 2015
- Sinkholes over the 120”Main
- External Point Repairs at Joints
- Multi-Sensor Inspection in 2016

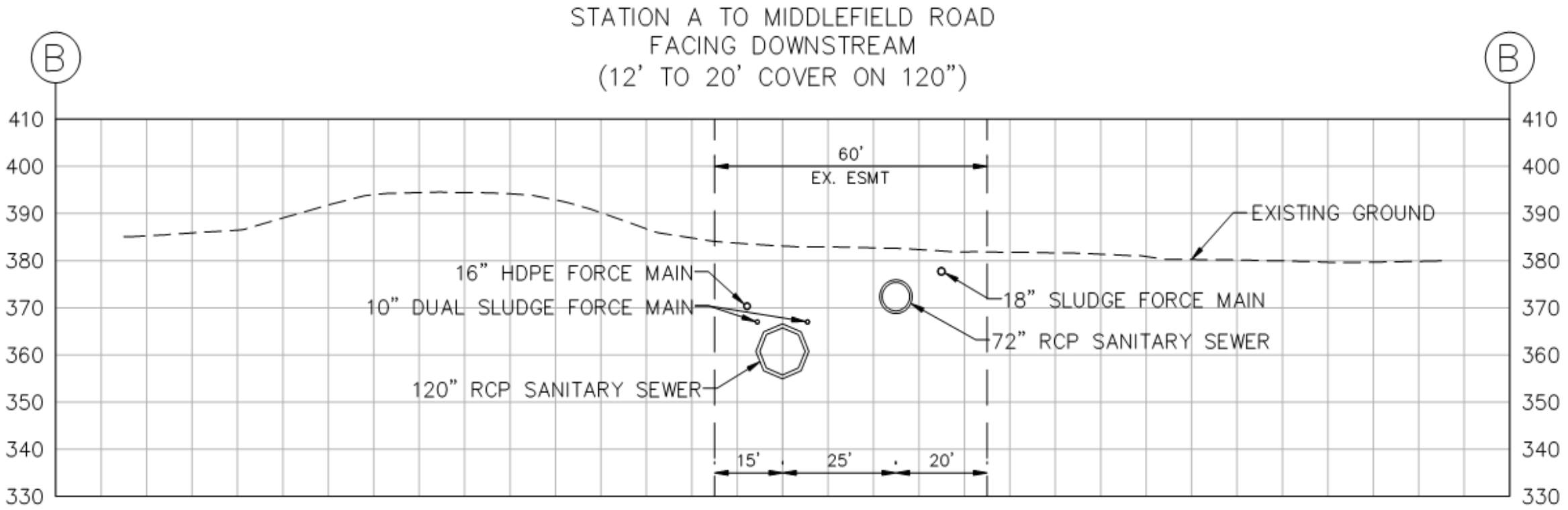
PROJECT LOCATION



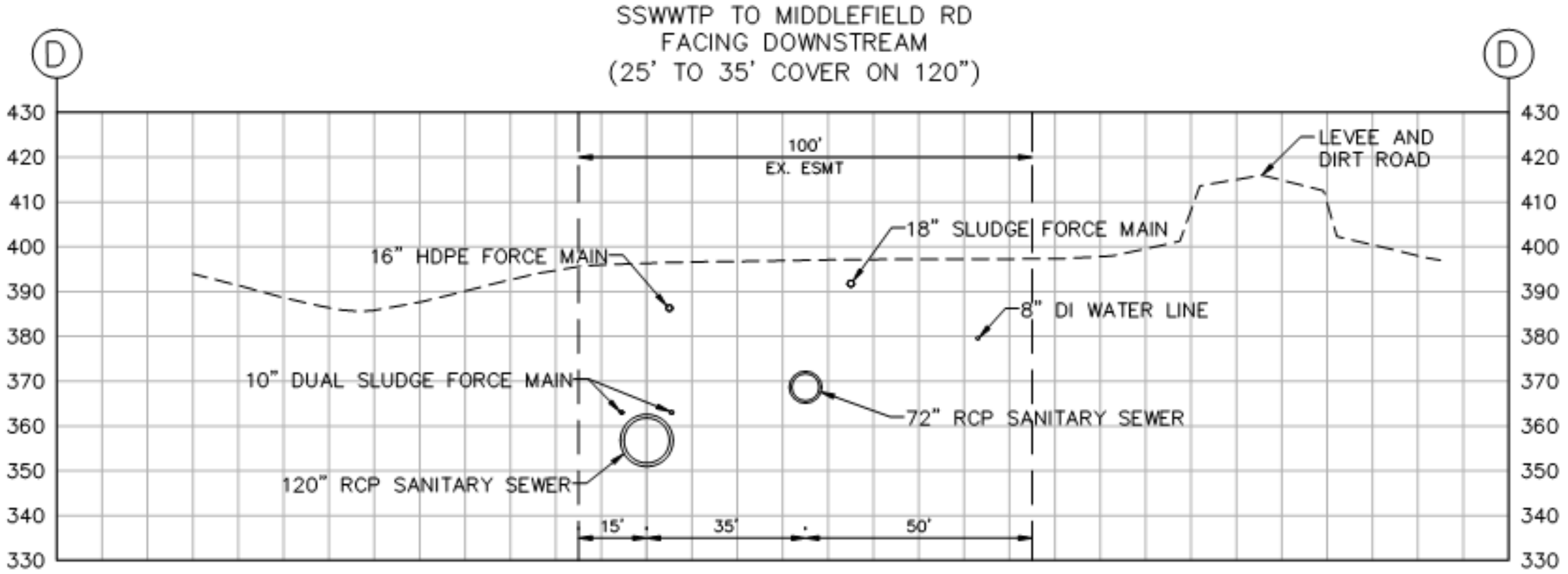
PROJECT LOCATION



UPSTREAM CROSS SECTION



DOWNSTREAM CROSS SECTION



CONDITION ASSESSMENT

Multi-Sensor Lidar/Sonar/CCTV Inspection

- **January 2016 (Upstream Section)**
- **December 2016 (Downstream Section)**
- **Corrosion**
- **Debris**
- **Missing Gaskets and Infiltration**

Start MH	End MH	Minimum Corrosion (in.)	Maximum Corrosion (in.)	Minimum Debris (in.)	Maximum Debris (in.)
14000000200M	14000000190M	2.5	8.4	8.1	21.8
14000000190M	14000000180M	1.9	5.8	0.5	18.9
14000000180M	14000000170M	0.8	5.3	0.5	19
14000000170M	14000000160M	2.3	6.8	0.3	9.7
14000000160M	14000000150M	2	4	0.6	12.2
14000000150M	14000000140M	1.5	9.5	2.8	7.2
14000000140M	14000000130M	1.2	3.1	0.5	6.6
14000000130M	14000000120M	1.6	4	0.5	16.4
14000000120M	14000000110M	0.8	3.8	0.7	13
14000000110M	14000000100M	0.5	0.9	0.6	9.1
14000000100M	14000000090M	0.5	1.1	0.5	6.4
14000000090M	14000000080M	0.5	0.5	0.6	3.7
14000000080M	14000000070M	0.3	1.1	1.7	3
14000000070M	14000000060M	1.7	1.7	3.5	10
14000000060M	14000000050M	0.6	0.7	8.8	8.8
14000000050M	14000000040M	0.5	0.9	10.2	10.2
14000000040M	14000000030M	0.5	1.2	0.8	10.5
14000000030M	14000000020M	0.5	1.1	1.6	7.5
14000000020M	14000000010M	0.5	0.9	0.7	3.8

REHABILITATION ALTERNATIVES

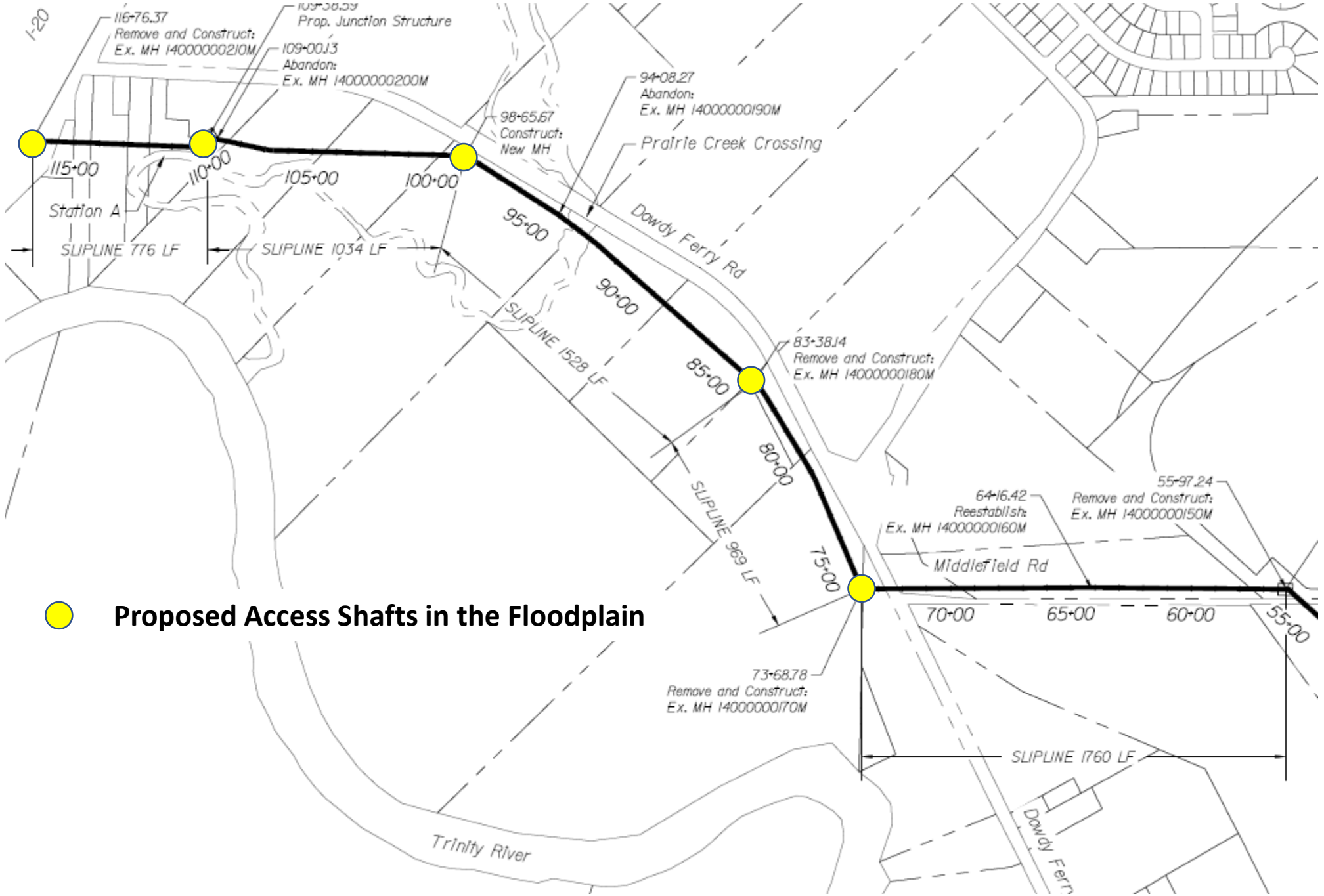
- Sliplining
- Cured-in-Place
- Spiral Wind PVC/HDPE
- Spray Line with Geopolymer or Epoxy
- Open Cut Replacement

