

# **Appendix G**

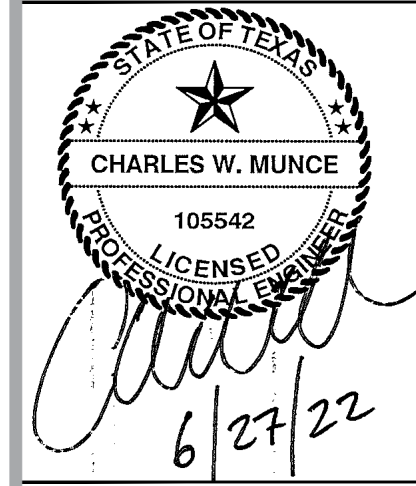
**Design Drawing Package**

# SAN JACINTO RIVER WASTE PITS NORTHERN IMPOUNDMENT PRE-FINAL 90% REMEDIAL DESIGN HARRIS COUNTY, TEXAS

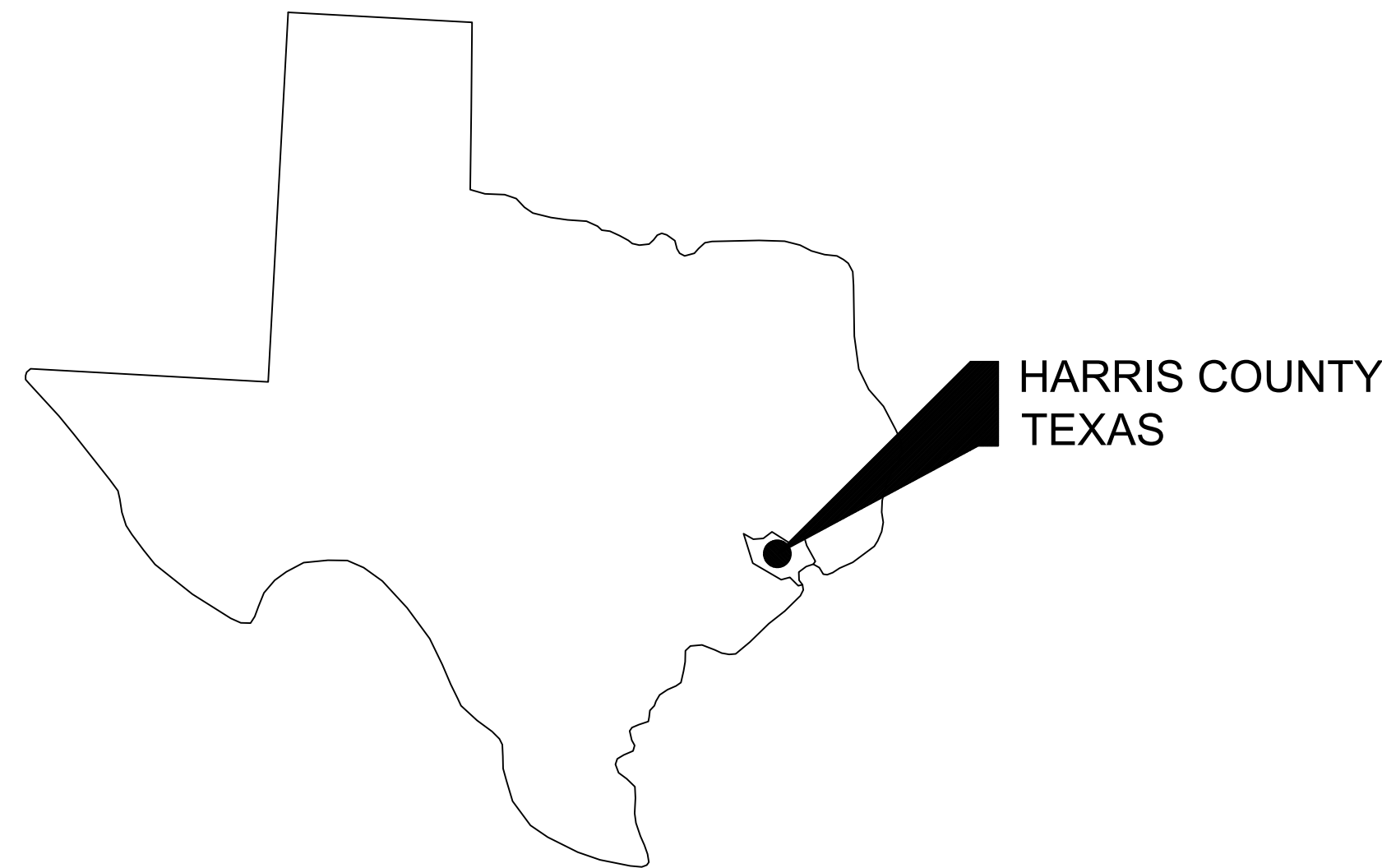
JUNE 2022  
11215702



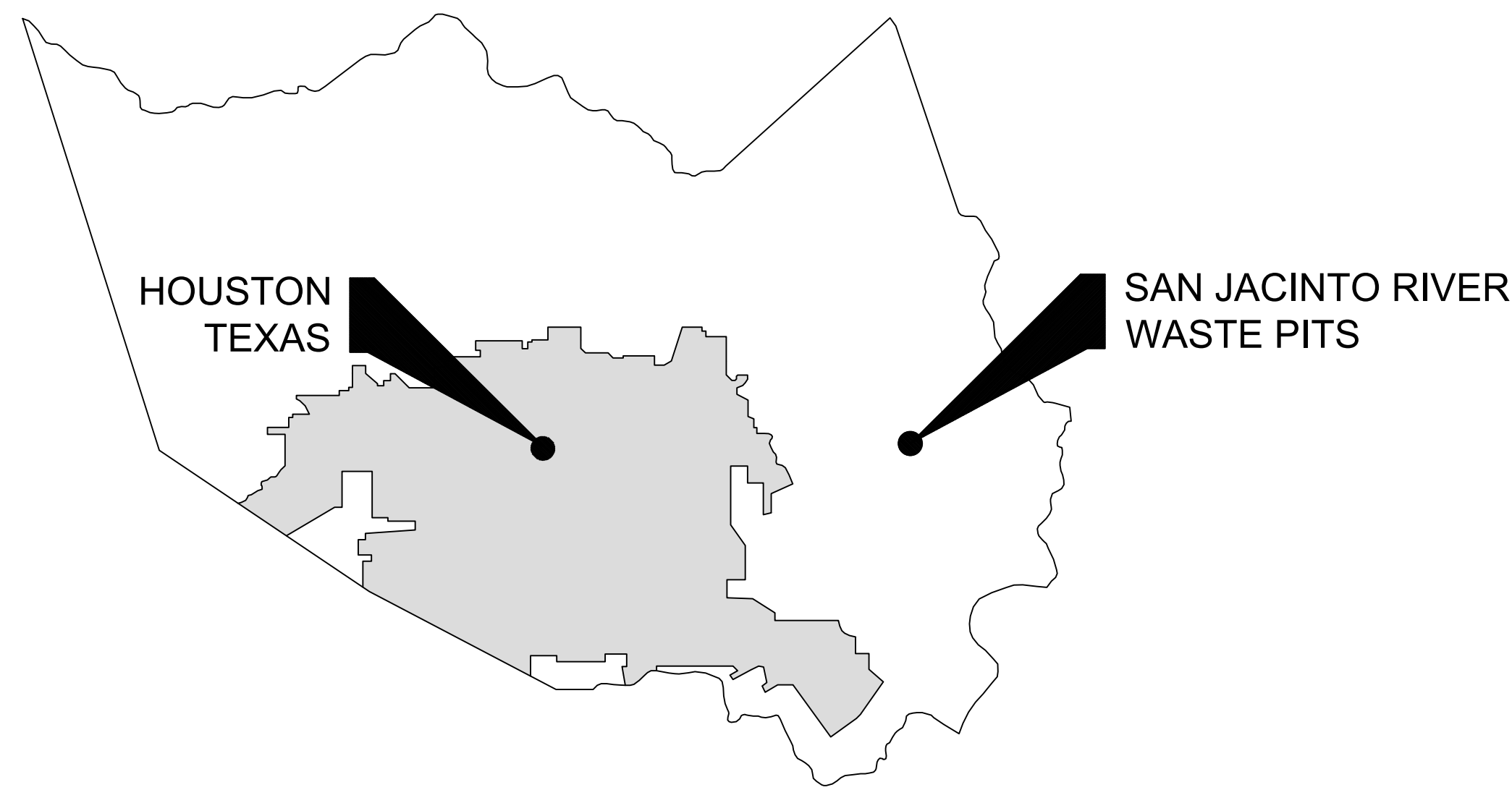
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STATE OF TEXAS  
VICINITY MAP



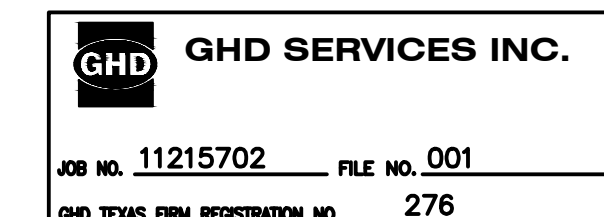
HARRIS COUNTY  
VICINITY MAP



LOCATION MAP

DRAWING NUMBER	DRAWING NAME
<b>GENERAL SERIES</b>	
G-01	COVER SHEET
<b>CIVIL SERIES</b>	
C-01	OVERALL PLAN
C-02	EXISTING CONDITIONS
C-03	SSA AREA AND NORTHERN IMPOUNDMENT WORKS
C-04	SOIL EROSION AND SEDIMENT CONTROL PLAN - OVERALL
C-05	SOIL EROSION AND SEDIMENT CONTROL PLAN - SEASONAL
C-06	SOIL EROSION AND SEDIMENT CONTROL DETAILS
C-07	PROJECT TRAFFIC CONTROL PLAN
C-08	EXCAVATION PLAN - OVERALL
C-09	EXCAVATION PLAN NORTHWEST
C-10	EXCAVATION PLAN NORTHEAST
C-11	EXCAVATION PLAN SOUTHEAST
C-12	EXCAVATION PLAN SOUTHWEST
C-13	EXCAVATION SECTION - 1 OF 6
C-14	EXCAVATION SECTION - 2 OF 6
C-15	EXCAVATION SECTION - 3 OF 6
C-16	EXCAVATION SECTION - 4 OF 6
C-17	EXCAVATION SECTION - 5 OF 6
C-18	EXCAVATION SECTION - 6 OF 6
C-19	TYPICAL SEASONAL EXCAVATION SEQUENCING
C-20	TYPICAL EXCAVATION SEQUENCING - 1 OF 2
C-21	TYPICAL EXCAVATION SEQUENCING - 2 OF 2
C-22	RESTORATION PLAN
C-23	TYPICAL CONSTRUCTION SEQUENCING - 1 OF 2
C-24	TYPICAL CONSTRUCTION SEQUENCING - 2 OF 2
C-25	TYPICAL DETAILS - 1 OF 3
C-26	TYPICAL DETAILS - 2 OF 3
C-27	TYPICAL DETAILS - 3 OF 3
C-28	PILE WALL LAYOUT PLAN
C-29	DOUBLE PILE WALL PLAN AND PROFILE - 1 OF 4
C-30	DOUBLE PILE WALL PLAN AND PROFILE - 2 OF 4
C-31	DOUBLE PILE WALL PLAN AND PROFILE - 3 OF 4
C-32	DOUBLE PILE WALL PLAN AND PROFILE - 4 OF 4
C-33	SOUTH WALL PLAN AND PROFILE - 1 OF 2
C-34	SOUTH WALL PLAN AND PROFILE - 2 OF 2
C-35	DOUBLE PILE WALL SECTIONS - 1 OF 7
C-36	DOUBLE PILE WALL SECTIONS - 2 OF 7
C-37	DOUBLE PILE WALL SECTIONS - 3 OF 7
C-38	DOUBLE PILE WALL SECTIONS - 4 OF 7
C-39	DOUBLE PILE WALL SECTIONS - 5 OF 7
C-40	DOUBLE PILE WALL SECTIONS - 6 OF 7
C-41	DOUBLE PILE WALL SECTIONS - 7 OF 7
C-42	SOUTH WALL SECTIONS - 1 OF 3
C-43	SOUTH WALL SECTIONS - 2 OF 3
C-44	SOUTH WALL SECTIONS - 3 OF 3
<b>STRUCTURAL SERIES</b>	
S-01	STRUCTURAL NOTES
S-02	STRUCTURAL LAYOUT PLAN
S-03	STRUCTURAL SECTIONS
S-04	STRUCTURAL DETAILS 1 OF 2
S-05	STRUCTURAL DETAILS 2 OF 2
<b>PROCESS FLOW AND INSTRUMENTATION SERIES</b>	
P-00A	WATER TREATMENT SYSTEM PROCESS FLOW DIAGRAM SYMBOLS
P-00B	WATER TREATMENT SYSTEM PROCESS FLOW DIAGRAM SCHEDULES
P-01	WATER TREATMENT SYSTEM PROCESS FLOW DIAGRAM MASS BALANCE
P-02	WATER TREATMENT SYSTEM P&ID (1 OF 4)
P-03	WATER TREATMENT SYSTEM P&ID (2 OF 4)
P-04	WATER TREATMENT SYSTEM P&ID (3 OF 4)
P-05	WATER TREATMENT SYSTEM P&ID (4 OF 4)
P-06	SITE PLAN WATER TREATMENT SYSTEM SEASON 3-6

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Client  
**SAN JACINTO RIVER WASTE PITS**

Project  
**NORTHERN IMPOUNDMENT PRE-FINAL 90% REMEDIAL DESIGN HARRIS COUNTY, TEXAS**

No.	Issue	Drawn	Approved	Date
4	90% EPA REVIEW	MW	CM	06/27/2022

Drawn	MW	Designer	RH
Drafting Check	JC	Design Check	LL
Project Coordinator	CM	Date	Jun 27, 2022
Original Size	Arch D	Scale	N.T.S.

Project No. 11215702

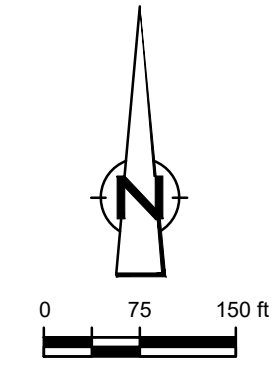
Title  
**COVER SHEET**

Sheet No.

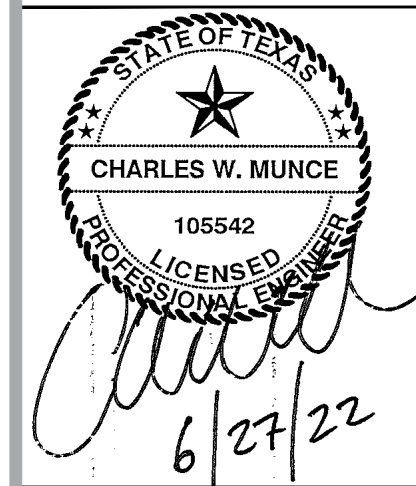
**G-01**

**90% EPA REVIEW**

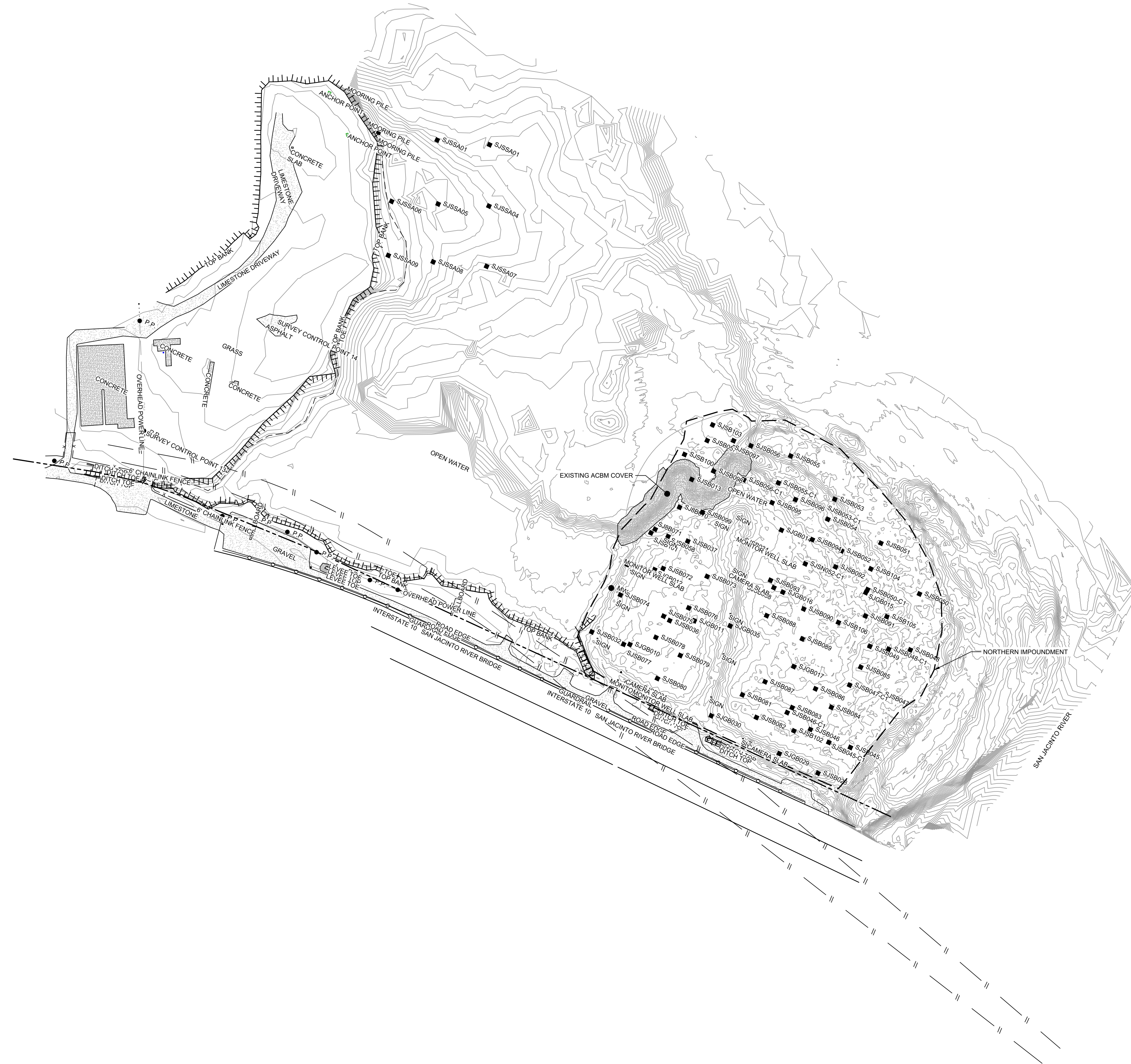
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**LEGEND**

---	ASSUMED TxDOT RIGHT OF WAY
---	TORA CAP PERIMETER
-10-	EXISTING CONTOUR INTERVAL
x	FENCELINE
---	SHORELINE
---	TOP OF BANK
---	TOE OF SLOPE
---	OVERHEAD ELECTRICAL
---	GUARDRAIL
---	PIPELINE
●	BORING LOCATION
●	MONITORING WELL
●	POWER POLE
●	L.P.
○	WELL
---	ASPHALT
---	CONCRETE
---	GRAVEL

Client  
**SAN JACINTO RIVER WASTE PITS**

Project  
**NORTHERN IMPOUNDMENT PRE-FINAL 90% REMEDIAL DESIGN HARRIS COUNTY, TEXAS**

4	90% EPA REVIEW	MW	CM	06/27/2022
No.	Issue	Drawn	Approved	Date
Drawn	MW	Designer	RH	
Drafting Check	JC	Design Check	LL	
Project Coordinator	CM	Date	Jun 27, 2022	

SOURCE:  
TOPOGRAPHIC, HYDROGRAPHIC, & MAGNETOMETER SURVEY OF SAN JACINTO RIVER WASTE PITS, HARRIS COUNTY, TEXAS, MORRISON SURVEYING INC., 190608, JULY 8, 2019 TO AUGUST 2, 2019. UPDATED BATHYMETRY DATA PROVIDED BY ANCHOR GEA OCTOBER 2021

NOTES:  
1. ASSUMED TxDOT RIGHT OF WAY IS BASED ON INFORMATION PROVIDED BY THE HARRIS COUNTY TAX ASSESSOR'S OFFICE.

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**GHD SERVICES INC.**  
JOB NO. 11215702 FILE NO. 001  
GHD TEXAS FIRM REGISTRATION NO. 276

Original Size  
**Arch D**  
Bar is one inch on original size drawing  
0 1"

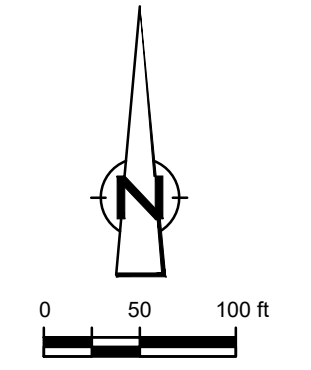
Project No. 11215702

Title  
**OVERALL PLAN**

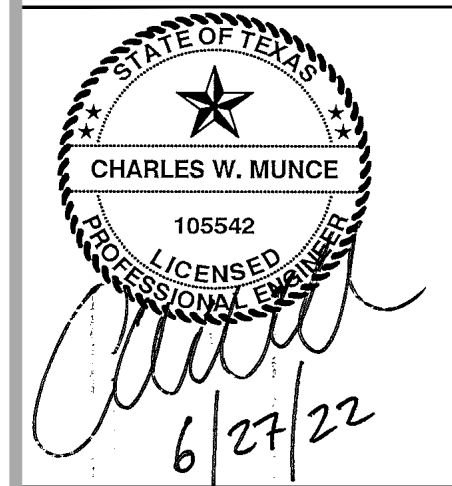
Sheet No.

**C-01**

**90% EPA REVIEW**



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---	ASSUMED TxDOT RIGHT OF WAY
---	TORA CAP PERIMETER
-10-	EXISTING CONTOUR INTERVAL
x	FENCELINE
---	SHORELINE
---	TOP OF BANK
---	TOE OF SLOPE
---	OVERHEAD ELECTRICAL
---	GUARDRAIL
---	PIPELINE
●	BJSB002 BORING LOCATION
●	MW MONITORING WELL
●	P.P. POWER POLE
●	L.P. LIGHT POLE
○	WELL
---	MATERIAL TO BE EXCAVATED
---	EXISTING BERM TO EXCAVATED
---	EXISTING BERM
---	NORTHWEST CORNER*
---	CONCRETE
---	GRAVEL
---	ASPHALT

Client  
**SAN JACINTO RIVER WASTE PITS**

Project  
**NORTHERN IMPOUNDMENT PRE-FINAL 90% REMEDIAL DESIGN HARRIS COUNTY, TEXAS**

4	90% EPA REVIEW	MW	CM	06/27/2022
---	----------------	----	----	------------

No.	Issue	Drawn	Approved	Date
Drawn	MW	Designer	RH	

Drafting	JC	Design	LL
Check		Check	

Project Coordinator	CM	Date	Jun 27, 2022
Original Size		Scale	1" = 100'

Project No.	11215702
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Title  
**EXISTING CONDITIONS**

Sheet No.

Sheet No.

**C-02**

Sheet - of -



SOURCE:  
TOPOGRAPHIC, HYDROGRAPHIC, & MAGNETOMETER SURVEY OF SAN JACINTO RIVER WASTE PITS, HARRIS COUNTY, TEXAS, MORRISON SURVEYING INC., 1990&#8208;1998, JULY 8, 2019 TO AUGUST 2, 2019  
UPDATED BATHYMETRY DATA PROVIDED BY ANCHOR GEA OCTOBER 2021

\*THE REMEDIAL DESIGN INFORMATION FOR THE NORTHWEST PORTION OF THE NORTHERN IMPOUNDMENT IS INCLUDED IN THIS SUBMITTAL. THE DESIGN TO DATE CONCLUDES THAT COMPLETING THE REMEDIAL ACTION "IN THE DRY" IN THE NORTHWEST PORTION OF THE NORTHERN IMPOUNDMENT AS STATED IN THE EPA RECORD OF DECISION IS NOT TECHNICALLY FEASIBLE DUE TO HYDRAULIC HEAVE. THE SUPPORTING TECHNICAL AND ENGINEERING BASIS FOR THIS CONCLUSION ARE INCLUDED IN THIS SUBMITTAL, AND AS SUCH, PENDING A FINAL EPA DETERMINATION REGARDING THIS AREA, IT IS ANTICIPATED THAT AN ADDENDUM TO THE PRE-FINAL 90% REMEDIAL DESIGN WILL BE SUBMITTED AT A FUTURE DATE TO ADDRESS THE NORTHWEST PORTION OF THE NORTHERN IMPOUNDMENT IN ACCORDANCE WITH EPA'S FINAL DETERMINATION AFTER REVIEW OF THIS NEWLY DEVELOPED SITE INFORMATION.

NOTES:  
1. ASSUMED TxDOT RIGHT OF WAY IS BASED ON INFORMATION PROVIDED BY THE HARRIS COUNTY TAX ASSESSOR'S OFFICE.

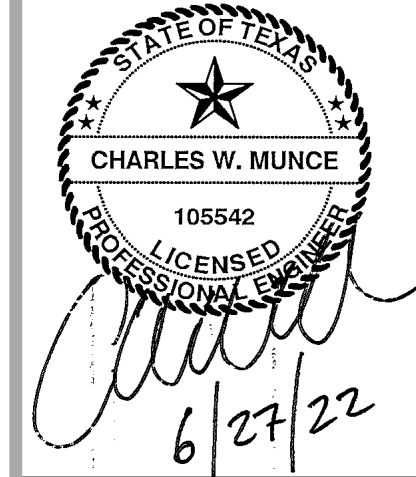
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**GHD SERVICES INC.**  
JOB NO. 11215702 FILE NO. 001  
GHD TEXAS FIRM REGISTRATION NO. 276

**90% EPA REVIEW**



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**LEGEND**

---	ASSUMED TxDOT RIGHT OF WAY
---	TORA CAP PERIMETER
---	EXISTING CONTOUR INTERVAL
---	FENCELINE
---	SHORELINE
---	TOP OF BANK
---	TOE OF SLOPE
---	OVERHEAD ELECTRICAL
---	GUARDRAIL
---	PIPELINE
---	BORING LOCATION
---	MONITORING WELL
---	POWER POLE
---	LIGHT POLE
---	WELL
---	MATERIAL TO BE EXCAVATED
---	EXISTING BERM TO EXCAVATED
---	EXISTING BERM
---	NORTHWEST CORNER*
---	CONCRETE
---	GRAVEL
---	ASPHALT
---	AZ26-700 PILE
---	AZ46-700 PILE
---	PLANNED IMPROVEMENTS FOR NORTHERN IMPOUNDMENT ACCESS
---	SOIL TYPE S1

Client: **SAN JACINTO RIVER WASTE PITS**  
Project: **NORTHERN IMPOUNDMENT PRE-FINAL 90% REMEDIAL DESIGN HARRIS COUNTY, TEXAS**

4	90% EPA REVIEW	MW	CM	06/27/2022
No.	Issue	Drawn	Approved	Date

Drawn	MW	Designer	RH
Drafting	JC	Design	LL
Check		Check	
Project Coordinator	CM	Date	Jun 27, 2022

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Scale: 1" = 100'

Original Size	Arch D	Bar is one inch on original size drawing
Project No.	11215702	

Title: **SSA AREA AND NORTHERN IMPOUNDMENT WORKS**

Sheet No. **C-03**

90% EPA REVIEW



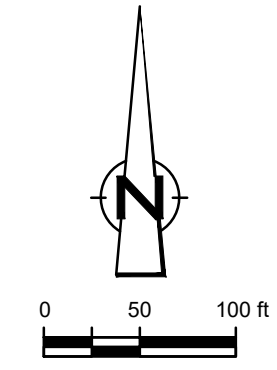
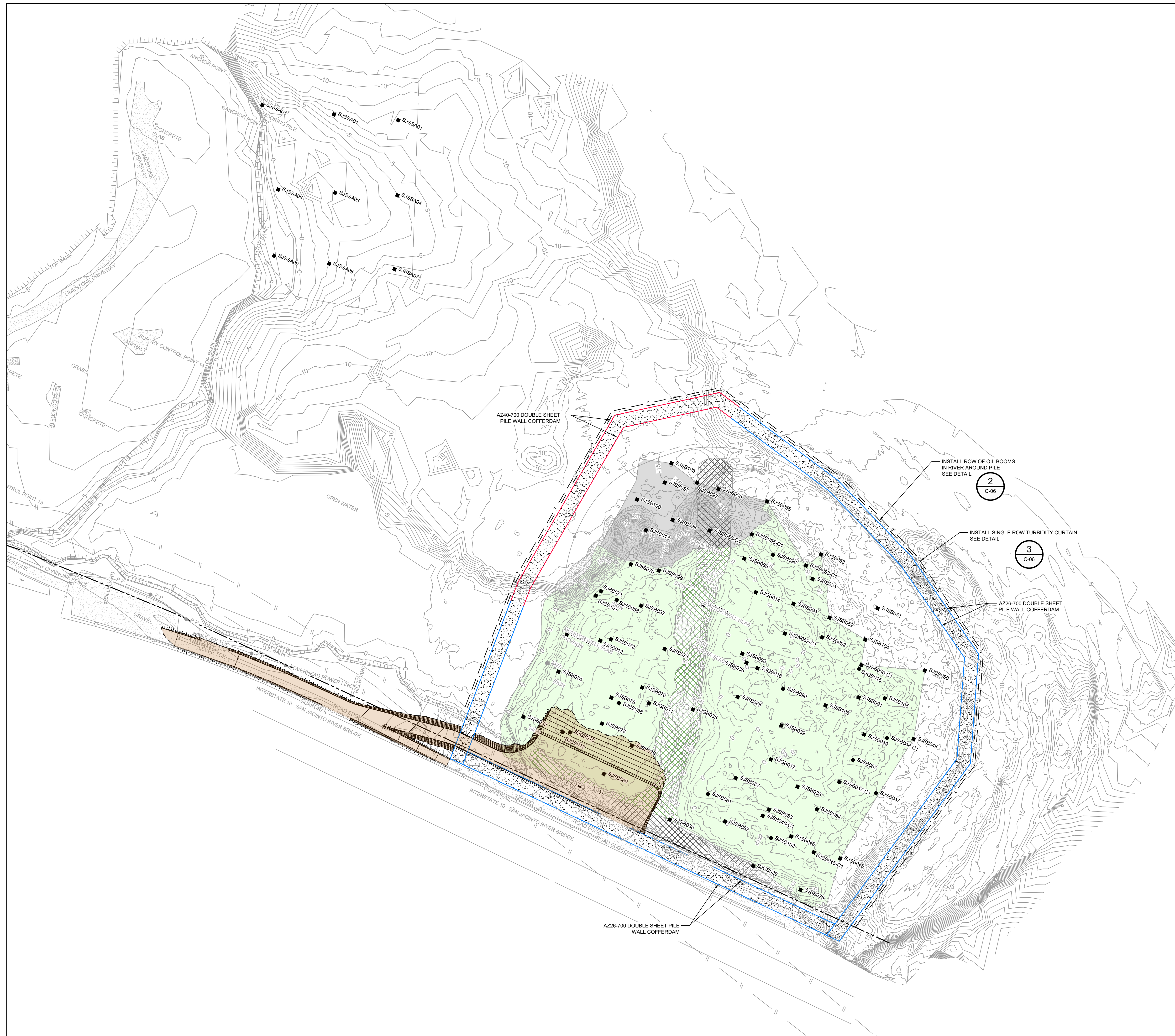
SOURCE:  
TOPOGRAPHIC, HYDROGRAPHIC, & MAGNETOMETER SURVEY OF SAN JACINTO RIVER WASTE PITS, HARRIS COUNTY, TEXAS, MORRISON SURVEYING INC., 190608, JULY 8, 2019 TO AUGUST 2, 2019  
UPDATED BATHYMETRY DATA PROVIDED BY ANCHOR QEA OCTOBER 2021

\*THE REMEDIAL DESIGN INFORMATION FOR THE NORTHWEST PORTION OF THE NORTHERN IMPOUNDMENT IS INCLUDED IN THIS SUBMITTAL. THE DESIGN TO DATE CONCLUDES THAT COMPLETING THE REMEDIAL ACTION "IN THE DRY" IN THE NORTHWEST PORTION OF THE NORTHERN IMPOUNDMENT AS STATED IN THE EPA RECORD OF DECISION IS NOT TECHNICALLY FEASIBLE DUE TO HYDRAULIC HEAVE. THE SUPPORTING TECHNICAL AND ENGINEERING BASIS FOR THIS CONCLUSION ARE INCLUDED IN THIS SUBMITTAL, AND AS SUCH, PENDING A FINAL EPA DETERMINATION REGARDING THIS AREA, IT IS ANTICIPATED THAT AN ADDENDUM TO THE PRE-FINAL 90% REMEDIAL DESIGN WILL BE SUBMITTED AT A FUTURE DATE TO ADDRESS THE NORTHWEST PORTION OF THE NORTHERN IMPOUNDMENT IN ACCORDANCE WITH EPA'S FINAL DETERMINATION AFTER REVIEW OF THIS NEWLY DEVELOPED SITE INFORMATION.

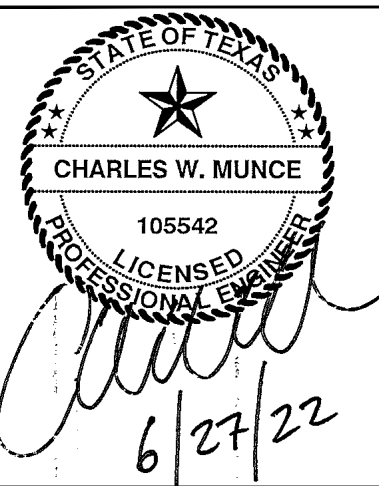
- NOTES:
- ASSUMED TxDOT RIGHT OF WAY IS BASED ON INFORMATION PROVIDED BY THE HARRIS COUNTY TAX ASSESSOR'S OFFICE.
  - LOCATION OF OVERBURDEN STOCKPILE, DECONTAMINATION PAD, SOLIDIFICATION PAD, AND DEWATERING FACILITY ARE SUBJECT TO CHANGE AND CAN VARY FROM SEASON TO SEASON.

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**LEGEND**

--- (dashed line)	ASSUMED TxDOT RIGHT OF WAY
-10 (contour line)	TORA GAP PERIMETER
x (dashed line)	EXISTING CONTOUR INTERVAL
--- (dotted line)	FENCELINE
--- (dotted line)	SHORELINE
--- (dotted line)	TOP OF BANK
--- (dotted line)	TOE OF SLOPE
--- (dotted line)	OVERHEAD ELECTRICAL
--- (dotted line)	GUARDRAIL
--- (dotted line)	PIPELINE
■ (square)	SJSB002 BORING LOCATION
● (circle)	MW MONITORING WELL
● (circle)	P.P. POWER POLE
● (circle)	L.P. LIGHT POLE
○ (circle)	WELL
--- (dotted line)	MATERIAL TO BE EXCAVATED
--- (dotted line)	EXISTING BERM TO EXCAVATED
--- (dotted line)	EXISTING BERM
--- (dotted line)	NORTHWEST CORNER*
--- (dotted line)	CONCRETE
--- (dotted line)	GRAVEL
--- (dotted line)	ASPHALT
--- (dotted line)	AZ26-700 PILE
--- (dotted line)	AZ40-700 PILE
--- (dotted line)	SILT FENCE
--- (dotted line)	TURBIDITY CURTAIN
--- (dotted line)	OIL BOOM
--- (dotted line)	PLANNED IMPROVEMENTS FOR NORTHERN IMPOUNDMENT ACCESS

Client  
**SAN JACINTO RIVER WASTE PITS**  
 Project  
**NORTHERN IMPOUNDMENT PRE-FINAL 90% REMEDIAL DESIGN HARRIS COUNTY, TEXAS**

4	90% EPA REVIEW	MW	CM	06/27/2022
No.	Issue	Drawn	Approved	Date
Drawn	MW	Designer	RH	
Drafting	JC	Design	LL	
Check		Check		
Project Coordinator	CM	Date	Jun 27, 2022	
Original Size	Arch D	Scale	1" = 100'	
		Bar is one inch on original size drawing		
Project No.	11215702			
Title	<b>SOIL EROSION AND SEDIMENT CONTROL PLAN OVERALL</b>			
Sheet No.	<b>C-04</b>			

**SOURCE:**  
 TOPOGRAPHIC, HYDROGRAPHIC, & MAGNETOMETER SURVEY OF SAN JACINTO RIVER WASTE PITS, HARRIS COUNTY, TEXAS, MORRISON SURVEYING INC., 190608, JULY 8, 2019 TO AUGUST 2, 2019  
 UPDATED BATHYMETRY DATA PROVIDED BY ANCHOR GEA OCTOBER 2021

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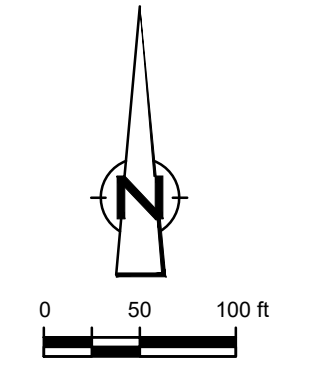
**NOTES:**

1. ASSUMED TxDOT RIGHT OF WAY IS BASED ON INFORMATION PROVIDED BY THE HARRIS COUNTY TAX ASSESSOR'S OFFICE.
2. LOCATION AND TYPE OF SOIL EROSION AND SEDIMENT CONTROLS ARE SUBJECT TO CHANGE AND CAN VARY FROM SEASON TO SEASON.
3. TURBIDITY CONTROLS AND OIL BOOM ONLY TO BE IMPLEMENTED DURING BMP INSTALLATION AND REMOVAL.
4. TURBIDITY CURTAIN AND OIL BOOM ONLY TO BE DEPLOYED IN IMMEDIATE AREA AROUND BMP INSTALLATION AND REMOVAL; LOCATION TO VARY DURING CONSTRUCTION PHASE.