RECOMMENDED ALTERNATIVES

- Slipline 120-inch RCP with 110-inch FRP (11,700 LF)
- Point Repairs on 72-inch RCP (15)
- CIPP 42 to 54-inch RCP (860 LF)
- Opinion of Probable Construction Costs = $24.1M

DESIGN CONSIDERATIONS

- Access Shafts in the Floodplain
- Access Manholes
- Bypass Pumping/Flow Diversion
- Grouting Specifications

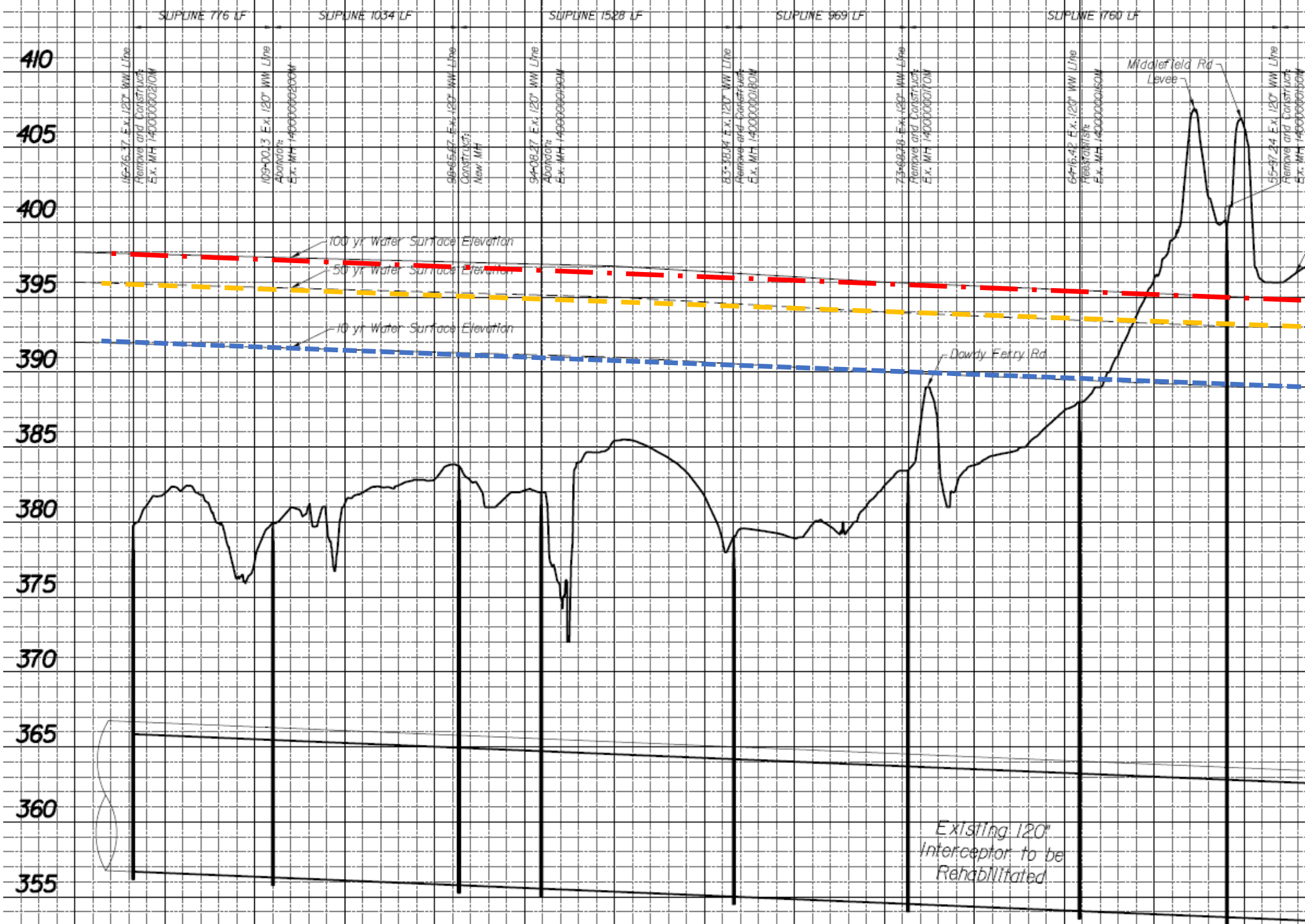


Proposed Access Shafts in the Floodplain

100 year WSE

50 year WSE

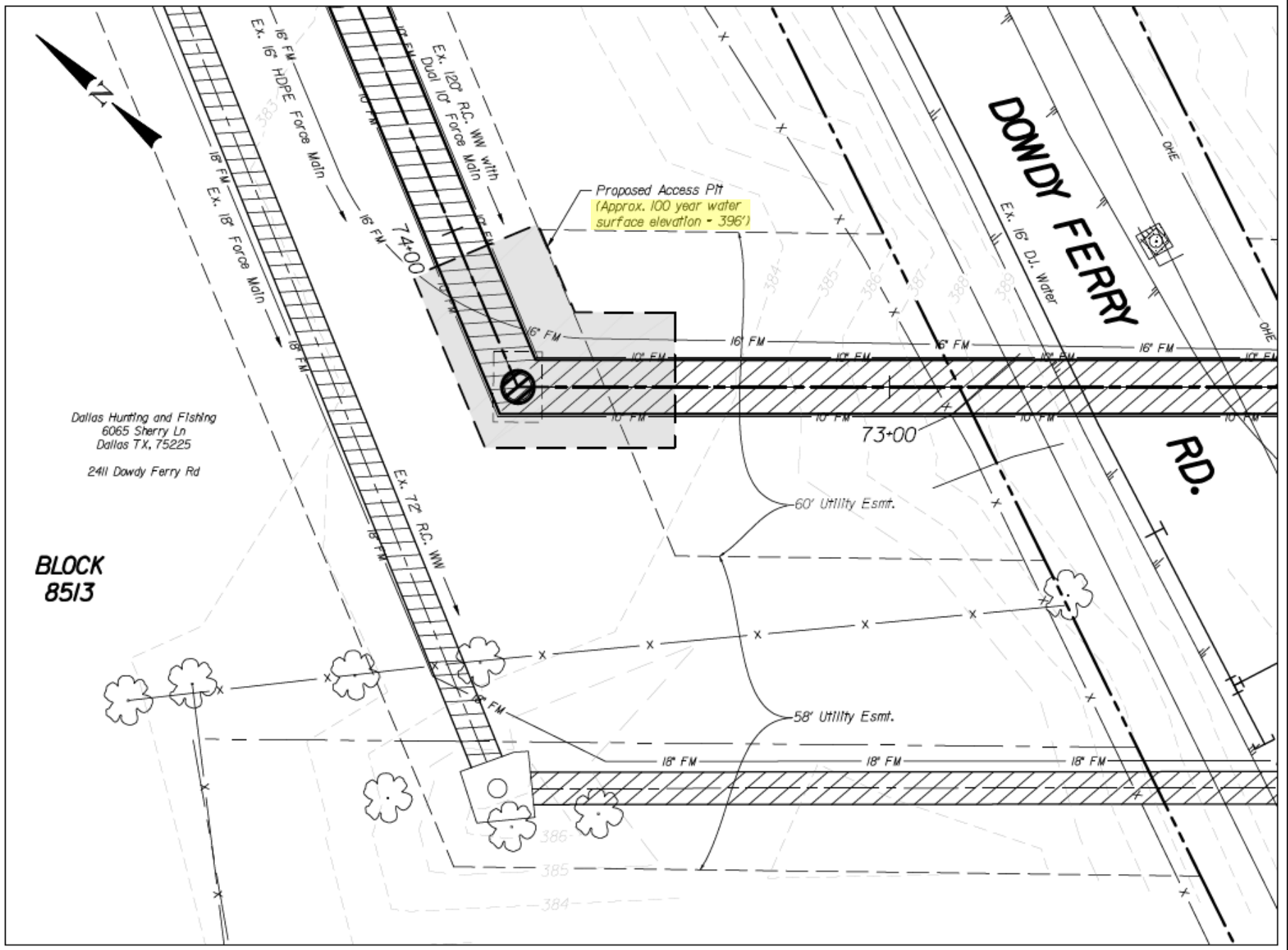
10 year WSE



Design Notes

- **100 year WSE at Shaft**
- **Min. protection 1 ft above 100 year WSE**
- **Submittal required**