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**90% EPA REVIEW**



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STATE OF TEXAS  
 CHARLES W. MUNCE  
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 LICENSED PROFESSIONAL ENGINEER  
 6/27/22

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**LEGEND**

---	ASSUMED TxDOT RIGHT OF WAY
- - - -	TORA GAP PERIMETER
---	EXISTING CONTOUR INTERVAL
- - - -	FENCELINE
---	SHORELINE
---	TOP OF BANK
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---	PIPELINE
●	BORING LOCATION
○	MONITORING WELL
○	POWER POLE
○	L.P.
○	WELL
---	MATERIAL TO BE EXCAVATED
---	EXISTING BERM TO EXCAVATED
---	EXISTING BERM
---	NORTHWEST CORNER*
---	CONCRETE
---	GRAVEL
---	ASPHALT
---	AZ26-700 PILE
---	AZ40-700 PILE
---	SILT FENCE
---	TURBIDITY CURTAIN
---	PILE BOOM
---	PLANNED IMPROVEMENTS FOR NORTHERN IMPOUNDMENT ACCESS

Client  
**SAN JACINTO RIVER WASTE PITS**  
 Project  
**NORTHERN IMPOUNDMENT PRE-FINAL 90% REMEDIAL DESIGN HARRIS COUNTY, TEXAS**

4	90% EPA REVIEW	MW	CM	06/27/2022
No.	Issue	Drawn	Approved	Date
Drawn	MW	Designer	RH	
Drafting	JC	Design	LL	
Check		Check		
Project Coordinator	CM	Date	Jun 27, 2022	
Original Size		Scale	1" = 100'	
		Bar is one inch on original size drawing	0	1"
Project No.	11215702			
Title	<b>SOIL EROSION AND SEDIMENT CONTROL PLAN SEASONAL</b>			

SOURCE:  
 TOPOGRAPHIC, HYDROGRAPHIC, & MAGNETOMETER SURVEY OF SAN JACINTO RIVER WASTE PITS, HARRIS COUNTY, TEXAS, MORRISON SURVEYING INC., 190608, JULY 8, 2019 TO AUGUST 2, 2019  
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NOTES:  
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 JOB NO. 11215702 FILE NO. 001  
 GHD TEXAS FIRM REGISTRATION NO. 276

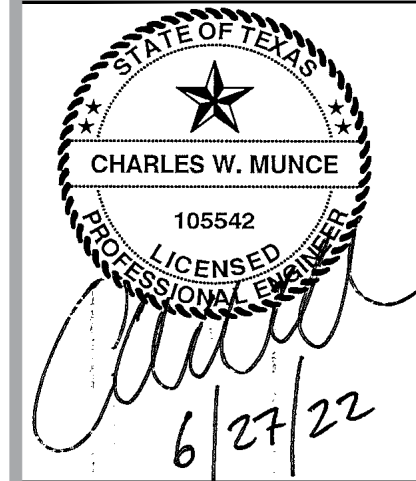
**90% EPA REVIEW**

C-05

Sheet - of -



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Client  
**SAN JACINTO RIVER WASTE PITS**  
Project  
**NORTHERN IMPOUNDMENT PRE-FINAL 90% REMEDIAL DESIGN HARRIS COUNTY, TEXAS**

No.	Issue	Drawn	Approved	Date
4	90% EPA REVIEW	MW	CM	08/27/2022

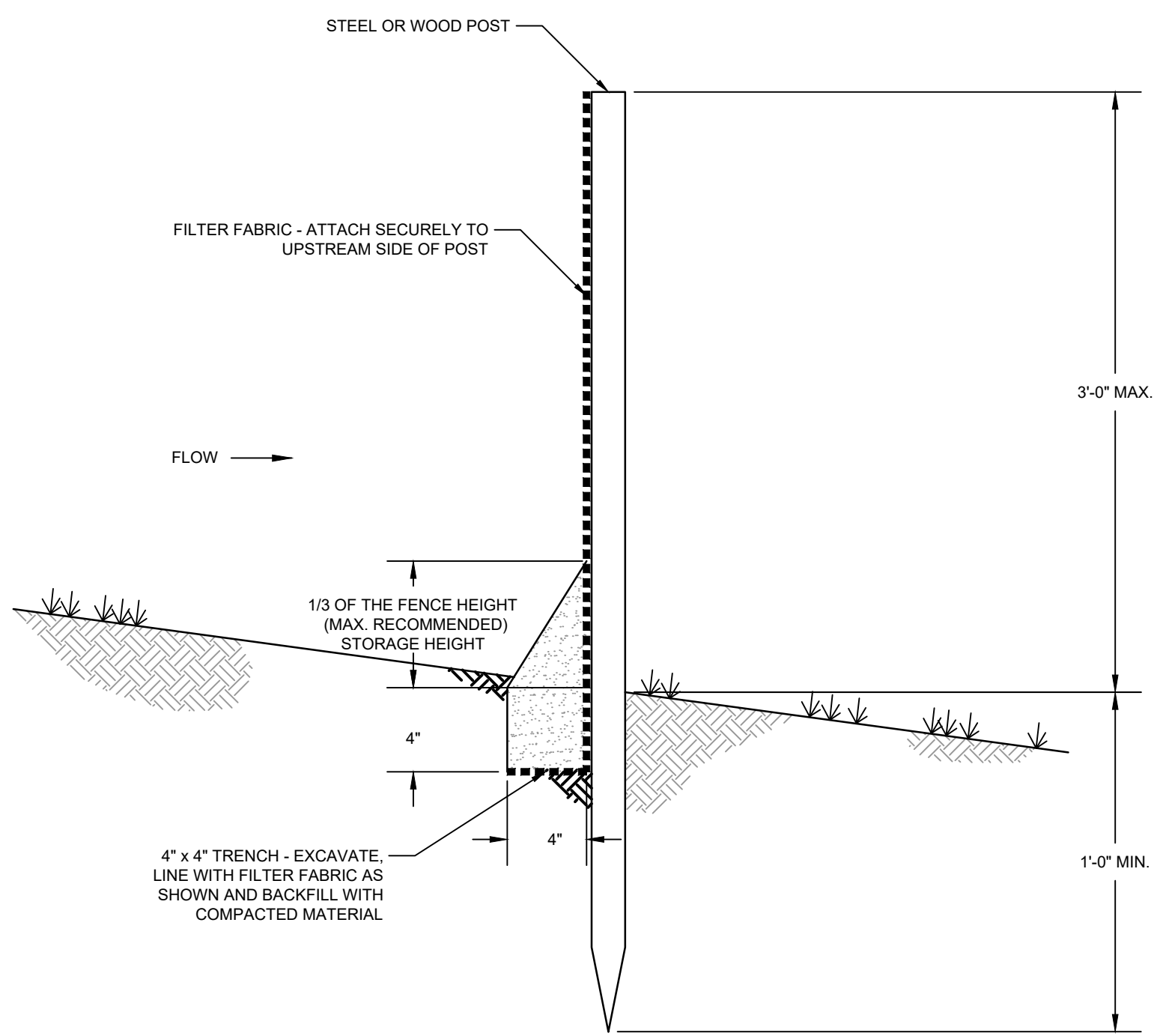
Drawn **MW** Designer **RH**  
Drafting Check **JC** Design Check **LL**  
Project Coordinator **CM** Date **Jun 27, 2022**  
Scale **N.T.S.**

Original Size  
**Arch D**  
Bar is one inch on original size drawing  
0 1"

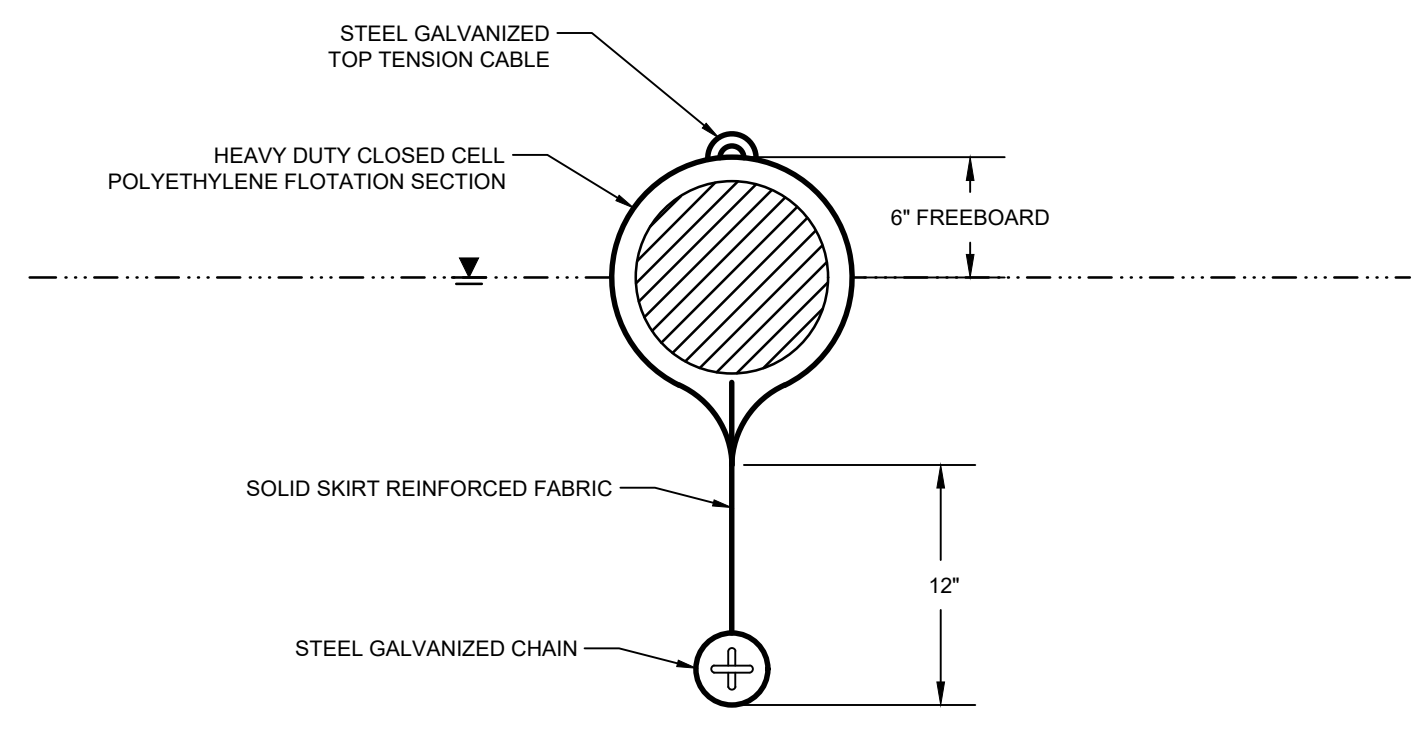
Project No. **11215702**  
Title  
**SOIL EROSION AND SEDIMENT CONTROL DETAILS**

Sheet No.  
**C-06**

90% EPA REVIEW  
Sheet - of -

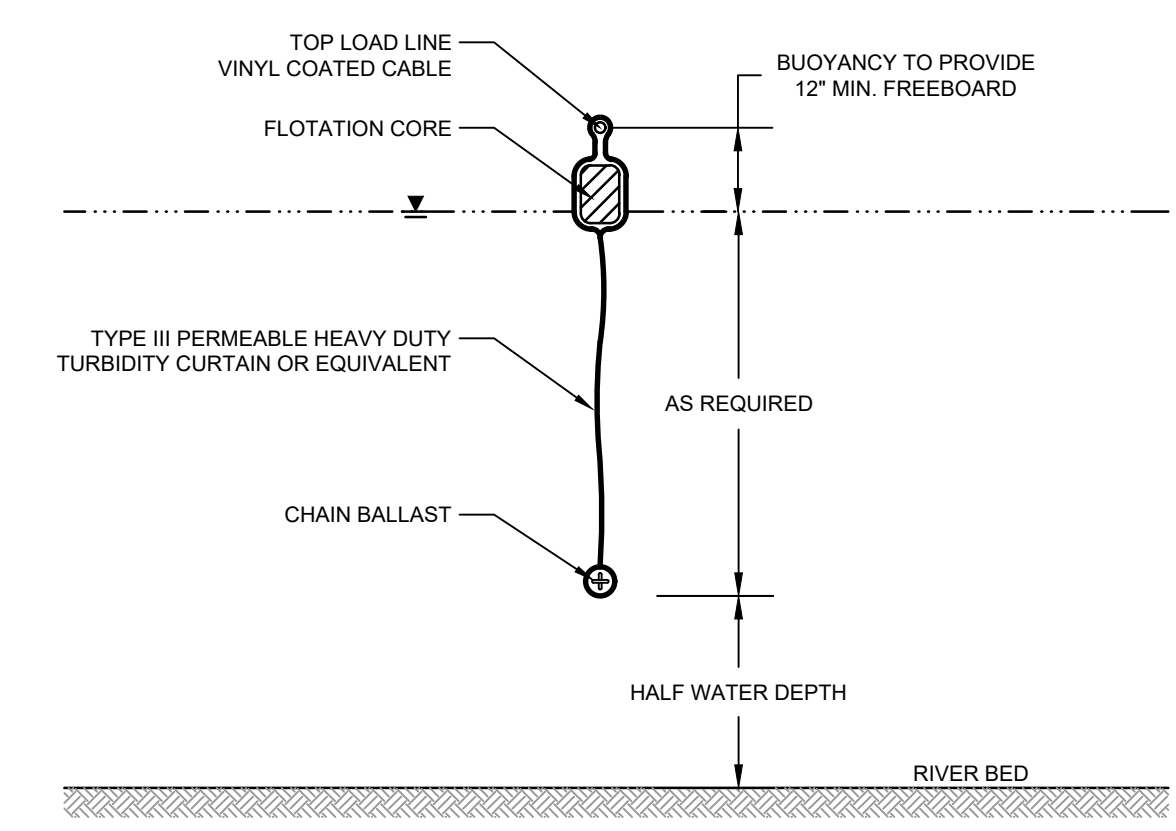


**DETAIL 1 TEMPORARY SILT FENCE**  
N.T.S. C-05



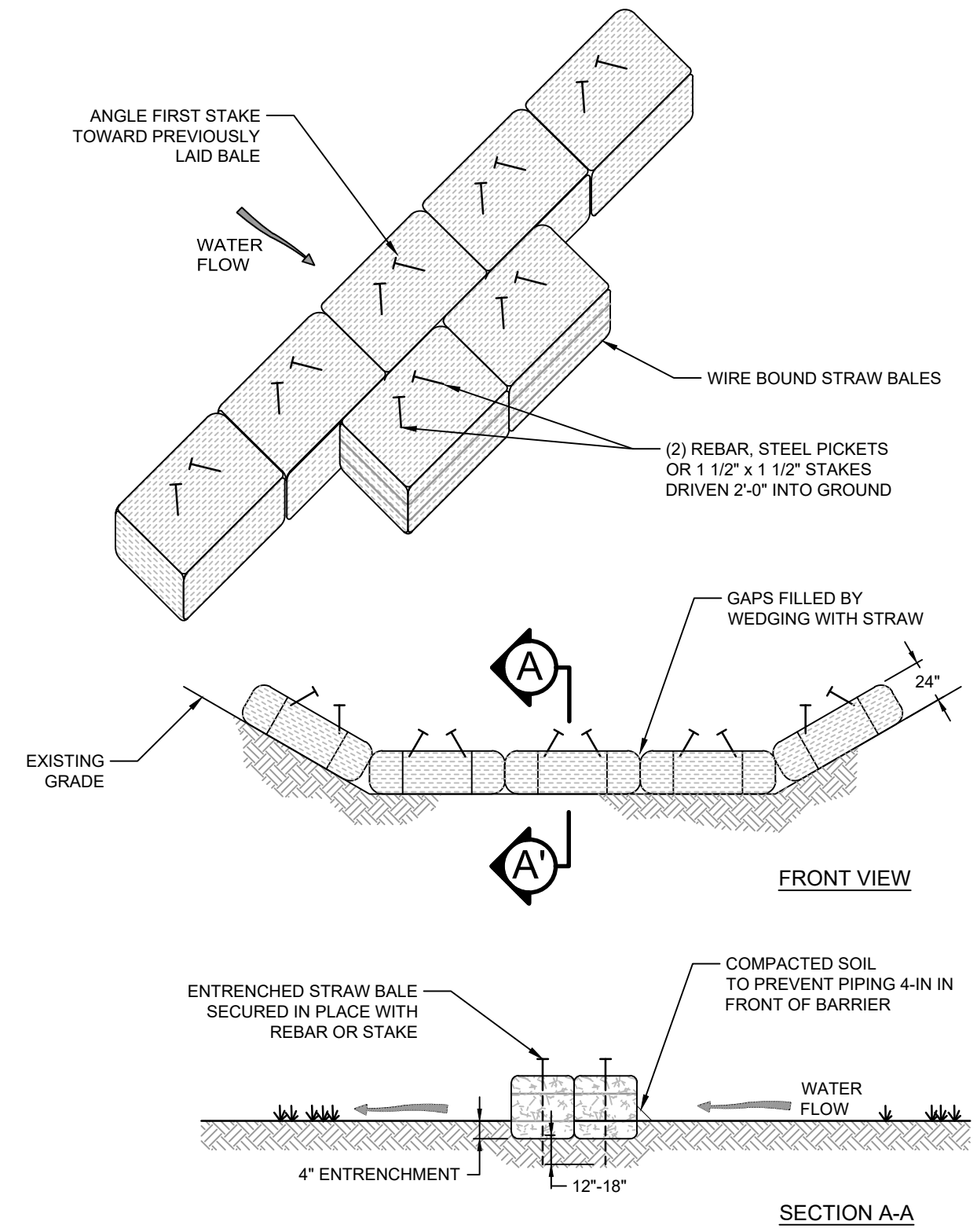
- NOTES
- OIL BOOM SHALL CONFORM TO COAST GUARD OPA 90 REGULATION AND ASTM F-1523
  - OIL BOOM SHALL BE CONTINUOUS TYPE.

**DETAIL 2 NON-ABSORBENT OIL BOOM**  
N.T.S. C-04



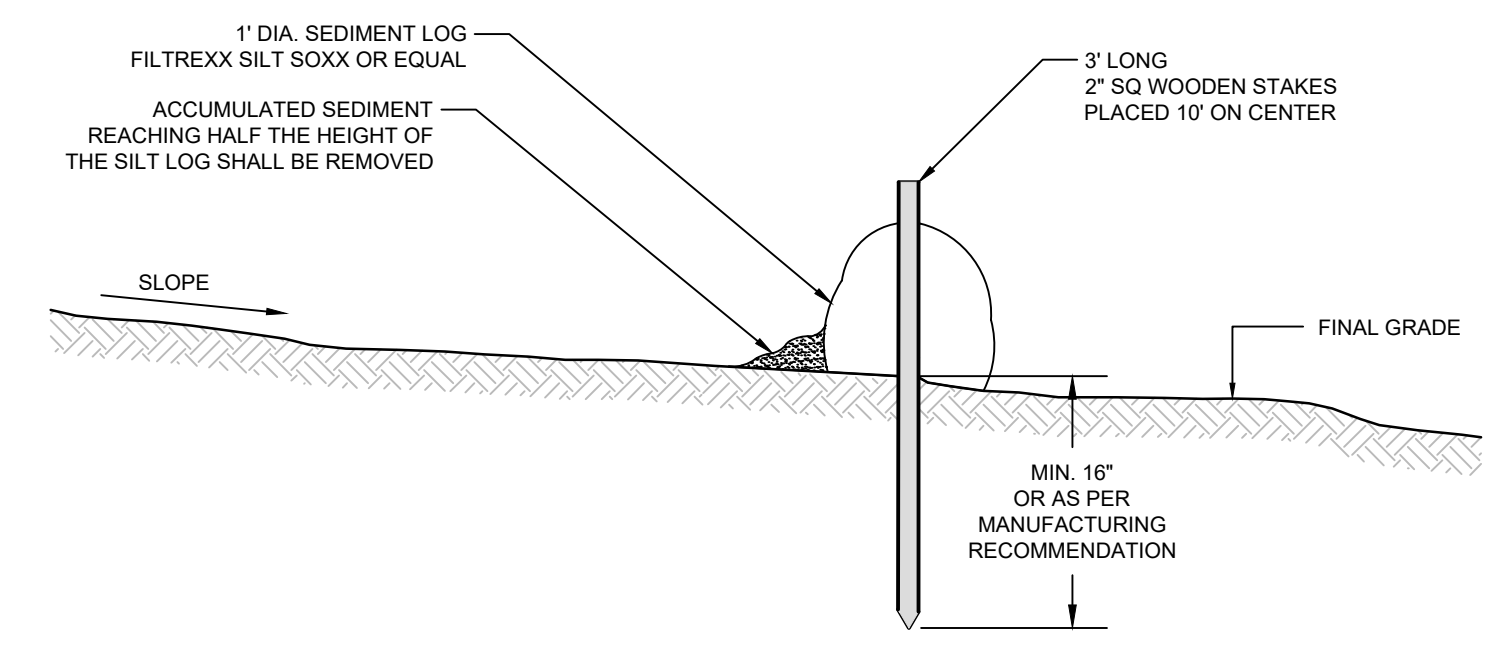
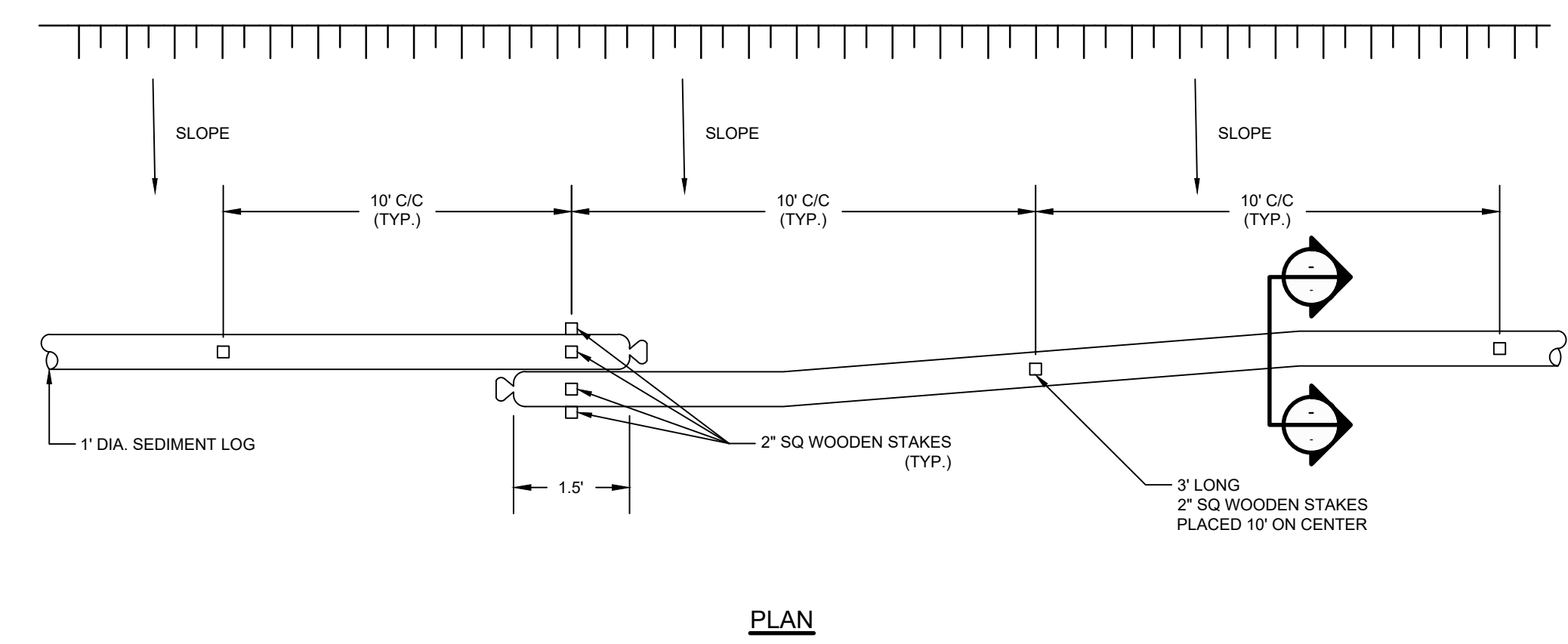
- NOTES
- TURBIDITY CURTAIN SHALL BE TYPE III ACCORDING TO DEPARTMENT OF THE ARMY, US ARMY CORPS OF ENGINEERS WASHINGTON, DC, ENGINEERING AND DESIGN HANDBOOK FOR THE PREPARATION OF STORM WATER POLLUTION PREVENTION PLANS FOR CONSTRUCTION ACTIVITIES, APPENDIX C BMP 27 TURBIDITY CURTAIN, DOCUMENT EP1110-1-16, 1997.
  - CURTAIN SYSTEM SHALL BE EQUIPPED WITH LOAD TRANSFER TYPE PANEL CONNECTORS
  - INCLUDE MOORING SYSTEM IF REQUIRED.

**DETAIL 3 TURBIDITY CURTAIN**  
N.T.S. C-04



NOTE:  
INSTALL SECOND ROW OF STRAW BALES IN BOTTOM OF SWALE ONLY.

**DETAIL 4 STRAW BALE BARRIER**  
N.T.S.



MIN. 16" OR AS PER MANUFACTURING RECOMMENDATION

**DETAIL 5 SEDIMENT LOG**  
N.T.S. C-05

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JOB NO. 11215702 FILE NO. 001  
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**LEGEND**

- ASSUMED TXDOT RIGHT OF WAY
- TORA CAP PERIMETER
- - - EXISTING CONTOUR INTERVAL
- FENCELINE
- SHORELINE
- TOP OF BANK
- TOE OF SLOPE
- OVERHEAD ELECTRICAL
- GUARDRAIL
- PIPELINE
- SJSB002 BORING LOCATION
- MW MONITORING WELL
- P.P. POWER POLE
- L.P. LIGHT POLE
- WELL

- MATERIAL TO BE EXCAVATED
- EXISTING BERM TO EXCAVATED
- EXISTING BERM
- NORTHWEST CORNER\*
- CONCRETE
- GRAVEL
- ASPHALT
- AZ26-700 PILE
- AZ40-700 PILE
- TRAFFIC FLOW
- PLANNED IMPROVEMENTS FOR NORTHERN IMPOUNDMENT ACCESS

Client  
**SAN JACINTO RIVER WASTE PITS**

Project  
**NORTHERN IMPOUNDMENT PRE-FINAL 90% REMEDIAL DESIGN HARRIS COUNTY, TEXAS**

No.	Issue	Drawn	Approved	Date
4	90% EPA REVIEW	MW	CM	06/27/2022
Drawn	MW	Designer	RH	
Drafting	JC	Design	LL	
Check		Check		
Project Coordinator	CM	Date	Jun 27, 2022	
Original Size		Scale	1" = 100'	
		Bar is one inch on original size drawing		
		0	1"	
Project No.	11215702			
Title	<b>PROJECT TRAFFIC CONTROL PLAN</b>			

SOURCE:  
TOPOGRAPHIC, HYDROGRAPHIC, & MAGNETOMETER SURVEY OF SAN JACINTO RIVER WASTE PITS, HARRIS COUNTY, TEXAS, MORRISON SURVEYING INC., 190608, JULY 8, 2019 TO AUGUST 2, 2019  
UPDATED BATHYMETRY DATA PROVIDED BY ANCHOR GEA OCTOBER 2021

\*THE REMEDIAL DESIGN INFORMATION FOR THE NORTHWEST PORTION OF THE NORTHERN IMPOUNDMENT IS INCLUDED IN THIS SUBMITTAL. THE DESIGN TO DATE CONCLUDES THAT COMPLETING THE REMEDIAL ACTION "IN THE DRY" IN THE NORTHWEST PORTION OF THE NORTHERN IMPOUNDMENT AS STATED IN THE EPA RECORD OF DECISION IS NOT TECHNICALLY FEASIBLE DUE TO HYDRAULIC HEAVE. THE SUPPORTING TECHNICAL AND ENGINEERING BASIS FOR THIS CONCLUSION ARE INCLUDED IN THIS SUBMITTAL, AND AS SUCH, PENDING A FINAL EPA DETERMINATION REGARDING THIS AREA, IT IS ANTICIPATED THAT AN ADDENDUM TO THE PRE-FINAL 90% REMEDIAL DESIGN WILL BE SUBMITTED AT A FUTURE DATE TO ADDRESS THE NORTHWEST PORTION OF THE NORTHERN IMPOUNDMENT IN ACCORDANCE WITH EPA'S FINAL DETERMINATION AFTER REVIEW OF THIS NEWLY DEVELOPED SITE INFORMATION.

- NOTES:
1. ASSUMED TXDOT RIGHT OF WAY IS BASED ON INFORMATION PROVIDED BY THE HARRIS COUNTY TAX ASSESSOR'S OFFICE
  1. TRAFFIC ROUTES ARE PRELIMINARY. ASSUME USE OF TXDOT ACCESS ROAD.
  2. ACCESS ROAD IMPROVEMENTS MAY BE NECESSARY AND WILL BE DETERMINED AT A LATER STAGE IN THE REMEDIAL DESIGN.

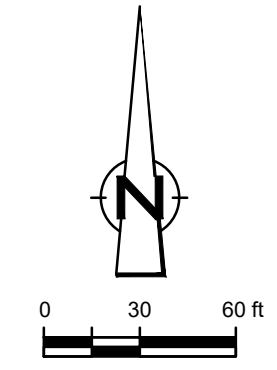
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GHD TEXAS FIRM REGISTRATION NO. 276

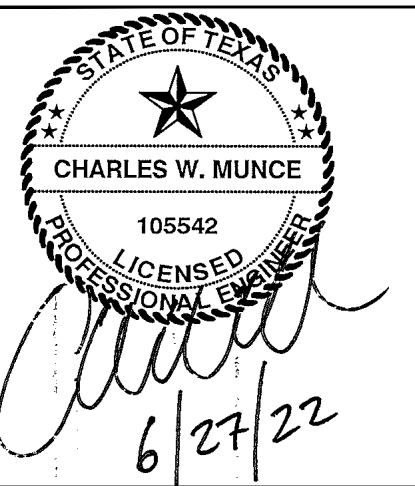
**90% EPA REVIEW**

**C-07**

Sheet - of -



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**LEGEND**

---	ASSUMED TxDOT RIGHT OF WAY
---	TORA CAP PERIMETER
---	EXISTING CONTOUR INTERVAL
---	FENCELINE
---	SHORELINE
---	TOP OF BANK
---	TOE OF SLOPE
---	OVERHEAD ELECTRICAL
---	GUARDRAIL
---	PIPELINE
●	BORING LOCATION
●	MONITORING WELL
●	POWER POLE
●	L.P.
○	LIGHT POLE
○	WELL
---	MATERIAL TO BE EXCAVATED
---	EXISTING BERM TO EXCAVATED
---	EXISTING BERM
---	NORTHWEST CORNER*
---	CONCRETE
---	GRAVEL
---	AZ26-700 PILE
---	AZ40-700 PILE
---	PLANNED IMPROVEMENTS FOR NORTHERN IMPOUNDMENT ACCESS
---	RAISED BENCH

Client: **SAN JACINTO RIVER WASTE PITS**  
 Project: **NORTHERN IMPOUNDMENT PRE-FINAL 90% REMEDIAL DESIGN HARRIS COUNTY, TEXAS**

No.	Issue	Drawn	Approved	Date
4	90% EPA REVIEW	MW	CM	06/27/2022
Drawn	MW	Designer	RH	
Drafting	JC	Design	LL	
Check		Check		
Project Coordinator	CM	Date	Jun 27, 2022	
Original Size		Scale	1" = 60'	
		Bar is one inch on original size drawing		

Project No. **11215702**  
 Title

**EXCAVATION PLAN OVERALL**

Sheet No.

**C-08**  
 Sheet - of -

SOURCE:  
 TOPOGRAPHIC, HYDROGRAPHIC, & MAGNETOMETER SURVEY OF SAN JACINTO RIVER WASTE PITS, HARRIS COUNTY, TEXAS, MORRISON SURVEYING INC., 1908B, JULY 8, 2019 TO AUGUST 2, 2019  
 UPDATED BATHYMETRY DATA PROVIDED BY ANCHOR GEA OCTOBER 2021

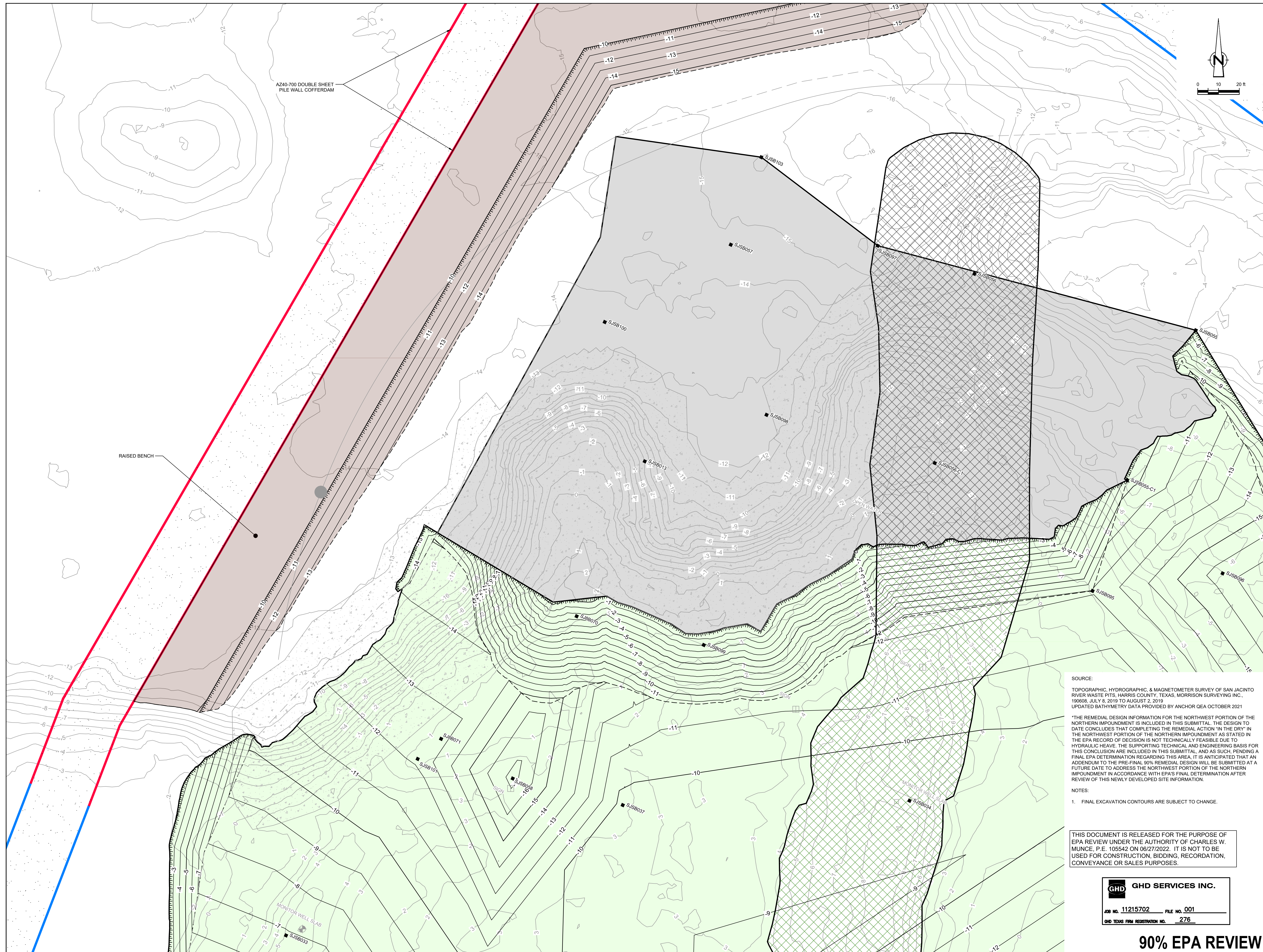
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- NOTES:
1. ASSUMED TxDOT RIGHT OF WAY IS BASED ON INFORMATION PROVIDED BY THE HARRIS COUNTY TAX ASSESSOR'S OFFICE.
  2. FINAL EXCAVATION CONTOURS ARE SUBJECT TO CHANGE.

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 JOB NO. 11215702 FILE NO. 001  
 GHD TEXAS FIRM REGISTRATION NO. 276

**90% EPA REVIEW**



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STATE OF TEXAS  
CHARLES W. MUNCE  
105542  
LICENSED PROFESSIONAL ENGINEER  
6/27/22

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**LEGEND**

- ASSUMED TxDOT RIGHT OF WAY
- TORA CAP PERIMETER
- EXISTING CONTOUR INTERVAL
- FENCELINE
- SHORELINE
- TOP OF BANK
- TOE OF SLOPE
- OVERHEAD ELECTRICAL
- GUARDRAIL
- PIPELINE
- BORING LOCATION
- MONITORING WELL
- POWER POLE
- LIGHT POLE
- WELL

- MATERIAL TO BE EXCAVATED
- EXISTING BERM TO EXCAVATED
- EXISTING BERM
- NORTHWEST CORNER\*
- CONCRETE
- GRAVEL
- AZ26-700 PILE
- AZ40-700 PILE
- RAISED BENCH

Client  
**SAN JACINTO RIVER WASTE PITS**

Project  
**NORTHERN IMPOUNDMENT PRE-FINAL 90% REMEDIAL DESIGN HARRIS COUNTY, TEXAS**

No.	Issue	Drawn	Approved	Date
4	90% EPA REVIEW	MW	CM	06/27/2022
Drawn	MW	Designer	RH	
Drafting	JC	Design	LL	
Check		Check		
Project Coordinator	CM	Date	Jun 27, 2022	
Original Size		Scale	1" = 20'	
		Bar is one inch on original size drawing		

**SOURCE:**  
TOPOGRAPHIC, HYDROGRAPHIC, & MAGNETOMETER SURVEY OF SAN JACINTO RIVER WASTE PITS, HARRIS COUNTY, TEXAS, MORRISON SURVEYING INC., 190608, JULY 8, 2019 TO AUGUST 2, 2019, UPDATED BATHYMETRY DATA PROVIDED BY ANCHOR GEA OCTOBER 2021

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**NOTES:**  
1. FINAL EXCAVATION CONTOURS ARE SUBJECT TO CHANGE.

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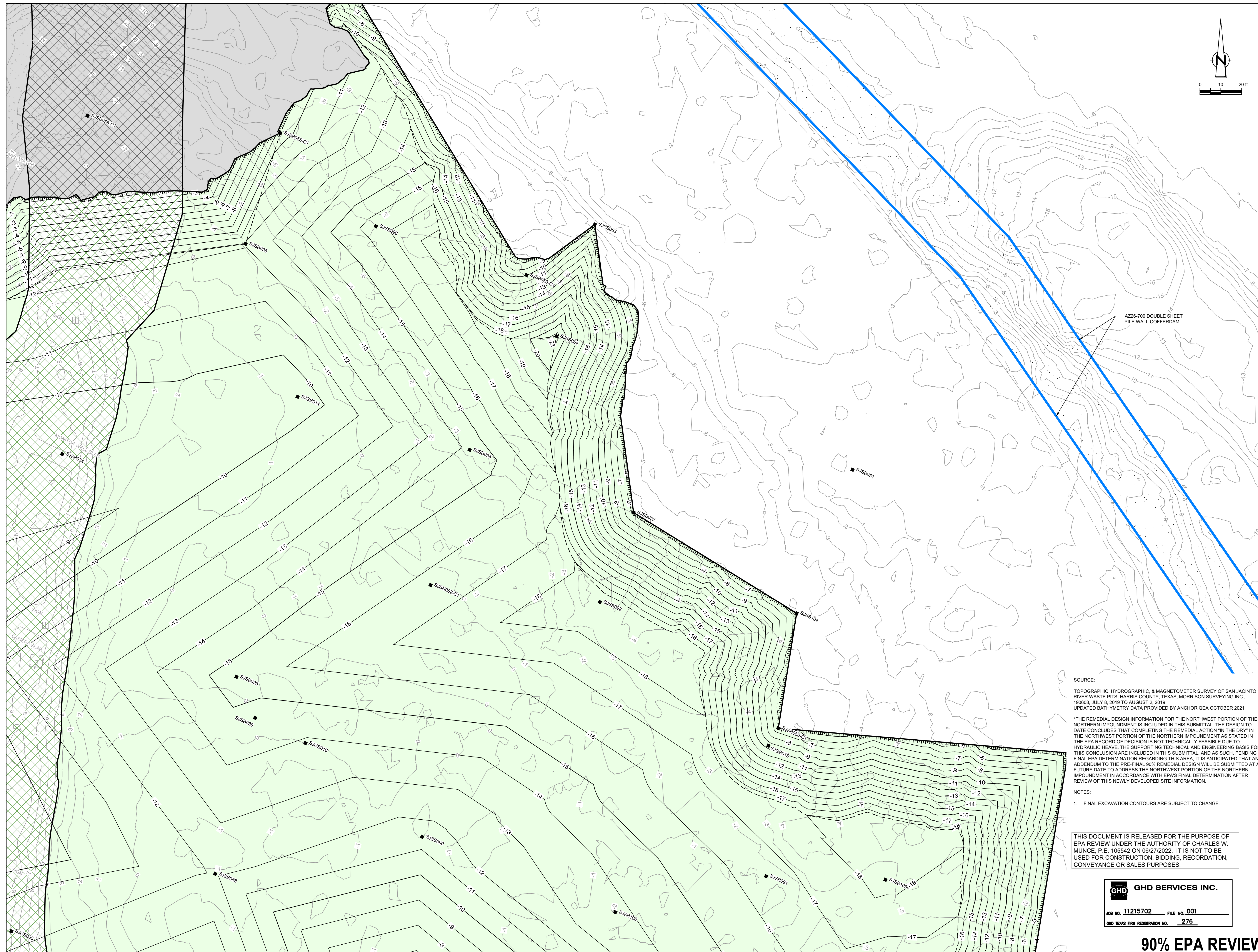
**90% EPA REVIEW**

Project No. 11215702

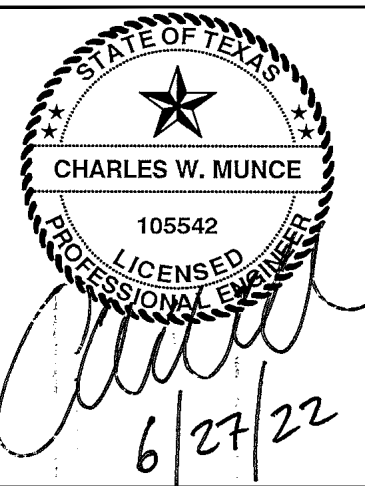
Title  
**EXCAVATION PLAN NORTHWEST**

Sheet No.  
**C-09**

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**LEGEND**

---	ASSUMED TxDOT RIGHT OF WAY
- - - -	TORA CAP PERIMETER
---	EXISTING CONTOUR INTERVAL
---	FENCELINE
---	SHORELINE
---	TOP OF BANK
---	TOE OF SLOPE
---	OVERHEAD ELECTRICAL
---	GUARDRAIL
---	PIPELINE
●	BORING LOCATION
●	MONITORING WELL
●	POWER POLE
●	LIGHT POLE
○	WELL
---	MATERIAL TO BE EXCAVATED
---	EXISTING BERM TO EXCAVATED
---	EXISTING BERM
---	NORTHWEST CORNER*
---	CONCRETE
---	GRAVEL
---	AZ26-700 PILE
---	AZ40-700 PILE

Client  
**SAN JACINTO RIVER WASTE PITS**

Project  
**NORTHERN IMPOUNDMENT PRE-FINAL 90% REMEDIAL DESIGN HARRIS COUNTY, TEXAS**

4	90% EPA REVIEW	MW	CM	06/27/2022
No.	Issue	Drawn	Approved	Date
Drawn	MW	Designer	RH	
Drafting	JC	Design	LL	
Check		Check		
Project Coordinator	CM	Date	Jun 27, 2022	
Original Size		Scale	1" = 20'	
		Bar is one inch on original size drawing		

SOURCE:  
 TOPOGRAPHIC, HYDROGRAPHIC, & MAGNETOMETER SURVEY OF SAN JACINTO RIVER WASTE PITS, HARRIS COUNTY, TEXAS, MORRISON SURVEYING INC., 1998B, JULY 8, 2019 TO AUGUST 2, 2019  
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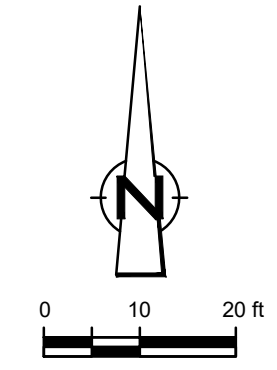
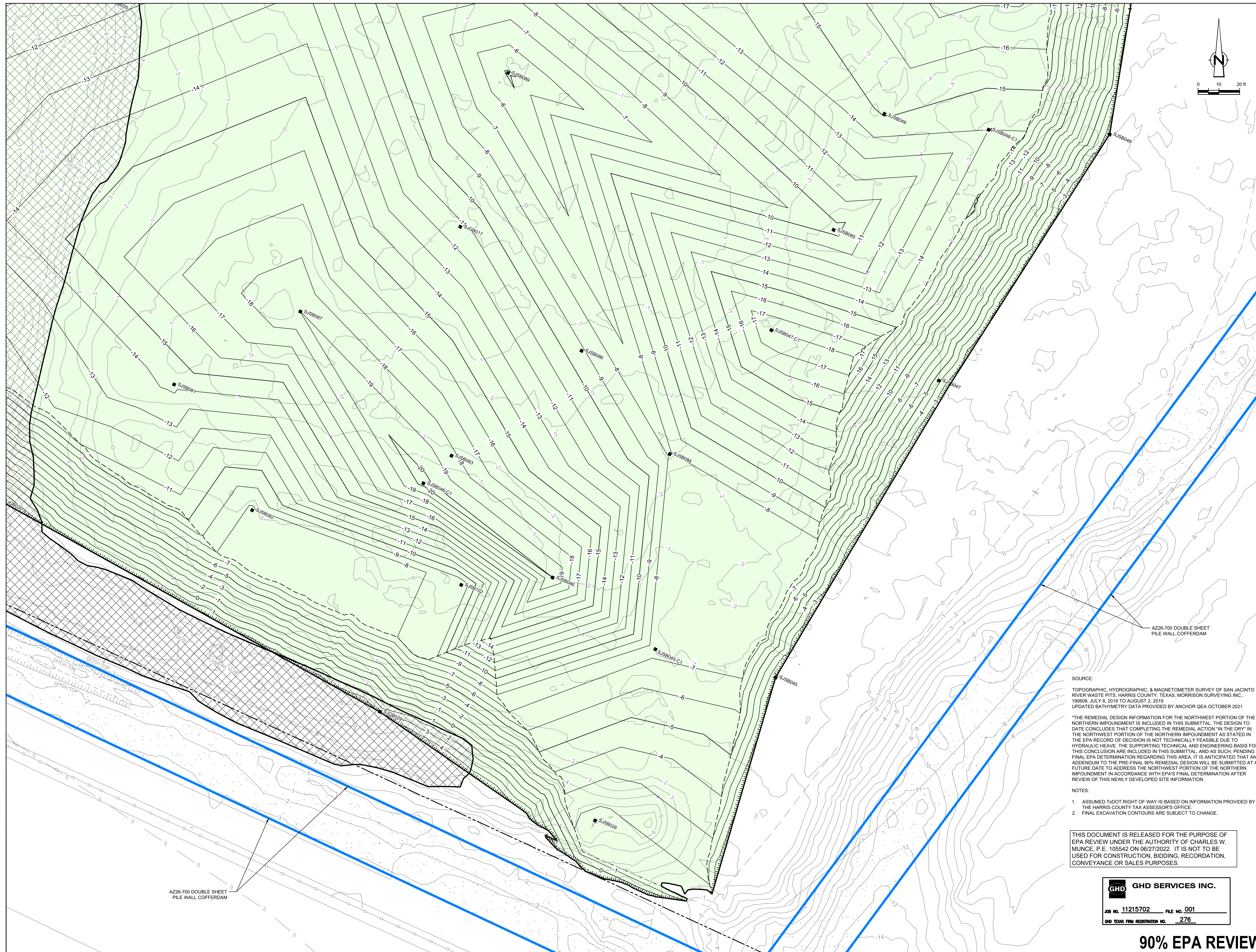
**90% EPA REVIEW**

Project No. **11215702**

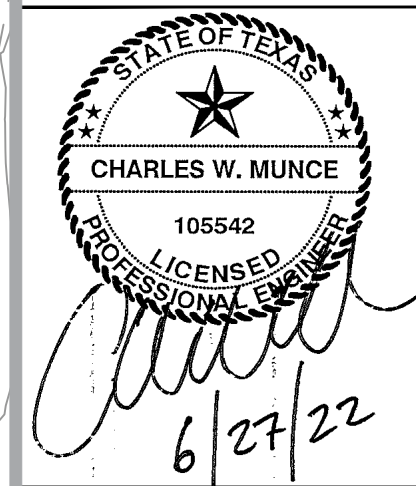
Title  
**EXCAVATION PLAN NORTHEAST**

Sheet No.  
**C-10**

Sheet - of -



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**LEGEND**

---	ASSUMED TxDOT RIGHT OF WAY
-10	TORA CAP PERIMETER
---	EXISTING CONTOUR INTERVAL
---	FENCELINE
---	SHORELINE
---	TOP OF BANK
---	TOE OF SLOPE
---	OVERHEAD ELECTRICAL
---	GUARDRAIL
---	PIPELINE
●	BORING LOCATION
●	MONITORING WELL
●	POWER POLE
●	L.P.
○	LIGHT POLE
○	WELL
---	MATERIAL TO BE EXCAVATED
---	EXISTING BERM TO EXCAVATED
---	EXISTING BERM
---	GRAVEL
---	AZ26-700 PILE
---	AZ42-700 PILE