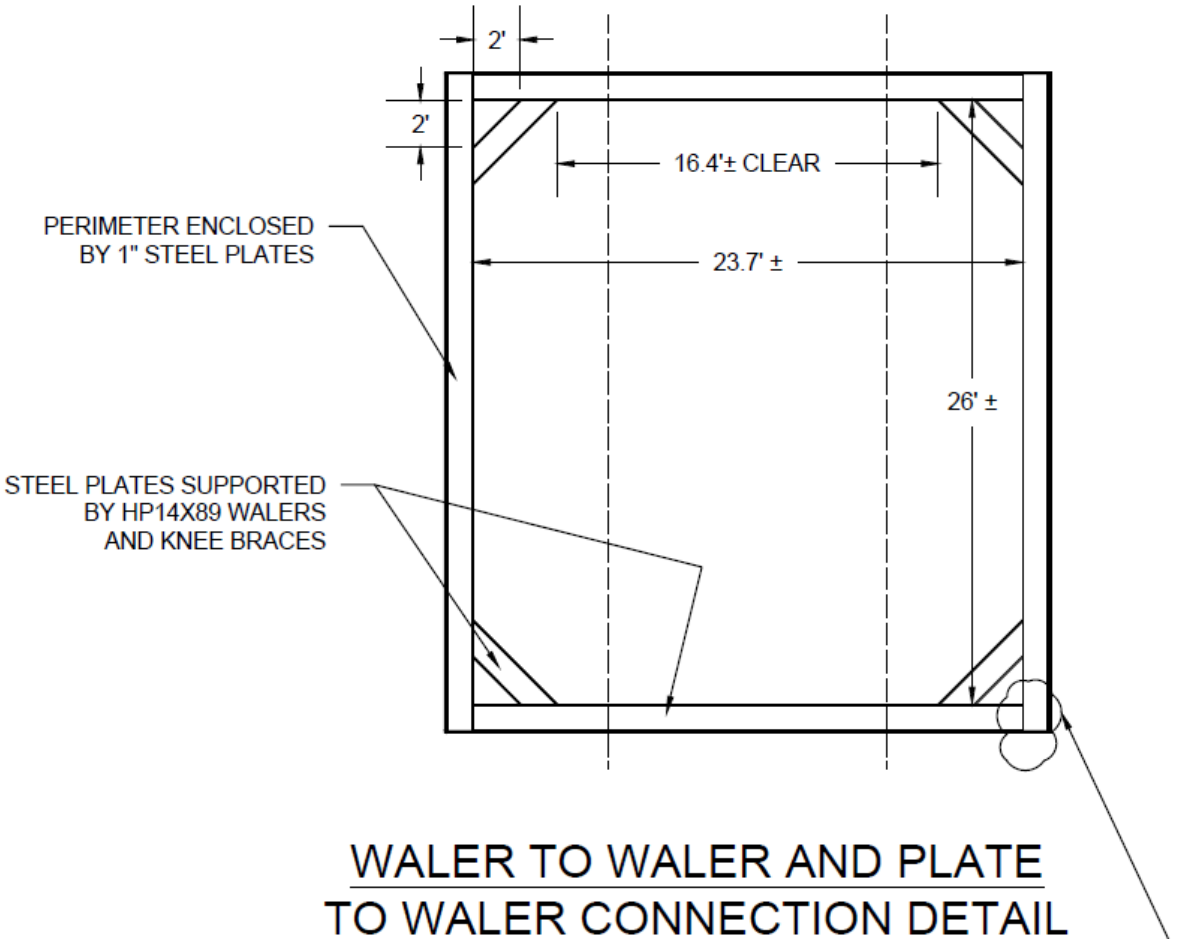
2. The Contractor shall protect all access pits from flooding during the 100 year storm event. Minimum protection shall be one foot above 100 year water surface elevation shown on plans. No separate pay item. The Contractor shall submit a flood protection plan to the Engineer for review prior to construction.



ACCESS PIT DETAIL STA. 73+68.78

PLAN VIEW FLOOD CONTROL OPTION 1 - 21 FT OF HEAD

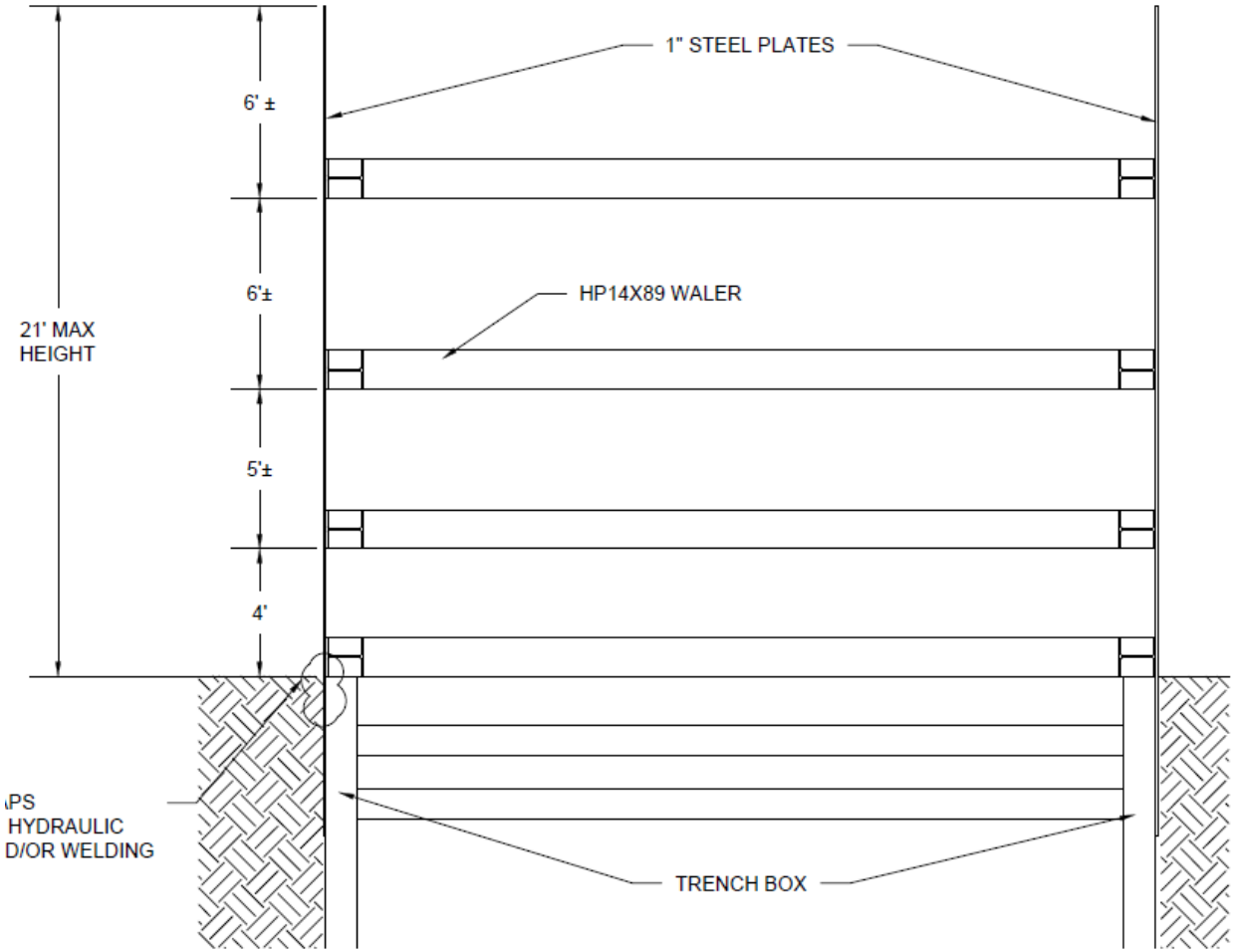
SCALE: 1" = 8'



WALER TO WALER AND PLATE TO WALER CONNECTION DETAIL

PROFILE VIEW SHAFT FLOOD CONTROL OPTION 1 - 21 FT OF HEAD

SCALE: 1" = 5'



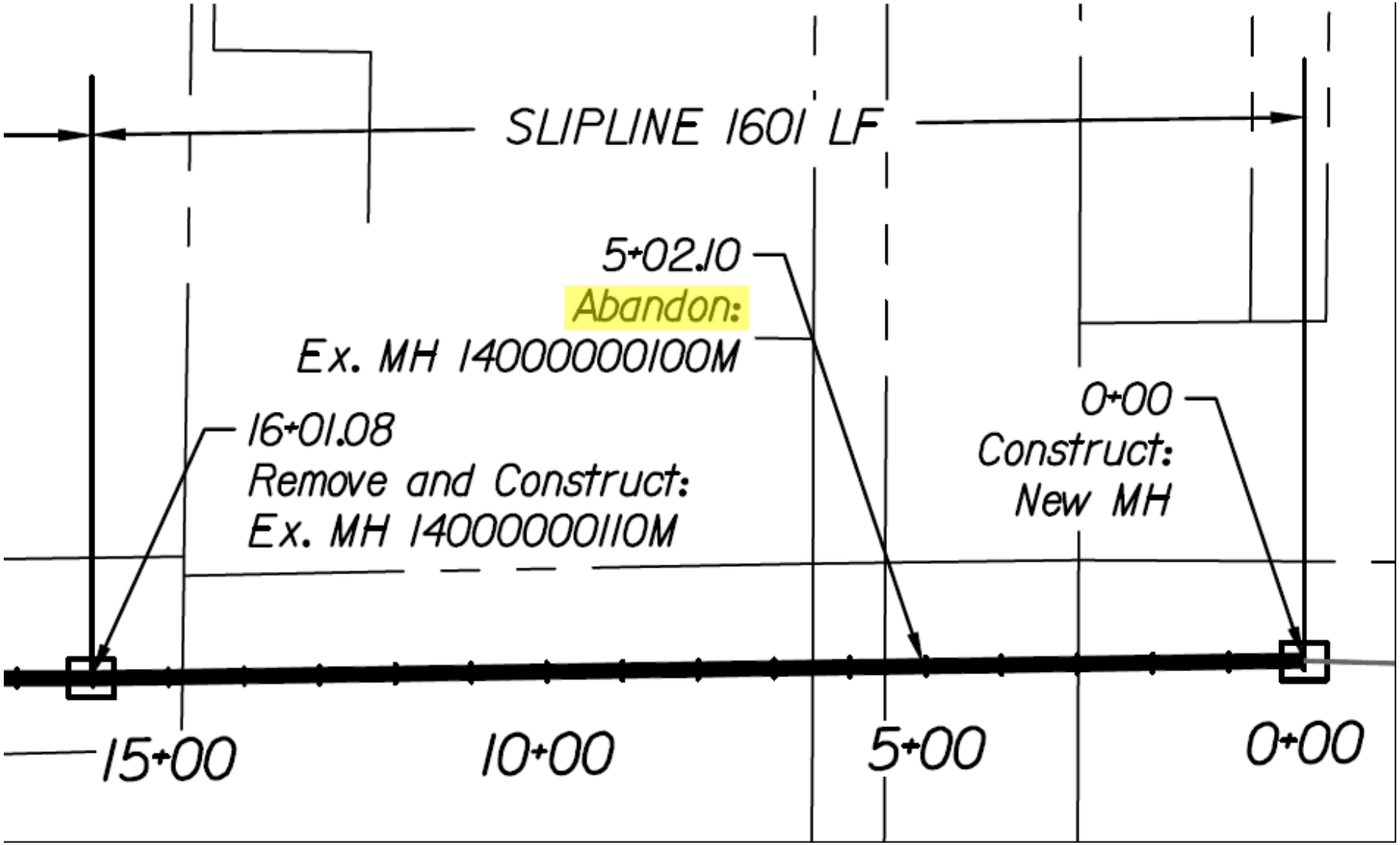
NOTE: FLOOD PROTECTION METHODS SHOWN ON THIS FIGURE ARE APPLICABLE TO ALL SHAFTS SHOWN ON FIGURE 1 AND FIGURE 2.

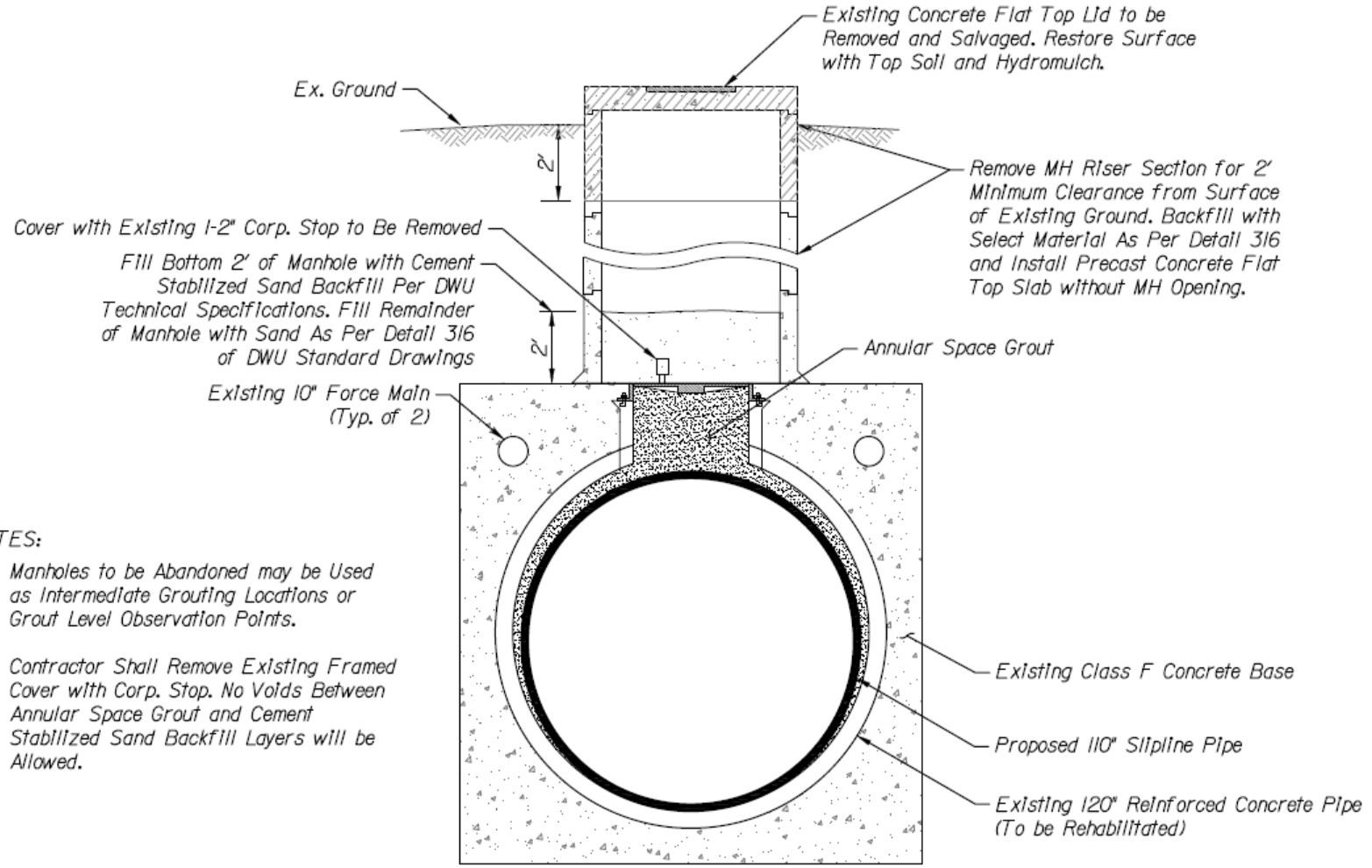
STATE OF TEXAS
FRITZ KLINGLER
115443
LICENSED PROFESSIONAL ENGINEER

10/25/2018

ACCESS MANHOLES

- 2,000 LF Maximum Spacing
- 72-Inch Diameter with 42-Inch Tee Base
- Up to 46 Feet Deep
- Polymer Concrete


SLIPLINE 1601' LF
5+02.10
Abandon:
Ex. MH 14000000100M
16+01.08
Remove and Construct:
Ex. MH 14000000110M
0+00
Construct:
New MH
15+00
10+00
5+00
0+00