Client: **SAN JACINTO RIVER WASTE PITS**  
 Project: **NORTHERN IMPOUNDMENT PRE-FINAL 90% REMEDIAL DESIGN HARRIS COUNTY, TEXAS**

No.	Issue	Drawn	CM	Approved	Date
4	90% EPA REVIEW	MW	CM		06/27/2022
Drawn	MW	Designer	RH		
Drafting	JC	Design	LL		
Check		Check			
Project	CM	Date	Jun 27, 2022		
Coordinator		Scale	1" = 20'		
Original Size		Bar is one inch on original size drawing			

SOURCE:  
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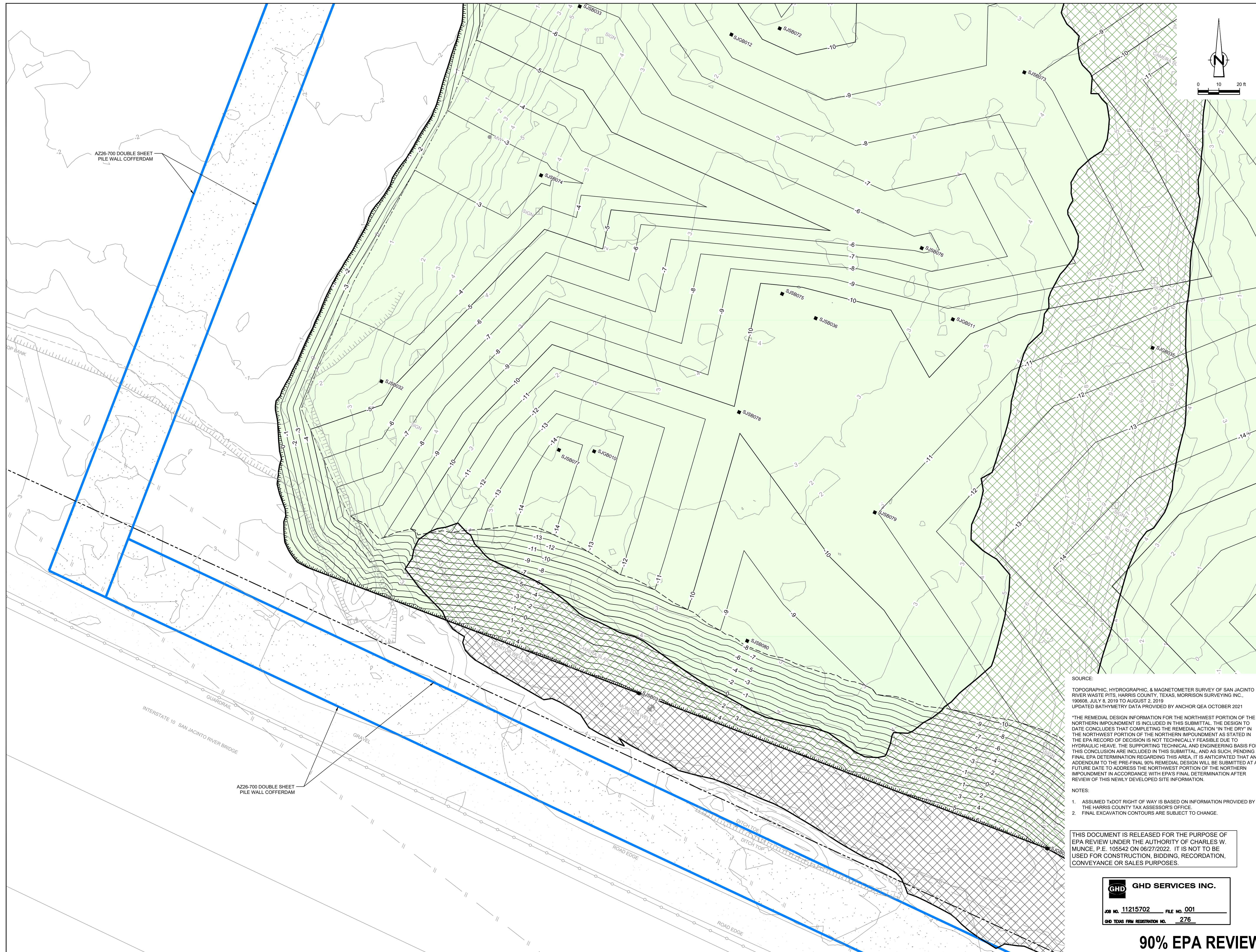
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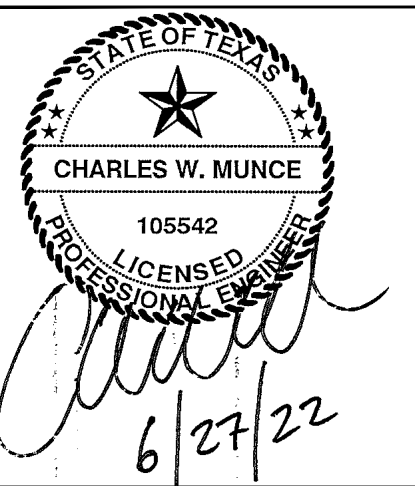
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 JOB NO. 11215702 FILE NO. 001  
 GHD TEXAS FIRM REGISTRATION NO. 276

Project No. 11215702  
 Title: **EXCAVATION PLAN SOUTHEAST**

Sheet No. **C-11**  
 Sheet - of -



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**LEGEND**

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---	TORA CAP PERIMETER
---	EXISTING CONTOUR INTERVAL
---	FENCELINE
---	SHORELINE
---	TOP OF BANK
---	TOE OF SLOPE
---	OVERHEAD ELECTRICAL
---	GUARDRAIL
---	PIPELINE
●	BORING LOCATION
●	MONITORING WELL
●	POWER POLE
●	LIGHT POLE
○	WELL
---	MATERIAL TO BE EXCAVATED
---	EXISTING BERM TO BE EXCAVATED
---	EXISTING BERM
---	GRAVEL
---	AZ26-700 PILE
---	AZ40-700 PILE

Client: **SAN JACINTO RIVER WASTE PITS**  
 Project: **NORTHERN IMPOUNDMENT PRE-FINAL 90% REMEDIAL DESIGN HARRIS COUNTY, TEXAS**

No.	Issue	Drawn	Approved	Date
4	90% EPA REVIEW	MW	CM	06/27/2022

Drawn	MW	Designer	RH
Drafting	JC	Design	LL
Check		Check	
Project Coordinator	CM	Date	Jun 27, 2022
Original Size		Scale	1" = 20'

Project No. **11215702**  
 Title: **EXCAVATION PLAN SOUTHWEST**

Sheet No. **C-12**  
 Sheet - of -

SOURCE:  
 TOPOGRAPHIC, HYDROGRAPHIC, & MAGNETOMETER SURVEY OF SAN JACINTO RIVER WASTE PITS, HARRIS COUNTY, TEXAS, MORRISON SURVEYING INC., 1998B, JULY 8, 2019 TO AUGUST 2, 2019. UPDATED BATHYMETRY DATA PROVIDED BY ANCHOR GEA OCTOBER 2021

THE REMEDIAL DESIGN INFORMATION FOR THE NORTHWEST PORTION OF THE NORTHERN IMPOUNDMENT IS INCLUDED IN THIS SUBMITTAL. THE DESIGN TO DATE CONCLUDES THAT COMPLETING THE REMEDIAL ACTION "IN THE DRY" IN THE NORTHWEST PORTION OF THE NORTHERN IMPOUNDMENT AS STATED IN THE EPA RECORD OF DECISION IS NOT TECHNICALLY FEASIBLE DUE TO HYDRAULIC HEAVE. THE SUPPORTING TECHNICAL AND ENGINEERING BASIS FOR THIS CONCLUSION ARE INCLUDED IN THIS SUBMITTAL, AND AS SUCH, PENDING A FINAL EPA DETERMINATION REGARDING THIS AREA, IT IS ANTICIPATED THAT AN ADDENDUM TO THE PRE-FINAL 90% REMEDIAL DESIGN WILL BE SUBMITTED AT A FUTURE DATE TO ADDRESS THE NORTHWEST PORTION OF THE NORTHERN IMPOUNDMENT IN ACCORDANCE WITH EPA'S FINAL DETERMINATION AFTER REVIEW OF THIS NEWLY DEVELOPED SITE INFORMATION.

- NOTES:
1. ASSUMED TxDOT RIGHT OF WAY IS BASED ON INFORMATION PROVIDED BY THE HARRIS COUNTY TAX ASSESSOR'S OFFICE.
  2. FINAL EXCAVATION CONTOURS ARE SUBJECT TO CHANGE.

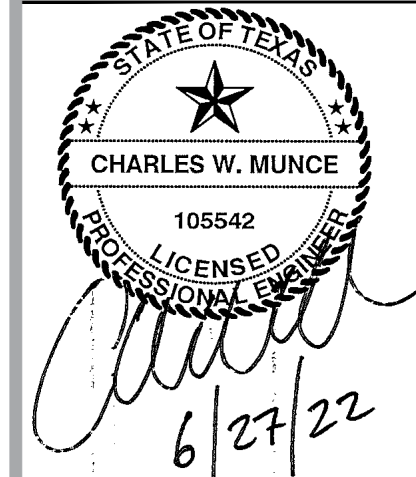
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**GHD SERVICES INC.**  
 JOB NO. 11215702 FILE NO. 001  
 GHD TEXAS FIRM REGISTRATION NO. 276

**90% EPA REVIEW**



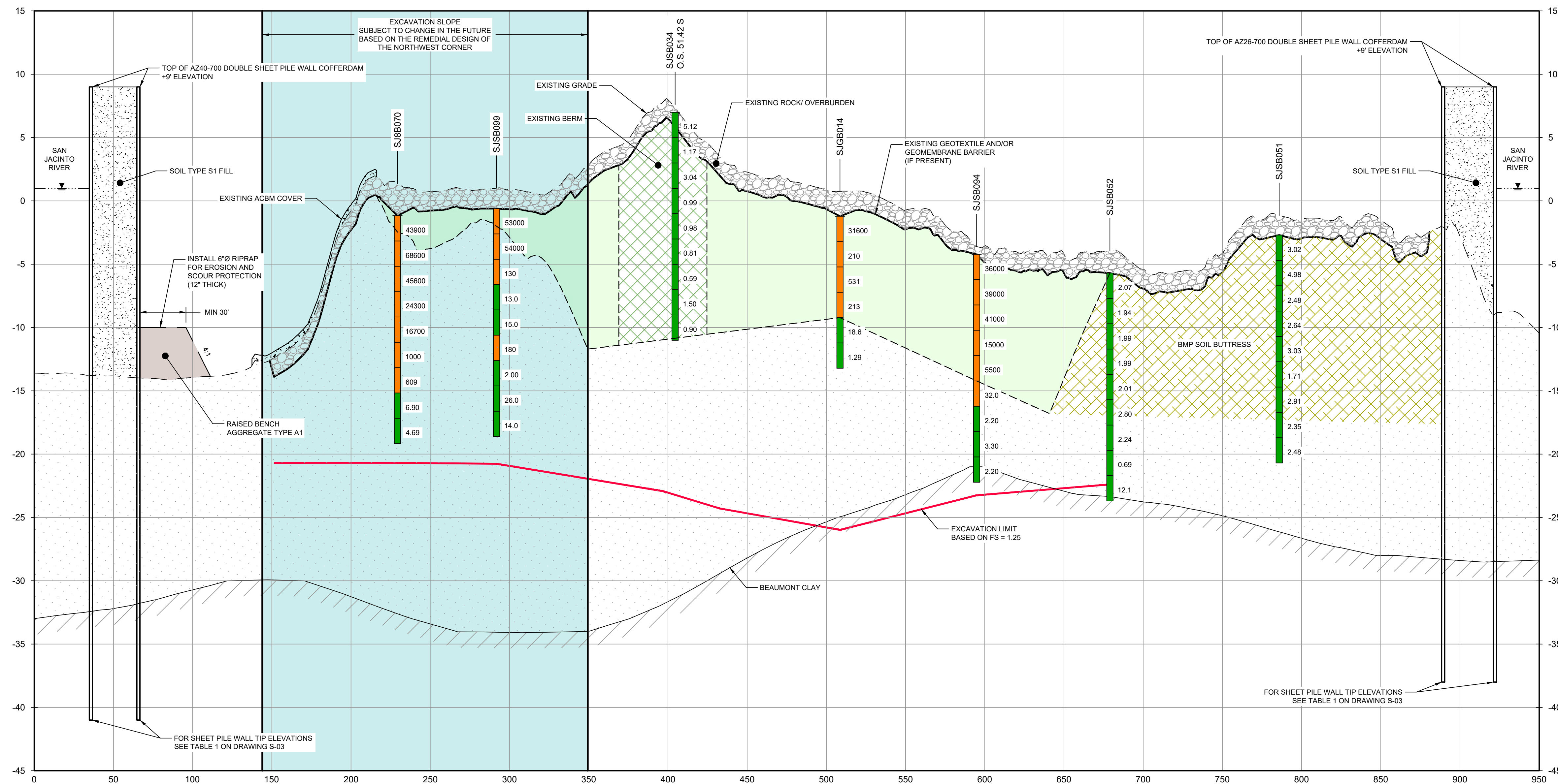
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	EXISTING BERM TO BE EXCAVATED
	BMP SOIL BUTTRISS



NOTES:  
1. BOTTOM OF EXCAVATION IS SUBJECT TO CHANGE.

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**GHD SERVICES INC.**  
JOB NO. 11215702 FILE NO. 001  
GHD TEXAS FIRM REGISTRATION NO. 276

Client: **SAN JACINTO RIVER WASTE PITS**  
Project: **NORTHERN IMPOUNDMENT PRE-FINAL 90% REMEDIAL DESIGN HARRIS COUNTY, TEXAS**

4	90% EPA REVIEW	MW	CM	06/27/2022
No.	Issue	Drawn	Approved	Date
Drawn MW		Designer RH		
Drafting Check JC		Design Check LL		
Project Coordinator CM		Date Jun 27, 2022		
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Original Size		Bar is one inch on original size drawing		
<b>Arch D</b>				

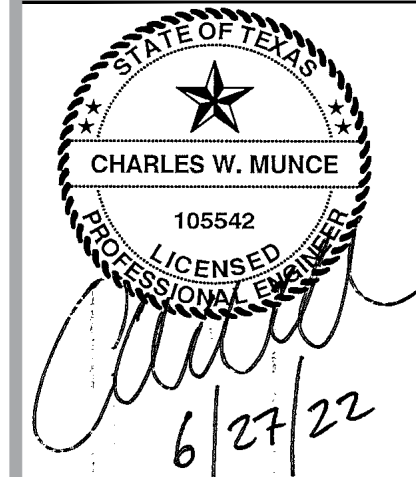
Project No. 11215702  
Title: **EXCAVATION SECTION 1 OF 6**

Sheet No. **C-13**

**90% EPA REVIEW**



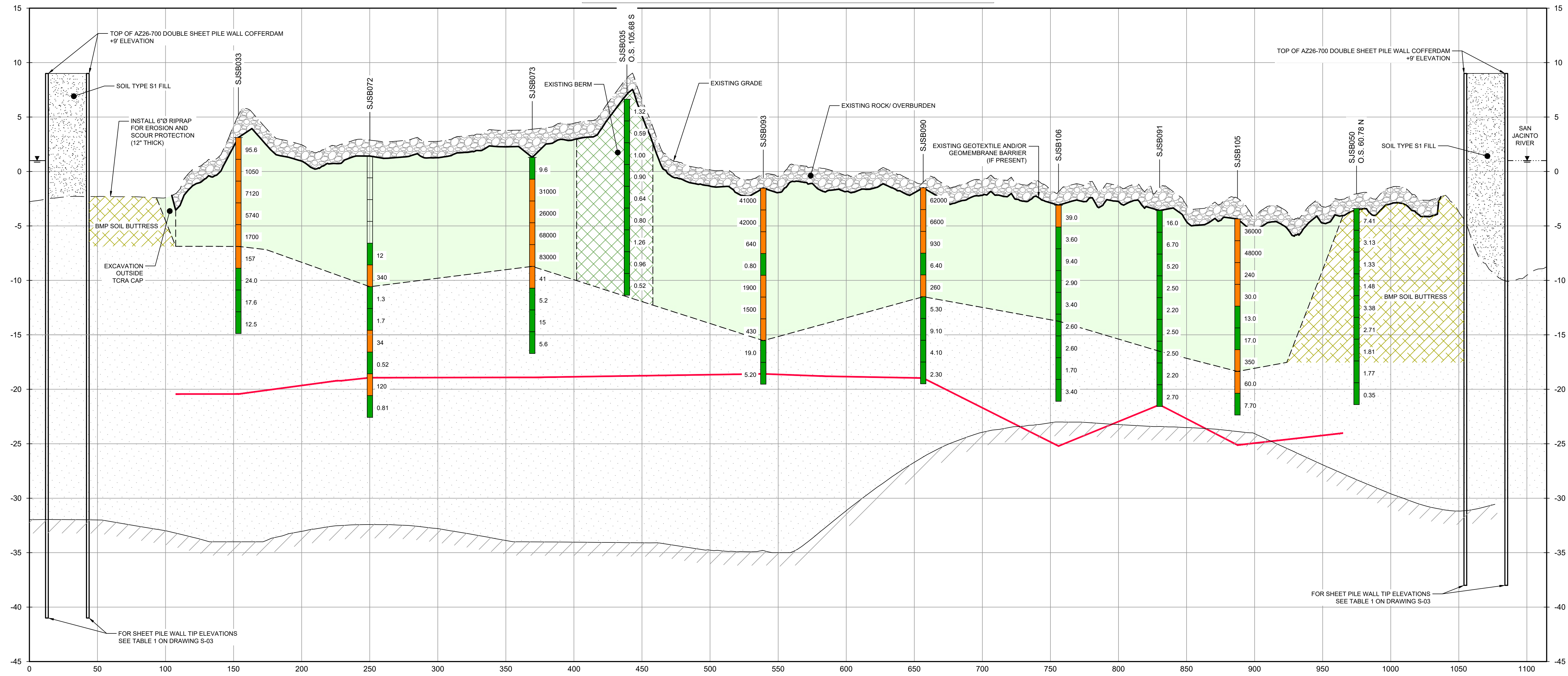
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**LEGEND**

	MATERIAL TO BE EXCAVATED
	EXISTING BERM TO BE EXCAVATED
	BMP SOIL BUTTRESS



**SECTION B WEST/EAST**  
HORIZ: 1"=40'  
VERT: 1"=5'

NOTES:  
1. BOTTOM OF EXCAVATION IS SUBJECT TO CHANGE.

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**GHD SERVICES INC.**  
JOB NO. 11215702 FILE NO. 001  
GHD TEXAS FIRM REGISTRATION NO. 276

Client: **SAN JACINTO RIVER WASTE PITS**  
Project: **NORTHERN IMPOUNDMENT PRE-FINAL 90% REMEDIAL DESIGN HARRIS COUNTY, TEXAS**

4	90% EPA REVIEW	MW	CM	06/27/2022
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Drawn	MW	Designer	RH
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Drafting	JC	Design	LL
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Project Coordinator	CM	Date	Jun 27, 2022
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Scale	AS SHOWN
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Original Size	Arch D	Bar is one inch on original size drawing
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Project No. 11215702

Title: **EXCAVATION SECTION 2 OF 6**

Sheet No.

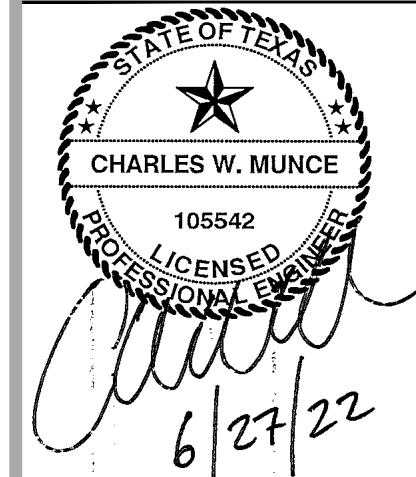
**C-14**

**90% EPA REVIEW**





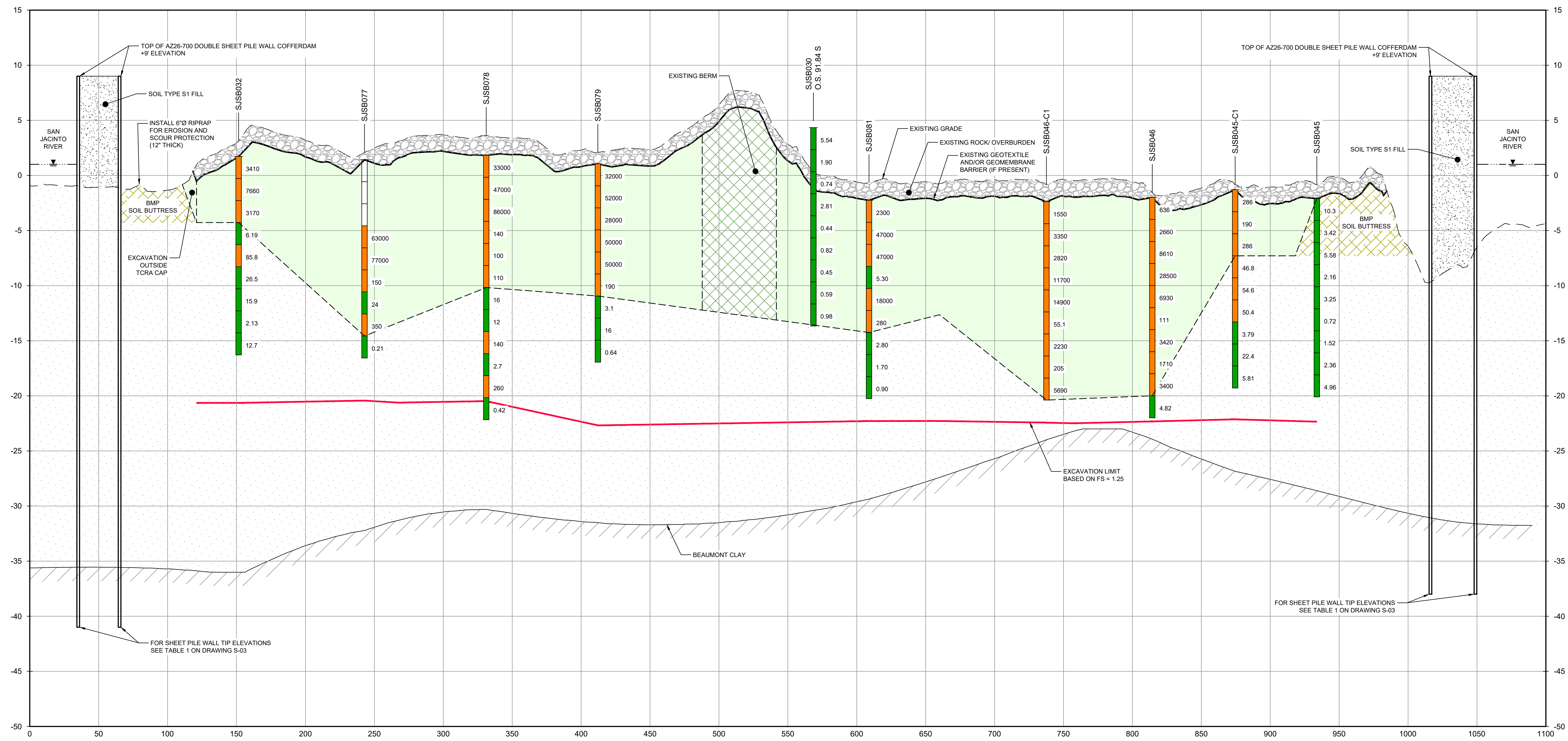
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**LEGEND**

	MATERIAL TO BE EXCAVATED
	EXISTING BERM TO BE EXCAVATED
	BMP SOIL BUTTRISS



SECTION **C** WEST/EAST  
HORIZ: 1"=40'  
VERT: 1"=5'

NOTES:  
1. BOTTOM OF EXCAVATION IS SUBJECT TO CHANGE.

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**GHD SERVICES INC.**  
JOB NO. 11215702 FILE NO. 001  
GHD TEXAS FIRM REGISTRATION NO. 276

**90% EPA REVIEW**

Client **SAN JACINTO RIVER WASTE PITS**  
Project **NORTHERN IMPOUNDMENT PRE-FINAL 90% REMEDIAL DESIGN HARRIS COUNTY, TEXAS**

4	90% EPA REVIEW	MW	CM	06/27/2022
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No.	Issue	Drawn	Approved	Date
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Drawn	MW	Designer	RH
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Drafting Check	JC	Design Check	LL
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Project Coordinator	CM	Date	Jun 27, 2022
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Original Size	Arch D	Scale	AS SHOWN
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Project No. 11215702

Title

**EXCAVATION SECTION 3 OF 6**

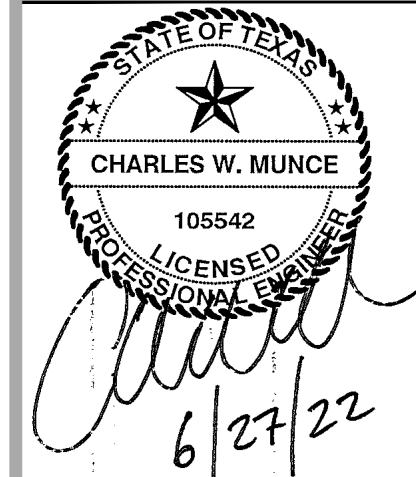
Sheet No.

**C-15**

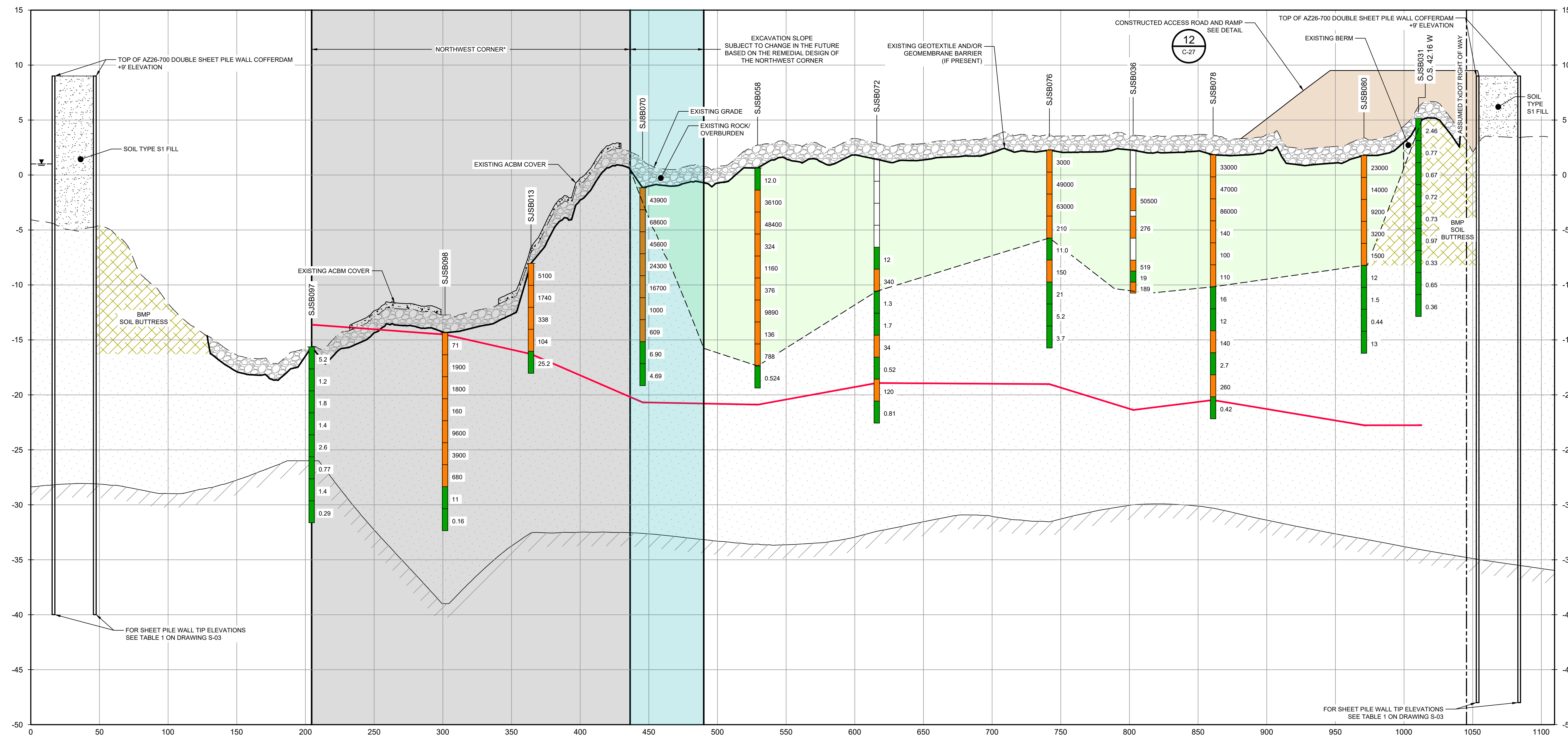
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**LEGEND**

	MATERIAL TO BE EXCAVATED
	EXISTING BERM TO BE EXCAVATED
	BMP SOIL BUTTRESS
	PLANNED IMPROVEMENTS FOR NORTHERN IMPOUNDMENT ACCESS

Client  
**SAN JACINTO RIVER WASTE PITS**

Project  
**NORTHERN IMPOUNDMENT PRE-FINAL 90% REMEDIAL DESIGN HARRIS COUNTY, TEXAS**

4 90% EPA REVIEW MW CM 06/27/2022

No.	Issue	Drawn	Approved	Date

Drawn MW Designer RH

Drafting JC Design Check LL

Project Coordinator CM Date Jun 27, 2022

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Scale AS SHOWN

Original Size

Arch D Bar is one inch on original size drawing 0 1"

Project No. 11215702

Title

**EXCAVATION SECTION**

**4 OF 6**

Sheet No.

**C-16**

Sheet - of -

"THE REMEDIAL DESIGN INFORMATION FOR THE NORTHWEST PORTION OF THE NORTHERN IMPOUNDMENT IS INCLUDED IN THIS SUBMITTAL. THE DESIGN TO DATE CONCLUDES THAT COMPLETING THE REMEDIAL ACTION "IN THE DRY" IN THE NORTHWEST PORTION OF THE NORTHERN IMPOUNDMENT AS STATED IN THE EPA RECORD OF DECISION IS NOT TECHNICALLY FEASIBLE DUE TO HYDRAULIC HEAVE. THE SUPPORTING TECHNICAL AND ENGINEERING BASIS FOR THIS CONCLUSION ARE INCLUDED IN THIS SUBMITTAL, AND AS SUCH, PENDING A FINAL EPA DETERMINATION REGARDING THIS AREA, IT IS ANTICIPATED THAT AN ADDENDUM TO THE PRE-FINAL 90% REMEDIAL DESIGN WILL BE SUBMITTED AT A FUTURE DATE TO ADDRESS THE NORTHWEST PORTION OF THE NORTHERN IMPOUNDMENT IN ACCORDANCE WITH EPA'S FINAL DETERMINATION AFTER REVIEW OF THIS NEWLY DEVELOPED SITE INFORMATION.

- NOTES:
1. ASSUMED TxDOT RIGHT OF WAY IS BASED ON INFORMATION PROVIDED BY THE HARRIS COUNTY TAX ASSESSOR'S OFFICE.
  2. BOTTOM OF EXCAVATION IS SUBJECT TO CHANGE.

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**GHD SERVICES INC.**

JOB NO. 11215702 FILE NO. 001

GHD TEXAS FIRM REGISTRATION NO. 276

**90% EPA REVIEW**

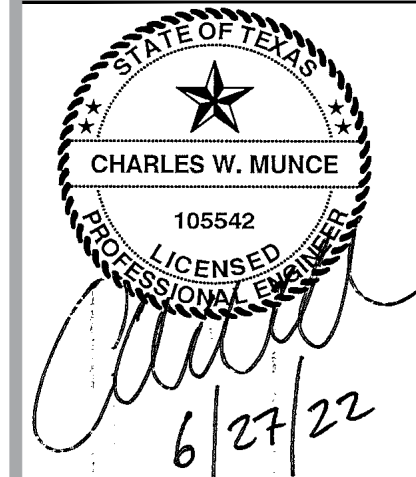
**SECTION D NORTH/SOUTH**

HORIZ: 1"=40'

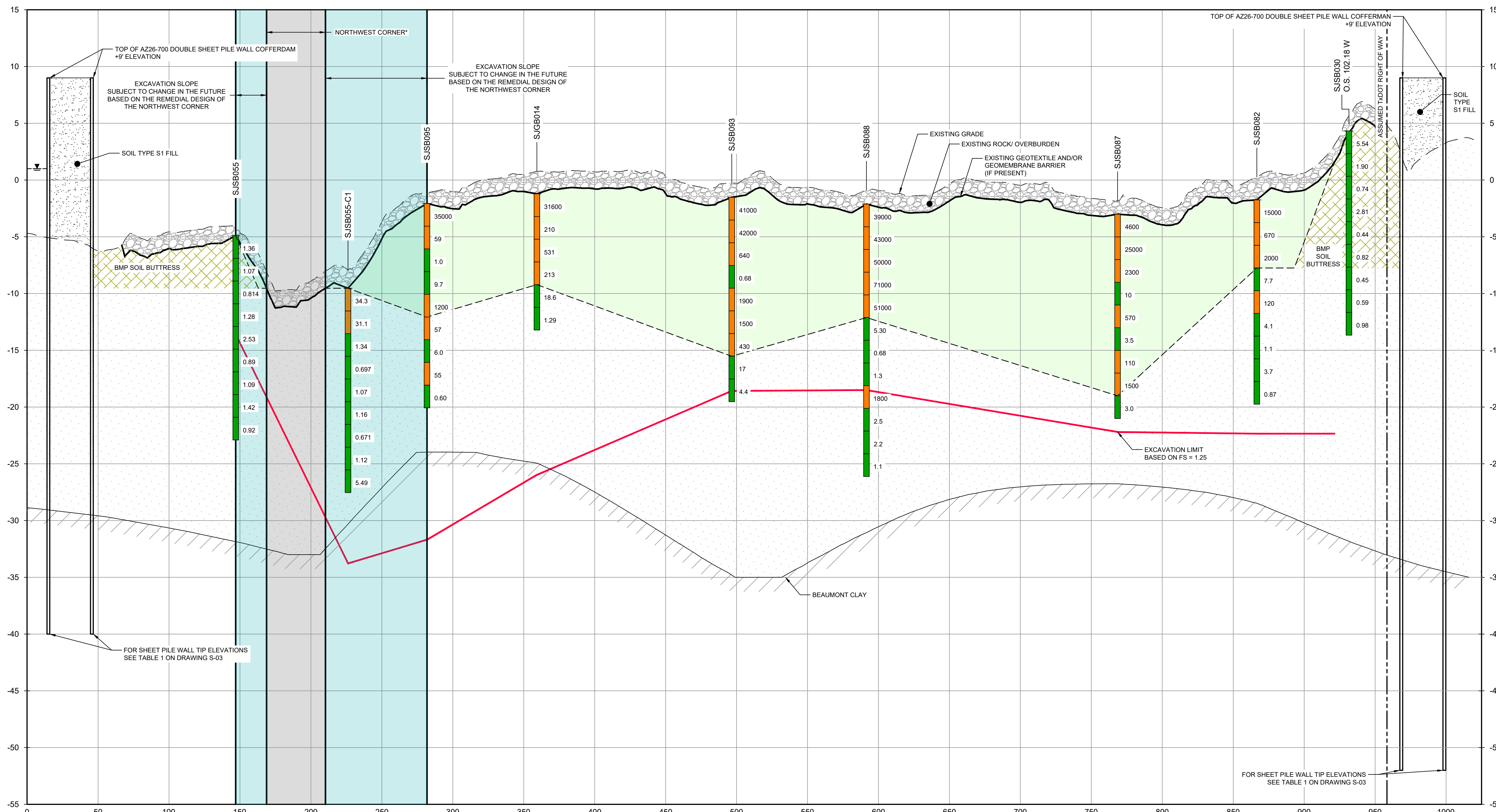
VERT: 1"=5'



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**LEGEND**

	MATERIAL TO BE EXCAVATED
	EXISTING BERM TO BE EXCAVATED
	BMP SOIL BUTTRESS
	PLANNED IMPROVEMENTS FOR NORTHERN IMPOUNDMENT ACCESS

Client  
**SAN JACINTO RIVER WASTE PITS**

Project  
**NORTHERN IMPOUNDMENT PRE-FINAL 90% REMEDIAL DESIGN HARRIS COUNTY, TEXAS**

4	90% EPA REVIEW	MW	CM	06/27/2022
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No.	Issue	Drawn	Approved	Date

Drawn	MW	Designer	RH
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Drafting	JC	Design	LL
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Project	CM	Date	Jun 27, 2022
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Original Size	Scale	AS SHOWN
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Original Size	Bar is one inch on original size drawing
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Arch	D
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Project No.	11215702
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Title	EXCAVATION SECTION 5 OF 6
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Sheet No.	C-17
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SECTION **E** NORTH/SOUTH  
C-08  
HORIZ: 1"=40'  
VERT: 1"=5'

"THE REMEDIAL DESIGN INFORMATION FOR THE NORTHWEST PORTION OF THE NORTHERN IMPOUNDMENT IS INCLUDED IN THIS SUBMITTAL. THE DESIGN TO DATE CONCLUDES THAT COMPLETING THE REMEDIAL ACTION "IN THE DRY" IN THE NORTHWEST PORTION OF THE NORTHERN IMPOUNDMENT AS STATED IN THE EPA RECORD OF DECISION IS NOT TECHNICALLY FEASIBLE DUE TO HYDRAULIC HEAVE. THE SUPPORTING TECHNICAL AND ENGINEERING BASIS FOR THIS CONCLUSION ARE INCLUDED IN THIS SUBMITTAL, AND AS SUCH, PENDING A FINAL EPA DETERMINATION REGARDING THIS AREA, IT IS ANTICIPATED THAT AN ADDENDUM TO THE PRE-FINAL 90% REMEDIAL DESIGN WILL BE SUBMITTED AT A FUTURE DATE TO ADDRESS THE NORTHWEST PORTION OF THE NORTHERN IMPOUNDMENT IN ACCORDANCE WITH EPA'S FINAL DETERMINATION AFTER REVIEW OF THIS NEWLY DEVELOPED SITE INFORMATION.

- NOTES:
1. ASSUMED TxDOT RIGHT OF WAY IS BASED ON INFORMATION PROVIDED BY THE HARRIS COUNTY TAX ASSESSOR'S OFFICE.
  2. BOTTOM OF EXCAVATION IS SUBJECT TO CHANGE.

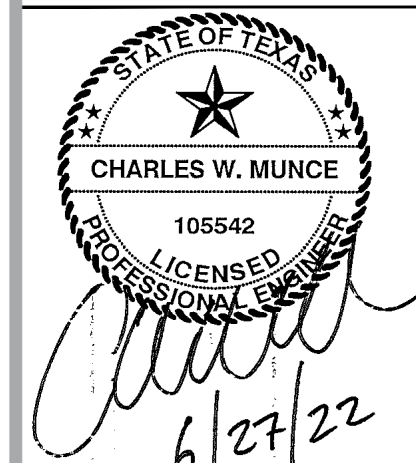
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**GHD SERVICES INC.**  
JOB NO. 11215702 FILE NO. 001  
GHD TEXAS FIRM REGISTRATION NO. 276

**90% EPA REVIEW**



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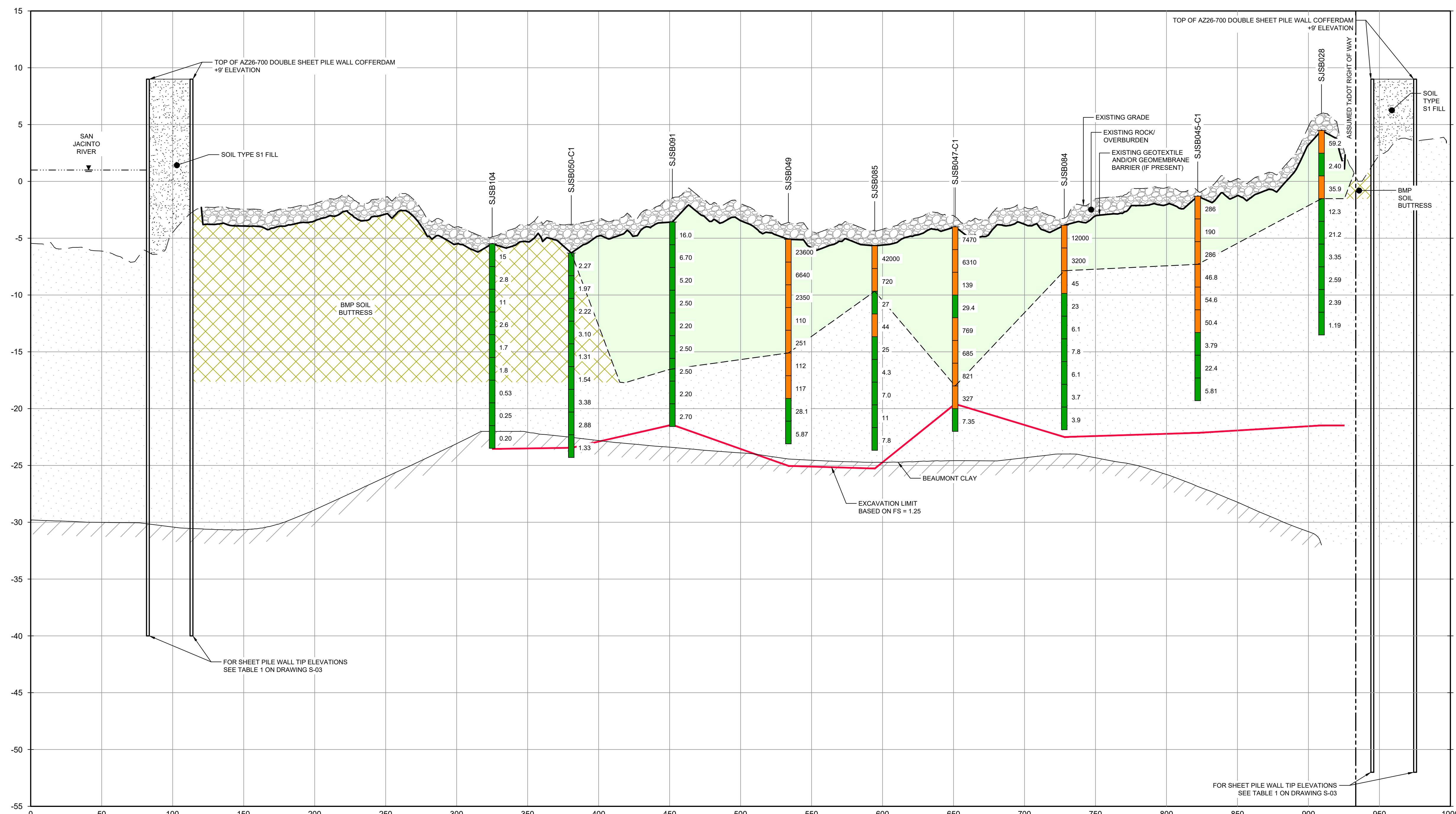
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**LEGEND**  
  
 MATERIAL TO BE EXCAVATED  
 BMP SOIL BUTTRESS

Client **SAN JACINTO RIVER WASTE PITS**  
 Project **NORTHERN IMPOUNDMENT PRE-FINAL 90% REMEDIAL DESIGN HARRIS COUNTY, TEXAS**

4	90% EPA REVIEW	MW	CM	06/27/2022
No.	Issue	Drawn	Approved	Date
Drawn	MW	Designer	RH	
Drafting Check	JC	Design Check	LL	
Project Coordinator	CM	Date	Jun 27, 2022	
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Original Size	Bar is one inch on original size drawing 0 1"			

Project No. **11215702**  
 Title **EXCAVATION SECTION 6 OF 6**  
 Sheet No. **C-18**



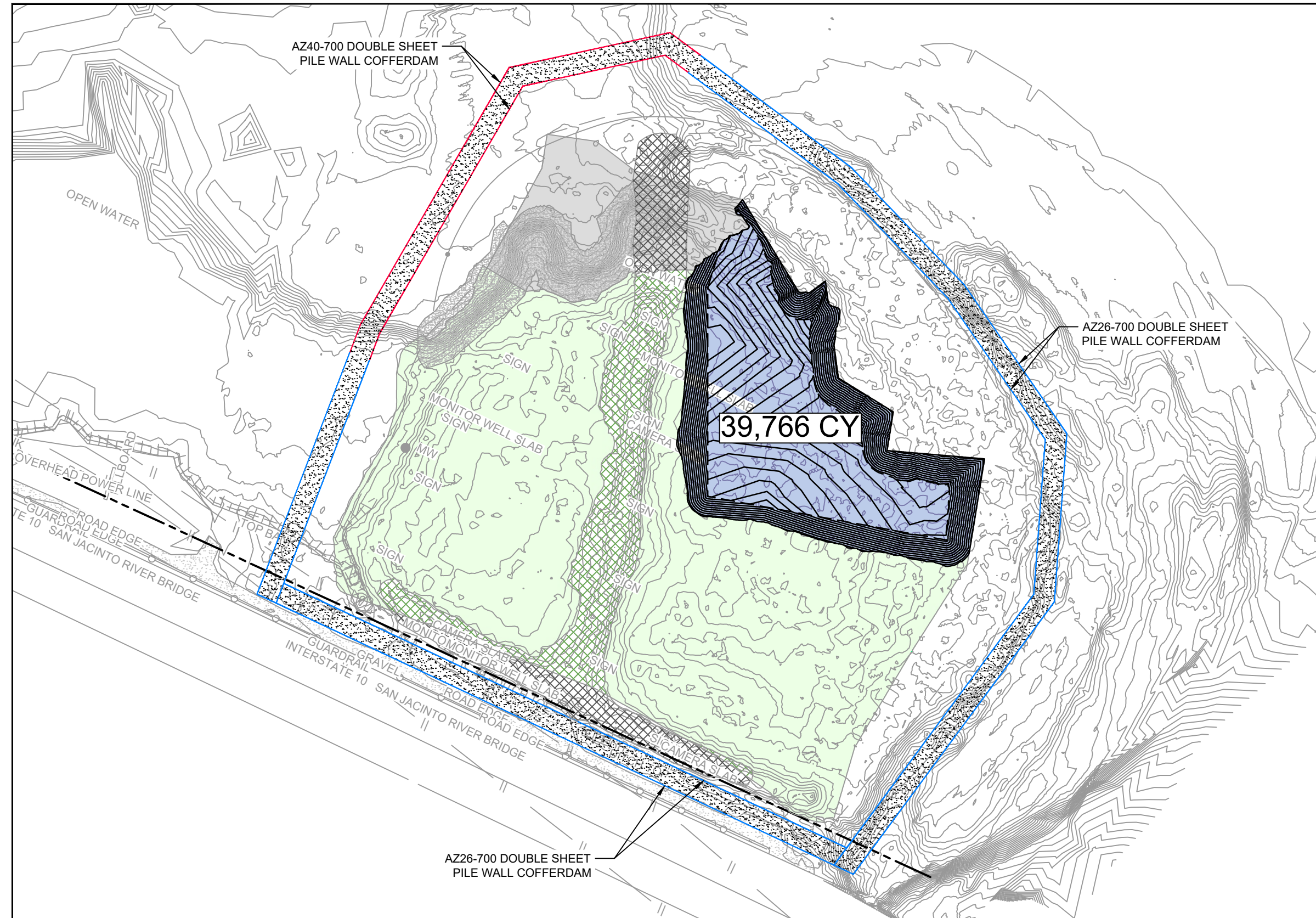
**SECTION F NORTH/SOUTH**  
 C-08  
 HORIZ: 1"=40'  
 VERT: 1"=5'

- NOTES:
- ASSUMED TxDOT RIGHT OF WAY IS BASED ON INFORMATION PROVIDED BY THE HARRIS COUNTY TAX ASSESSOR'S OFFICE.
  - BOTTOM OF EXCAVATION IS SUBJECT TO CHANGE.

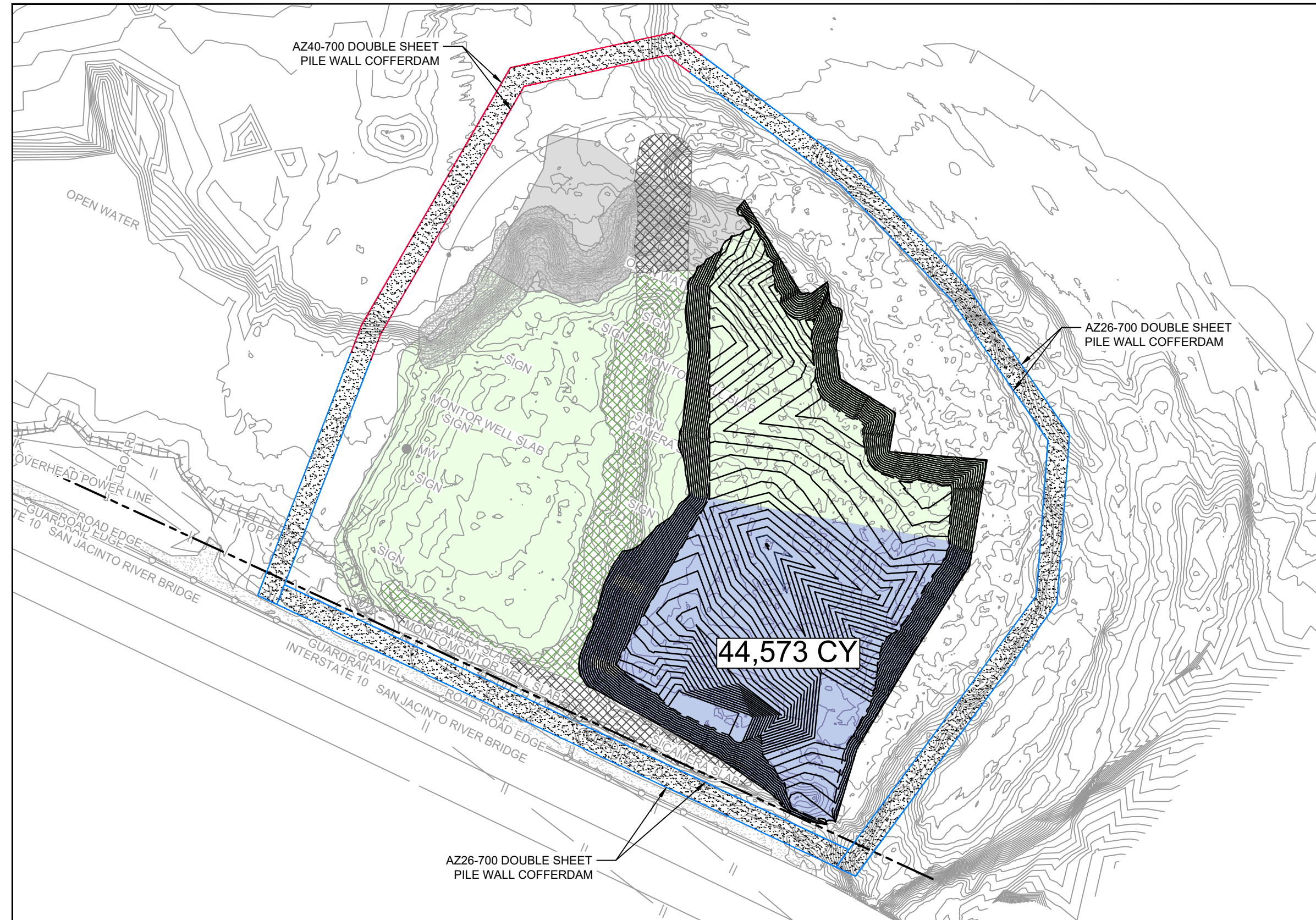
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**GHD SERVICES INC.**  
 JOB NO. 11215702 FILE NO. 001  
 GHD TEXAS FIRM REGISTRATION NO. 276

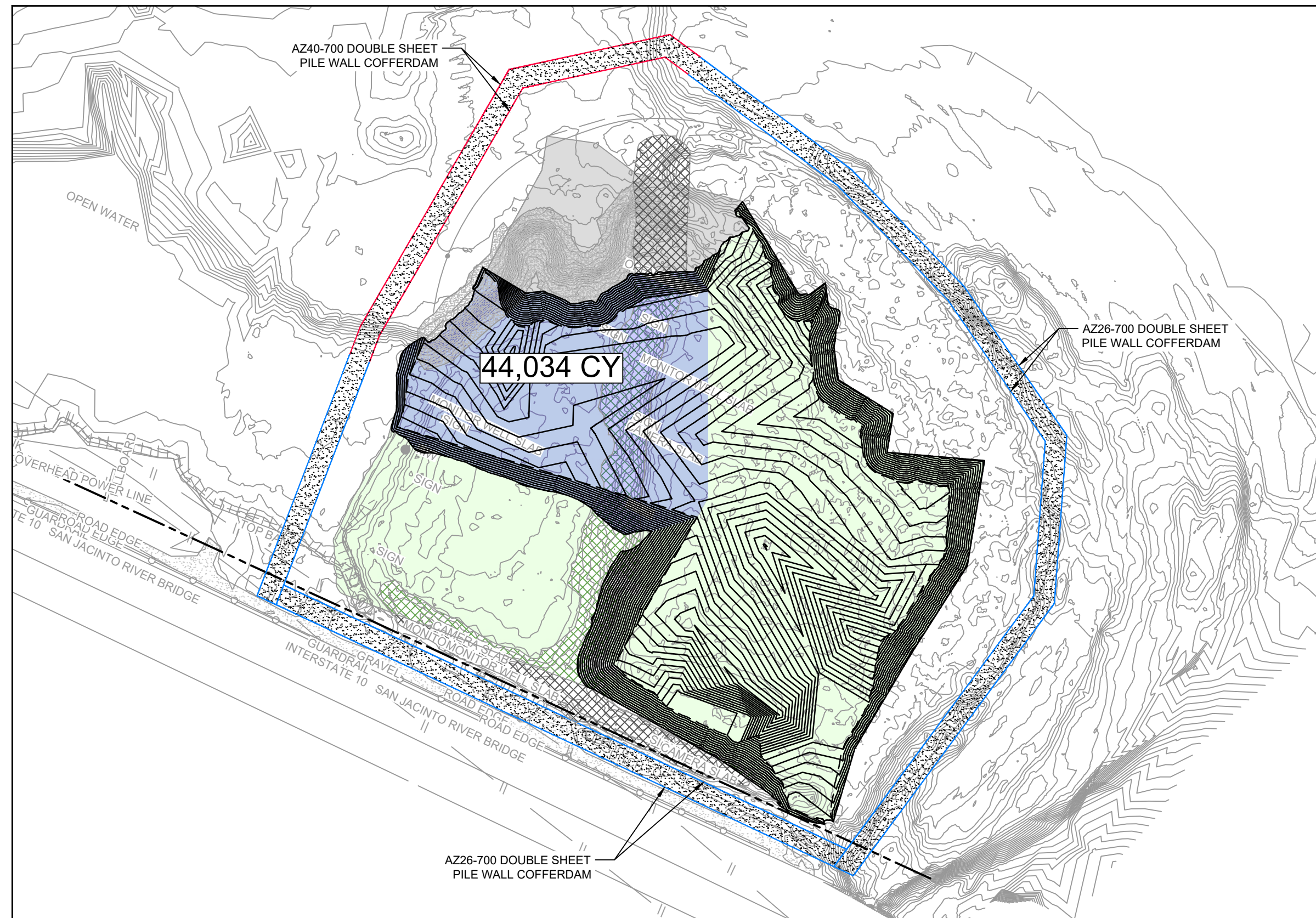
**90% EPA REVIEW**



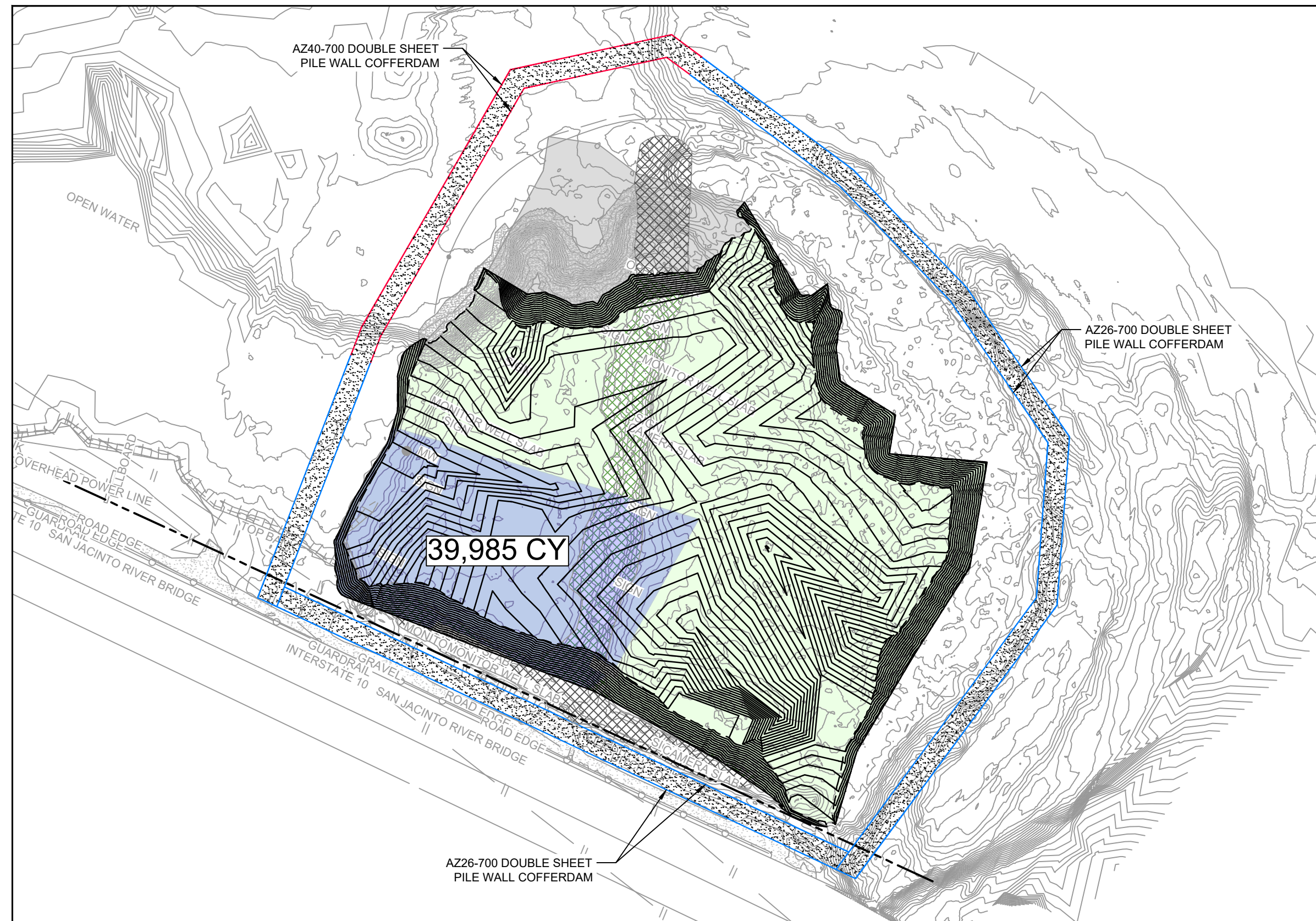
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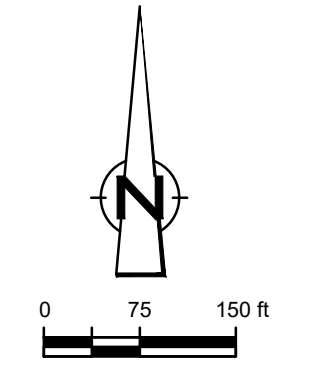
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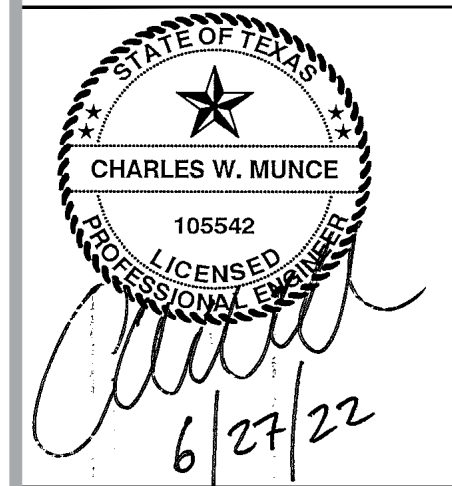
YEAR 5



YEAR 6



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**LEGEND**

---	ASSUMED TxDOT RIGHT OF WAY
---	TORA CAP PERIMETER
---	EXISTING CONTOUR INTERVAL
---	FENCELINE
---	SHORELINE
---	TOP OF BANK
---	TOE OF SLOPE
---	OVERHEAD ELECTRICAL
---	GUARDRAIL
---	PIPELINE
---	BORING LOCATION
---	MONITORING WELL
---	POWER POLE
---	LIGHT POLE
---	WELL
---	MATERIAL TO BE EXCAVATED
---	EXISTING BERM TO EXCAVATED
---	EXISTING BERM
---	NORTHWEST CORNER*
---	CONCRETE
---	GRAVEL
---	AZ26-700 PILE
---	AZ40-700 PILE
---	PHASE OF EXCAVATION

Client  
**SAN JACINTO RIVER WASTE PITS**

Project  
**NORTHERN IMPOUNDMENT PRE-FINAL 90% REMEDIAL DESIGN HARRIS COUNTY, TEXAS**

2	90% EPA REVIEW	MW	CM	06/27/2022
No.	Issue	Drawn	Approved	Date
Drawn	MW	Designer	RH	
Drafting	JC	Design	LL	
Check		Check		
Project Coordinator	CM	Date	Jun 27, 2022	
Original Size		Scale	1" = 150'	
Arch D		Bar is one inch on original size drawing	0	1"

Project No. 11215702

Title  
**TYPICAL SEASONAL EXCAVATION SEQUENCING**

Sheet No.

C-19

SOURCE:  
TOPOGRAPHIC, HYDROGRAPHIC, & MAGNETOMETER SURVEY OF SAN JACINTO RIVER WASTE PITS, HARRIS COUNTY, TEXAS, MORRISON SURVEYING INC., 190606, JULY 8, 2019 TO AUGUST 2, 2019  
UPDATED BATHYMETRY DATA PROVIDED BY ANCHOR QEA OCTOBER 2021

NOTES:  
1. ASSUMED TxDOT RIGHT OF WAY IS BASED ON INFORMATION PROVIDED BY THE HARRIS COUNTY TAX ASSESSOR'S OFFICE.  
2. TYPICAL EXCAVATION SEQUENCING ASSUMES BMP INSTALLATION AND SITE PREPARATION WILL BE COMPLETED IN YEAR 1, REMEDIATION OF THE NORTHWEST CORNER IN YEAR 2, AND BMP REMOVAL AND SITE RESTORATION WILL BE COMPLETED IN YEAR 7.  
3. SEASONAL EXCAVATION AREAS, VOLUMES, AND SEQUENCING ARE APPROXIMATE AND SUBJECT TO CHANGE.

\*THE REMEDIAL DESIGN INFORMATION FOR THE NORTHWEST PORTION OF THE NORTHERN IMPOUNDMENT IS INCLUDED IN THIS SUBMITTAL. THE DESIGN TO DATE CONCLUDES THAT COMPLETING THE REMEDIAL ACTION "IN THE DRY" IN THE NORTHWEST PORTION OF THE NORTHERN IMPOUNDMENT AS STATED IN THE EPA RECORD OF DECISION IS NOT TECHNICALLY FEASIBLE DUE TO HYDRAULIC HEAVE. THE SUPPORTING TECHNICAL AND ENGINEERING BASIS FOR THIS CONCLUSION ARE INCLUDED IN THIS SUBMITTAL, AND AS SUCH, PENDING A FINAL EPA DETERMINATION REGARDING THIS AREA, IT IS ANTICIPATED THAT AN ADDENDUM TO THE PRE-FINAL 90% REMEDIAL DESIGN WILL BE SUBMITTED AT A FUTURE DATE TO ADDRESS THE NORTHWEST PORTION OF THE NORTHERN IMPOUNDMENT IN ACCORDANCE WITH EPA'S FINAL DETERMINATION AFTER REVIEW OF THIS NEWLY DEVELOPED SITE INFORMATION.

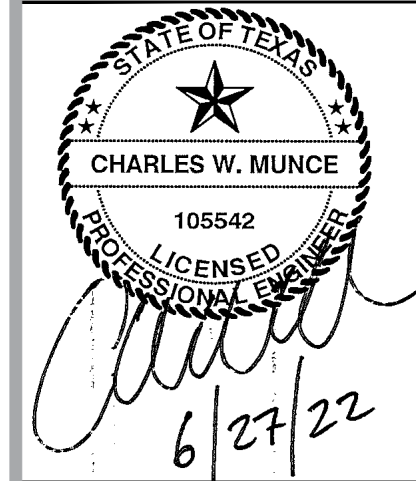
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**GHD SERVICES INC.**  
JOB NO. 11215702 FILE NO. 001  
GHD TEXAS FIRM REGISTRATION NO. 276

**90% EPA REVIEW**



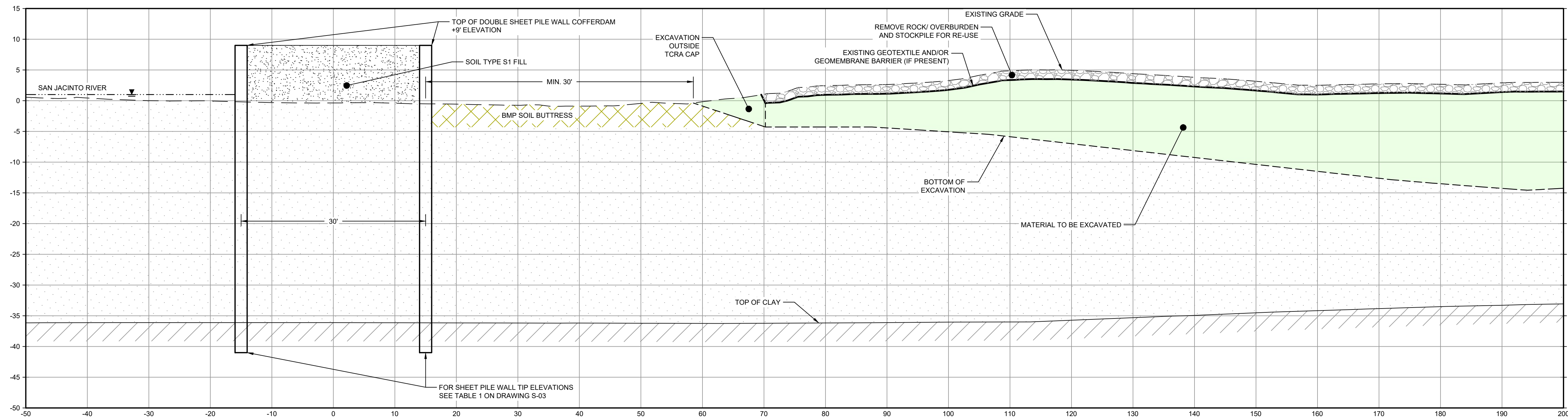
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LEGEND

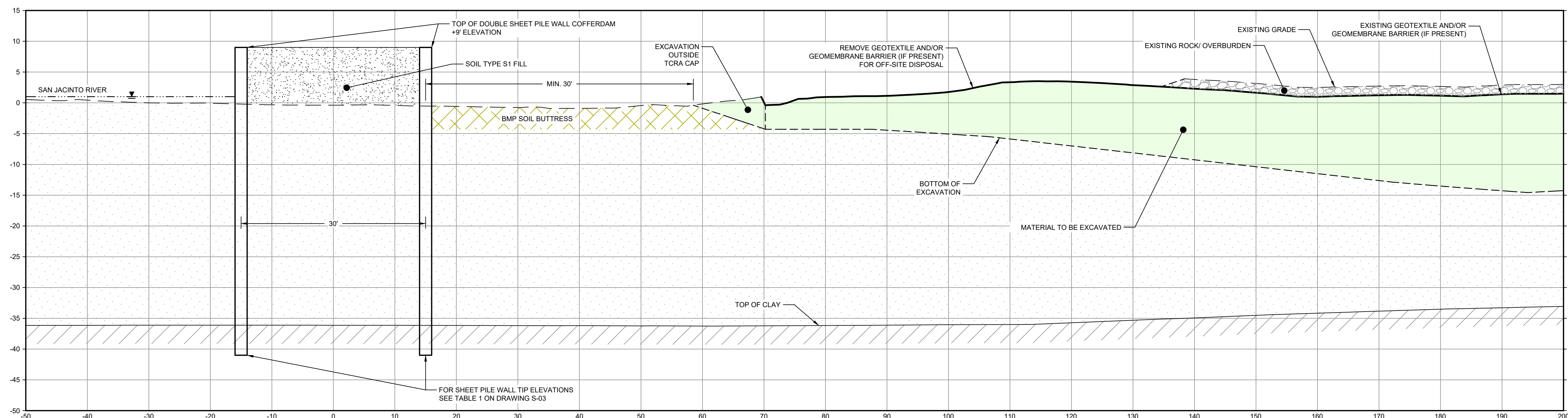
- MATERIAL TO BE EXCAVATED
- BMP SOIL BUTTRISS



NOTES:

1. INSTALL PILE WALL COFFERDAM AROUND PERIMETER OF EXCAVATION AND DEWATER.

**PHASE 1**  
1" = 10'



NOTES:

1. REMOVE ROCK LAYER TO BE STOCKPILED ON SITE. REUSED AS TEMPORARY COVER AT END OF SEASONAL EXCAVATION.

**PHASE 2**  
1" = 10'

NOTES:

1. BOTTOM OF EXCAVATION IS SUBJECT TO CHANGE.

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**90% EPA REVIEW**

Client  
**SAN JACINTO RIVER WASTE PITS**

Project  
**NORTHERN IMPOUNDMENT PRE-FINAL 90% REMEDIAL DESIGN HARRIS COUNTY, TEXAS**

2	90% EPA REVIEW	MW	CM	06/27/2022
No.	Issue	Drawn	Approved	Date
Drawn	MW	Designer	RH	
Drafting Check	JC	Design Check	LL	
Project Coordinator	CM	Date	Jun 27, 2022	

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Original Size  
**Arch D**  
Scale **AS SHOWN**  
Bar is one inch on original size drawing  
0 1"

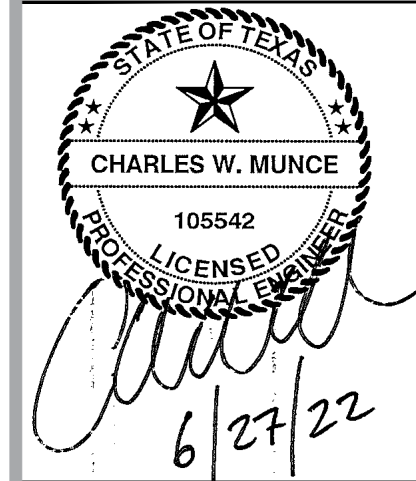
Project No. **11215702**  
Title

**TYPICAL EXCAVATION SEQUENCING**  
**1 OF 2**

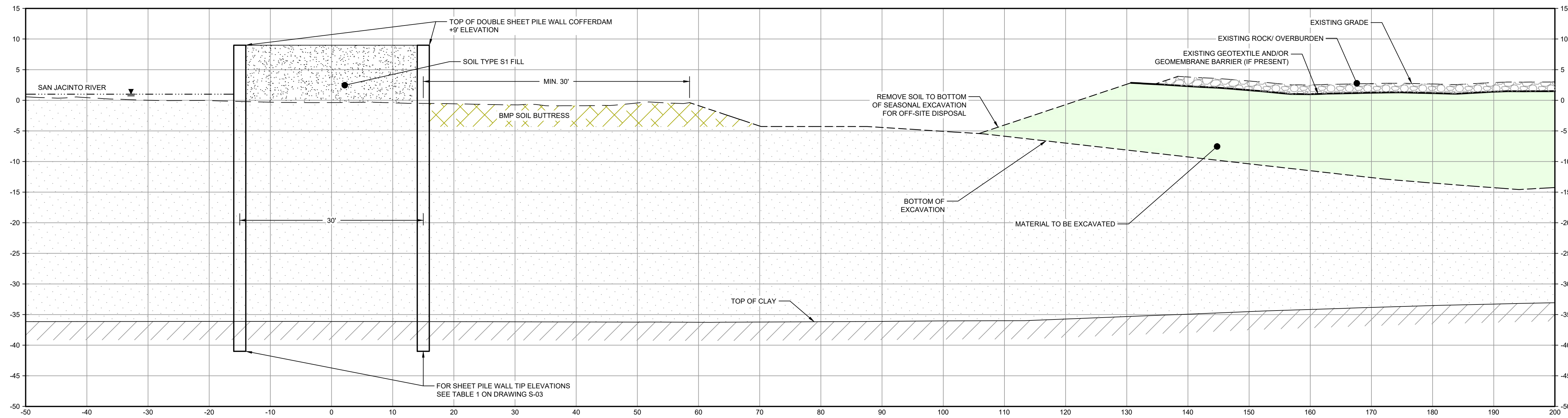
Sheet No.  
**C-20**



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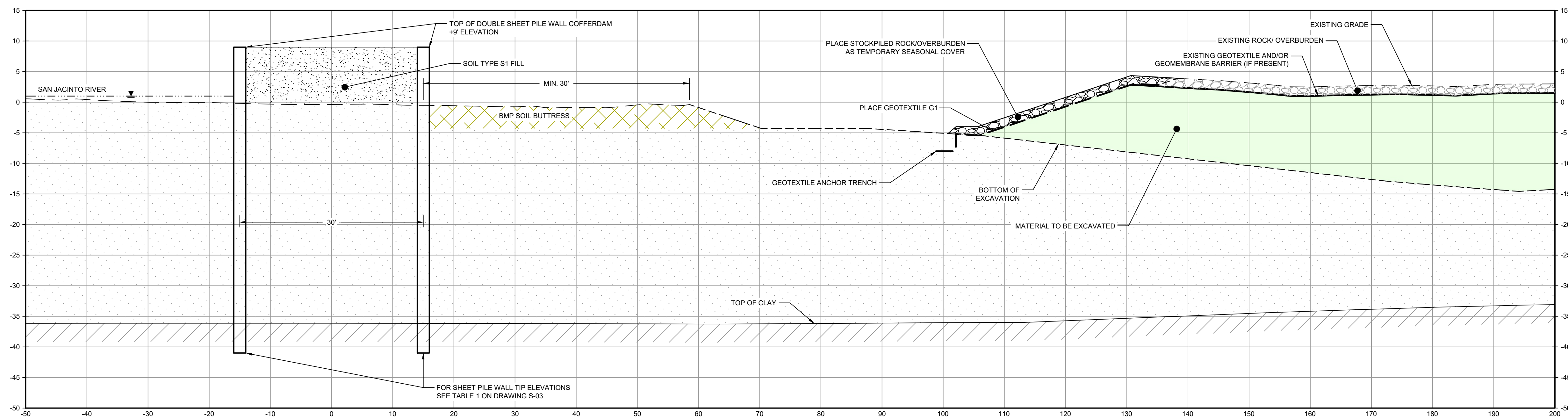
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NOTES:

1. REMOVE GEOMEMBRANE, EXCAVATE MATERIAL AND DISPOSE OF OFFSITE.

**PHASE 3**  
1" = 10'



- NOTES:
1. BOTTOM OF EXCAVATION IS SUBJECT TO CHANGE.

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JOB NO. 11215702 FILE NO. 001  
GHD TEXAS FIRM REGISTRATION NO. 276

LEGEND

	MATERIAL TO BE EXCAVATED
	BMP SOIL BUTTRESS

Client: **SAN JACINTO RIVER WASTE PITS**  
Project: **NORTHERN IMPOUNDMENT PRE-FINAL 90% REMEDIAL DESIGN HARRIS COUNTY, TEXAS**

2	90% EPA REVIEW	MW	CM	06/27/2022
No.	Issue	Drawn	Approved	Date
Drawn	MW	Designer	RH	
Drafting Check	JC	Design Check	LL	
Project Coordinator	CM	Date	Jun 27, 2022	
Original Size	Scale			AS SHOWN
Arch D	Bar is one inch on original size drawing			0 1"

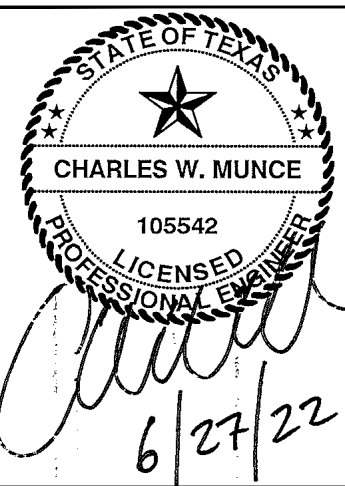
Project No. 11215702  
Title: **TYPICAL EXCAVATION SEQUENCING 2 OF 2**

Sheet No. **C-21**  
Sheet - of -

**90% EPA REVIEW**



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**LEGEND**

---	ASSUMED TxDOT RIGHT OF WAY
---	TORA CAP PERIMETER
---	EXISTING CONTOUR INTERVAL
---	FENCELINE
---	SHORELINE
---	TOP OF BANK
---	TOE OF SLOPE
---	OVERHEAD ELECTRICAL
---	GUARDRAIL
---	PIPELINE
●	BORING LOCATION
●	MONITORING WELL
●	POWER POLE
●	LIGHT POLE
○	WELL
---	CONCRETE
---	GRAVEL
---	AZ26-700 PILE
---	AZ40-700 PILE
---	RESTORED AREA INCLUDING TOPSOIL PLACEMENT AND SEEDING TO RIVER LEVEL

Client  
**SAN JACINTO RIVER WASTE PITS**

Project  
**NORTHERN IMPOUNDMENT PRE-FINAL 90% REMEDIAL DESIGN HARRIS COUNTY, TEXAS**

2	90% EPA REVIEW	MW	CM	06/27/2022
No.	Issue	Drawn	Approved	Date
Drawn	MW	Designer	RH	
Drafting	JC	Design	LL	
Check		Check		
Project	CM	Date	Jun 27, 2022	
Coordinator		Scale	1" = 60'	

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 Original Size  
**Arch D**  
 Bar is one inch on original size drawing  
 0 1"

Project No. **11215702**  
 Title

**RESTORATION PLAN**

Sheet No.

**C-22**

Sheet - of -

SOURCE:  
 TOPOGRAPHIC, HYDROGRAPHIC, & MAGNETOMETER SURVEY OF SAN JACINTO RIVER WASTE PITS, HARRIS COUNTY, TEXAS, MORRISON SURVEYING INC., 190608, JULY 8, 2019 TO AUGUST 2, 2019  
 UPDATED BATHYMETRY DATA PROVIDED BY ANCHOR GEA OCTOBER 2021

NOTES:  
 1. ASSUMED TxDOT RIGHT OF WAY IS BASED ON INFORMATION PROVIDED BY THE HARRIS COUNTY TAX ASSESSOR'S OFFICE  
 2. FINAL EXCAVATION CONTOURS ARE SUBJECT TO CHANGE.

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**90% EPA REVIEW**





YEAR 1 - BMP INSTALLATION AND SITE PREPARATION



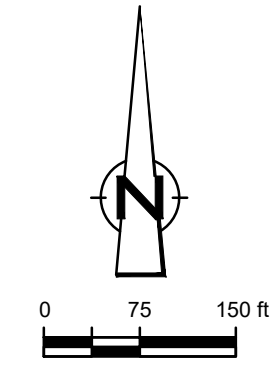
YEAR 2 - EXCAVATION SEASON 1



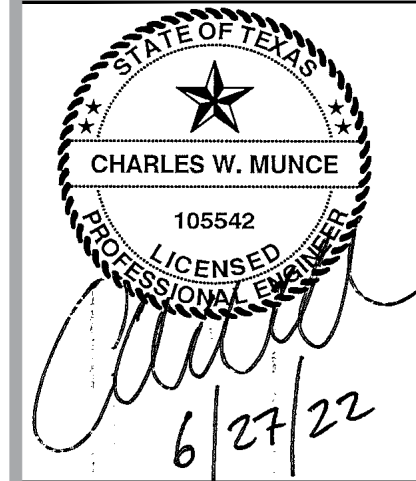
YEAR 3 - EXCAVATION SEASON 2



YEAR 4 - EXCAVATION SEASON 3



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LEGEND	
---	ASSUMED TxDOT RIGHT OF WAY
---	TORA CAP PERIMETER
---	EXISTING CONTOUR INTERVAL
---	FENCELINE
---	SHORELINE
---	TOP OF BANK
---	TOE OF SLOPE
---	OVERHEAD ELECTRICAL
---	GUARDRAIL
---	PIPELINE
●	BORING LOCATION
●	MONITORING WELL
●	POWER POLE
●	LIGHT POLE
○	WELL
█	MATERIAL TO BE EXCAVATED
█	EXISTING BERM TO EXCAVATED
█	EXISTING BERM
█	NORTHWEST CORNER*
█	CONCRETE
█	GRAVEL
█	AZ26-700 PILE
█	AZ40-700 PILE
█	PHASE OF EXCAVATION

Client  
**SAN JACINTO RIVER WASTE PITS**

Project  
**NORTHERN IMPOUNDMENT PRE-FINAL 90% REMEDIAL DESIGN HARRIS COUNTY, TEXAS**

No.	Issue	Drawn	Approved	Date
2	90% EPA REVIEW	MW	CM	06/27/2022
Drawn		MW	Designer RH	
Drafting Check		JC	Design Check LL	
Project Coordinator		CM	Date Jun 27, 2022	
Original Size		This document shall not be used for construction unless signed and sealed for construction.		
Arch D		Scale 1" = 150'		
		Bar is one inch on original size drawing		

Project No. 11215702

Title

**TYPICAL CONSTRUCTION SEQUENCING 1 OF 2**

Sheet No.

**C-23**

SOURCE:  
TOPOGRAPHIC, HYDROGRAPHIC, & MAGNETOMETER SURVEY OF SAN JACINTO RIVER WASTE PITS, HARRIS COUNTY, TEXAS, MORRISON SURVEYING INC., 190608, JULY 8, 2010 TO AUGUST 2, 2019  
UPDATED BATHYMETRY DATA PROVIDED BY ANCHOR O&A OCTOBER 2021

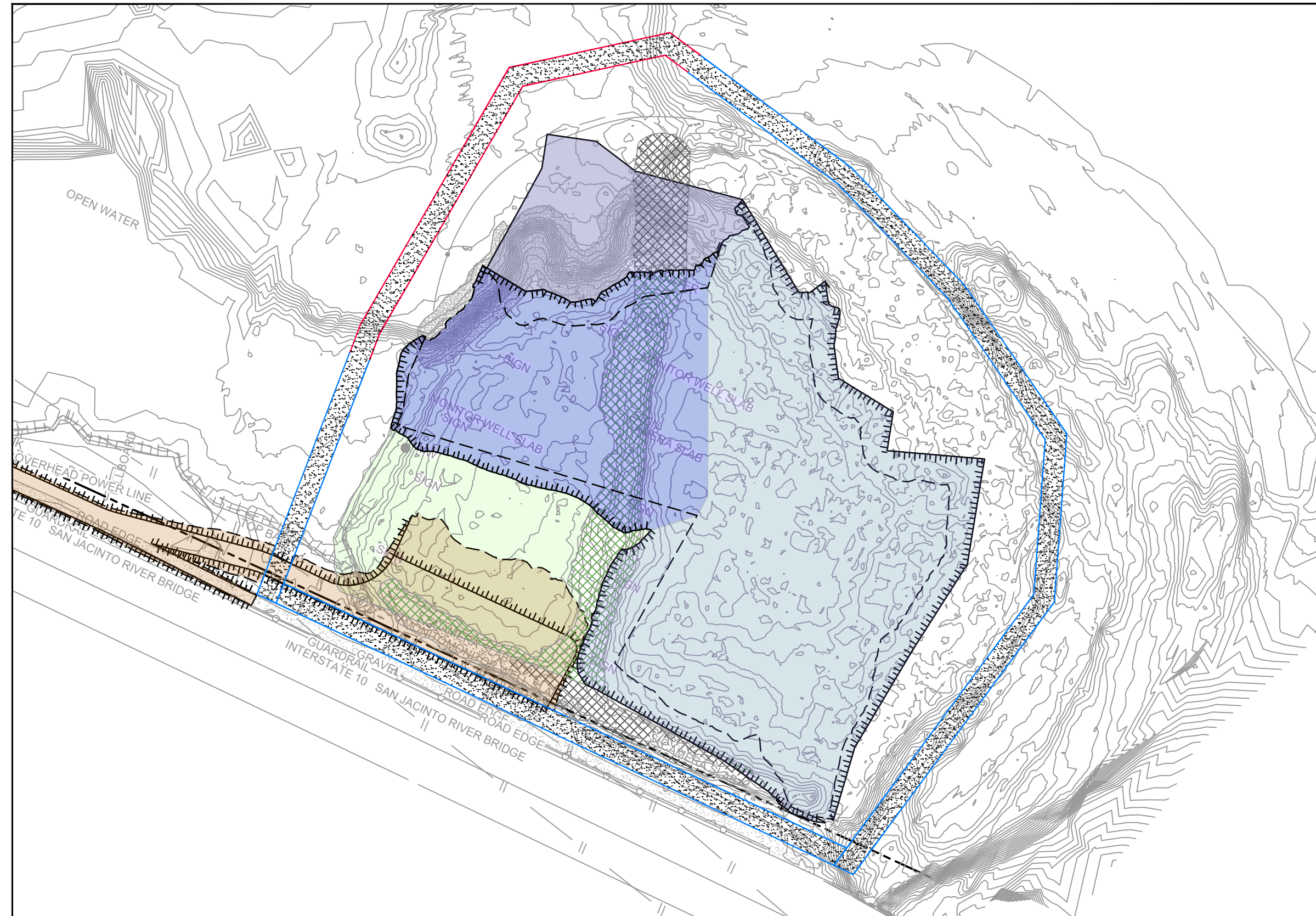
NOTES:  
1. ASSUMED TxDOT RIGHT OF WAY IS BASED ON INFORMATION PROVIDED BY THE HARRIS COUNTY TAX ASSESSOR'S OFFICE.  
2. SEASONAL EXCAVATION AREAS, VOLUMES, AND SEQUENCING ARE APPROXIMATE AND SUBJECT TO CHANGE.

\*THE REMEDIAL DESIGN INFORMATION FOR THE NORTHWEST PORTION OF THE NORTHERN IMPOUNDMENT IS INCLUDED IN THIS SUBMITTAL. THE DESIGN TO DATE CONCLUDES THAT COMPLETING THE REMEDIAL ACTION "IN THE DRY" IN THE NORTHWEST PORTION OF THE NORTHERN IMPOUNDMENT AS STATED IN THE EPA RECORD OF DECISION IS NOT TECHNICALLY FEASIBLE DUE TO HYDRAULIC HEAVE. THE SUPPORTING TECHNICAL AND ENGINEERING BASIS FOR THIS CONCLUSION ARE INCLUDED IN THIS SUBMITTAL, AND AS SUCH, PENDING A FINAL EPA DETERMINATION REGARDING THIS AREA, IT IS ANTICIPATED THAT AN ADDENDUM TO THE PRE-FINAL 90% REMEDIAL DESIGN WILL BE SUBMITTED AT A FUTURE DATE TO ADDRESS THE NORTHWEST PORTION OF THE NORTHERN IMPOUNDMENT IN ACCORDANCE WITH EPA'S FINAL DETERMINATION AFTER REVIEW OF THIS NEWLY DEVELOPED SITE INFORMATION.