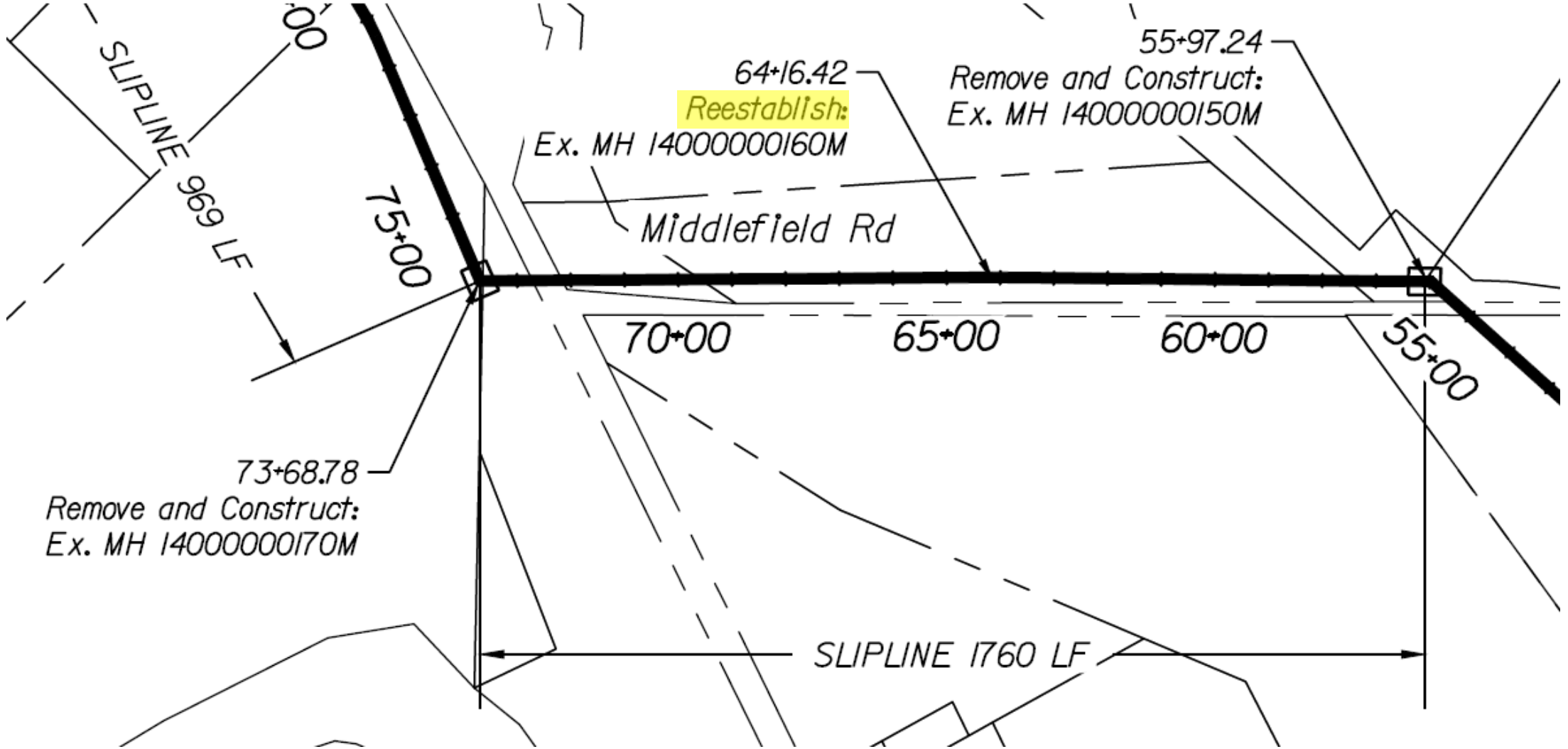


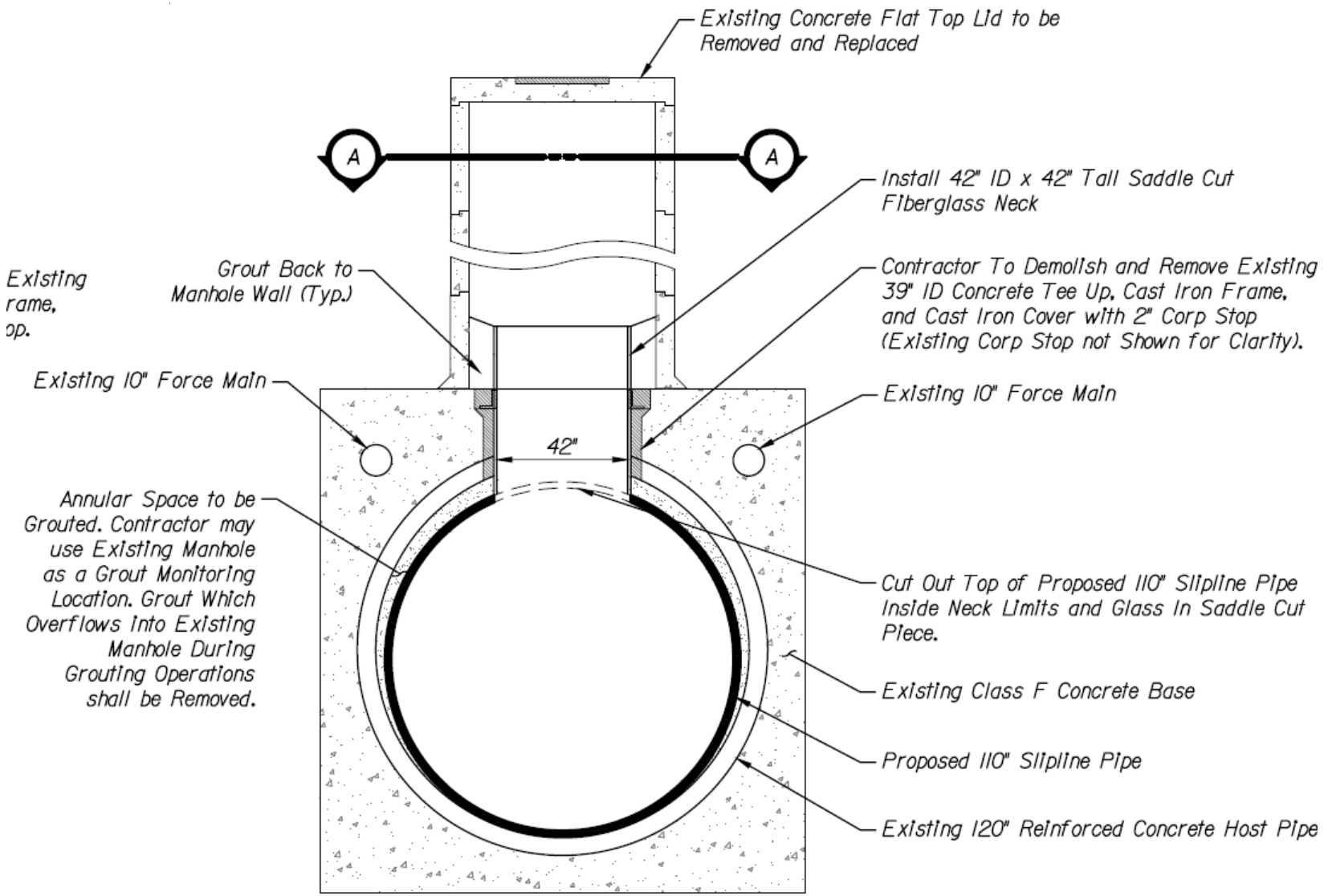
NOTES:

1. Manholes to be Abandoned may be Used as Intermediate Grouting Locations or Grout Level Observation Points.
2. Contractor Shall Remove Existing Framed Cover with Corp. Stop. No Voids Between Annular Space Grout and Cement Stabilized Sand Backfill Layers will be Allowed.

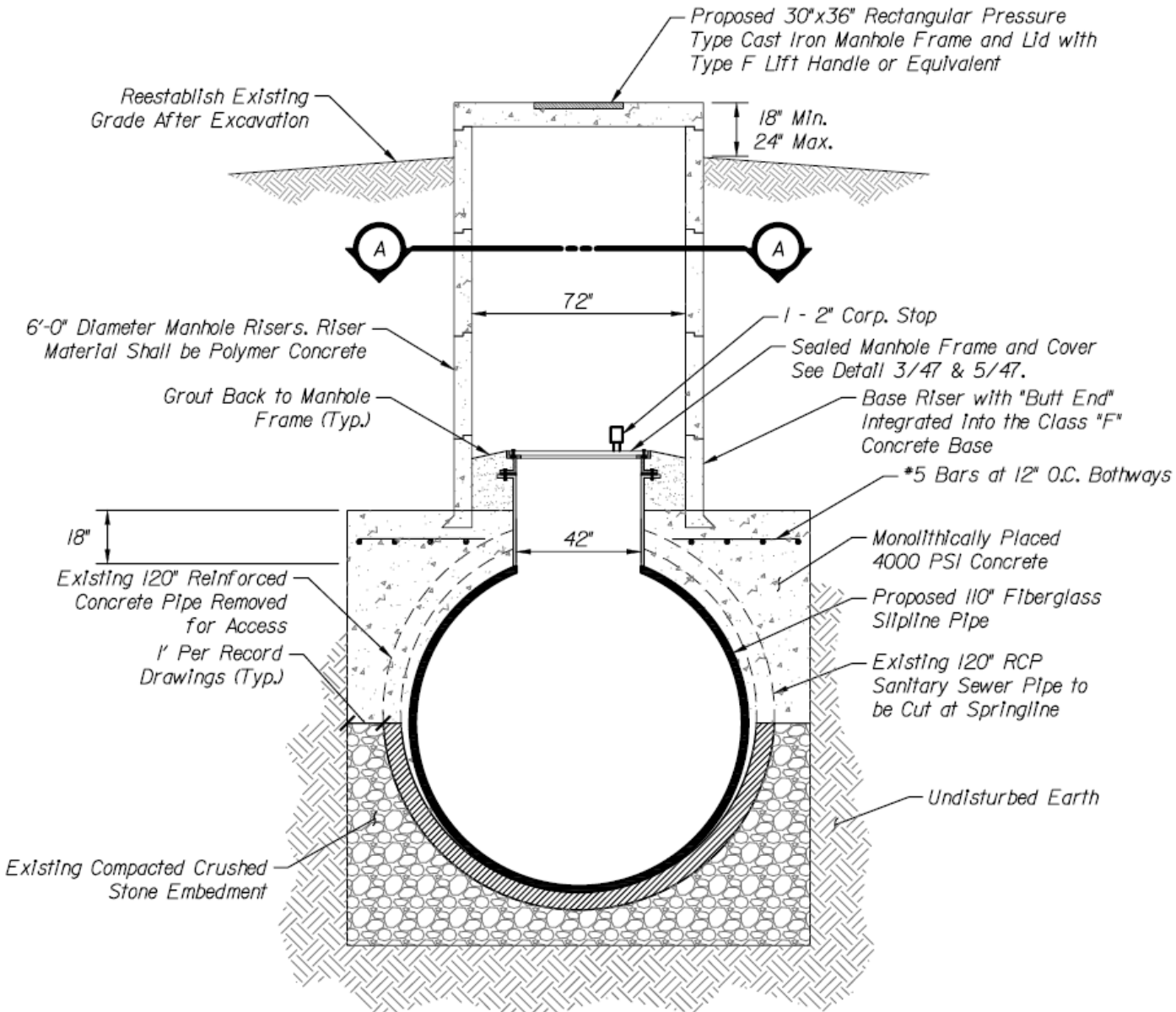
2/48 Abandon Manhole DETAIL

SCALE: 1/4" = 1'-0"


SLIPLINE 969 LF
75+00
64+16.42
Reestablish:
Ex. MH 14000000160M
55+97.24
Remove and Construct:
Ex. MH 14000000150M
Middlefield Rd
70+00
65+00
60+00
55+00
73+68.78
Remove and Construct:
Ex. MH 14000000170M
SLIPLINE 1760 LF