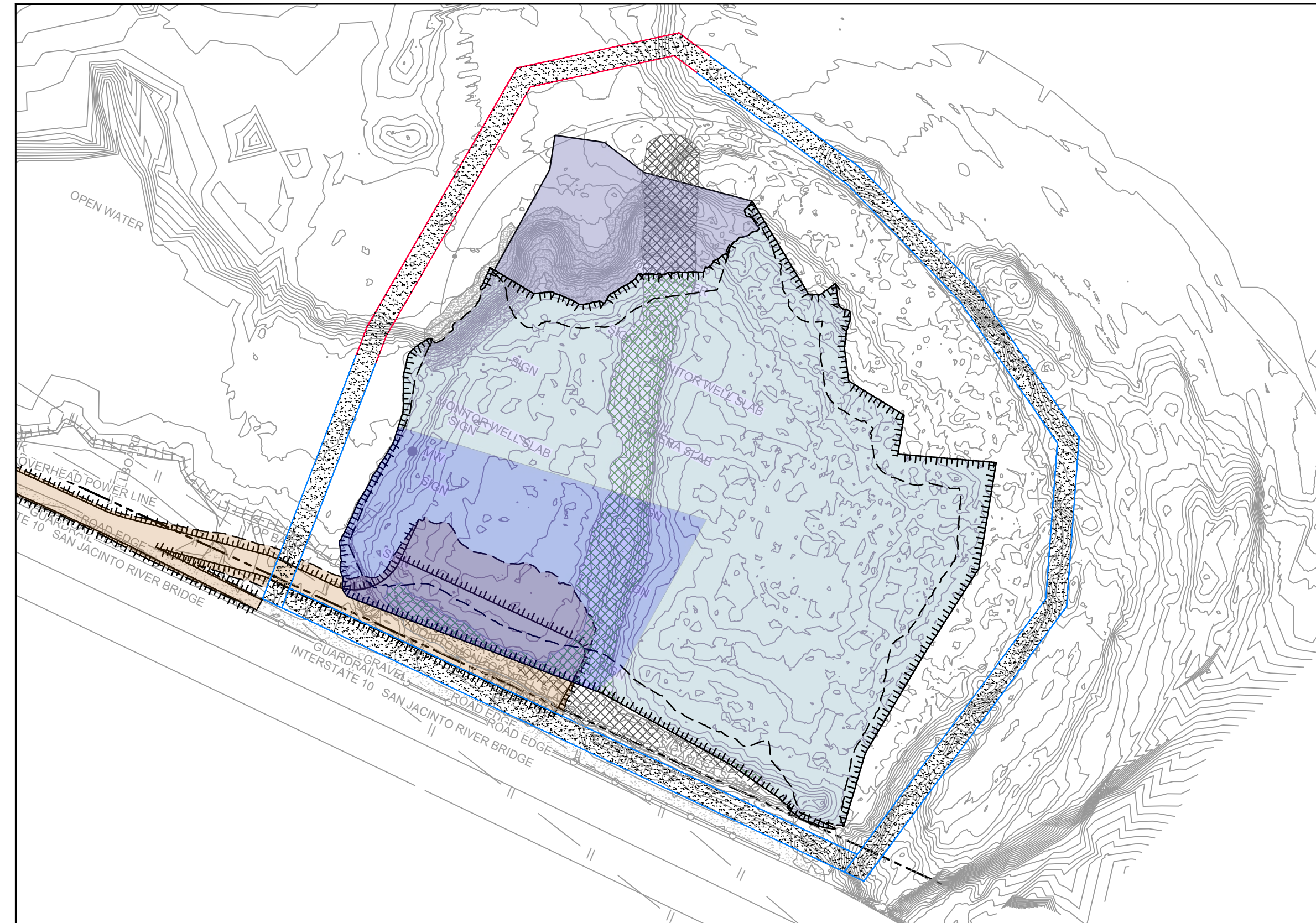
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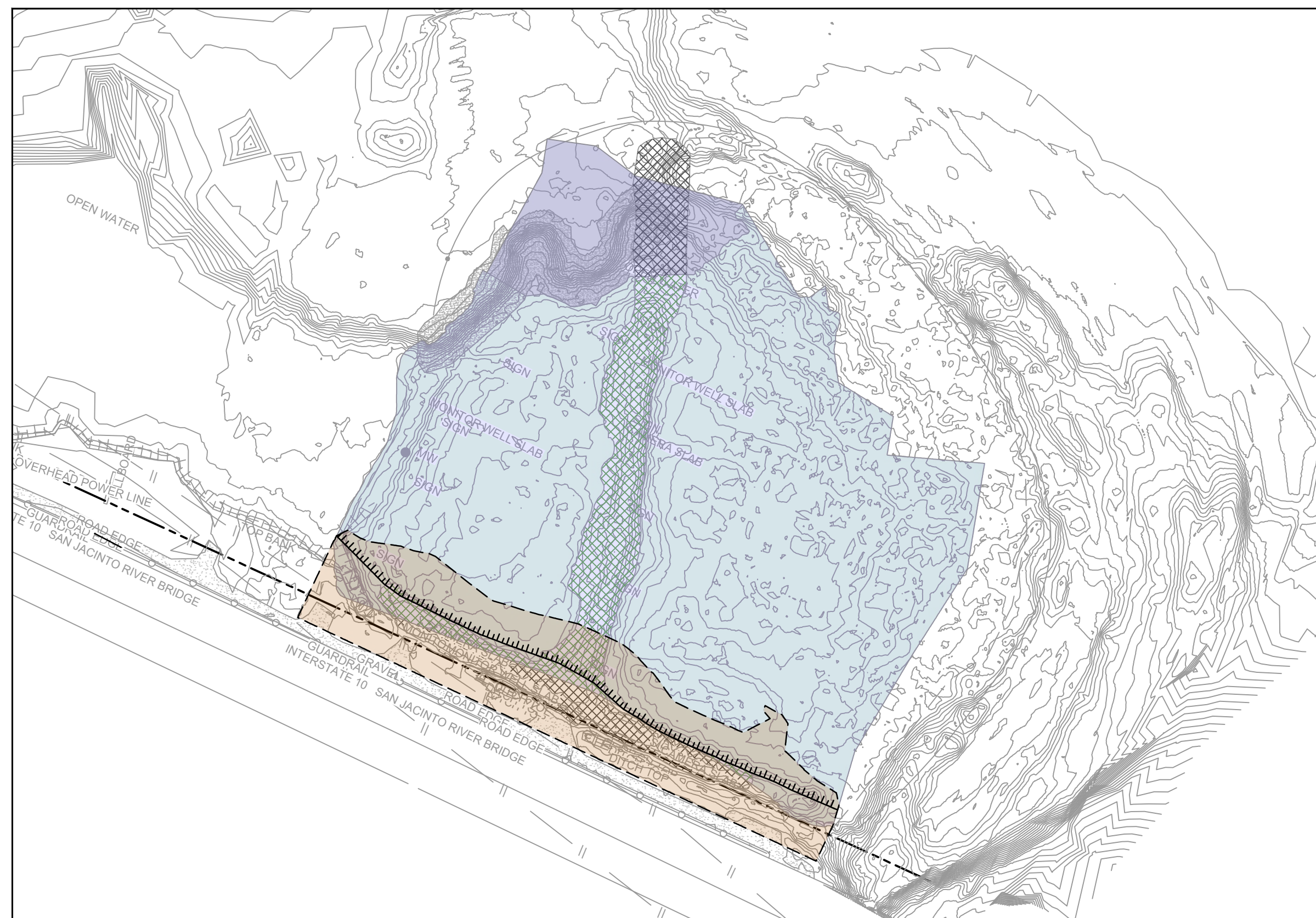
**90% EPA REVIEW**



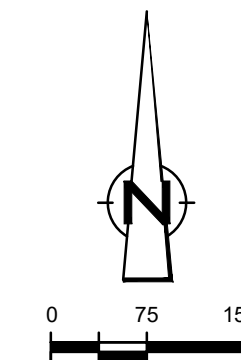
YEAR 5 - EXCAVATION SEASON 4



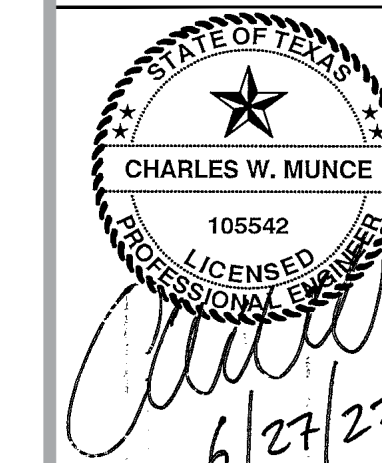
YEAR 6 - EXCAVATION SEASON 5



YEAR 7 - BMP REMOVAL AND SITE RESTORATION



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LEGEND	
---	ASSUMED TxDOT RIGHT OF WAY
---	TORA CAP PERIMETER
---	EXISTING CONTOUR INTERVAL
---	FENCELINE
---	SHORELINE
---	TOP OF BANK
---	TOE OF SLOPE
---	OVERHEAD ELECTRICAL
---	GUARDRAIL
---	PIPELINE
---	BORING LOCATION
---	MONITORING WELL
---	POWER POLE
---	LIGHT POLE
---	WELL
---	MATERIAL TO BE EXCAVATED
---	EXISTING BERM TO EXCAVATED
---	EXISTING BERM
---	NORTHWEST CORNER*
---	CONCRETE
---	GRAVEL
---	AZ26-700 PILE
---	AZ40-700 PILE
---	PHASE OF EXCAVATION

Client  
**SAN JACINTO RIVER WASTE PITS**

Project  
**NORTHERN IMPOUNDMENT PRE-FINAL 90% REMEDIAL DESIGN HARRIS COUNTY, TEXAS**

No.	Issue	Drawn	Approved	Date
2	90% EPA REVIEW	MW	CM	06/27/2022
Drawn MW		Designer RH		
Drafting JC		Design Check LL		
Project Coordinator CM		Date Jun 27, 2022		
Original Size		Scale 1" = 150'		
Arch D		Bar is one inch on original size drawing		

Project No. 11215702

Title  
**TYPICAL CONSTRUCTION SEQUENCING 2 OF 2**

Sheet No.

**C-24**

SOURCE:  
TOPOGRAPHIC, HYDROGRAPHIC, & MAGNETOMETER SURVEY OF SAN JACINTO RIVER WASTE PITS, HARRIS COUNTY, TEXAS, MORRISON SURVEYING INC., 190608, JULY 8, 2019 TO AUGUST 2, 2019  
UPDATED BATHYMETRY DATA PROVIDED BY ANCHOR O&A OCTOBER 2021

NOTES:  
1. ASSUMED TxDOT RIGHT OF WAY IS BASED ON INFORMATION PROVIDED BY THE HARRIS COUNTY TAX ASSESSOR'S OFFICE.  
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\*THE REMEDIAL DESIGN INFORMATION FOR THE NORTHWEST PORTION OF THE NORTHERN IMPOUNDMENT IS INCLUDED IN THIS SUBMITTAL. THE DESIGN TO DATE CONCLUDES THAT COMPLETING THE REMEDIAL ACTION "IN THE DRY" IN THE NORTHWEST PORTION OF THE NORTHERN IMPOUNDMENT AS STATED IN THE EPA RECORD OF DECISION IS NOT TECHNICALLY FEASIBLE DUE TO HYDRAULIC HEAVE. THE SUPPORTING TECHNICAL AND ENGINEERING BASIS FOR THIS CONCLUSION ARE INCLUDED IN THIS SUBMITTAL, AND AS SUCH, PENDING A FINAL EPA DETERMINATION REGARDING THIS AREA, IT IS ANTICIPATED THAT AN ADDENDUM TO THE PRE-FINAL 90% REMEDIAL DESIGN WILL BE SUBMITTED AT A FUTURE DATE TO ADDRESS THE NORTHWEST PORTION OF THE NORTHERN IMPOUNDMENT IN ACCORDANCE WITH EPA'S FINAL DETERMINATION AFTER REVIEW OF THIS NEWLY DEVELOPED SITE INFORMATION.

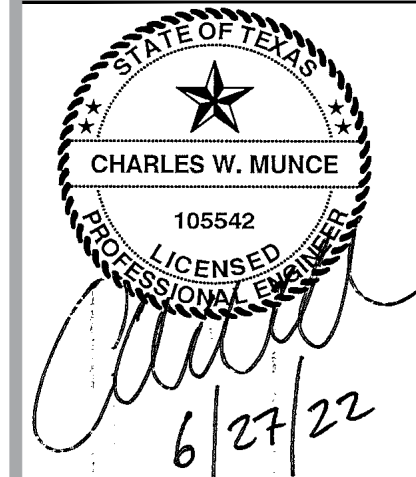
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JOB NO. 11215702 FILE NO. 001  
GHD TEXAS FIRM REGISTRATION NO. 276

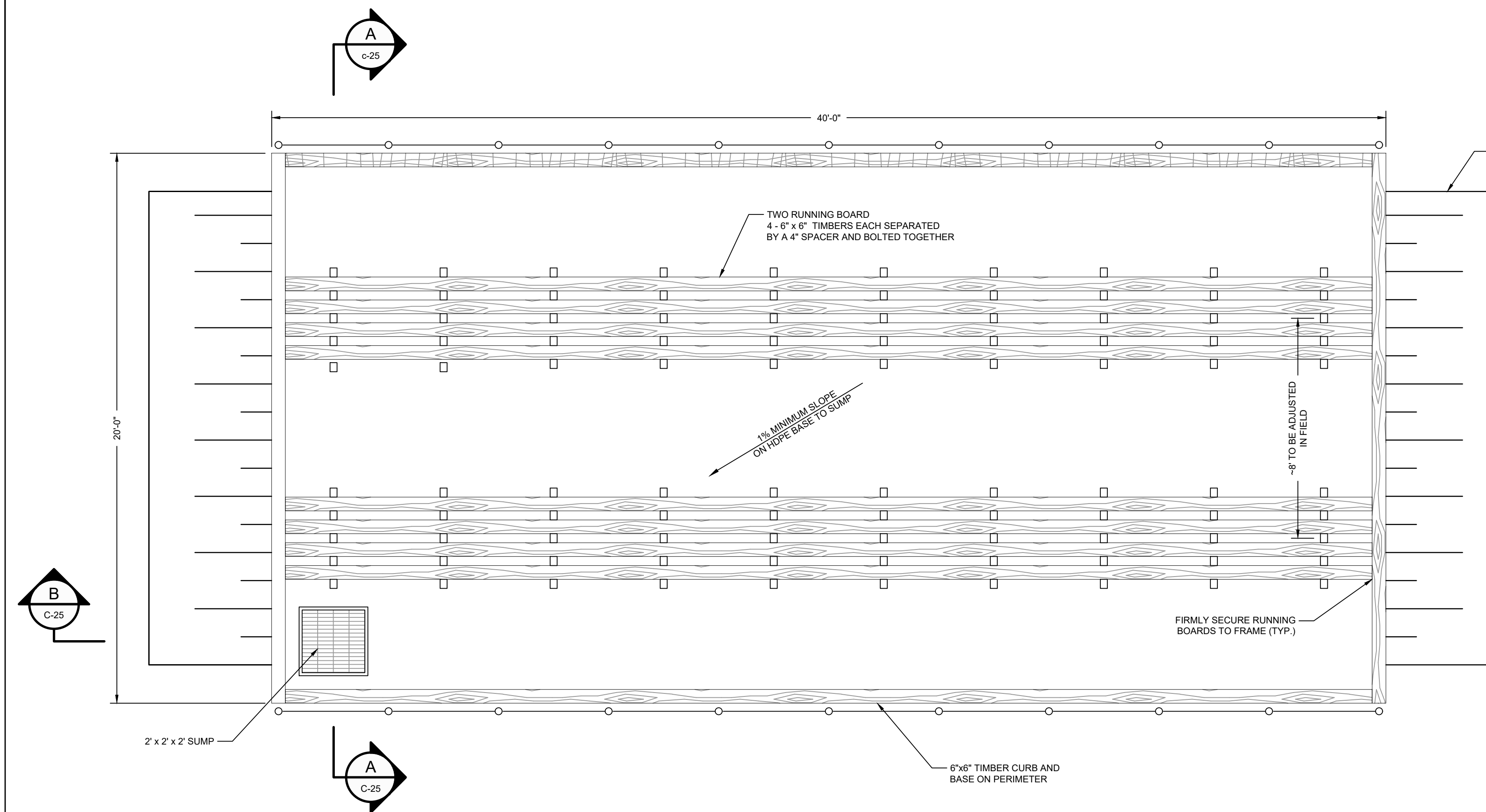
**90% EPA REVIEW**



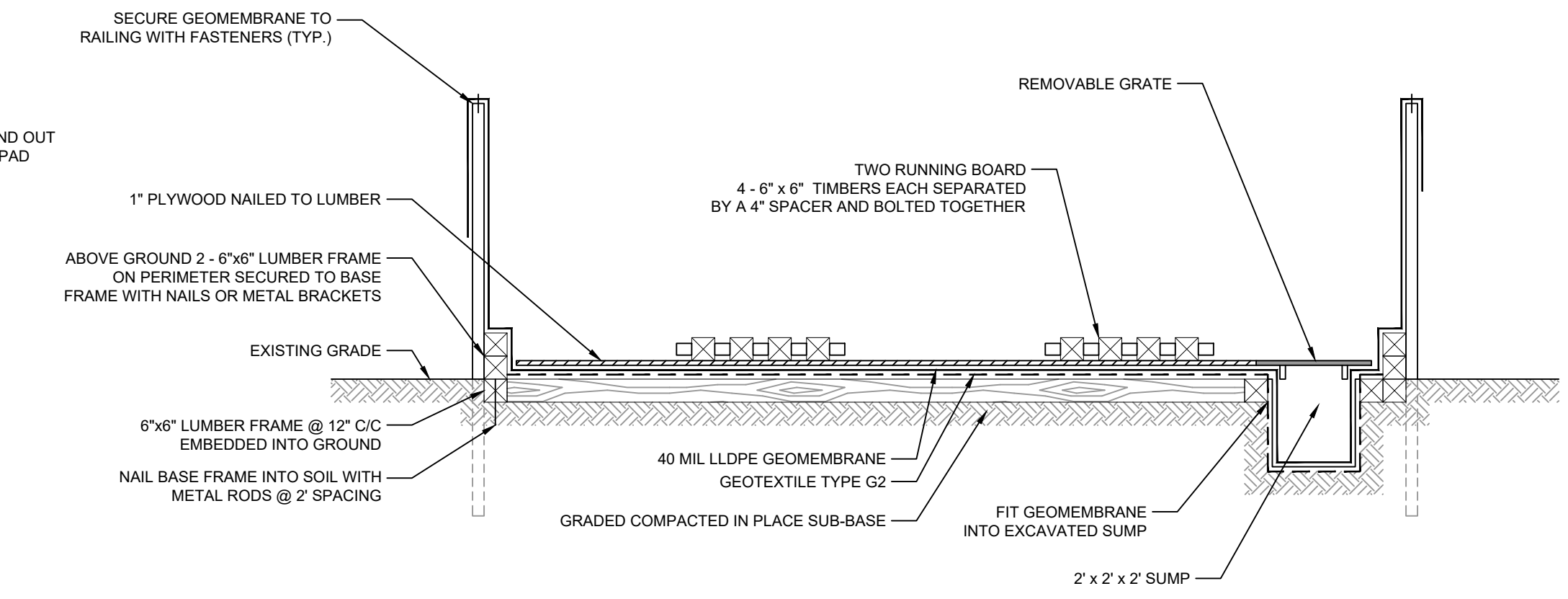
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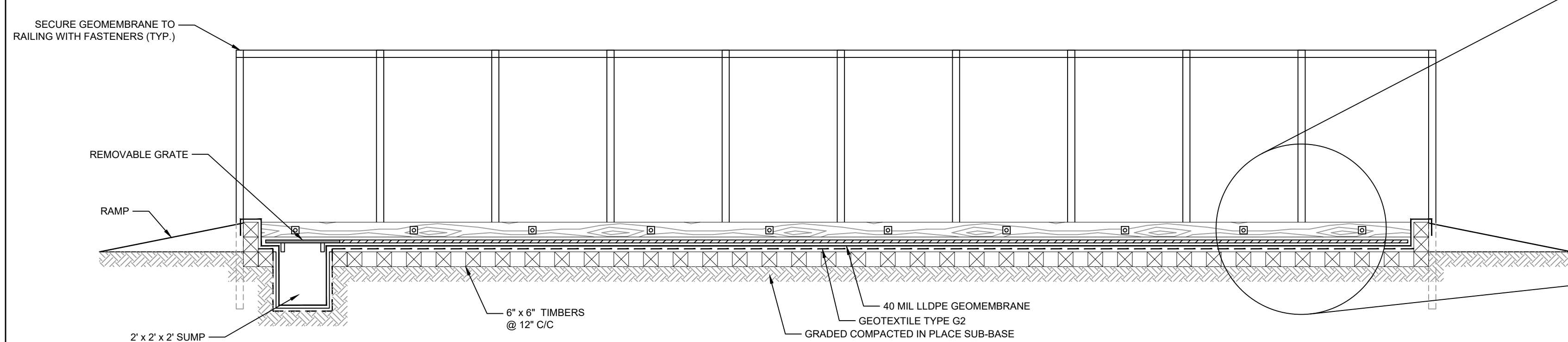
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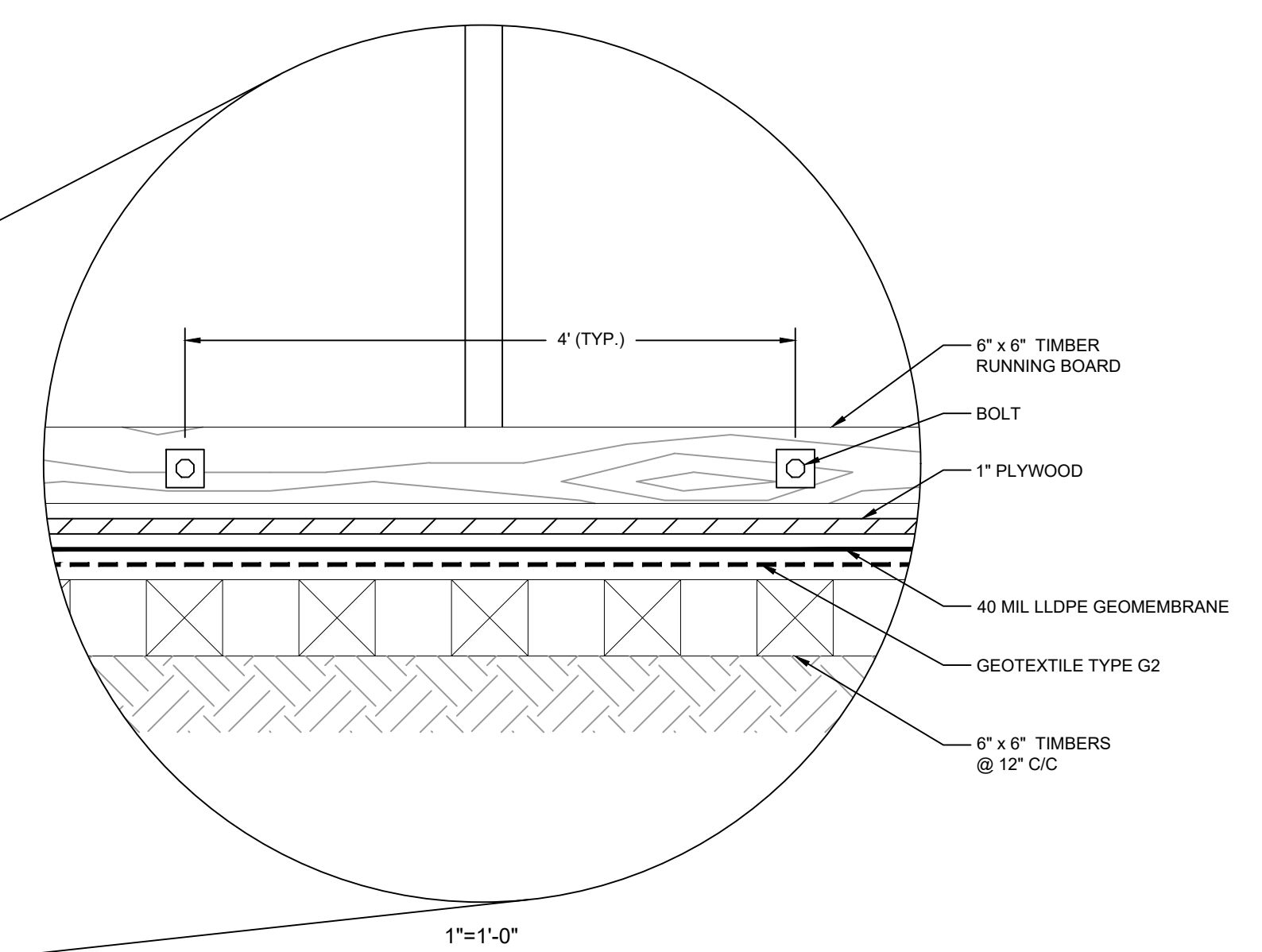
**PLAN**  
1"=3'-0"



**SECTION A**  
1"=3'-0"



**SECTION B**  
1"=3'-0"



1"=1'-0"

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JOB NO. 11215702 FILE NO. 001  
GHD TEXAS FIRM REGISTRATION NO. 276

**DETAIL 8 TEMPORARY EQUIPMENT DECONTAMINATION PAD**  
1"=3'-0"

Client **SAN JACINTO RIVER WASTE PITS**  
Project **NORTHERN IMPOUNDMENT PRE-FINAL 90% REMEDIAL DESIGN HARRIS COUNTY, TEXAS**

4	90% EPA REVIEW	MW	CM	06/27/2022
No.	Issue	Drawn	Approved	Date
Drawn	MW	Designer	RH	
Drafting Check	JC	Design Check	LL	
Project Coordinator	CM	Date	Jun 27, 2022	
		Scale	AS SHOWN	

Original Size **Arch D**  
Bar is one inch on original size drawing

Project No. **11215702**  
Title

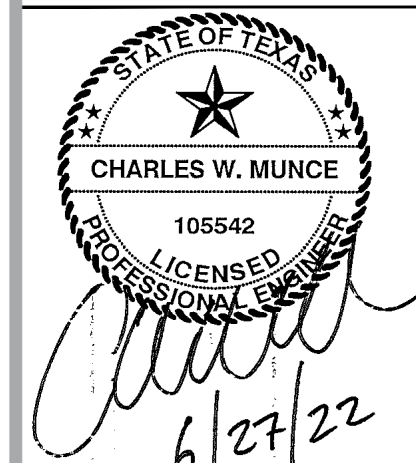
**TYPICAL DETAILS 1 OF 3**

Sheet No. **C-25**

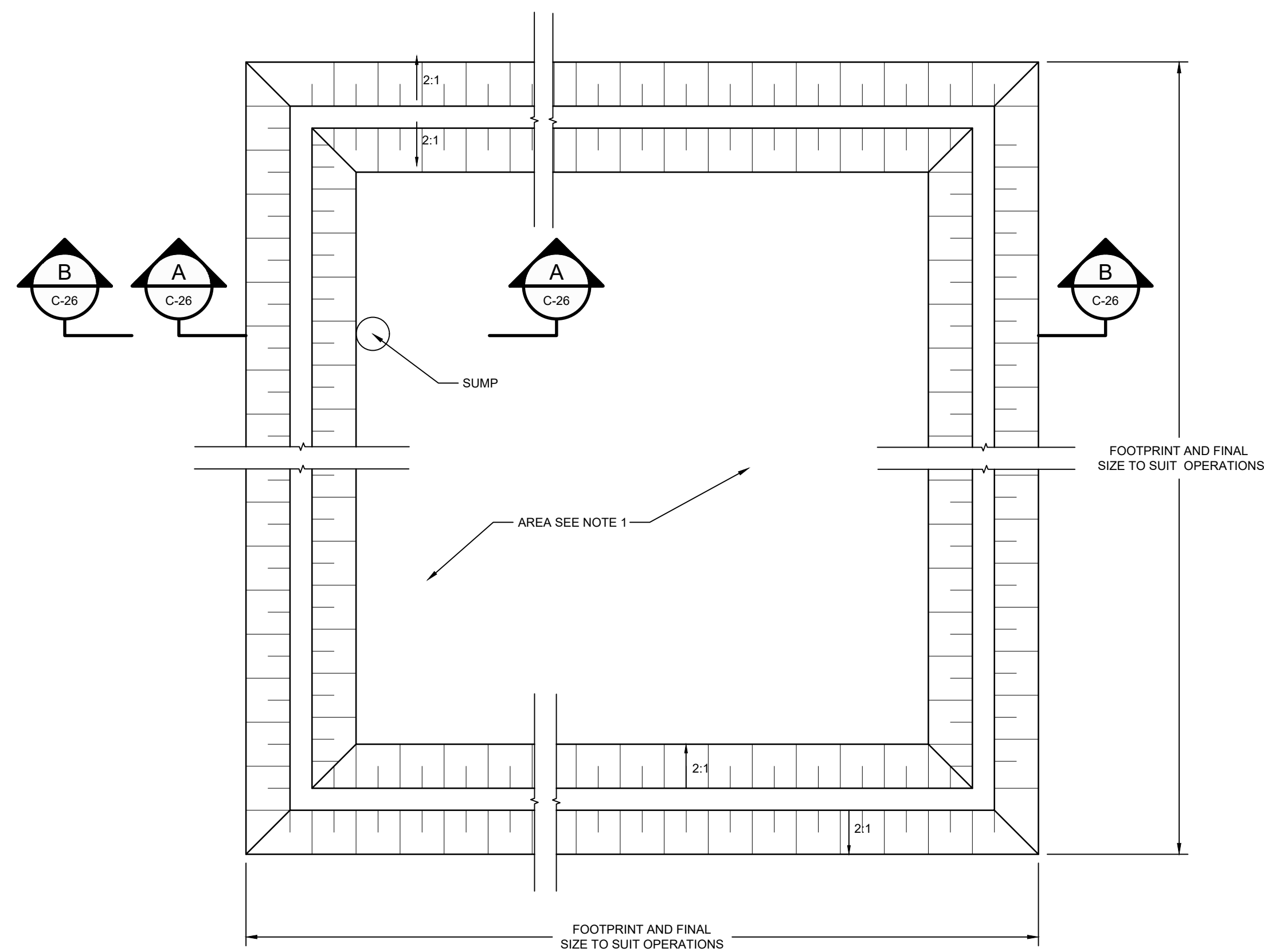
**90% EPA REVIEW**



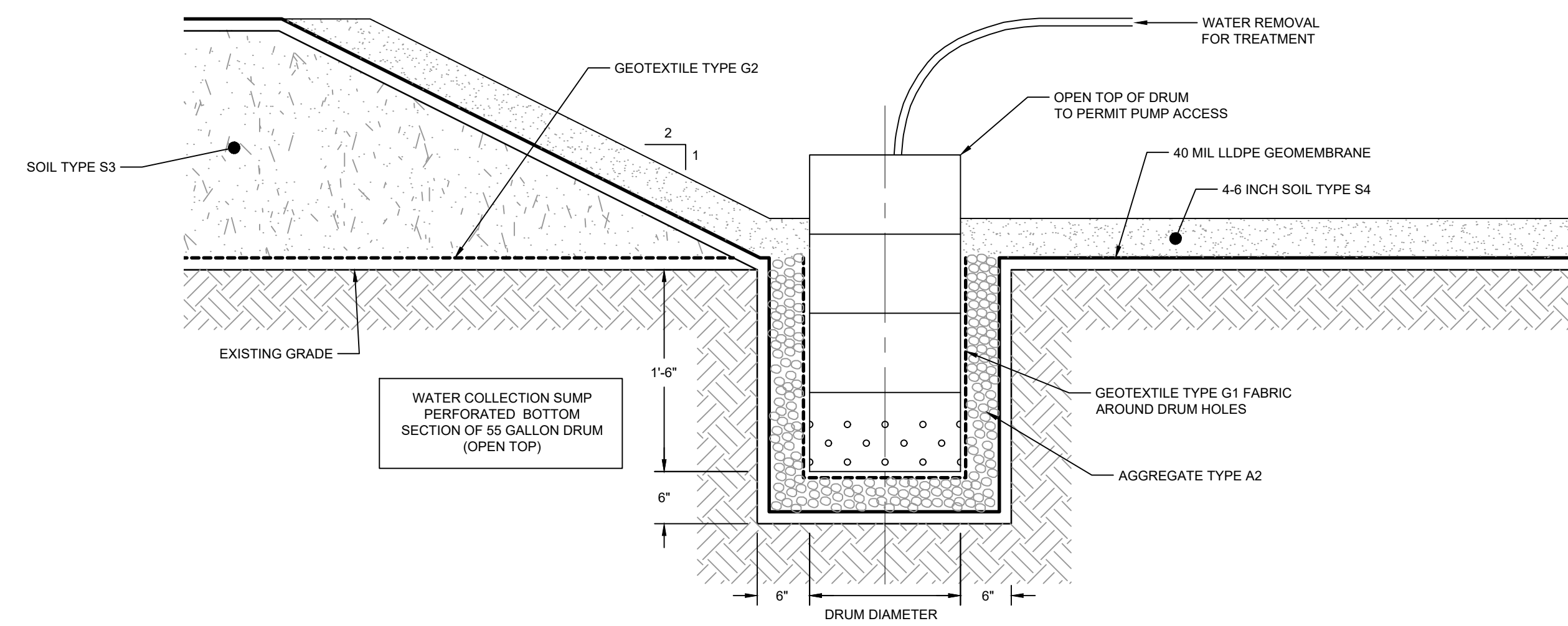
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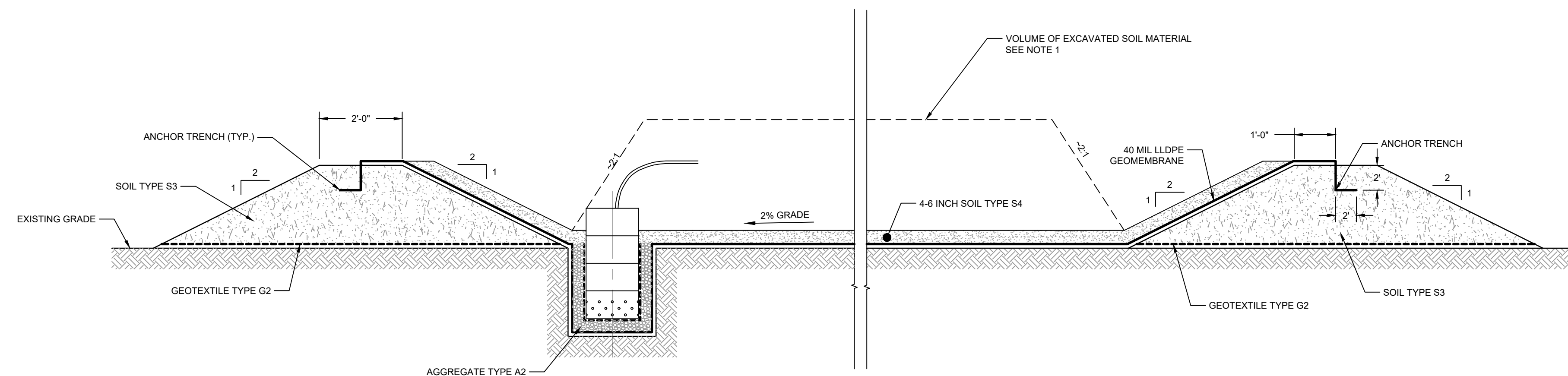


**PLAN**  
N.T.S.



**SECTION A SUMP**  
N.T.S.

NOTES:  
1. TYPICAL DETAILS SHOWN AT DEWATERING AND SOLIDIFICATION AREA MAY BE REVISED BY THE CONTRACTOR. CONTRACTOR'S REVISED DETAILS SHALL BE SUBMITTED FOR REVIEW PRIOR TO CONSTRUCTION.



**SECTION B**  
N.T.S.

**DETAIL 9 TEMPORARY DEWATERING FACILITY**  
N.T.S.

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JOB NO. 11215702 FILE NO. 001  
GHD TEXAS FIRM REGISTRATION NO. 276

**90% EPA REVIEW**

Client **SAN JACINTO RIVER WASTE PITS**  
Project **NORTHERN IMPOUNDMENT PRE-FINAL 90% REMEDIAL DESIGN HARRIS COUNTY, TEXAS**

4	90% EPA REVIEW	MW	CM	06/27/2022
No.	Issue	Drawn	Approved	Date
Drawn	MW	Designer	RH	
Drafting	JC	Design	LL	
Check		Check		
Project	CM	Date	Jun 27, 2022	
Coordinator		Scale	N.T.S.	

Original Size  
**Arch D**  
Bar is one inch on original size drawing  
0 1"

Project No. 11215702

Title  
**TYPICAL DETAILS 2 OF 3**

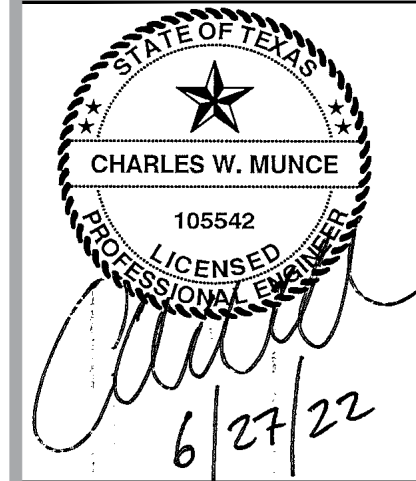
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**C-26**

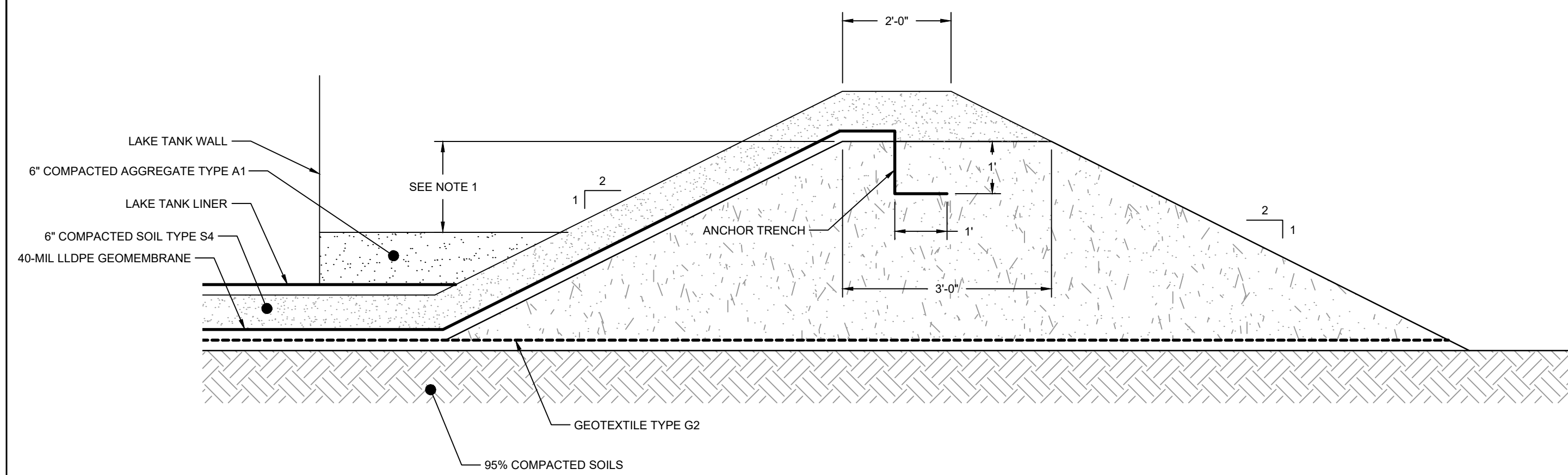
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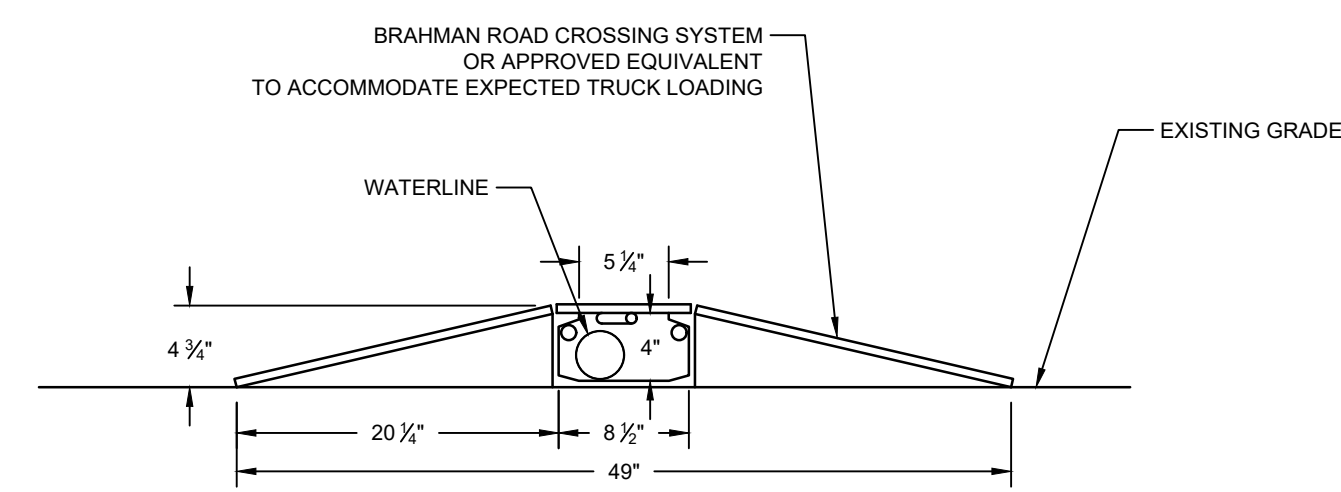


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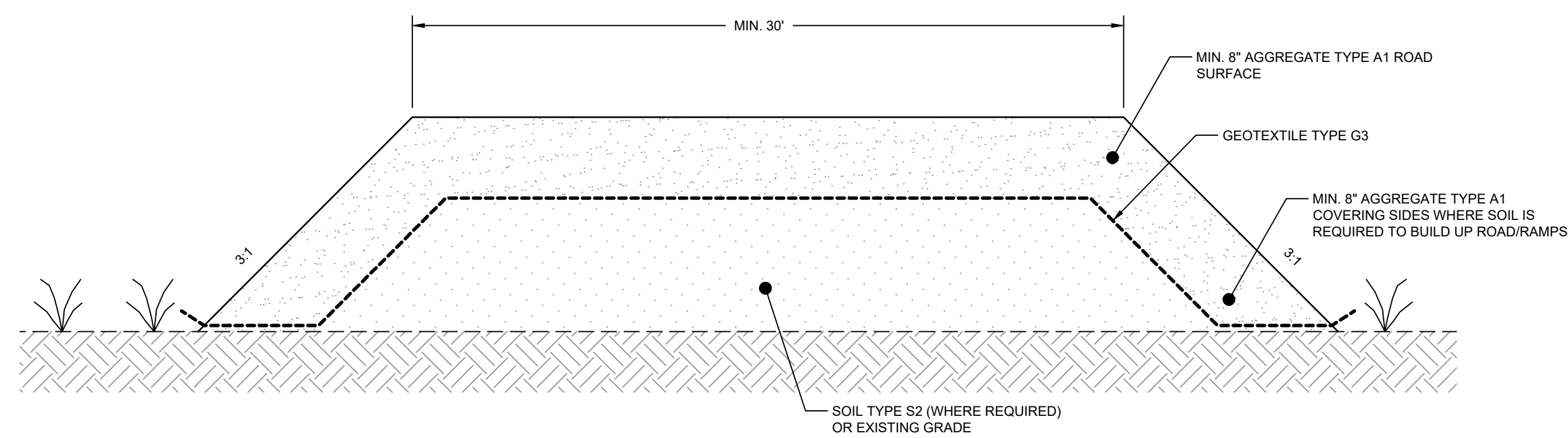


NOTE:  
1. CONTRACTOR SHALL DESIGN THE HEIGHT AND LENGTHS OF THE BERM SUCH THAT THE AVAILABLE VOLUME OF CONTAINMENT AREA (I.E., NOT OCCUPIED BY ONE INFLUENT TANK AND WTS EQUIPMENT) IS GREATER THAN THE 110% OF THE VOLUME OF THE LARGEST TANK (I.E., 1.33 MILLION GALLONS)

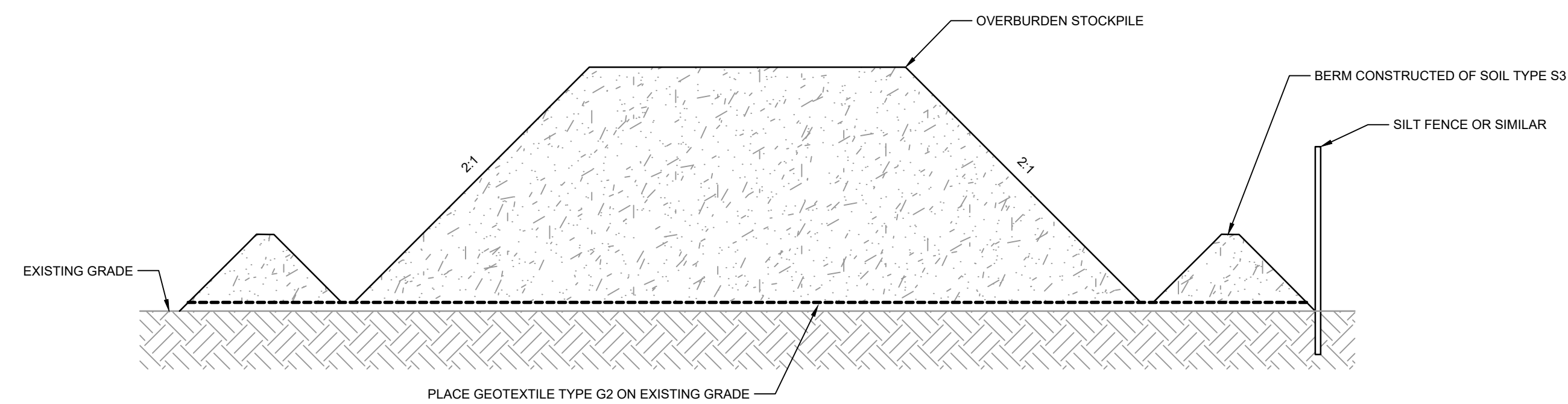
**DETAIL 10 WTS SECONDARY CONTAINMENT BERM**  
N.T.S.



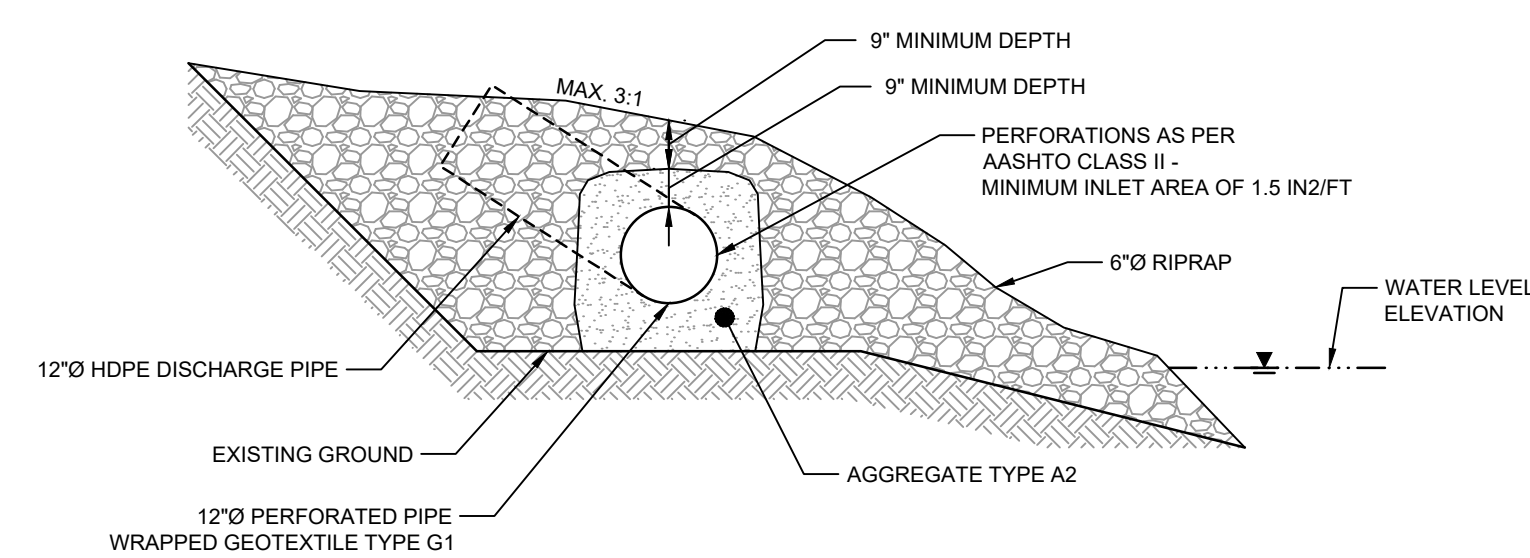
**DETAIL 11 TEMPORARY PIPE CROSSING PROTECTION**  
1"=1'-0"



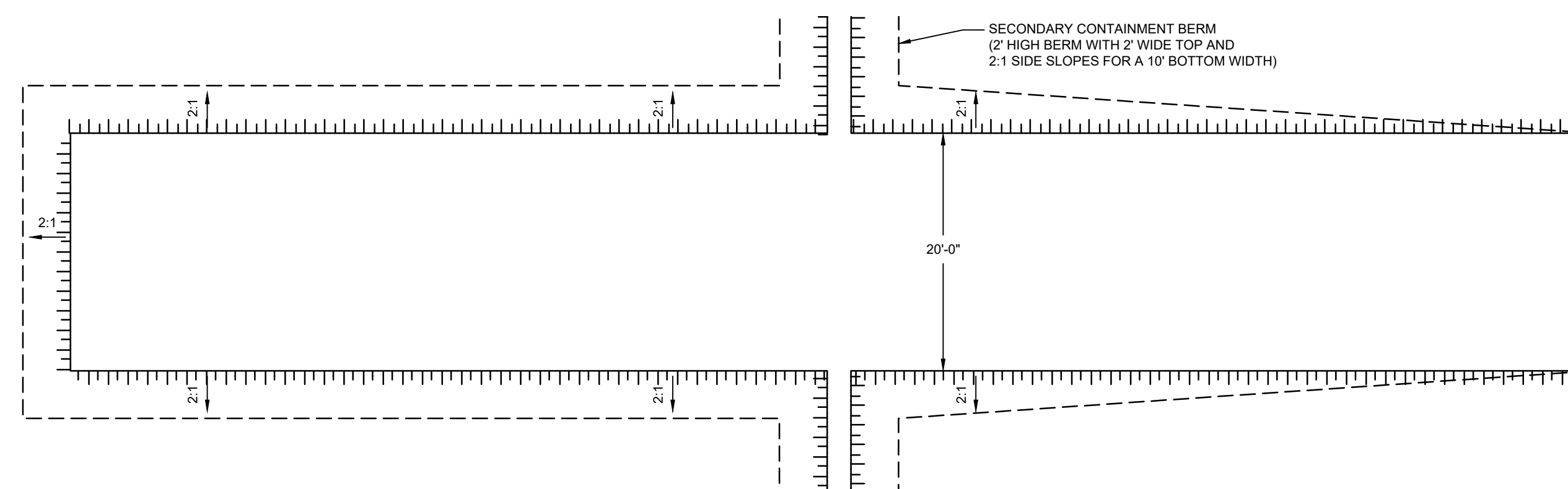
**DETAIL 12 TEMPORARY ACCESS ROAD/ RAMPS**  
N.T.S. C-03



**DETAIL 13 TEMPORARY EXCAVATED MATERIAL STOCKPILE**  
N.T.S. C-03



**DETAIL 14 RIVER DISCHARGE**  
N.T.S.



**DETAIL 15 ACCESS PLATFORM**  
N.T.S.

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JOB NO. 11215702 FILE NO. 001  
GHD TEXAS FIRM REGISTRATION NO. 276

**90% EPA REVIEW**

Client: **SAN JACINTO RIVER WASTE PITS**  
Project: **NORTHERN IMPOUNDMENT PRE-FINAL 90% REMEDIAL DESIGN HARRIS COUNTY, TEXAS**

4 90% EPA REVIEW MW CM 06/27/2022

No.	Issue	Drawn	Approved	Date

Drawn	MW	Designer	RH
-------	----	----------	----

Drafting Check	JC	Design Check	LL
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Project Coordinator	CM	Date	Jun 27, 2022
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This document shall not be used for construction unless signed and sealed for construction.	Scale	AS SHOWN
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Original Size	Bar is one inch on original size drawing
---------------	--

Arch D	0 1"
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Project No. 11215702

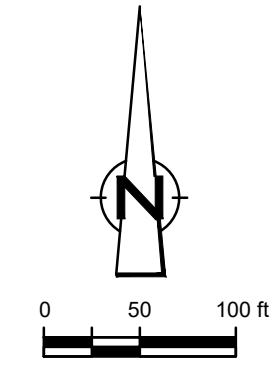
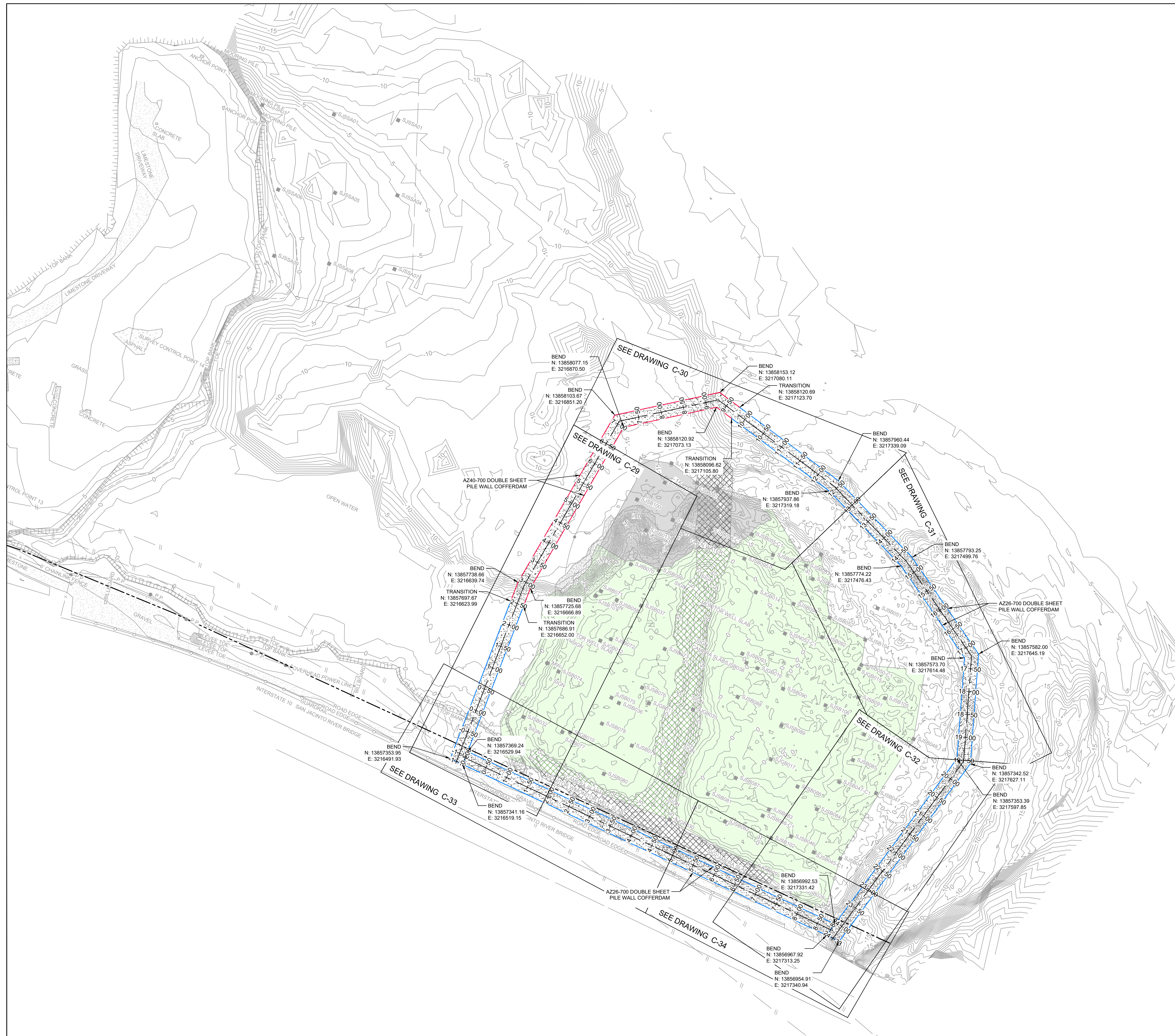
Title

**TYPICAL DETAILS 3 OF 3**

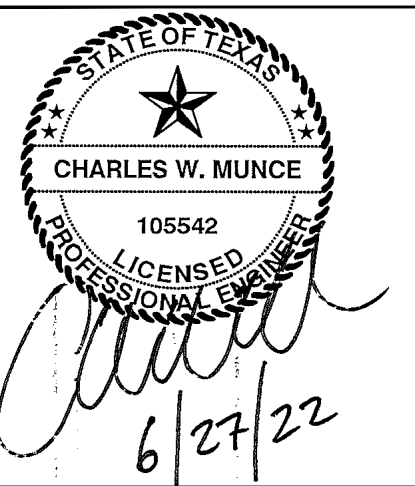
Sheet No.

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**LEGEND**

---	ASSUMED TxDOT RIGHT OF WAY
- - - -	TORA CAP PERIMETER
---	EXISTING CONTOUR INTERVAL
- - - -	FENCELINE
---	SHORELINE
---	TOP OF BANK
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---	OVERHEAD ELECTRICAL
---	GUARDRAIL
---	PIPELINE
---	BORING LOCATION
---	MONITORING WELL
---	POWER POLE
---	LIGHT POLE
---	WELL
---	MATERIAL TO BE EXCAVATED
---	EXISTING BERM TO EXCAVATED
---	EXISTING BERM
---	NORTHWEST CORNER*
---	CONCRETE
---	GRAVEL
---	ASPHALT
---	AZ26-700 PILE
---	AZ40-700 PILE

Client  
**SAN JACINTO RIVER WASTE PITS**

Project  
**NORTHERN IMPOUNDMENT PRE-FINAL 90% REMEDIAL DESIGN HARRIS COUNTY, TEXAS**

No.	Issue	Drawn	Approved	Date
4	90% EPA REVIEW	MW	CM	06/27/2022
Drawn	MW	Designer	RH	
Drafting	JC	Design	LL	
Check		Check		
Project Coordinator	CM	Date	Jun 27, 2022	
Original Size		Scale	1" = 100'	
		Bar is one inch on original size drawing		
		0		1"
Project No.	11215702			
Title	<b>PILE WALL LAYOUT PLAN</b>			

**SOURCE:**  
 TOPOGRAPHIC, HYDROGRAPHIC, & MAGNETOMETER SURVEY OF SAN JACINTO RIVER WASTE PITS, HARRIS COUNTY, TEXAS, MORRISON SURVEYING INC., 190608, JULY 8, 2019 TO AUGUST 2, 2019, UPDATED BATHYMETRY DATA PROVIDED BY ANCHOR GEA OCTOBER 2021

\*THE REMEDIAL DESIGN INFORMATION FOR THE NORTHWEST PORTION OF THE NORTHERN IMPOUNDMENT IS INCLUDED IN THIS SUBMITTAL. THE DESIGN TO DATE CONCLUDES THAT COMPLETING THE REMEDIAL ACTION "IN THE DRY" IN THE NORTHWEST PORTION OF THE NORTHERN IMPOUNDMENT AS STATED IN THE EPA RECORD OF DECISION IS NOT TECHNICALLY FEASIBLE DUE TO HYDRAULIC HEAVE. THE SUPPORTING TECHNICAL AND ENGINEERING BASIS FOR THIS CONCLUSION ARE INCLUDED IN THIS SUBMITTAL, AND AS SUCH, PENDING A FINAL EPA DETERMINATION REGARDING THIS AREA, IT IS ANTICIPATED THAT AN ADDENDUM TO THE PRE-FINAL 90% REMEDIAL DESIGN WILL BE SUBMITTED AT A FUTURE DATE TO ADDRESS THE NORTHWEST PORTION OF THE NORTHERN IMPOUNDMENT IN ACCORDANCE WITH EPA'S FINAL DETERMINATION AFTER REVIEW OF THIS NEWLY DEVELOPED SITE INFORMATION.

**NOTES:**  
 1. ASSUMED TxDOT RIGHT OF WAY IS BASED ON INFORMATION PROVIDED BY THE HARRIS COUNTY TAX ASSESSOR'S OFFICE.

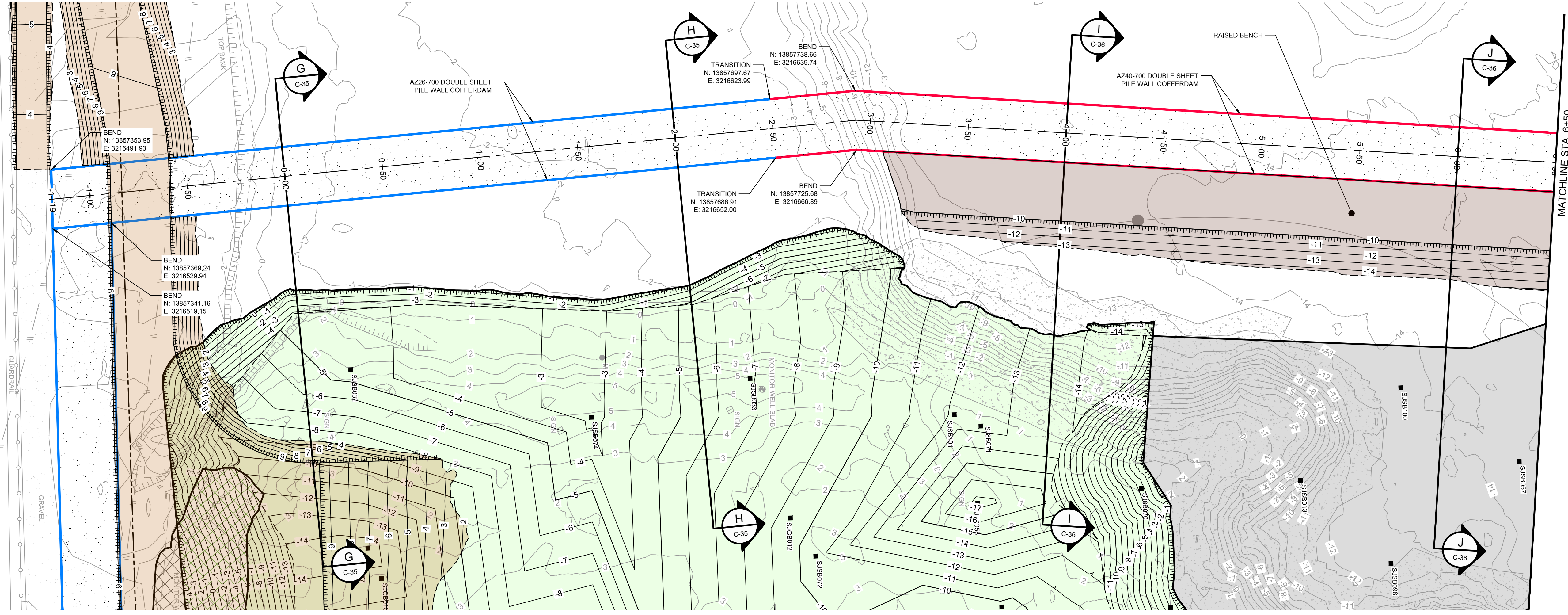
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**GHD SERVICES INC.**

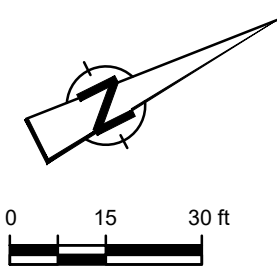
JOB NO. 11215702 FILE NO. 001  
 GHD TEXAS FIRM REGISTRATION NO. 276

**90% EPA REVIEW**

Sheet No. **C-28**  
 Sheet - of -



**PLAN**  
1" = 30'



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Baton Rouge Louisiana USA  
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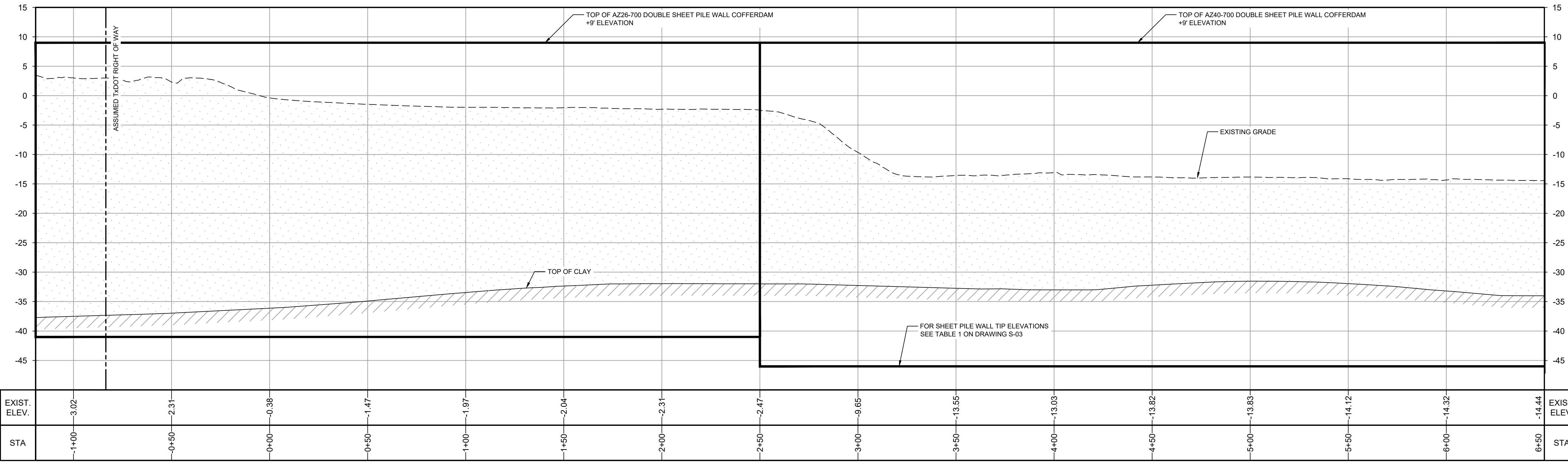
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CHARLES W. MUNCE  
105542  
LICENSED PROFESSIONAL ENGINEER  
6/27/22

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**LEGEND**

- ASSUMED TxDOT RIGHT OF WAY
- TORA CAP PERIMETER
- EXISTING CONTOUR INTERVAL
- FENCELINE
- SHORELINE
- TOP OF BANK
- TOE OF SLOPE
- OVERHEAD ELECTRICAL GUARDRAIL
- PIPELINE
- BORING LOCATION
- MONITORING WELL
- POWER POLE
- LIGHT POLE
- WELL

- MATERIAL TO BE EXCAVATED
- EXISTING BERM TO EXCAVATED
- EXISTING BERM
- NORTHWEST CORNER\*
- CONCRETE
- GRAVEL
- AZ26-700 PILE
- AZ40-700 PILE
- PLANNED IMPROVEMENTS FOR NORTHERN IMPOUNDMENT ACCESS
- RAISED BENCH



**PROFILE**  
HORIZ: 1" = 30'  
VERT: 1" = 10'

SOURCE:  
TOPOGRAPHIC, HYDROGRAPHIC, & MAGNETOMETER SURVEY OF SAN JACINTO RIVER WASTE PITS, HARRIS COUNTY, TEXAS, MORRISON SURVEYING INC., 198008, JULY 8, 2019 TO AUGUST 2, 2019  
UPDATED BATHYMETRY DATA PROVIDED BY ANCHOR QEA OCTOBER 2021

NOTES:  
1. ASSUMED TxDOT RIGHT OF WAY IS BASED ON INFORMATION PROVIDED BY THE HARRIS COUNTY TAX ASSESSOR'S OFFICE.  
2. FINAL EXCAVATION CONTOURS ARE SUBJECT TO CHANGE.

\*THE REMEDIAL DESIGN INFORMATION FOR THE NORTHWEST PORTION OF THE NORTHERN IMPOUNDMENT IS INCLUDED IN THIS SUBMITTAL. THE DESIGN TO DATE CONCLUDES THAT COMPLETING THE REMEDIAL ACTION 'IN THE DRY' IN THE NORTHWEST PORTION OF THE NORTHERN IMPOUNDMENT AS STATED IN THE EPA RECORD OF DECISION IS NOT TECHNICALLY FEASIBLE DUE TO HYDRAULIC HEAVE. THE SUPPORTING TECHNICAL AND ENGINEERING BASIS FOR THIS CONCLUSION ARE INCLUDED IN THIS SUBMITTAL, AND AS SUCH, PENDING A FINAL EPA DETERMINATION REGARDING THIS AREA, IT IS ANTICIPATED THAT AN ADDENDUM TO THE PRE-FINAL 90% REMEDIAL DESIGN WILL BE SUBMITTED AT A FUTURE DATE TO ADDRESS THE NORTHWEST PORTION OF THE NORTHERN IMPOUNDMENT IN ACCORDANCE WITH EPA'S FINAL DETERMINATION AFTER REVIEW OF THIS NEWLY DEVELOPED SITE INFORMATION.

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**GHD SERVICES INC.**  
JOB NO. 11215702 FILE NO. 001  
GHD TEXAS PILE REGISTRATION NO. 276

Client  
**SAN JACINTO RIVER WASTE PITS**

Project  
**NORTHERN IMPOUNDMENT PRE-FINAL 90% REMEDIAL DESIGN HARRIS COUNTY, TEXAS**

No.	Issue	Drawn	Approved	Date
4	90% EPA REVIEW	MW	CM	06/27/2022

Drawn MW Designer RH  
Drafting JC Design Check LL  
Project Coordinator CM Date Jun 27, 2022

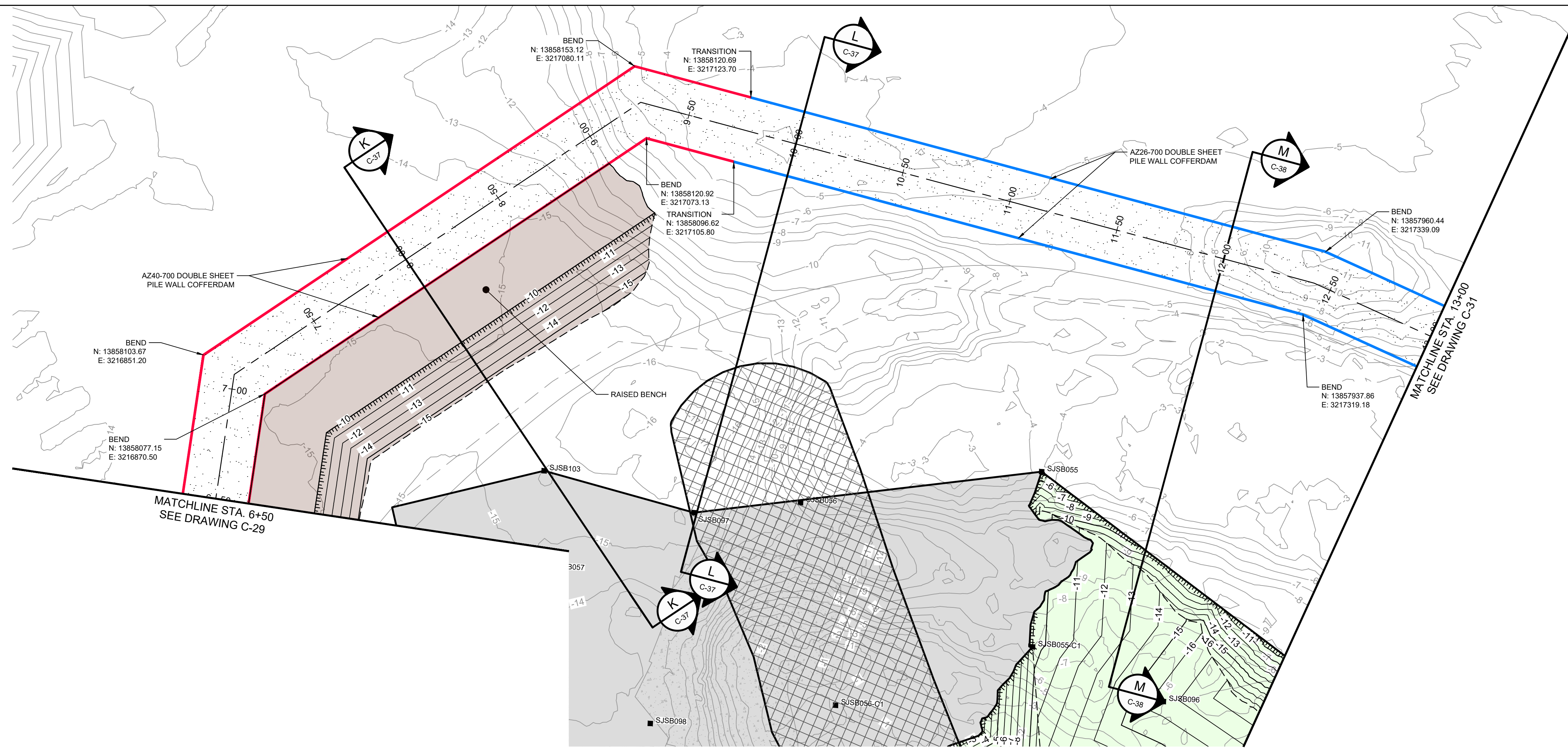
This document shall not be used for construction unless signed and sealed for construction.  
Original Size Arch D Bar is one inch on original size drawing  
Scale AS SHOWN

Project No. 11215702  
Title

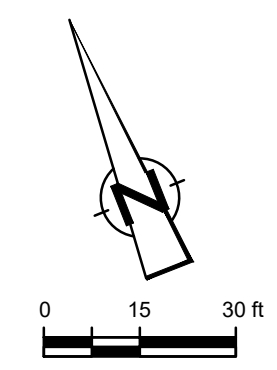
**DOUBLE PILE WALL PLAN AND PROFILE**  
**1 OF 4**

Sheet No. **C-29**  
Sheet - of -

**90% EPA REVIEW**



**PLAN**  
1" = 30'



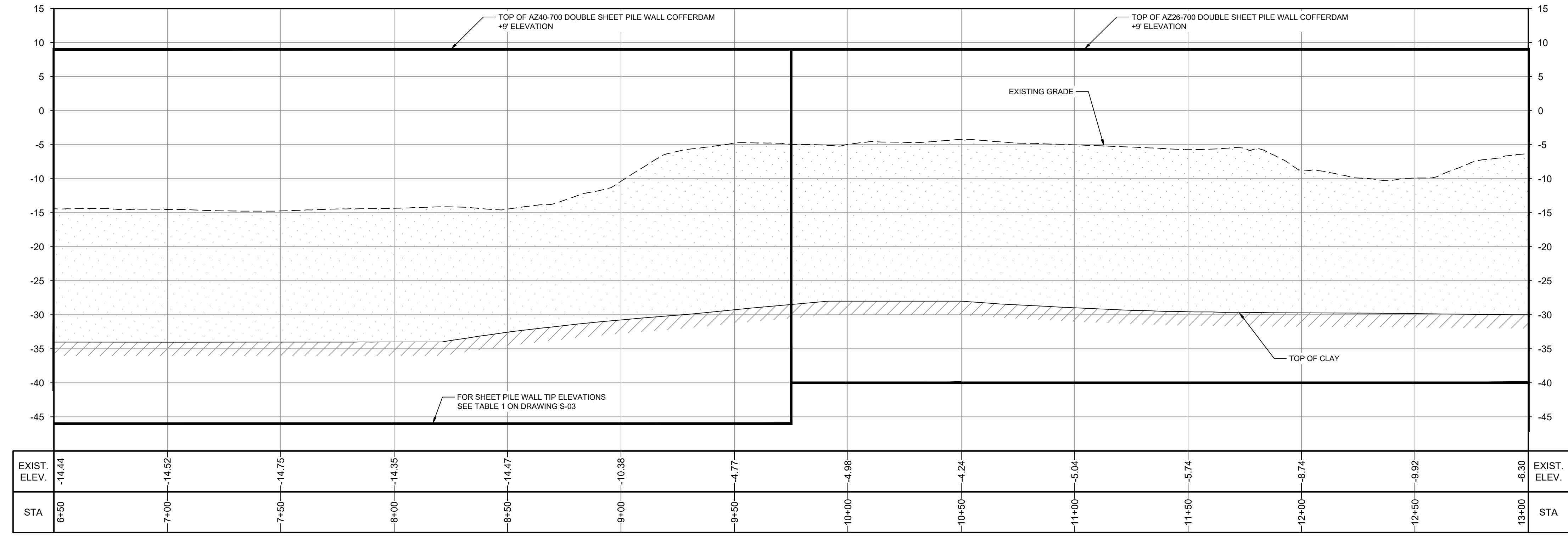
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6/27/22

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**LEGEND**

---	ASSUMED TxDOT RIGHT OF WAY
- - - -	TORA CAP PERIMETER
---	EXISTING CONTOUR INTERVAL
---	FENCELINE
---	SHORELINE
---	TOP OF BANK
---	TOE OF SLOPE
---	OVERHEAD ELECTRICAL
---	GUARDRAIL
---	PIPELINE
---	BORING LOCATION
---	MONITORING WELL
---	POWER POLE
---	LIGHT POLE
---	WELL
---	MATERIAL TO BE EXCAVATED
---	EXISTING BERM
---	NORTHWEST CORNER*
---	CONCRETE
---	GRAVEL
---	AZ26-700 PILE
---	AZ40-700 PILE
---	RAISED BENCH



**PROFILE**  
HORIZ: 1" = 30'  
VERT: 1" = 10'

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SOURCE:  
TOPOGRAPHIC, HYDROGRAPHIC, & MAGNETOMETER SURVEY OF SAN JACINTO RIVER WASTE PITS, HARRIS COUNTY, TEXAS, MORRISON SURVEYING INC., 190608, JULY 8, 2019 TO AUGUST 2, 2019  
UPDATED BATHYMETRY DATA PROVIDED BY ANCHOR QEA OCTOBER 2021

NOTES:  
1. FINAL EXCAVATION CONTOURS ARE SUBJECT TO CHANGE.

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**GHD SERVICES INC.**  
JOB NO. 11215702 FILE NO. 001  
GHD TEXAS FIRM REGISTRATION NO. 276

Client  
**SAN JACINTO RIVER WASTE PITS**  
Project  
**NORTHERN IMPOUNDMENT PRE-FINAL 90% REMEDIAL DESIGN HARRIS COUNTY, TEXAS**

4	90% EPA REVIEW	MW	CM	06/27/2022
No.	Issue	Drawn	Approved	Date
Drawn	MW	Designer	RH	
Drafting Check	JC	Design Check	LL	
Project Coordinator	CM	Date	Jun 27, 2022	
		Scale	AS SHOWN	

Original Size  
**Arch D**  
Bar is one inch on original size drawing  
0 1"

Project No. 11215702  
Title

**DOUBLE PILE WALL PLAN AND PROFILE**  
**2 OF 4**

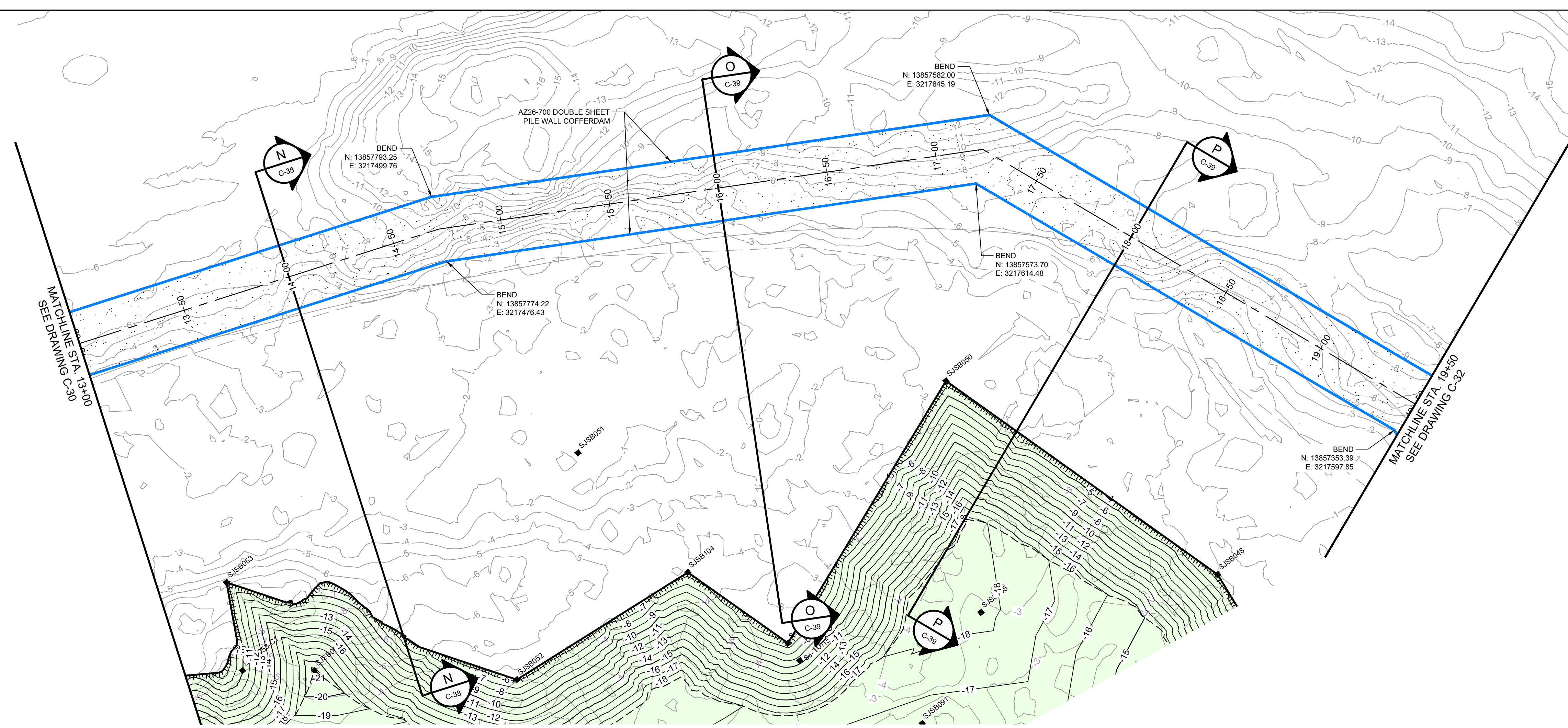
Sheet No.

**C-30**

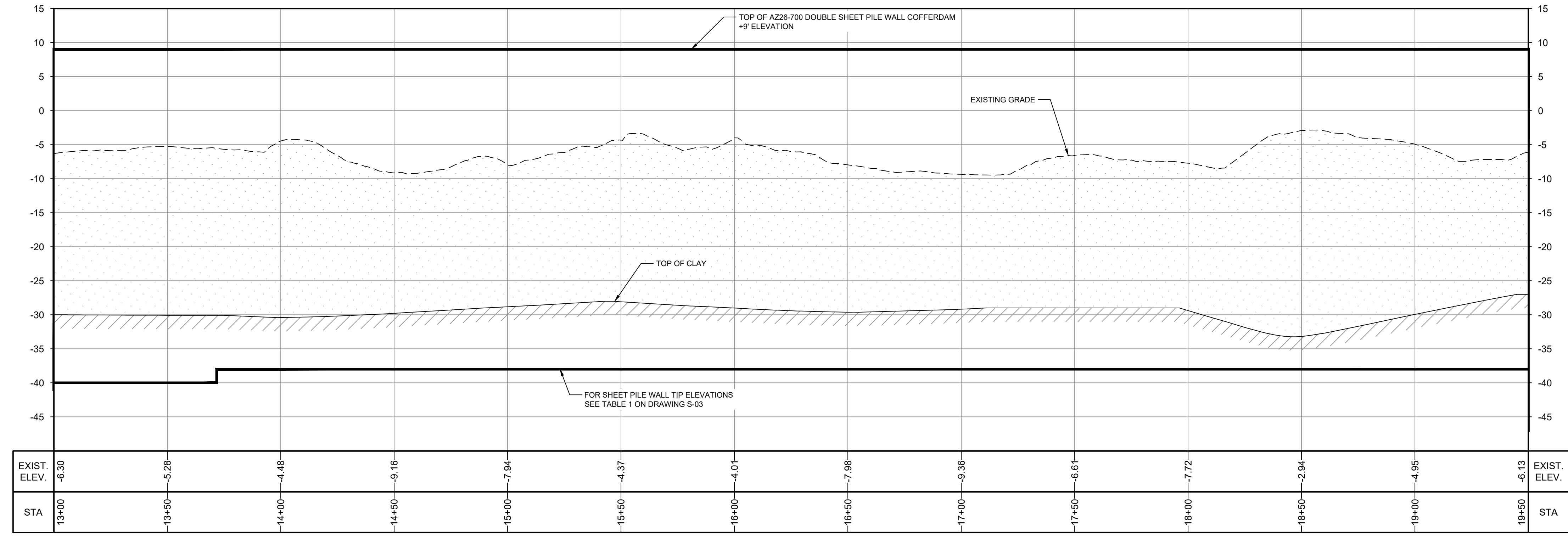
**90% EPA REVIEW**

Sheet - of -





**PLAN**  
1" = 30'



**PROFILE**  
HORIZ: 1" = 30'  
VERT: 1" = 10'

\*THE REMEDIAL DESIGN INFORMATION FOR THE NORTHWEST PORTION OF THE NORTHERN IMPOUNDMENT IS INCLUDED IN THIS SUBMITTAL. THE DESIGN TO DATE CONCLUDES THAT COMPLETING THE REMEDIAL ACTION "IN THE DRY" IN THE NORTHWEST PORTION OF THE NORTHERN IMPOUNDMENT AS STATED IN THE EPA RECORD OF DECISION IS NOT TECHNICALLY FEASIBLE DUE TO HYDRAULIC HEAVE. THE SUPPORTING TECHNICAL AND ENGINEERING BASIS FOR THIS CONCLUSION ARE INCLUDED IN THIS SUBMITTAL, AND AS SUCH, PENDING A FINAL EPA DETERMINATION REGARDING THIS AREA, IT IS ANTICIPATED THAT AN ADDENDUM TO THE PRE-FINAL 90% REMEDIAL DESIGN WILL BE SUBMITTED AT A FUTURE DATE TO ADDRESS THE NORTHWEST PORTION OF THE NORTHERN IMPOUNDMENT IN ACCORDANCE WITH EPA'S FINAL DETERMINATION AFTER REVIEW OF THIS NEWLY DEVELOPED SITE INFORMATION.

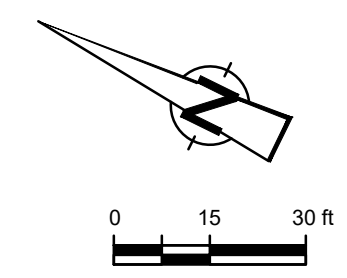
SOURCE:  
TOPOGRAPHIC, HYDROGRAPHIC, & MAGNETOMETER SURVEY OF SAN JACINTO RIVER WASTE PITS, HARRIS COUNTY, TEXAS, MORRISON SURVEYING INC., 190608, JULY 8, 2019 TO AUGUST 2, 2019  
UPDATED BATHYMETRY DATA PROVIDED BY ANCHOR QEA OCTOBER 2021

NOTES:  
1. FINAL EXCAVATION CONTOURS ARE SUBJECT TO CHANGE.