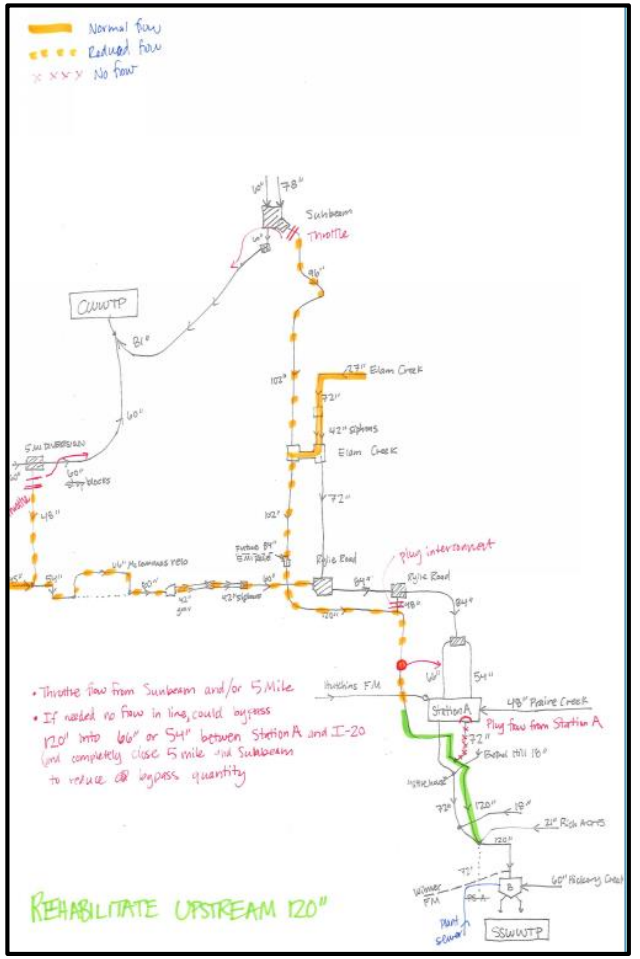


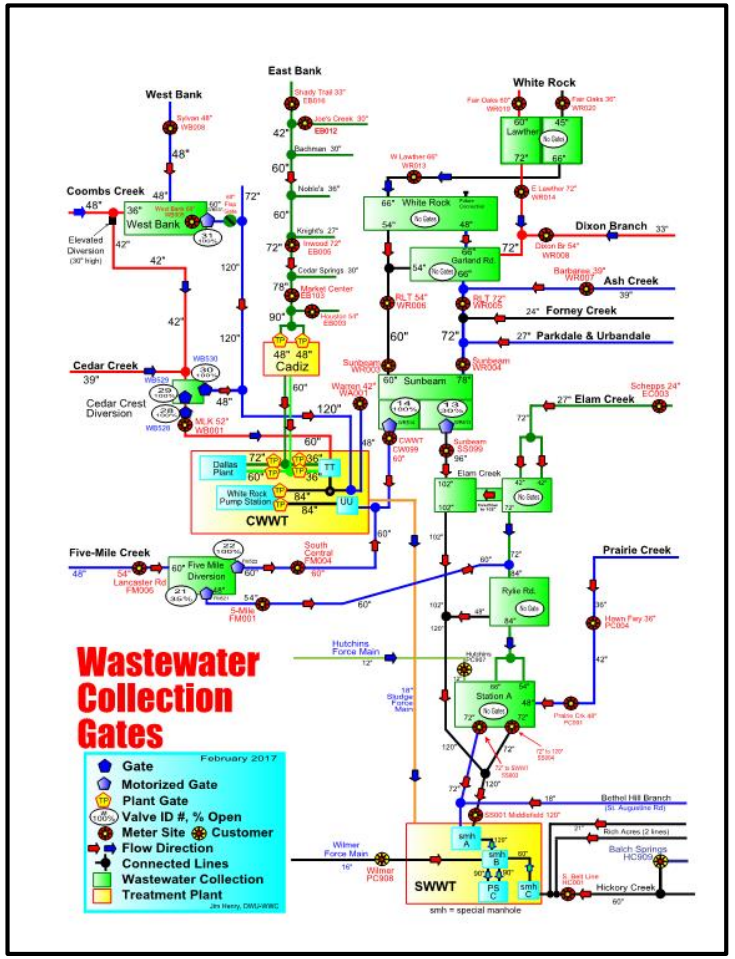
Section View C


Proposed 30"x36" Rectangular Pressure Type Cast Iron Manhole Frame and Lid with Type F Lift Handle or Equivalent
Reestablish Existing Grade After Excavation
18" Min.
24" Max.
A
A
72"
6'-0" Diameter Manhole Risers. Riser Material Shall be Polymer Concrete
1 - 2" Corp. Stop
Sealed Manhole Frame and Cover See Detail 3/47 & 5/47.
Grout Back to Manhole Frame (Typ.)
Base Riser with "Butt End" Integrated Into the Class "F" Concrete Base
#5 Bars at 12" O.C. Bothways
18"
42"
Monolithically Placed 4000 PSI Concrete
Existing 120" Reinforced Concrete Pipe Removed for Access
Proposed 110" Fiberglass Slipline Pipe
1' Per Record Drawings (Typ.)
Existing 120" RCP Sanitary Sewer Pipe to be Cut at Springline
Undisturbed Earth
Existing Compacted Crushed Stone Embedment

BYPASS PUMPING/FLOW DIVERSION

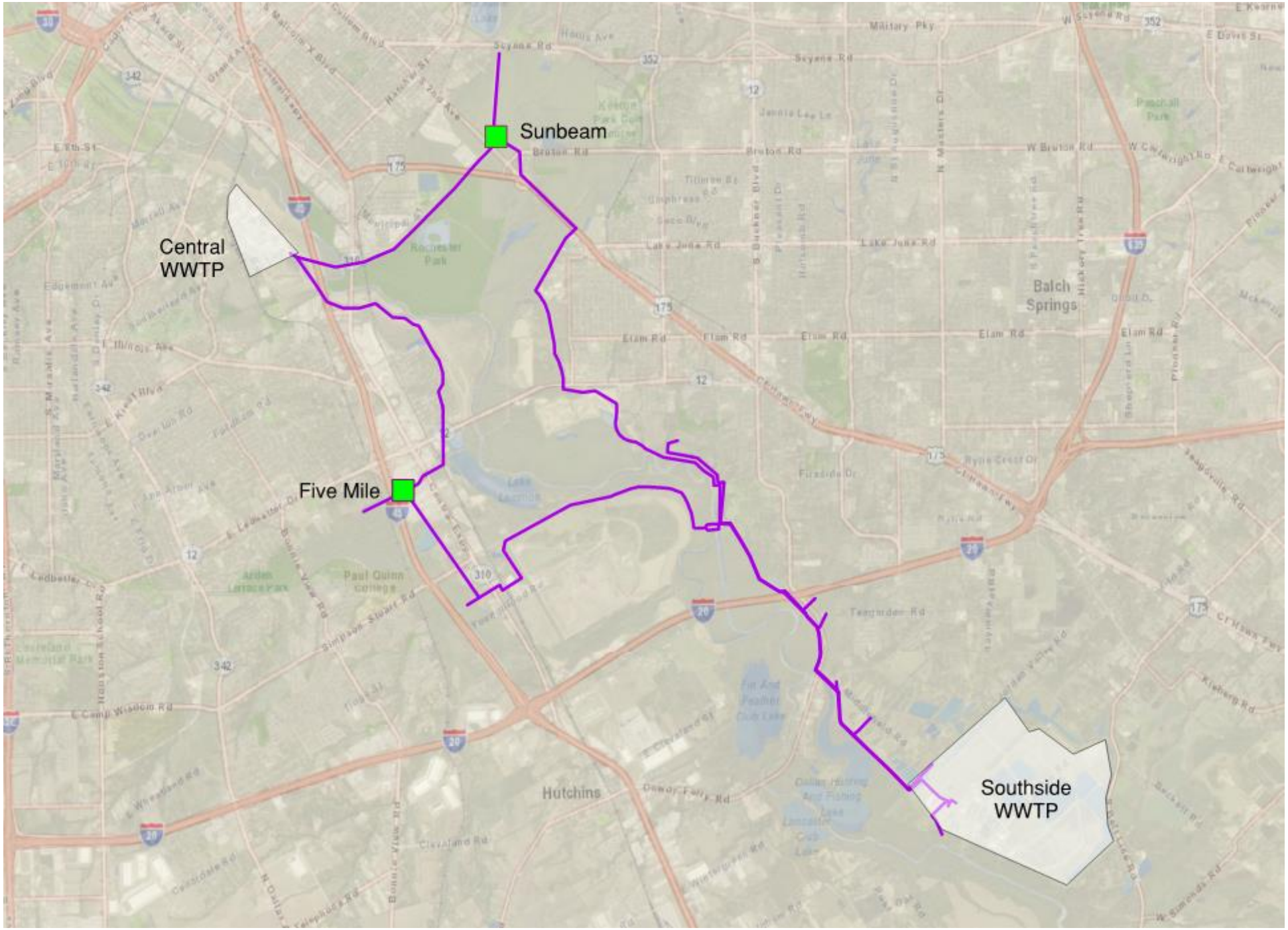
- Required understanding of larger upstream system
- Needed to maintain plant operations while minimizing cost and risk