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**GHD SERVICES INC.**  
JOB NO. 11215702 FILE NO. 001  
GHD TEXAS FIRM REGISTRATION NO. 276

**90% EPA REVIEW**



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**LEGEND**

---	ASSUMED TxDOT RIGHT OF WAY
---	TORA CAP PERIMETER
---	EXISTING CONTOUR INTERVAL
---	FENCELINE
---	SHORELINE
---	TOP OF BANK
---	TOE OF SLOPE
---	OVERHEAD ELECTRICAL
---	GUARDRAIL
---	PIPELINE
●	BORING LOCATION
●	MONITORING WELL
●	POWER POLE
●	L.P.
○	LIGHT POLE
○	WELL
---	MATERIAL TO BE EXCAVATED
---	GRAVEL
---	AZ26-700 PILE
---	AZ40-700 PILE

Client  
**SAN JACINTO RIVER WASTE PITS**  
Project  
**NORTHERN IMPOUNDMENT PRE-FINAL 90% REMEDIAL DESIGN HARRIS COUNTY, TEXAS**

4	90% EPA REVIEW	MW	CM	06/27/2022
No.	Issue	Drawn	Approved	Date
Drawn	MW	Designer	RH	
Drafting Check	JC	Design Check	LL	
Project Coordinator	CM	Date	Jun 27, 2022	
		Scale	AS SHOWN	

Original Size  
**Arch D**  
Bar is one inch on original size drawing  
0 1"

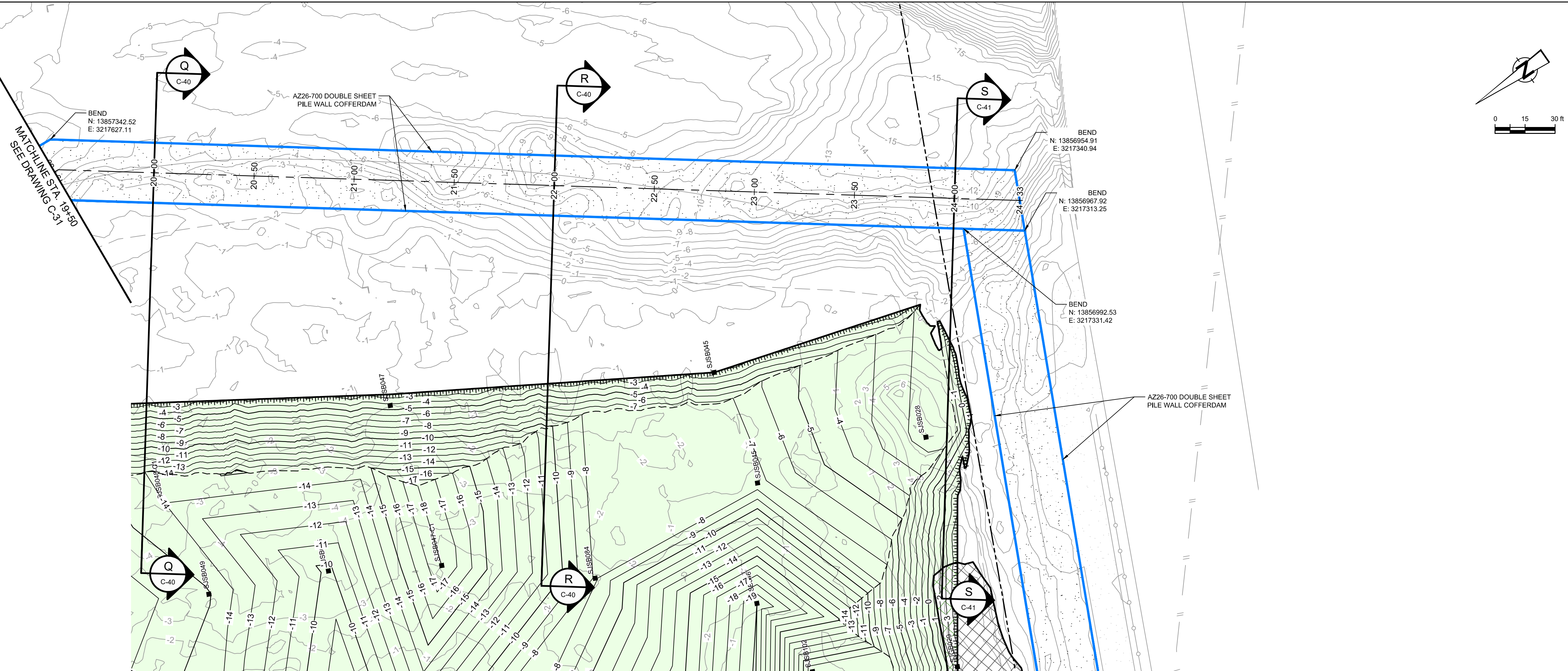
Project No. 11215702  
Title

**DOUBLE PILE WALL PLAN AND PROFILE**  
**3 OF 4**

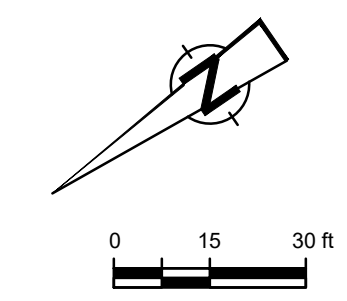
Sheet No.

**C-31**

Sheet - of -



**PLAN**  
1" = 30'



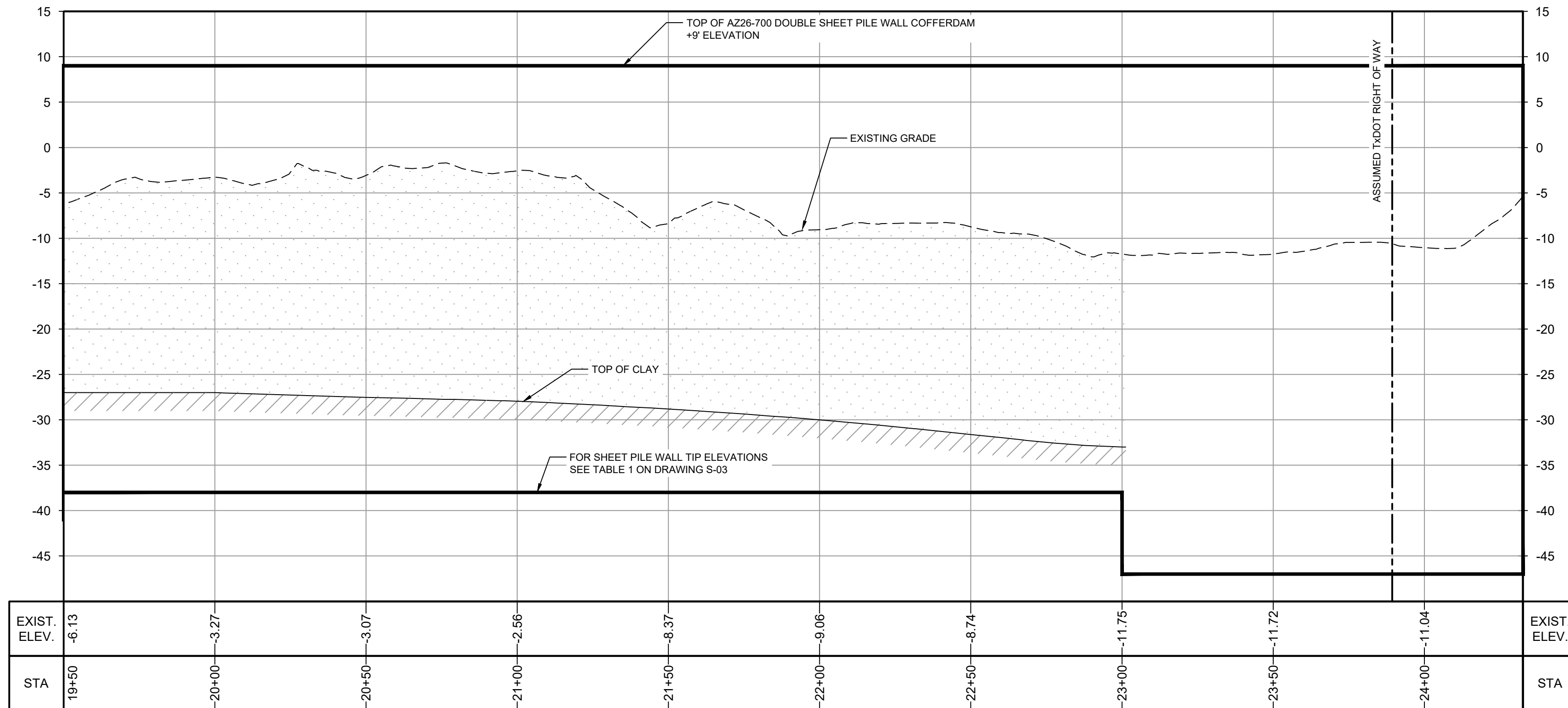
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**LEGEND**

---	ASSUMED TxDOT RIGHT OF WAY
---	TORA CAP PERIMETER
---	EXISTING CONTOUR INTERVAL
---	SHORELINE
---	TOP OF BANK
---	TOE OF SLOPE
---	OVERHEAD ELECTRICAL
---	GUARDRAIL
---	PIPELINE
---	BORING LOCATION
---	MONITORING WELL
---	POWER POLE
---	LIGHT POLE
---	WELL
---	MATERIAL TO BE EXCAVATED
---	EXISTING BERM
---	GRAVEL
---	AZ26-700 PILE
---	AZ40-700 PILE



**PROFILE**  
HORIZ: 1" = 30'  
VERT: 1" = 10'

SOURCE:  
 TOPOGRAPHIC, HYDROGRAPHIC, & MAGNETOMETER SURVEY OF SAN JACINTO RIVER WASTE PITS, HARRIS COUNTY, TEXAS, MORRISON SURVEYING INC., 1980/08, JULY 8, 2019 TO AUGUST 2, 2019  
 UPDATED BATHYMETRY DATA PROVIDED BY ANCHOR QEA OCTOBER 2021

NOTES:  
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**GHD SERVICES INC.**  
 JOB NO. 11215702 FILE NO. 001  
 GHD TEXAS FIRM REGISTRATION NO. 276

Client  
**SAN JACINTO RIVER WASTE PITS**

Project  
**NORTHERN IMPOUNDMENT PRE-FINAL 90% REMEDIAL DESIGN HARRIS COUNTY, TEXAS**

4	90% EPA REVIEW	MW	CM	06/27/2022
No.	Issue	Drawn	Approved	Date
Drawn	MW	Designer	RH	
Drafting	JC	Design	LL	
Check		Check		
Project Coordinator	CM	Date	Jun 27, 2022	
		Scale	AS SHOWN	

Original Size  
**Arch D**  
 Bar is one inch on original size drawing  
 0 1"

Project No. **11215702**  
 Title

**DOUBLE PILE WALL PLAN AND PROFILE**  
**4 OF 4**

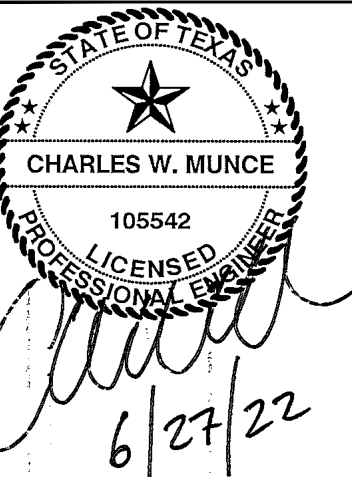
Sheet No.

**C-32**

**90% EPA REVIEW**



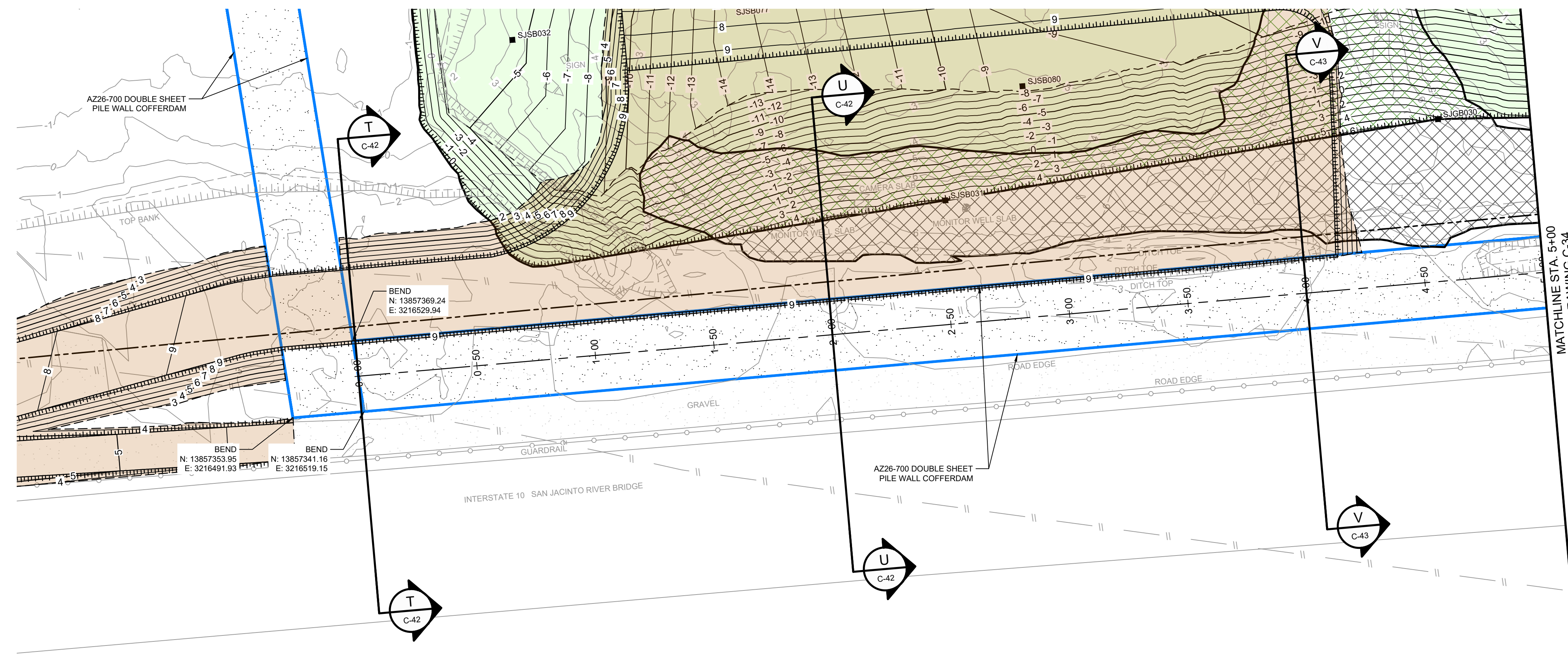
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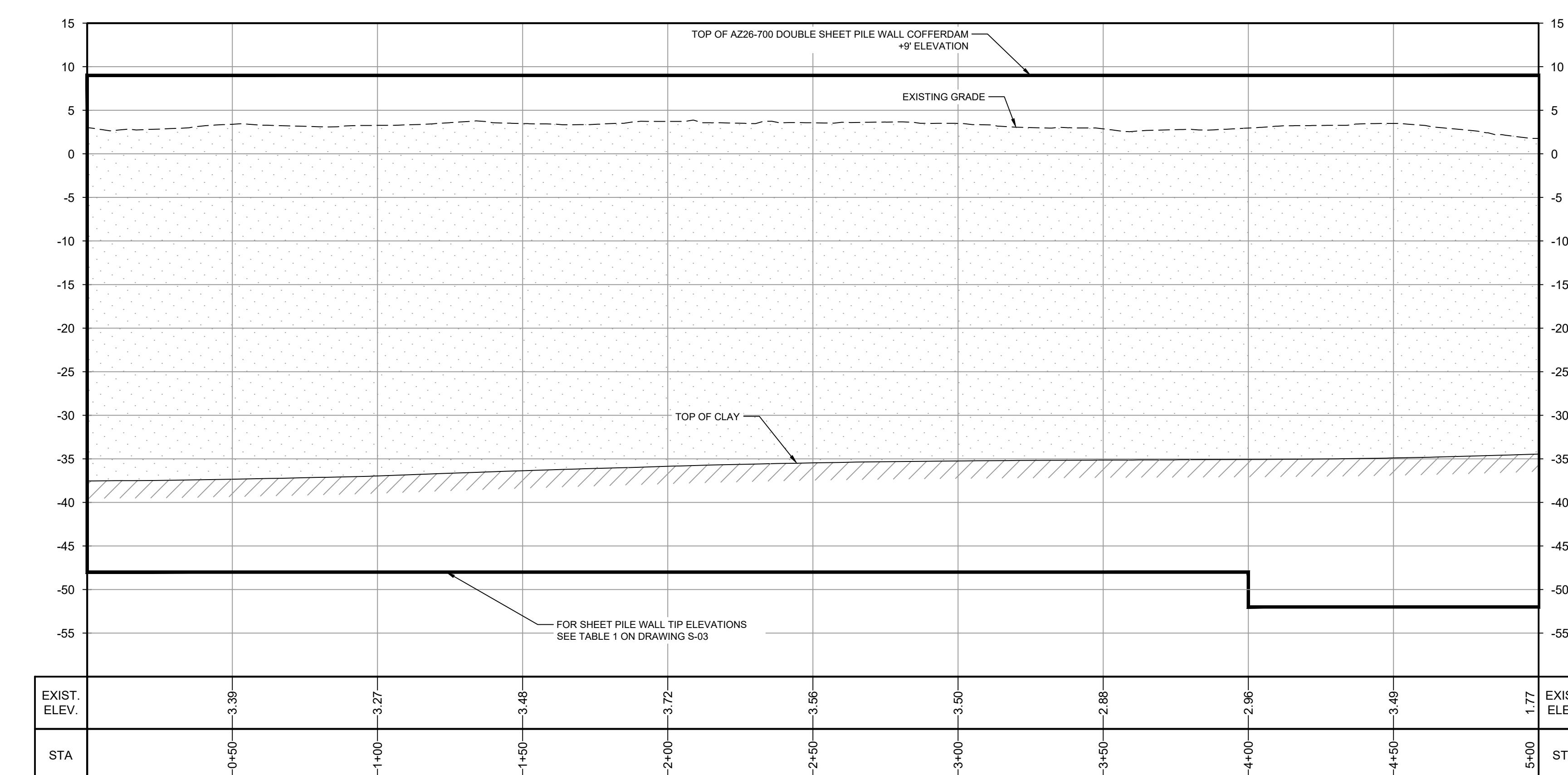
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LEGEND

---	ASSUMED TxDOT RIGHT OF WAY
- - - - -	TORA CAP PERIMETER
---	EXISTING CONTOUR INTERVAL
X	FENCELINE
.....	SHORELINE
-----	TOP OF BANK
-----	TOE OF SLOPE
-----	OVERHEAD ELECTRICAL
-----	GUARDRAIL
-----	PIPELINE
■	BJSSB002 BORING LOCATION
●	MW MONITORING WELL
○	P.P. POWER POLE
○	L.P. LIGHT POLE
○	WELL
[Hatched]	MATERIAL TO BE EXCAVATED
[Cross-hatched]	EXISTING BERM TO EXCAVATED
[Hatched]	EXISTING BERM
[Pattern]	GRAVEL
[Blue line]	AZ26-700 PILE
[Red line]	AZ40-700 PILE
[Green line]	PLANNED IMPROVEMENTS FOR NORTHERN IMPOUNDMENT ACCESS



PLAN  
1" = 30'



PROFILE  
HORIZ: 1" = 30'  
VERT: 1" = 10'

SOURCE:  
TOPOGRAPHIC, HYDROGRAPHIC, & MAGNETOMETER SURVEY OF SAN JACINTO RIVER WASTE PITS, HARRIS COUNTY, TEXAS, MORRISON SURVEYING INC., 190608, JULY 8, 2019 TO AUGUST 2, 2019.  
UPDATED BATHYMETRY DATA PROVIDED BY ANCHOR GEA OCTOBER 2021

NOTES:  
1. ASSUMED TxDOT RIGHT OF WAY IS BASED ON INFORMATION PROVIDED BY THE HARRIS COUNTY TAX ASSESSOR'S OFFICE  
2. FINAL EXCAVATION CONTOURS ARE SUBJECT TO CHANGE.

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GHD SERVICES INC.  
JOB NO. 11215702 FILE NO. 001  
GHD TEXAS FIRM REGISTRATION NO. 276

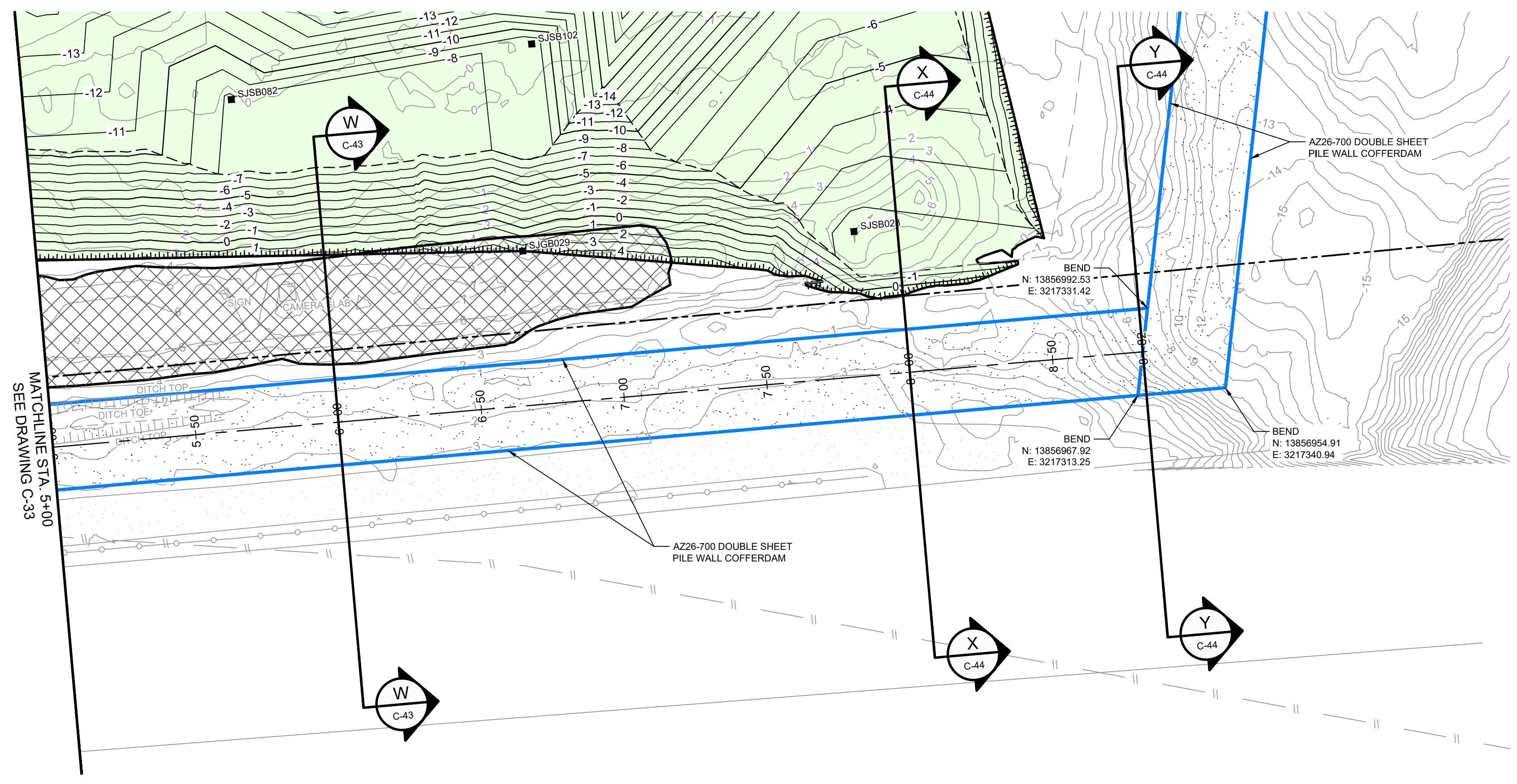
Client  
**SAN JACINTO RIVER WASTE PITS**  
Project  
**NORTHERN IMPOUNDMENT PRE-FINAL 90% REMEDIAL DESIGN HARRIS COUNTY, TEXAS**

4	90% EPA REVIEW	MW	CM	06/27/2022
No.	Issue	Drawn	Approved	Date
Drawn	MW		Designer	RH
Drafting Check	JC		Design Check	LL
Project Coordinator	CM		Date	Jun 27, 2022
			Scale	AS SHOWN
Original Size				Bar is one inch on original size drawing 0 1"

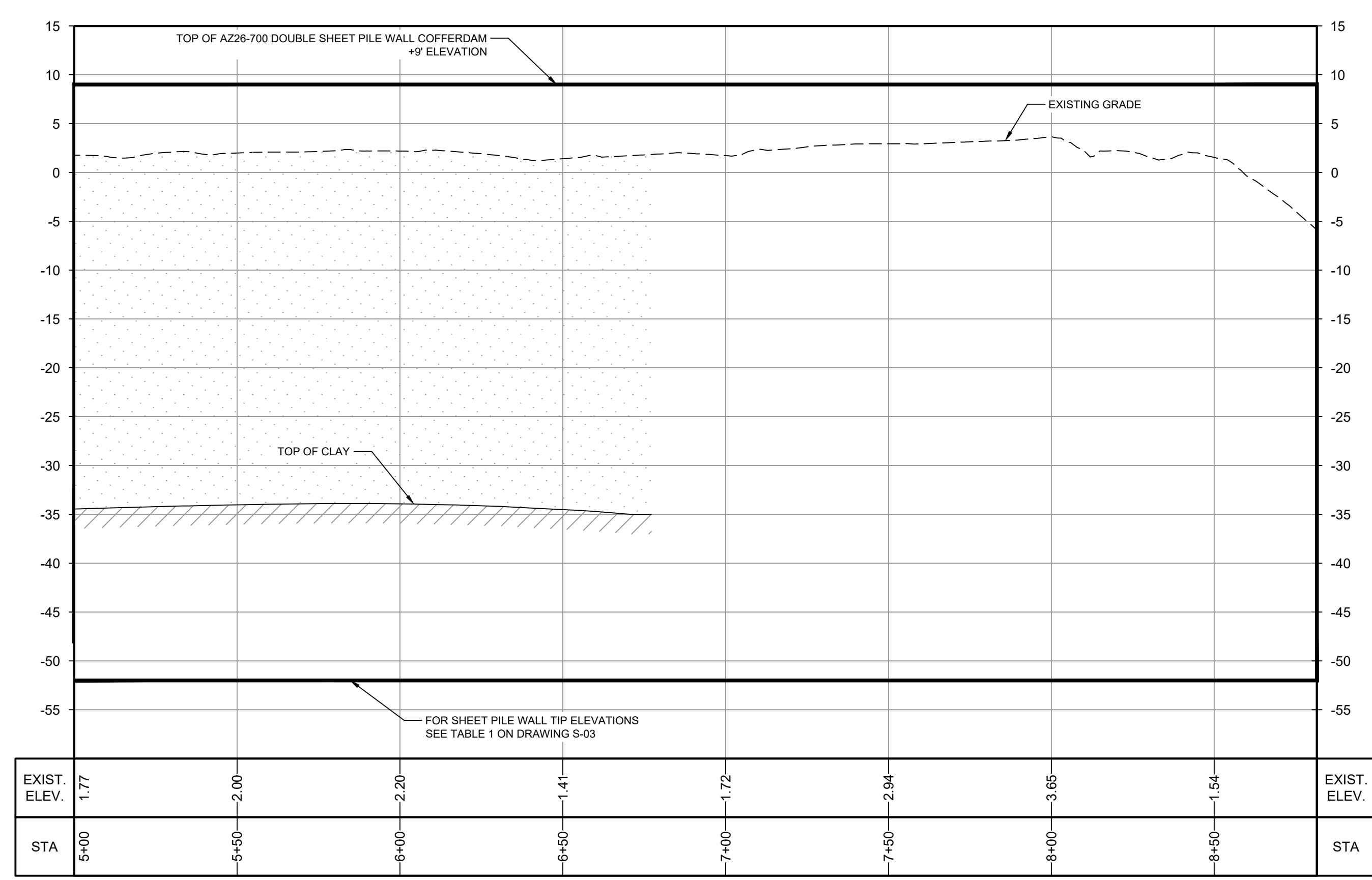
Project No. **11215702**  
Title  
**SOUTH WALL PLAN AND PROFILE 1 OF 2**

Sheet No.  
**C-33**  
Sheet - of -

90% EPA REVIEW



**PLAN**  
1" = 30'



**PROFILE**  
HORIZ: 1" = 30'  
VERT: 1" = 10'

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Baton Rouge Louisiana USA  
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STATE OF TEXAS  
CHARLES W. MUNCE  
105542  
LICENSED PROFESSIONAL ENGINEER  
6/27/22

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**LEGEND**

---	ASSUMED TxDOT RIGHT OF WAY
- - - -	TORA CAP PERIMETER
---	EXISTING CONTOUR INTERVAL
X	FENCELINE
---	SHORELINE
---	TOP OF BANK
---	TOE OF SLOPE
---	OVERHEAD ELECTRICAL
---	GUARDRAIL
---	PIPELINE
■	SJSB002 BORING LOCATION
●	MW MONITORING WELL
●	P.P. POWER POLE
●	L.P. LIGHT POLE
○	WELL
---	MATERIAL TO BE EXCAVATED
---	EXISTING BERM TO EXCAVATED
---	EXISTING BERM
---	GRAVEL
---	AZ26-700 PILE
---	AZ40-700 PILE

Client  
**SAN JACINTO RIVER WASTE PITS**

Project  
**NORTHERN IMPOUNDMENT PRE-FINAL 90% REMEDIAL DESIGN HARRIS COUNTY, TEXAS**

4	90% EPA REVIEW	MW	CM	06/27/2022
No.	Issue	Drawn	Approved	Date
Drawn	MW	Designer	RH	
Drafting Check	JC	Design Check	LL	
Project Coordinator	CM	Date	Jun 27, 2022	
		Scale	AS SHOWN	

SOURCE:  
TOPOGRAPHIC, HYDROGRAPHIC, & MAGNETOMETER SURVEY OF SAN JACINTO RIVER WASTE PITS, HARRIS COUNTY, TEXAS, MORRISON SURVEYING INC., 190608, JULY 8, 2019 TO AUGUST 2, 2019.  
UPDATED BATHYMETRY DATA PROVIDED BY ANCHOR GEA OCTOBER 2021

NOTES:  
1. ASSUMED TxDOT RIGHT OF WAY IS BASED ON INFORMATION PROVIDED BY THE HARRIS COUNTY TAX ASSESSOR'S OFFICE.  
2. FINAL EXCAVATION CONTOURS ARE SUBJECT TO CHANGE.

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GHD SERVICES INC.  
JOB NO. 11215702 FILE NO. 001  
GHD TEXAS FIRM REGISTRATION NO. 276

Original Size  
**Arch D**  
Bar is one inch on original size drawing  
0 1"

Project No. **11215702**

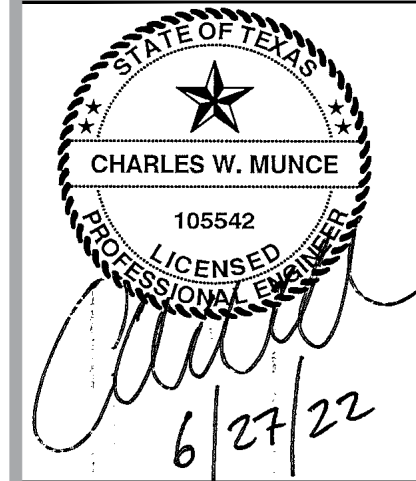
Title  
**SOUTH WALL PLAN AND PROFILE 2 OF 2**

Sheet No.  
**C-34**

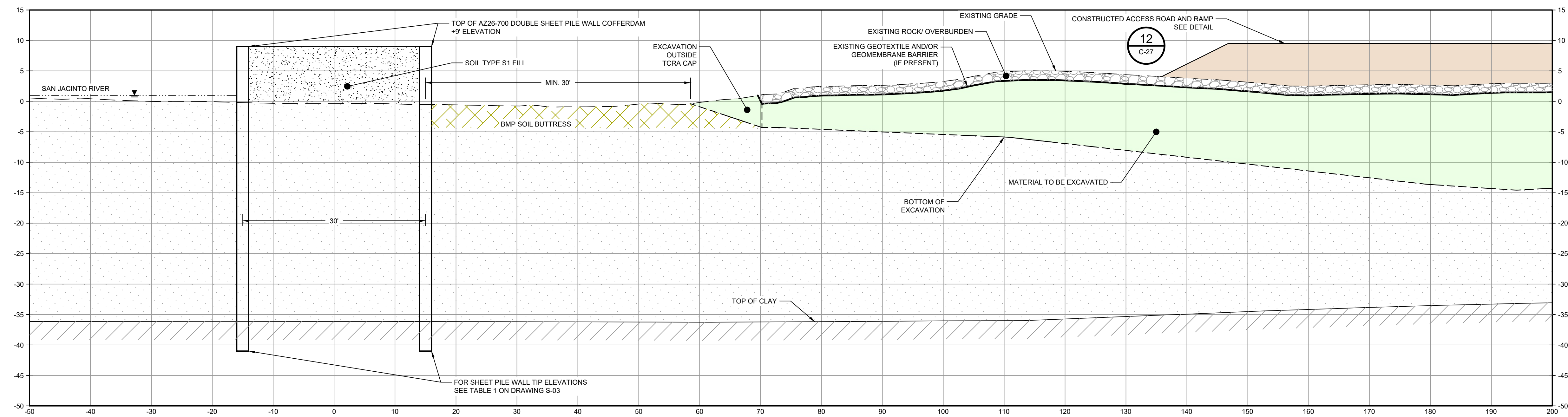
Sheet - of -



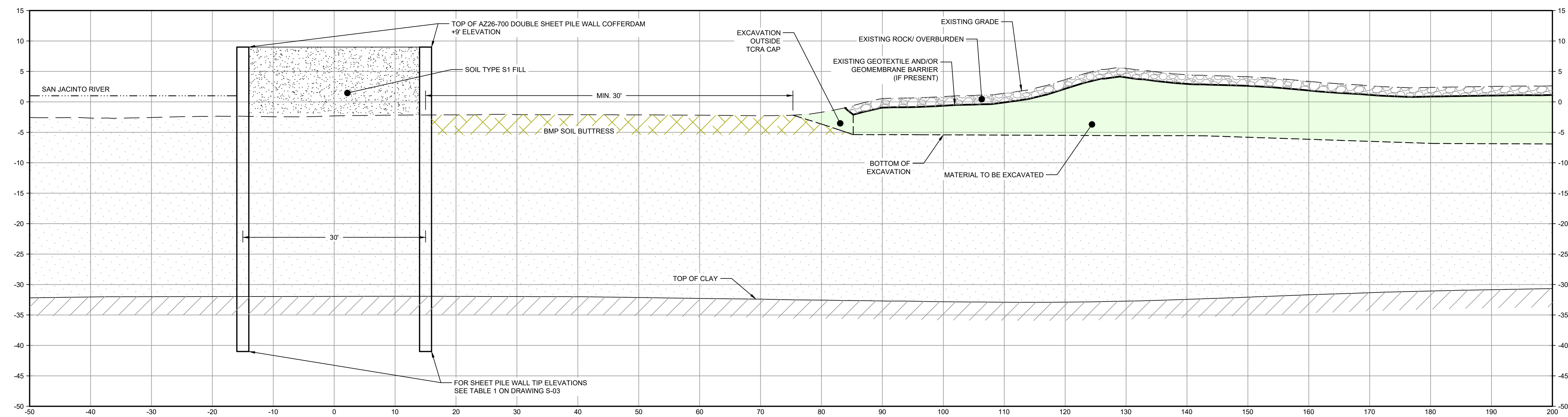
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SECTION **G** STA. 0+00.00  
SCALE: 1"=10'  
C-29



SECTION **H** STA. 2+00.00  
SCALE: 1"=10'  
C-29

LEGEND

	MATERIAL TO BE EXCAVATED
	BMP SOIL BUTTRESS
	PLANNED IMPROVEMENTS FOR NORTHERN IMPOUNDMENT ACCESS

Client  
**SAN JACINTO RIVER WASTE PITS**

Project  
**NORTHERN IMPOUNDMENT PRE-FINAL 90% REMEDIAL DESIGN HARRIS COUNTY, TEXAS**

2	90% EPA REVIEW	MW	CM	06/27/2022
No.	Issue	Drawn	Approved	Date
Drawn	MW	Designer	RH	
Drafting Check	JC	Design Check	LL	
Project Coordinator	CM	Date	Jun 27, 2022	

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Original Size  
**Arch D**  
Bar is one inch on original size drawing  
0 1"

Project No. 11215702

Title  
**DOUBLE PILE WALL SECTIONS 1 OF 7**

Sheet No.

**C-35**

- NOTES:
- BOTTOM OF EXCAVATION IS SUBJECT TO CHANGE.

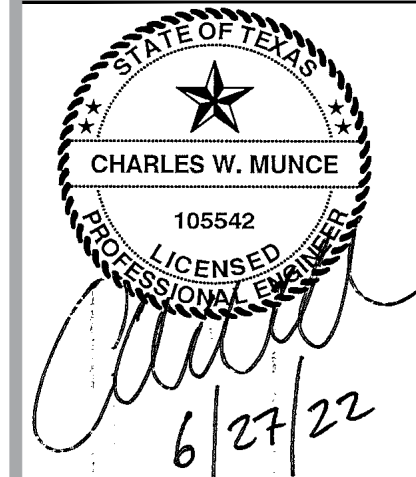
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**GHD SERVICES INC.**  
JOB NO. 11215702 FILE NO. 001  
GHD TEXAS FIRM REGISTRATION NO. 276

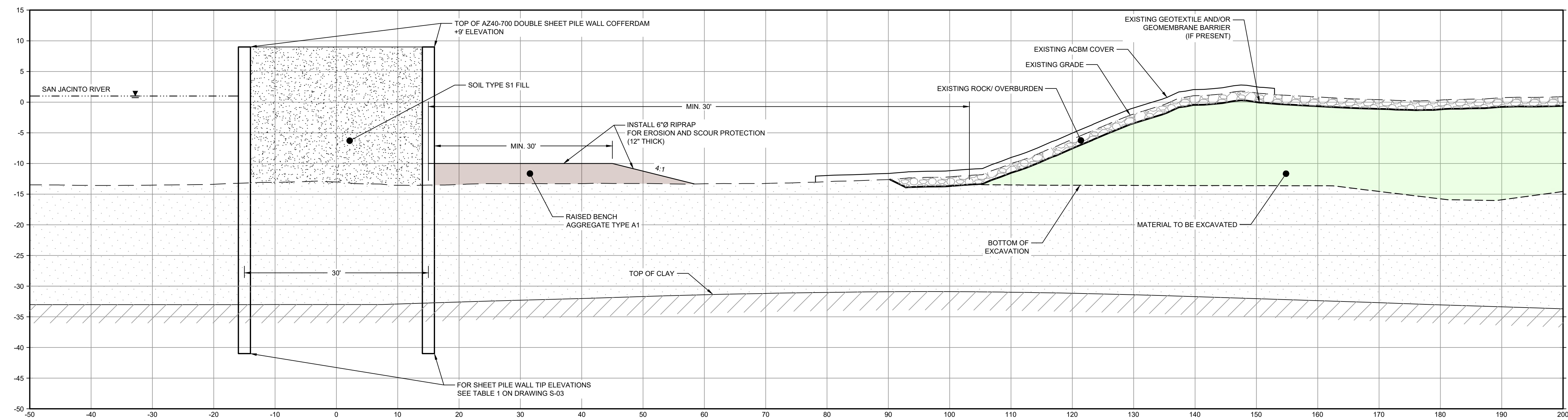
**90% EPA REVIEW**



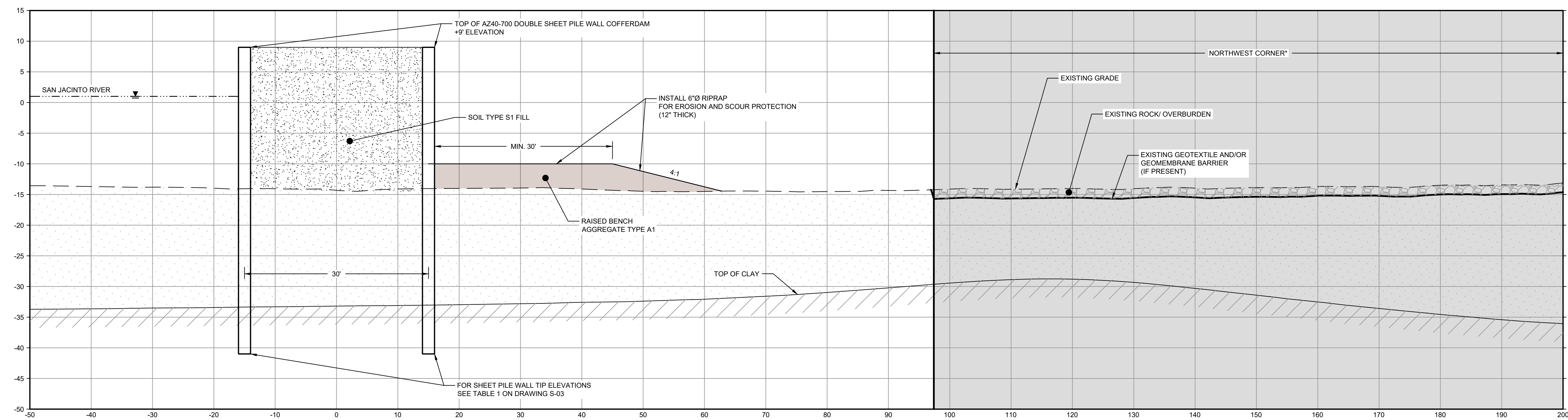
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SECTION I STA. 4+00.00  
SCALE: 1"=10'  
C-29



SECTION J STA. 6+00.00  
SCALE: 1"=10'  
C-29

LEGEND

	MATERIAL TO BE EXCAVATED
	BMP SOIL BUTTRISS
	RAISED BENCH

Client  
**SAN JACINTO RIVER WASTE PITS**

Project  
**NORTHERN IMPOUNDMENT PRE-FINAL 90% REMEDIAL DESIGN HARRIS COUNTY, TEXAS**

2	90% EPA REVIEW	MW	CM	06/27/2022
No.	Issue	Drawn	Approved	Date
Drawn	MW	Designer	RH	
Drafting Check	JC	Design Check	LL	
Project Coordinator	CM	Date	Jun 27, 2022	

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Original Size  
**Arch D**  
Bar is one inch on original size drawing  
0 1"

Project No. 11215702  
Title

**DOUBLE PILE WALL SECTIONS 2 OF 7**

Sheet No.  
**C-36**

\*THE REMEDIAL DESIGN INFORMATION FOR THE NORTHWEST PORTION OF THE NORTHERN IMPOUNDMENT IS INCLUDED IN THIS SUBMITTAL. THE DESIGN TO DATE CONCLUDES THAT COMPLETING THE REMEDIAL ACTION "IN THE DRY" IN THE NORTHWEST PORTION OF THE NORTHERN IMPOUNDMENT AS STATED IN THE EPA RECORD OF DECISION IS NOT TECHNICALLY FEASIBLE DUE TO HYDRAULIC HEAVE. THE SUPPORTING TECHNICAL AND ENGINEERING BASIS FOR THIS CONCLUSION ARE INCLUDED IN THIS SUBMITTAL AND AS SUCH, PENDING A FINAL EPA DETERMINATION REGARDING THIS AREA, IT IS ANTICIPATED THAT AN ADDENDUM TO THE PRE-FINAL 90% REMEDIAL DESIGN WILL BE SUBMITTED AT A FUTURE DATE TO ADDRESS THE NORTHWEST PORTION OF THE NORTHERN IMPOUNDMENT IN ACCORDANCE WITH EPA'S FINAL DETERMINATION AFTER REVIEW OF THIS NEWLY DEVELOPED SITE INFORMATION.