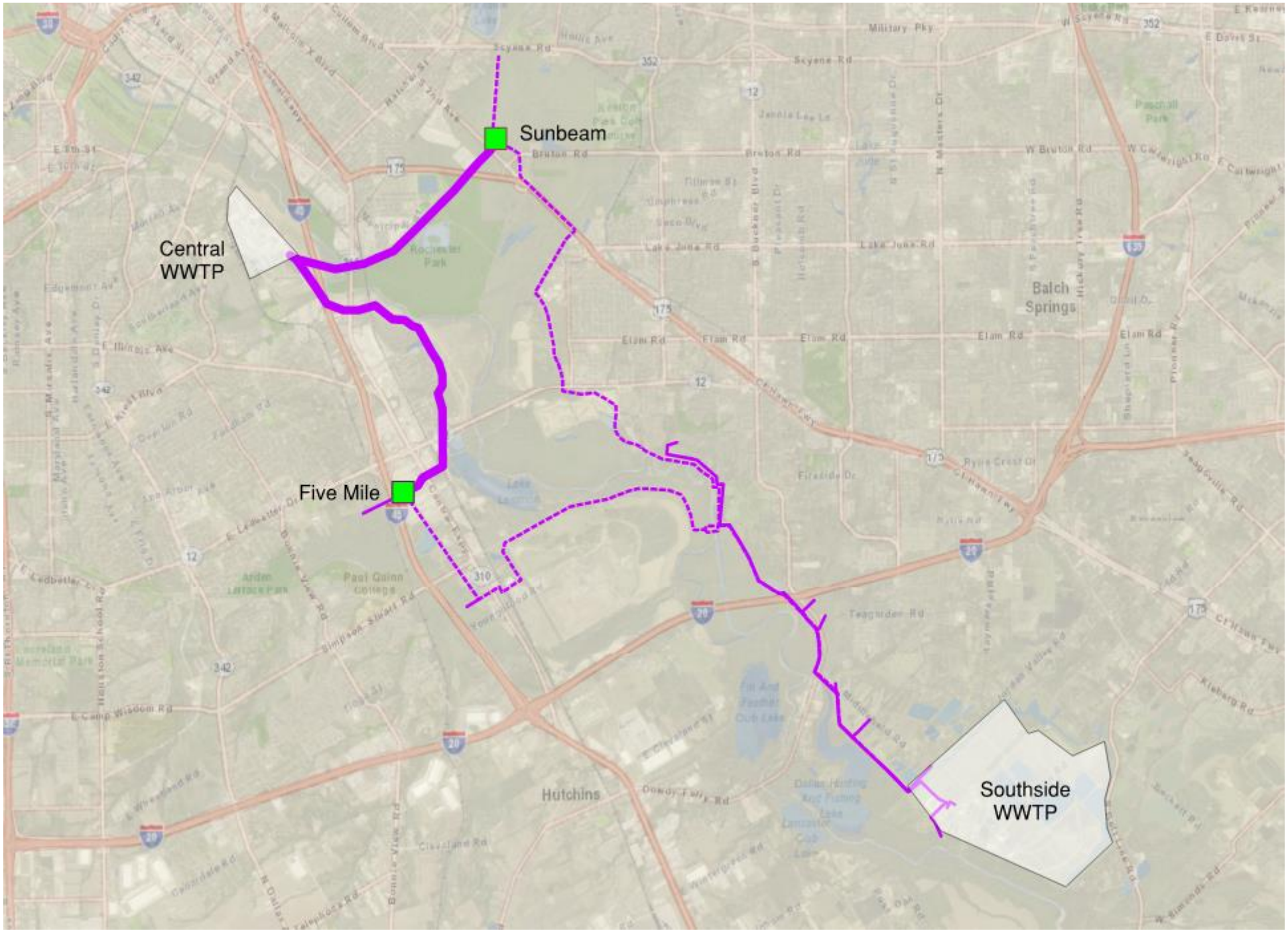


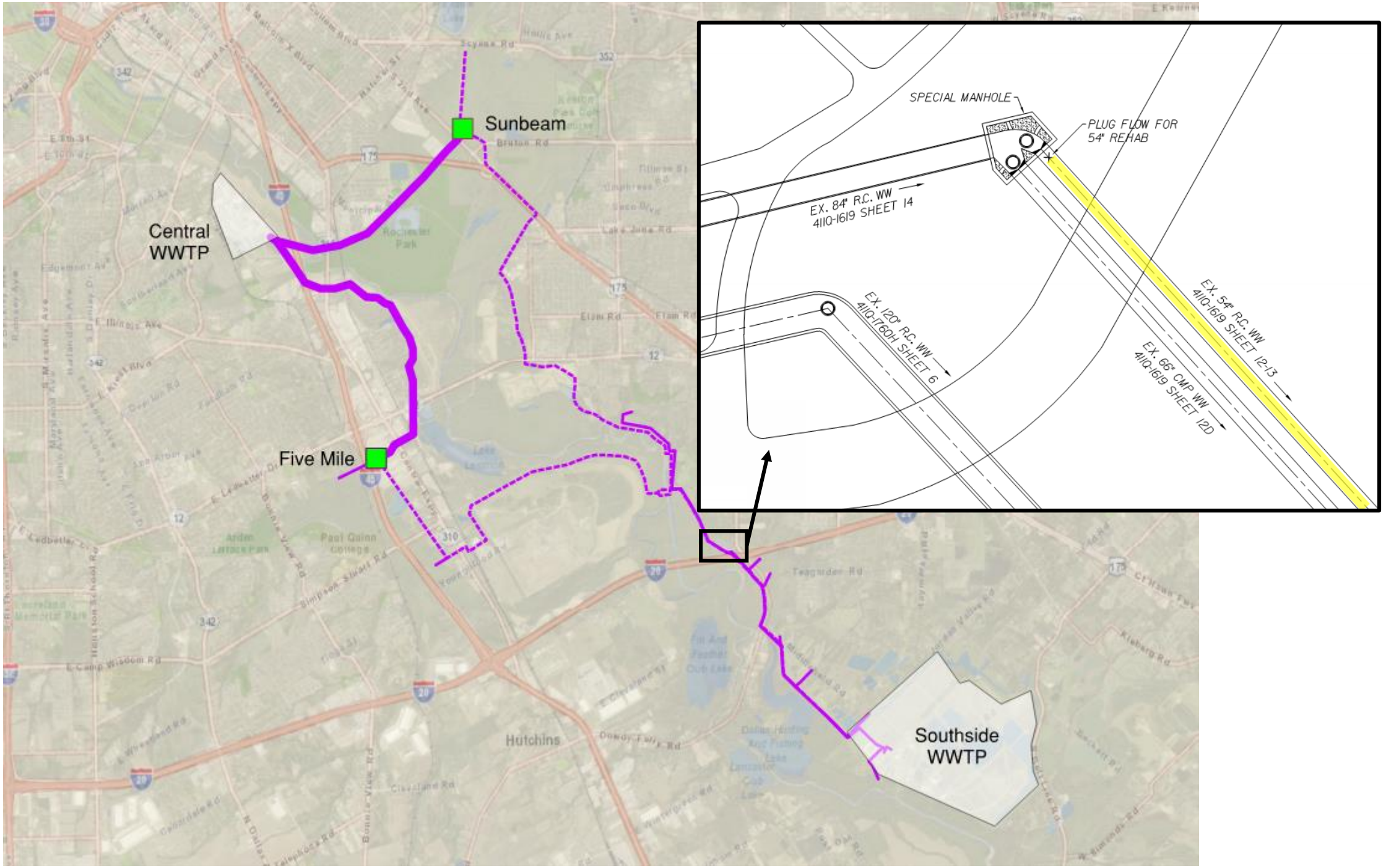


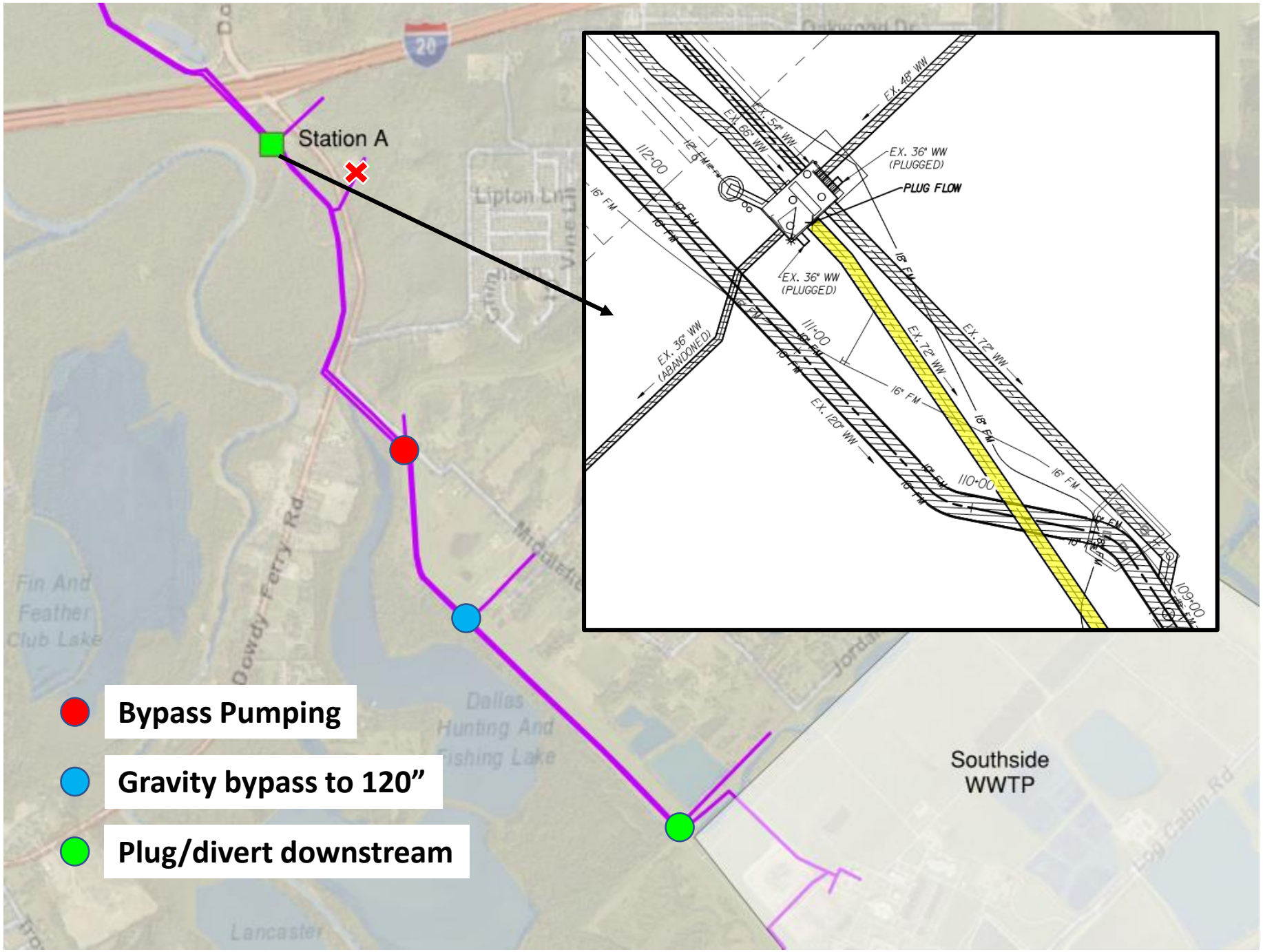
BYPASS PUMPING/FLOW DIVERSION

- Gravity diversion/bypass for:
  - 120-inch slipline
  - 54-inch CIPP
  - 72-inch point repairs and 42-inch CIPP
- Sludge force main relocations and shutdowns


Sunbeam
Central
WWTP
Five Mile
Southside
WWTP
Balch
Springs
Hutchins

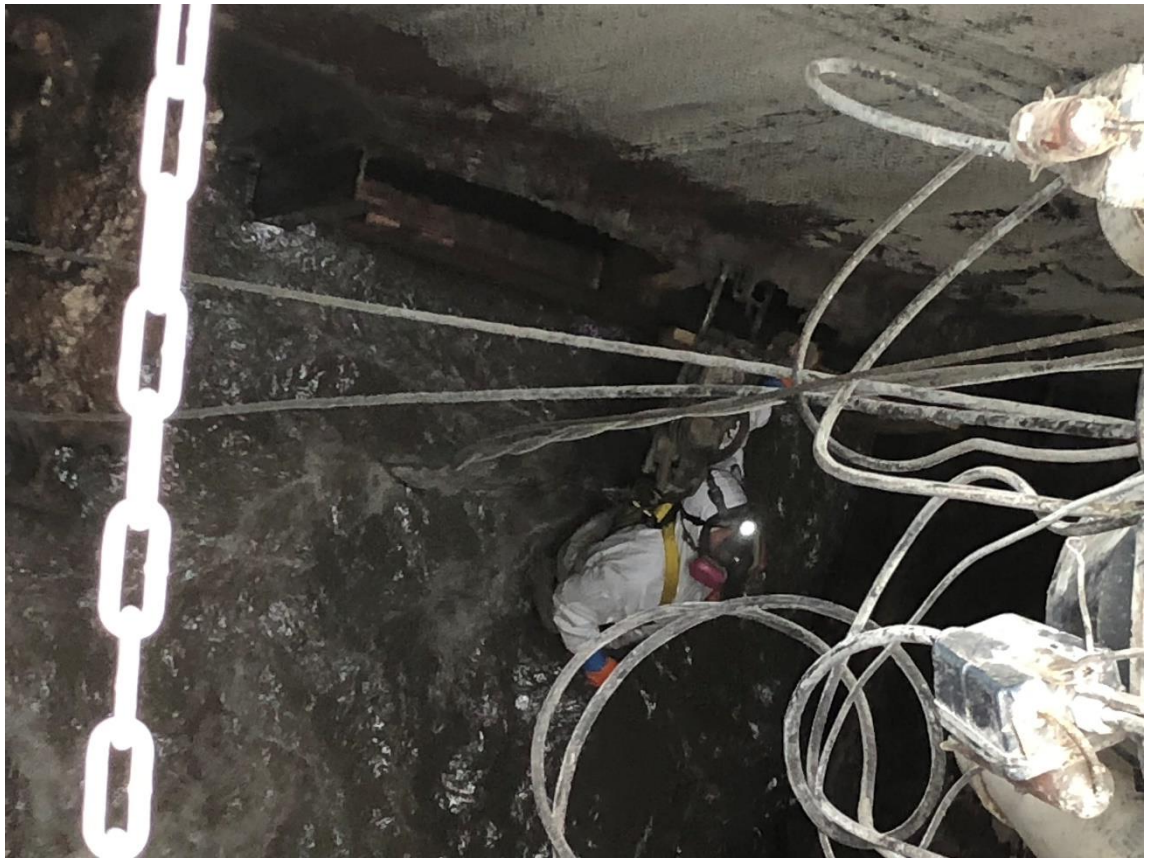

Sunbeam
Central
WWTP
Five Mile
Southside
WWTP
Balch
Springs
Hutchins


Sunbeam
Central WWTP
Five Mile
Southside WWTP
Hutchins
SPECIAL MANHOLE
PLUG FLOW FOR 54" REHAB
EX. 84" R.C. WW 4110-1619 SHEET 14
EX. 120" R.C. WW 4110-1760H SHEET 6
EX. 54" R.C. WW 4110-1619 SHEET 12-13
EX. 66" CMP WW 4110-1619 SHEET 12D


Station A
Bypass Pumping
Gravity bypass to 120”
Plug/divert downstream
Southside
WWTP
Dowdy Ferry Rd
Fin And
Feather
Club Lake
Dallas
Hunting And
Fishing Lake
Lancaster
Lipton Ln
Vine Ln
Oakwood Dr
Low Cabin Rd
20
EX. 48" WW
EX. 54" WW
EX. 66" WW
EX. 36" WW
(PLUGGED)
PLUG FLOW
EX. 36" WW
(PLUGGED)
EX. 36" WW
(ABANDONED)
EX. 72" WW
EX. 120" WW
112+00
111+00
110+00
109+00
16" FM
18" FM
10" FM

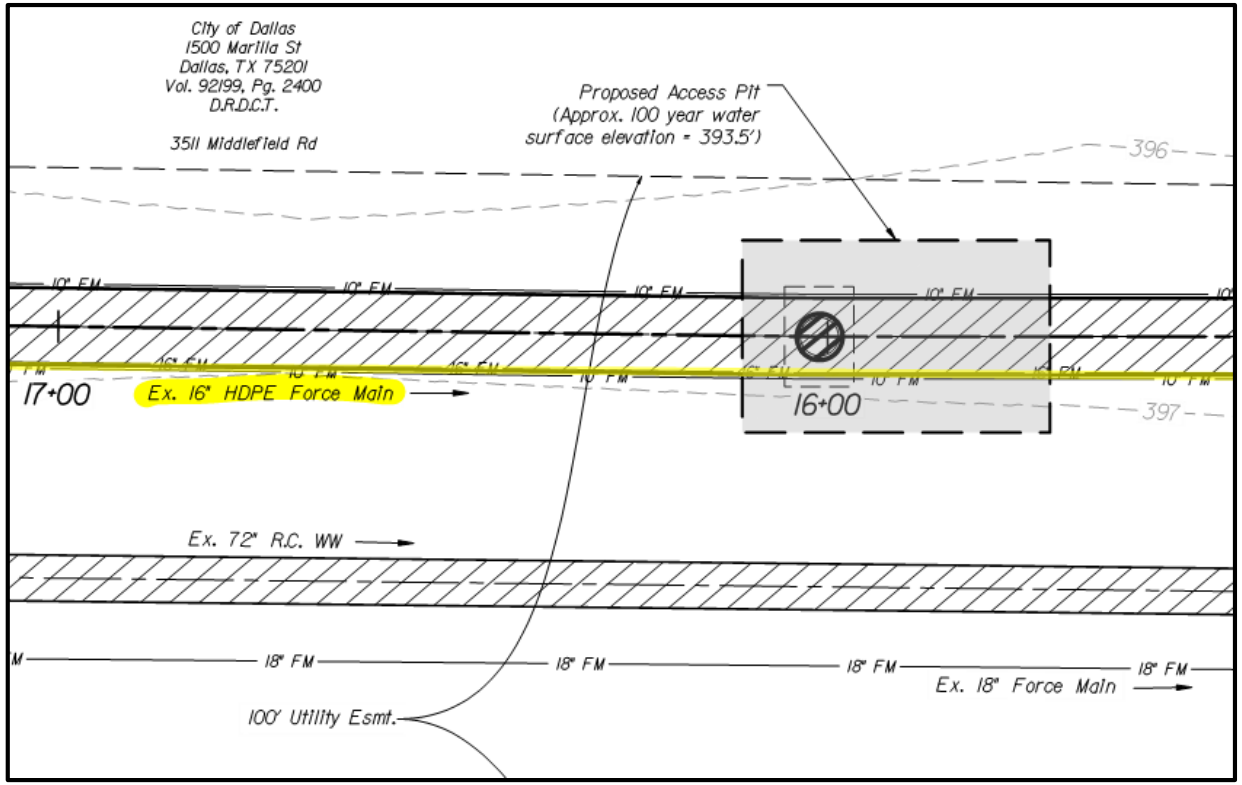
72-inch Diversion

- Bulkhead in Station A



SLUDGE FORCE MAIN SHUTDOWN

- Sole sludge line transporting sludge from Central WWTP for dewatering, drying at Southside WWTP facilities

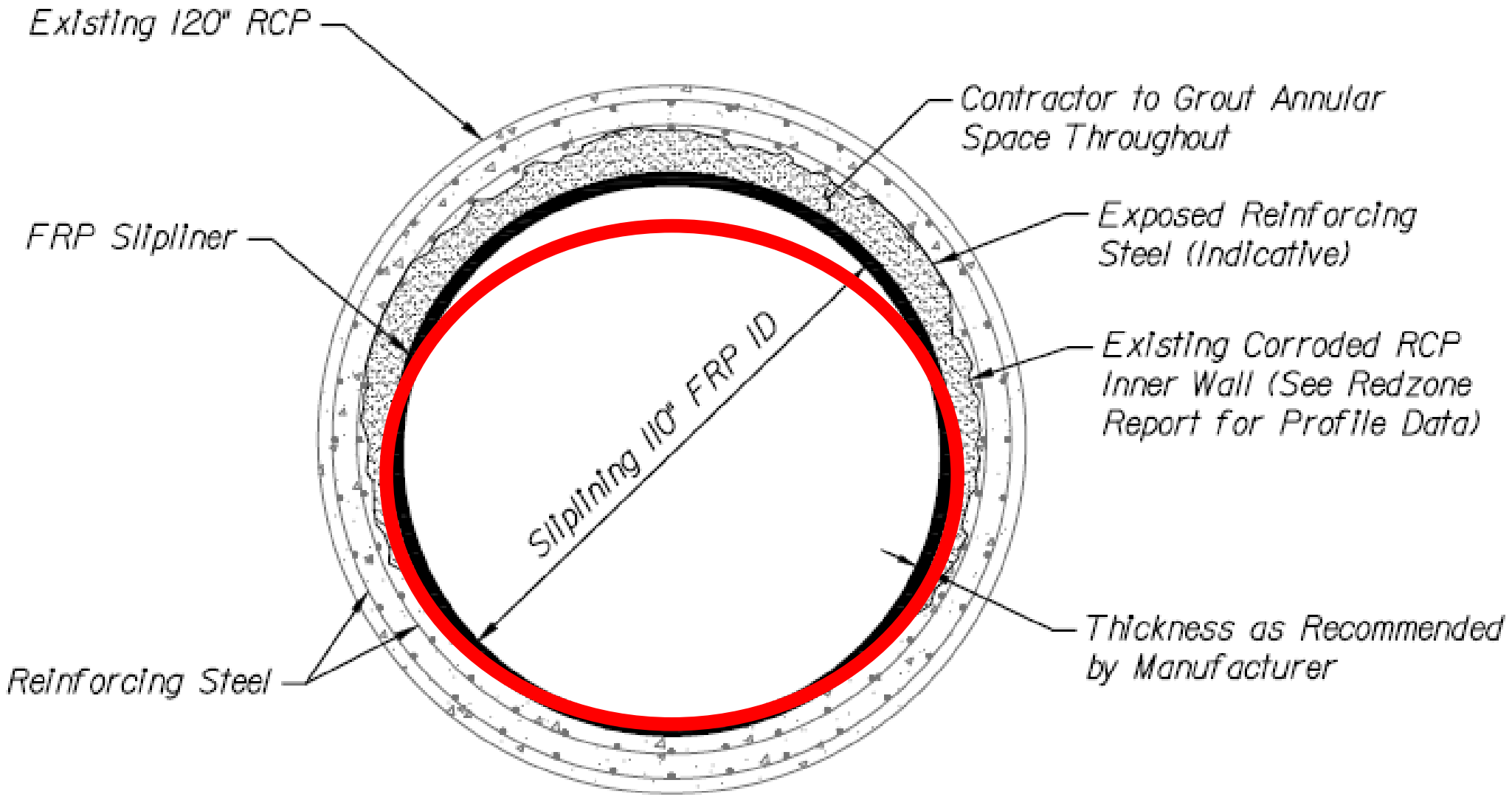


SLUDGE FORCE MAIN SHUTDOWN

- Contingent bid item used to cover relocations
- Coordination with both plants for connection shutdowns

GROUTING

- 5 psi Maximum Pressure
- Pipe Flotation Prevention
- Volume Control
- Pipe Deflection Verification


Existing 120" RCP
FRP Slipliner
Reinforcing Steel
Contractor to Grout Annular Space Throughout
Exposed Reinforcing Steel (Indicative)
Existing Corroded RCP Inner Wall (See Redzone Report for Profile Data)
Thickness as Recommended by Manufacturer
Sliplining 110" FRP ID

BID RESULTS

Contractor	Total Bid Price
Oscar Renda Contracting, Inc.	$22,436,985.50
S.J. Louis Construction of Texas, LTD.	$22,618,945.15
Ric-Man Construction, Inc.	$24,560,844.00

BID BREAKDOWN

Slipline 11,676 LF of 120”	$19.9M total	($1,620/LF base)
Point Repairs to 72”liner	$373k	($80/SF base)
CIPP 364 LF 42”	$300k	($830/LF)
CIPP 475 LF 54”	$300k	($500/LF base)
Concrete Retaining Walls	$1M	(2 wall locations)
Prairie Creek Crossing Protection	$260k	
General Site Access and Restoration	$86k	
Contingency Items	$178k	
Total Bid Price	$22,436,985.50	

CONSTRUCTION SCHEDULE

- NTP on November 5, 2018
- Contract Time = 523 Working Days
- Final Completion by December 7, 2020
- Begin Pushing Pipe in Place by May 2019

THANK YOU!

QUESTIONS?