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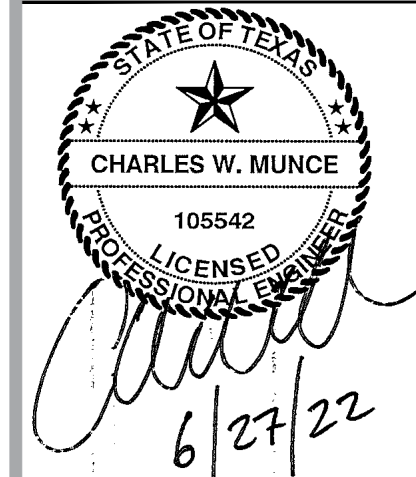
**GHD SERVICES INC.**  
JOB NO. 11215702 FILE NO. 001  
GHD TEXAS FIRM REGISTRATION NO. 276

- NOTES:  
1. BOTTOM OF EXCAVATION IS SUBJECT TO CHANGE.

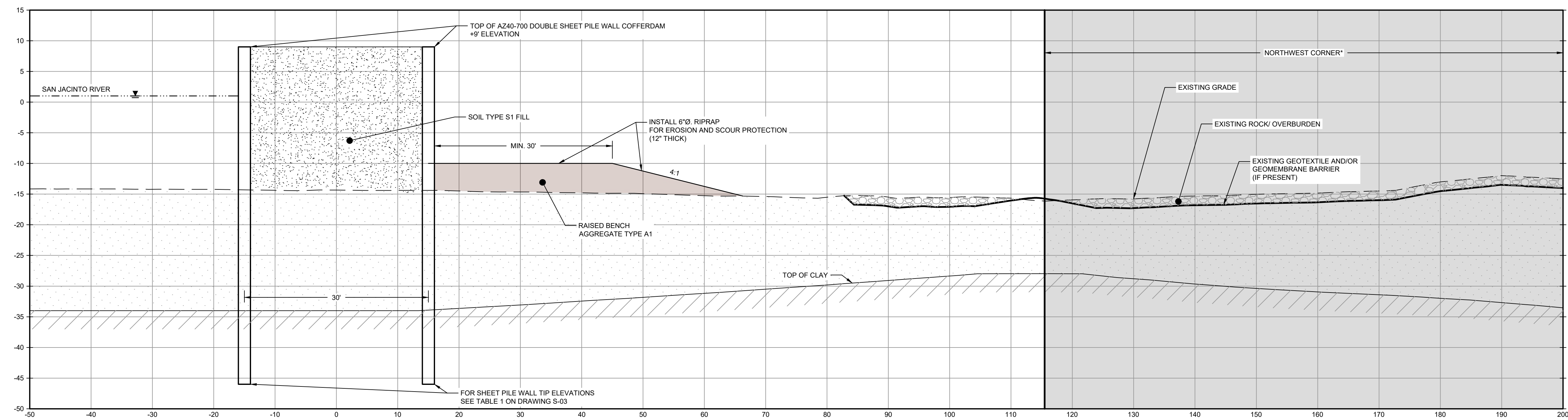
**90% EPA REVIEW**



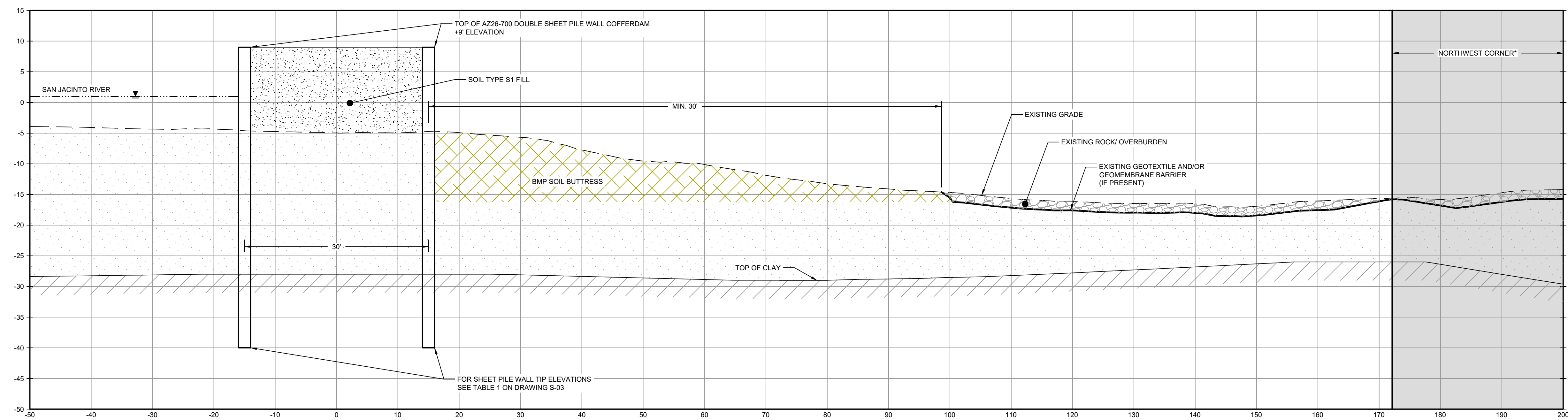
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SECTION **K** STA. 8+00.00  
SCALE: 1"=10'  
C-30



SECTION **L** STA. 10+00.00  
SCALE: 1"=10'  
C-30

LEGEND

	MATERIAL TO BE EXCAVATED
	BMP SOIL BUTTRESS
	RAISED BENCH

Client  
**SAN JACINTO RIVER WASTE PITS**

Project  
**NORTHERN IMPOUNDMENT PRE-FINAL 90% REMEDIAL DESIGN HARRIS COUNTY, TEXAS**

2	90% EPA REVIEW	MW	CM	06/27/2022
---	----------------	----	----	------------

Drawn MW Designer RH

Drafting Check JC Design Check LL

Project Coordinator CM Date Jun 27, 2022

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Scale 1" = 10'

Original Size  
**Arch D**  
Bar is one inch on original size drawing  
0 1"

Project No. 11215702

Title

**DOUBLE PILE WALL SECTIONS**  
3 OF 7

Sheet No.

**C-37**

\*THE REMEDIAL DESIGN INFORMATION FOR THE NORTHWEST PORTION OF THE NORTHERN IMPOUNDMENT IS INCLUDED IN THIS SUBMITTAL. THE DESIGN TO DATE CONCLUDES THAT COMPLETING THE REMEDIAL ACTION "IN THE DRY" IN THE NORTHWEST PORTION OF THE NORTHERN IMPOUNDMENT AS STATED IN THE EPA RECORD OF DECISION IS NOT TECHNICALLY FEASIBLE DUE TO HYDRAULIC HEAVE. THE SUPPORTING TECHNICAL AND ENGINEERING BASIS FOR THIS CONCLUSION ARE INCLUDED IN THIS SUBMITTAL AND AS SUCH, PENDING A FINAL EPA DETERMINATION REGARDING THIS AREA, IT IS ANTICIPATED THAT AN ADDENDUM TO THE PRE-FINAL 90% REMEDIAL DESIGN WILL BE SUBMITTED AT A FUTURE DATE TO ADDRESS THE NORTHWEST PORTION OF THE NORTHERN IMPOUNDMENT IN ACCORDANCE WITH EPA'S FINAL DETERMINATION AFTER REVIEW OF THIS NEWLY DEVELOPED SITE INFORMATION.

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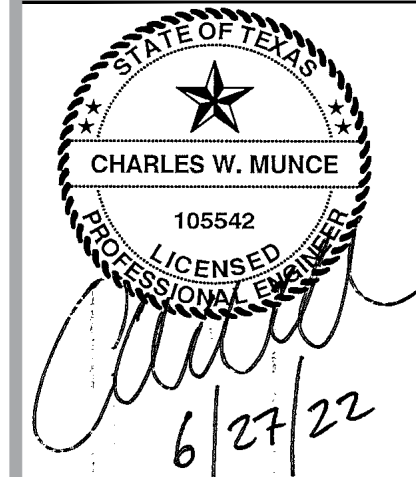
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JOB NO. 11215702 FILE NO. 001  
GHD TEXAS FIRM REGISTRATION NO. 276

- NOTES:
1. BOTTOM OF EXCAVATION IS SUBJECT TO CHANGE.

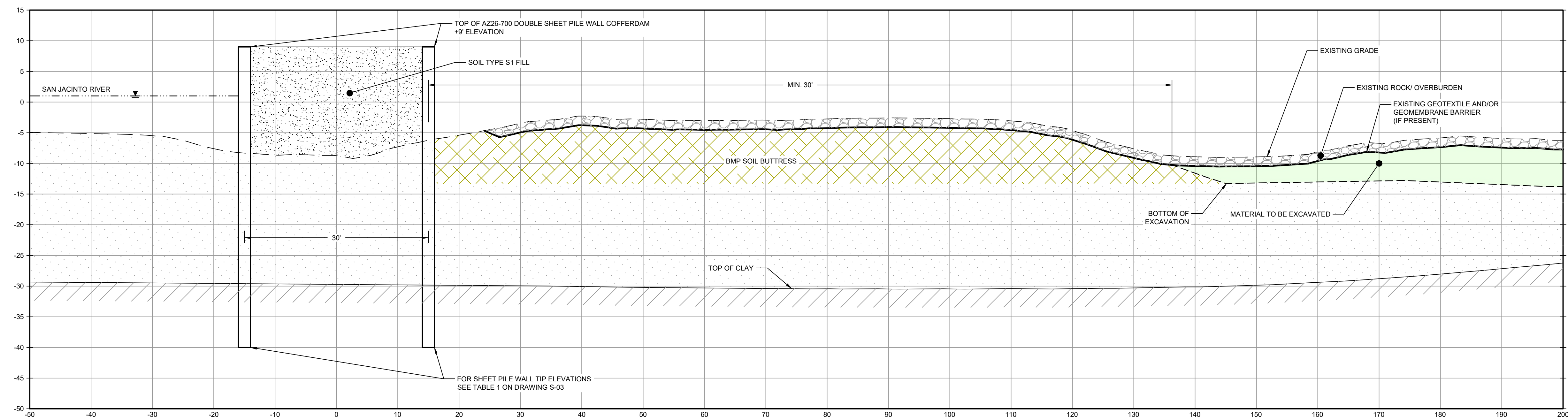
**90% EPA REVIEW**



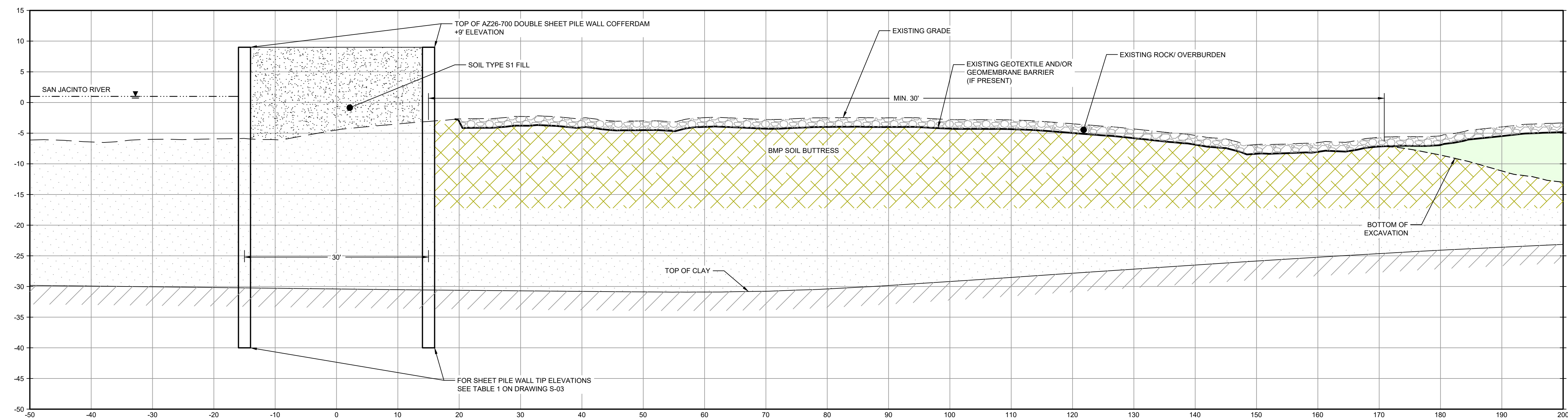
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SECTION **M** STA. 12+00.00  
SCALE: 1"=10'  
C-30



SECTION **N** STA. 14+00.00  
SCALE: 1"=10'  
C-31

LEGEND

	MATERIAL TO BE EXCAVATED
	BMP SOIL BUTTRISS

Client  
**SAN JACINTO RIVER WASTE PITS**

Project  
**NORTHERN IMPOUNDMENT PRE-FINAL 90% REMEDIAL DESIGN HARRIS COUNTY, TEXAS**

No.	Issue	Drawn	Approved	Date
2	90% EPA REVIEW	MW	CM	06/27/2022

Drawn **MW** Designer **RH**

Drafting Check **JC** Design Check **LL**

Project Coordinator **CM** Date **Jun 27, 2022**

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Original Size  
**Arch D** Scale **1" = 10'**

Bar is one inch on original size drawing

NOTES:  
1. BOTTOM OF EXCAVATION IS SUBJECT TO CHANGE.

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**GHD SERVICES INC.**

JOB NO. 11215702 FILE NO. 001  
GHD TEXAS FIRM REGISTRATION NO. 276

Project No. **11215702**

Title  
**DOUBLE PILE WALL SECTIONS 4 OF 7**

Sheet No.  
**C-38**

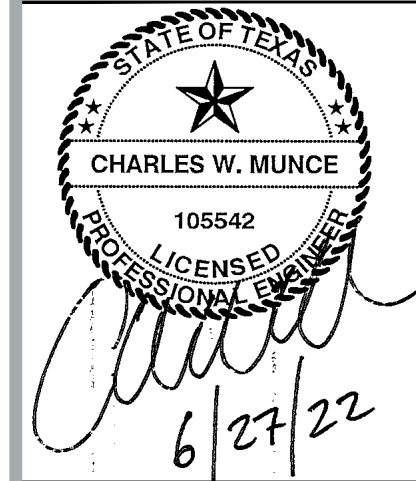
Sheet - of -

**90% EPA REVIEW**





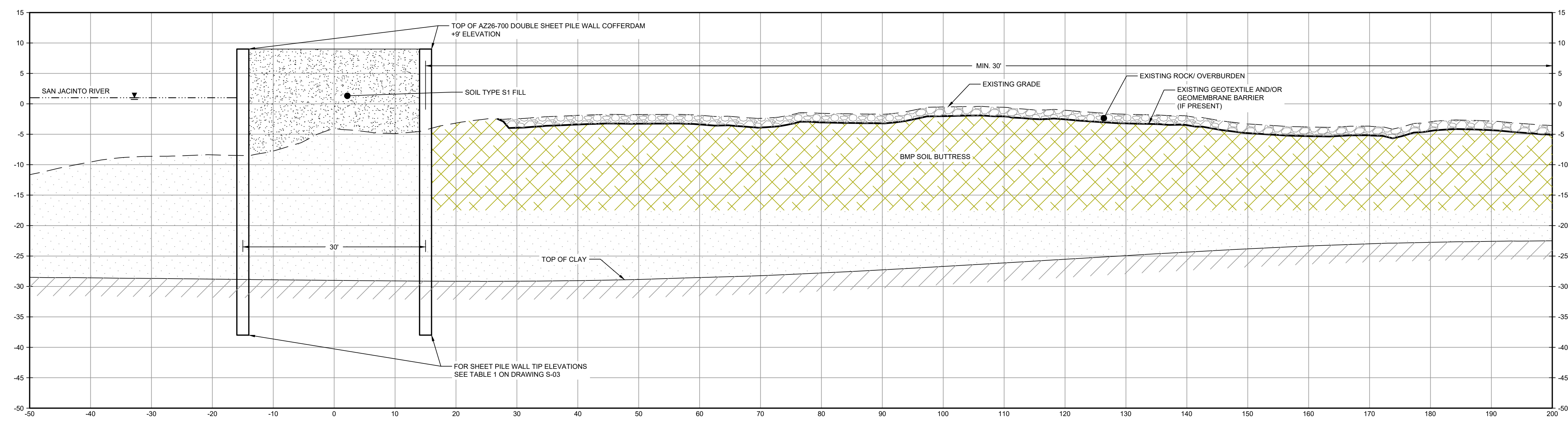
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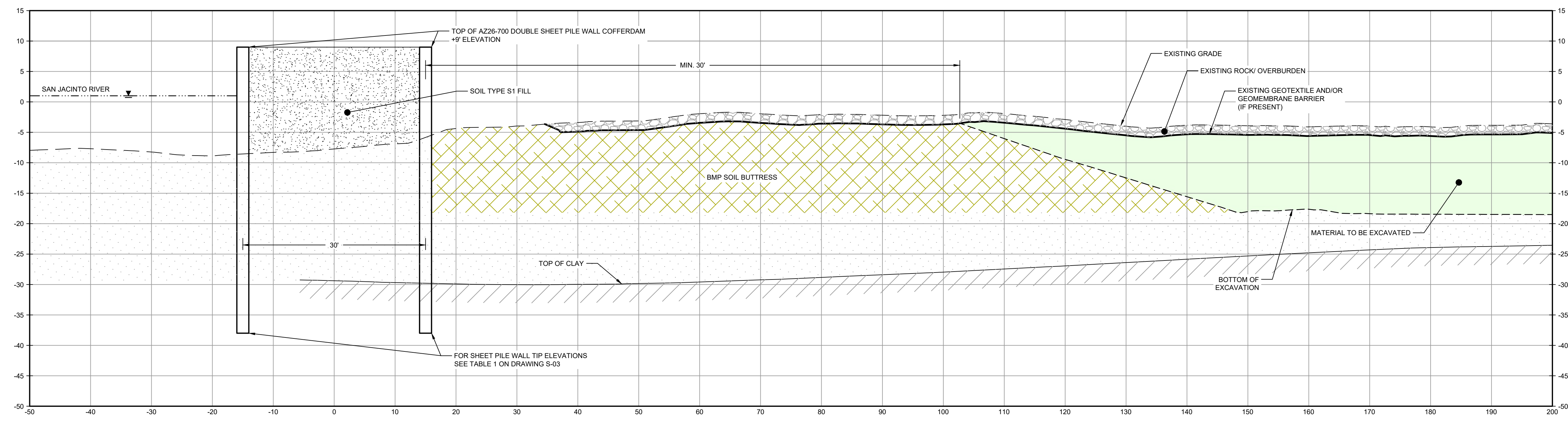
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LEGEND

	MATERIAL TO BE EXCAVATED
	BMP SOIL BUTTRESS



SECTION **O** STA. 16+00.00  
SCALE: 1"=10'  
C-31



SECTION **P** STA. 18+00.00  
SCALE: 1"=10'  
C-31

- NOTES:
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**GHD SERVICES INC.**  
JOB NO. 11215702 FILE NO. 001  
GHD TEXAS FIRM REGISTRATION NO. 276

**90% EPA REVIEW**

Client  
**SAN JACINTO RIVER WASTE PITS**  
Project  
**NORTHERN IMPOUNDMENT PRE-FINAL 90% REMEDIAL DESIGN HARRIS COUNTY, TEXAS**

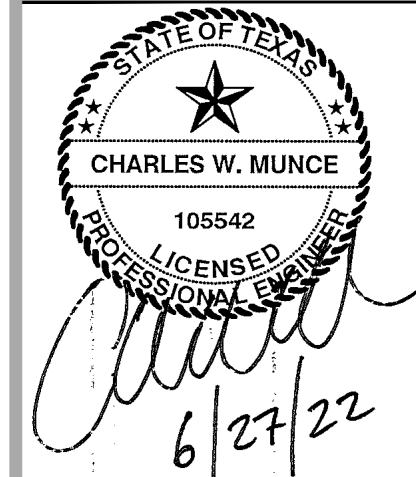
2	90% EPA REVIEW	MW	CM	06/27/2022
No.	Issue	Drawn	Approved	Date
Drawn	MW	Designer	RH	
Drafting Check	JC	Design Check	LL	
Project Coordinator	CM	Date	Jun 27, 2022	
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Original Size	Arch D			Bar is one inch on original size drawing 0 1"

Project No. 11215702  
Title  
**DOUBLE PILE WALL SECTIONS 5 OF 7**

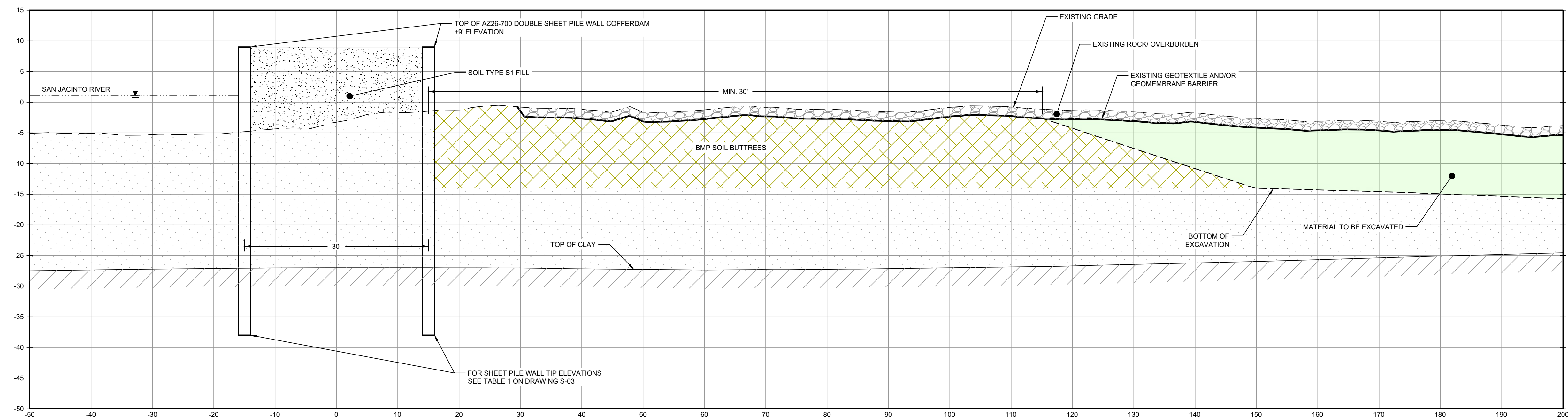
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**C-39**



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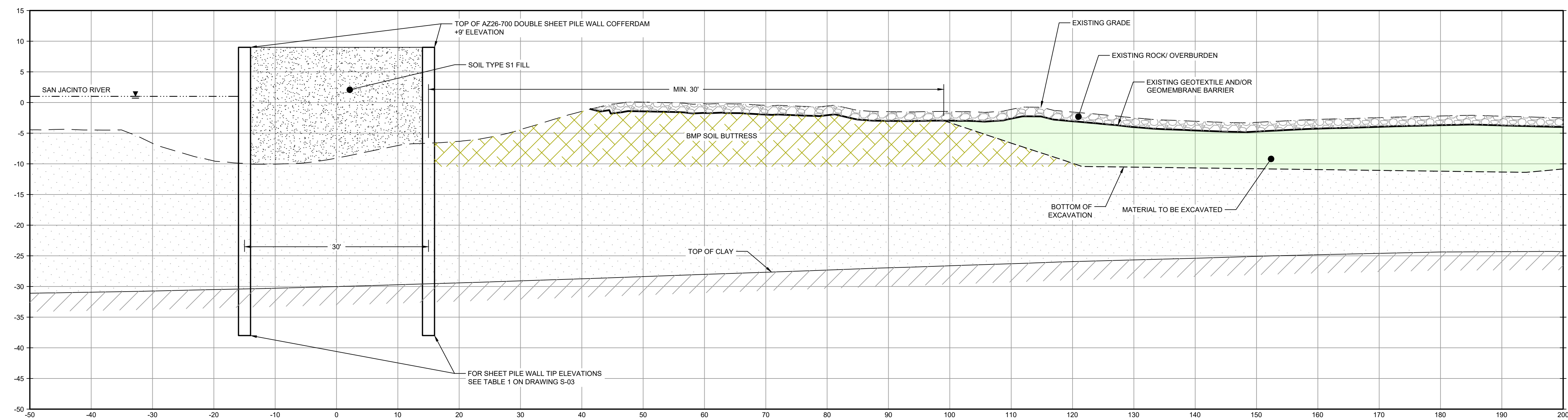


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SECTION **Q** STA. 20+00.00  
SCALE: 1"=10'  
C-XX

LEGEND



SECTION **R** STA. 22+00.00  
SCALE: 1"=10'  
C-XX

- NOTES:  
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JOB NO. 11215702 FILE NO. 001  
GHD TEXAS FIRM REGISTRATION NO. 276

Client **SAN JACINTO RIVER WASTE PITS**  
Project **NORTHERN IMPOUNDMENT PRE-FINAL 90% REMEDIAL DESIGN HARRIS COUNTY, TEXAS**

2	90% EPA REVIEW	MW	CM	06/27/2022
No.	Issue	Drawn	Approved	Date
Drawn	MW	Designer	RH	
Drafting Check	JC	Design Check	LL	
Project Coordinator	CM	Date	Jun 27, 2022	
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Original Size **Arch D**  
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0 1"

Project No. 11215702

Title **DOUBLE PILE WALL SECTIONS 6 OF 7**

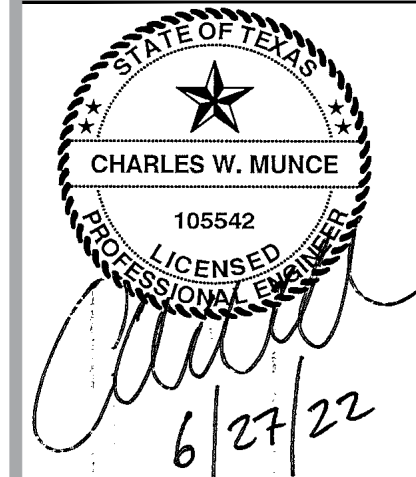
Sheet No.

**C-40**

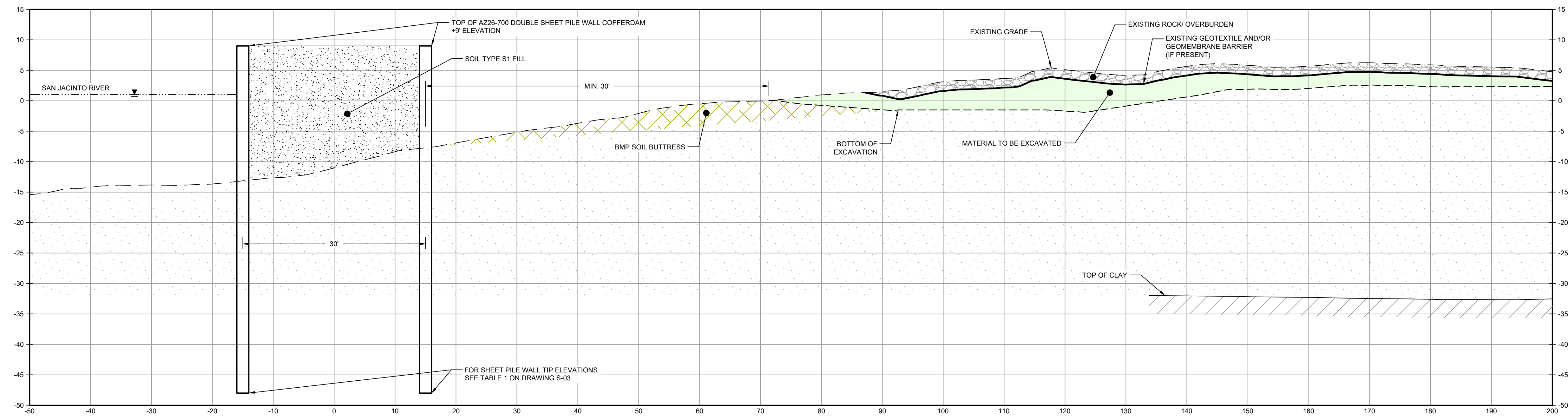
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SECTION **S** STA. 24+00  
 SCALE: 1"=10'  
 C-32

LEGEND  
 MATERIAL TO BE EXCAVATED  
 BMP SOIL BUTTRISS

Client  
**SAN JACINTO RIVER WASTE PITS**  
 Project  
**NORTHERN IMPOUNDMENT PRE-FINAL 90% REMEDIAL DESIGN HARRIS COUNTY, TEXAS**

No.	Issue	Drawn	Approved	Date
2	90% EPA REVIEW	MW	CM	06/27/2022

Drawn **MW** Designer **RH**  
 Drafting **JC** Design Check **LL**  
 Project Coordinator **CM** Date **Jun 27, 2022**  
 Scale **1" = 10'**

Original Size  
**Arch D**  
 Bar is one inch on original size drawing  
 0 1"

Project No. **11215702**  
 Title  
**DOUBLE PILE WALL SECTIONS 7 OF 7**

Sheet No.  
**C-41**  
 Sheet - of -

NOTES:  
 1. BOTTOM OF EXCAVATION IS SUBJECT TO CHANGE.

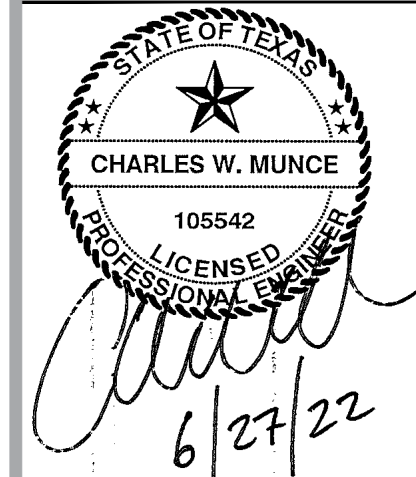
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**GHD SERVICES INC.**  
 JOB NO. 11215702 FILE NO. 001  
 GHD TEXAS FIRM REGISTRATION NO. 276

**90% EPA REVIEW**



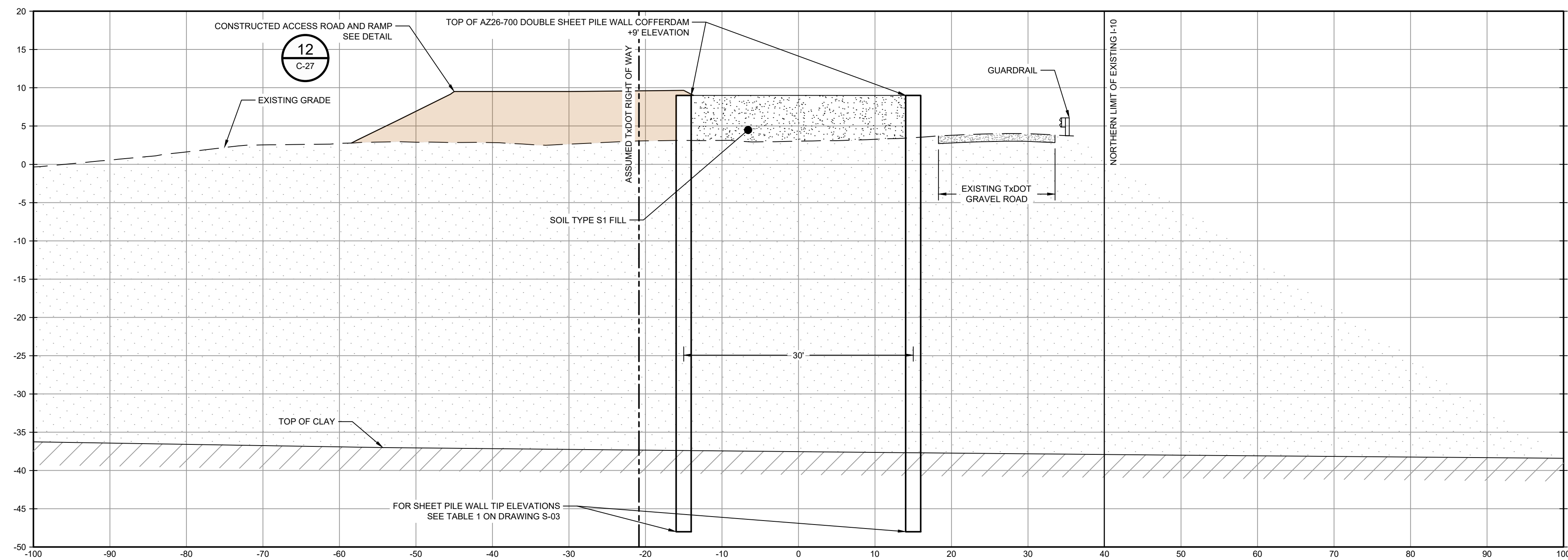
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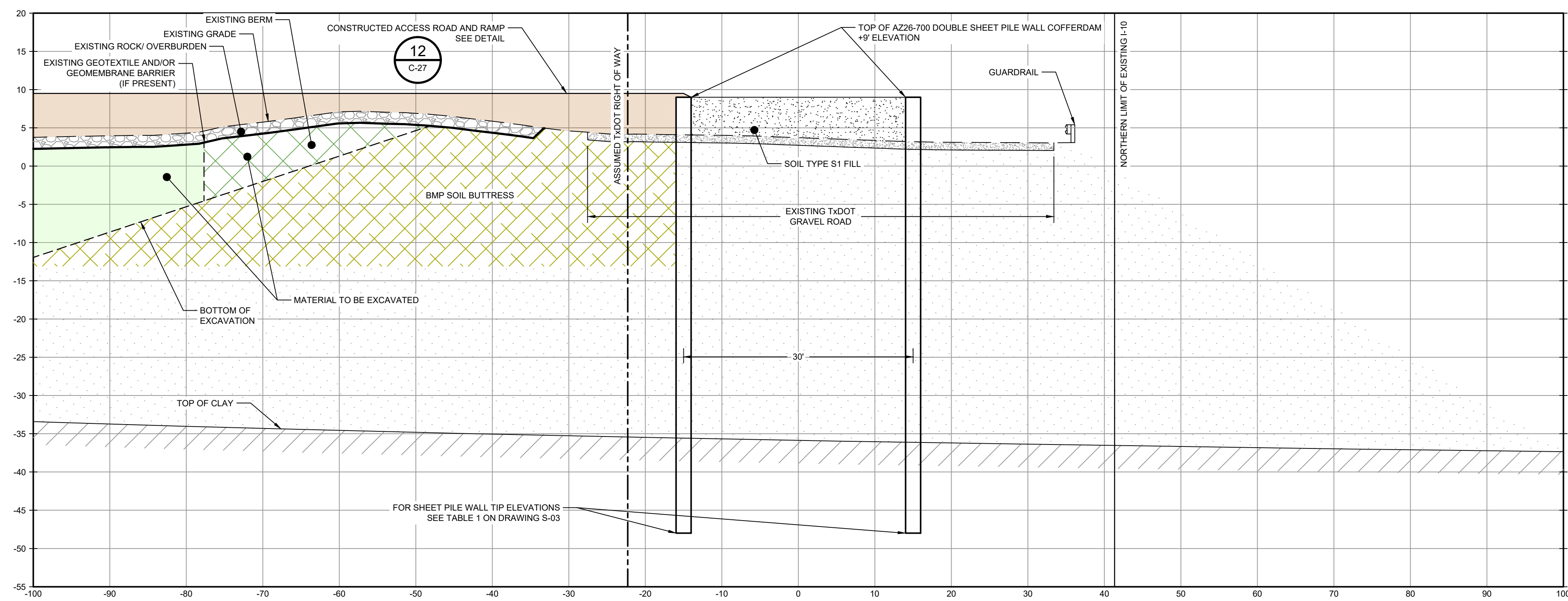
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**LEGEND**

	MATERIAL TO BE EXCAVATED
	EXISTING BERM TO BE EXCAVATED
	BMP SOIL BUTTRESS
	PLANNED IMPROVEMENTS FOR NORTHERN IMPOUNDMENT ACCESS



SECTION **T** STA. 0+00.00  
SCALE: 1"=10'  
C-33



SECTION **U** STA. 2+00.00  
SCALE: 1"=10'  
C-33

- NOTES:
1. ASSUMED TxDOT RIGHT OF WAY IS BASED ON INFORMATION PROVIDED BY THE HARRIS COUNTY TAX ASSESSOR'S OFFICE.
  2. BOTTOM OF EXCAVATION IS SUBJECT TO CHANGE.

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**90% EPA REVIEW**

Client **SAN JACINTO RIVER WASTE PITS**  
Project **NORTHERN IMPOUNDMENT PRE-FINAL 90% REMEDIAL DESIGN HARRIS COUNTY, TEXAS**

2	90% EPA REVIEW	MW	CM	06/27/2022
No.	Issue	Drawn	Approved	Date
Drawn	MW	Designer	RH	
Drafting Check	JC	Design Check	LL	
Project Coordinator	CM	Date	Jun 27, 2022	
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Original Size	Arch D			Bar is one inch on original size drawing 0 1"

Project No. 11215702

Title **SOUTH WALL SECTIONS 1 OF 3**

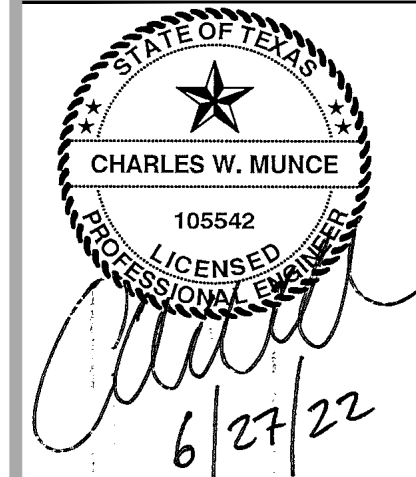
Sheet No.

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Sheet - of -



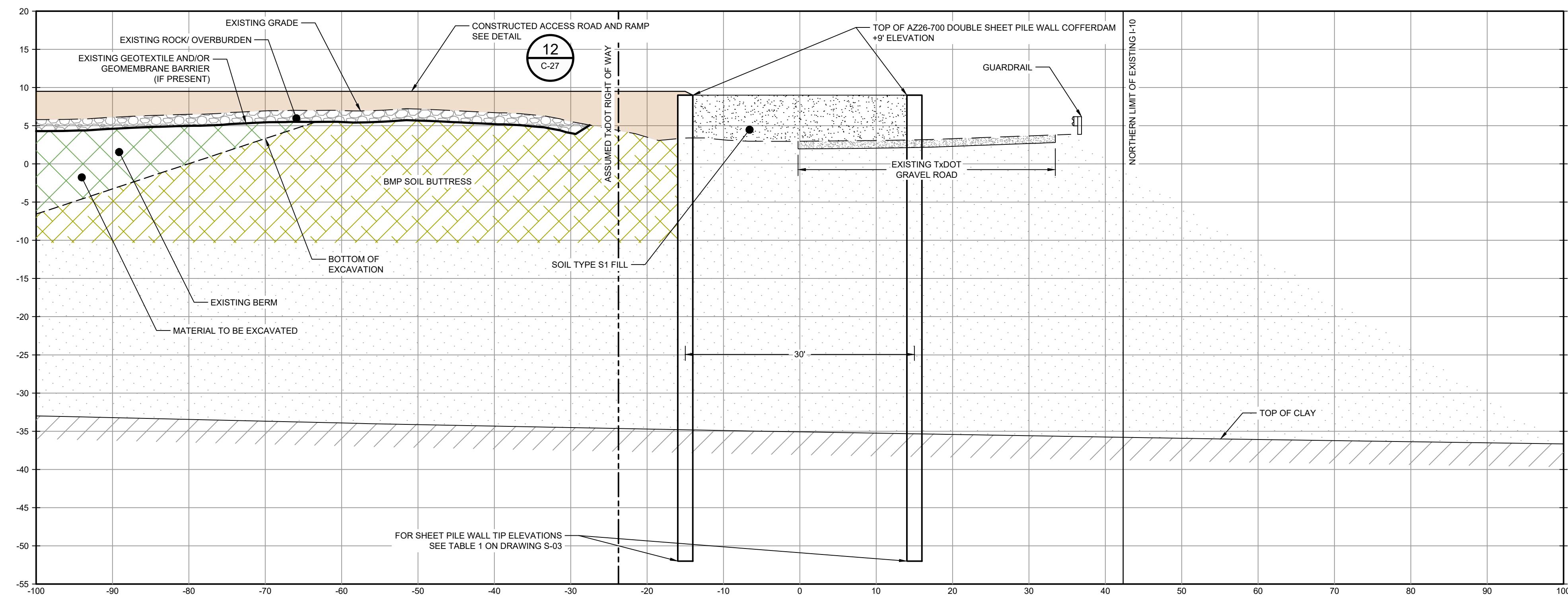
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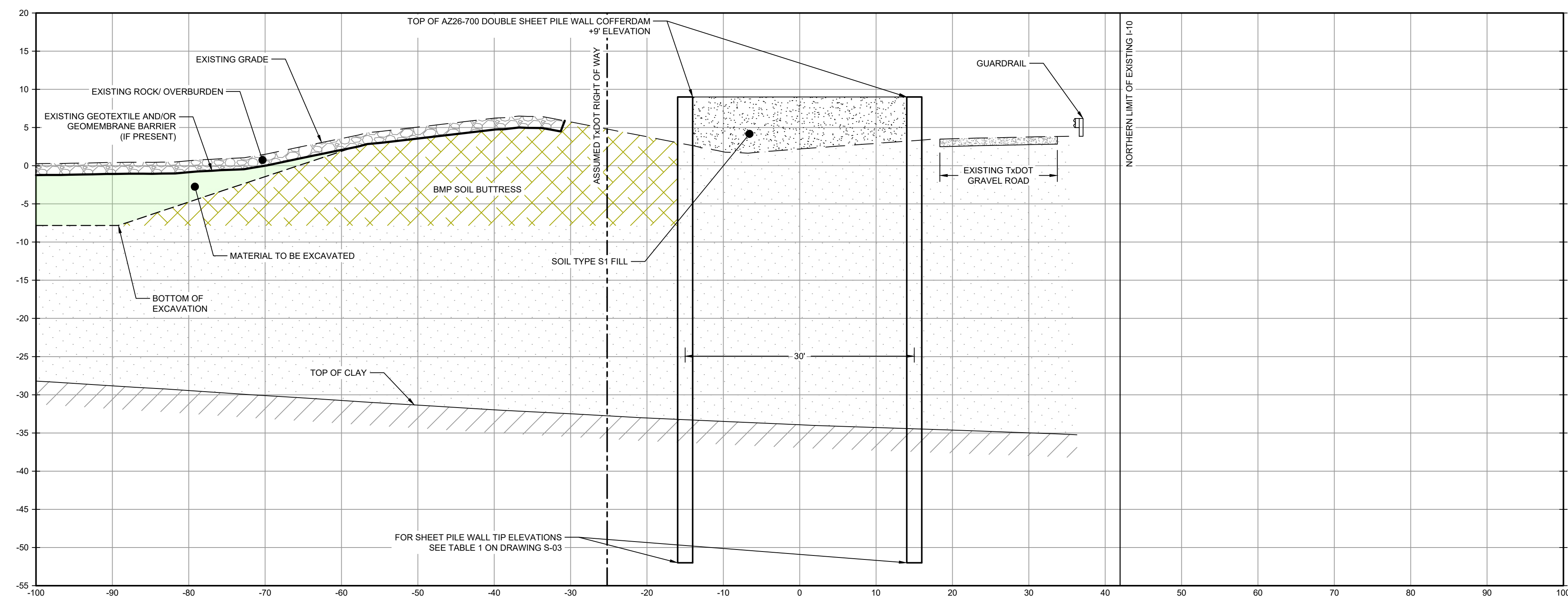
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**LEGEND**

	MATERIAL TO BE EXCAVATED
	EXISTING BERM TO BE EXCAVATED
	BMP SOIL BUTTRESS
	PLANNED IMPROVEMENTS FOR NORTHERN IMPOUNDMENT ACCESS



SECTION **V** STA. 4+00.00  
SCALE: 1"=10'  
C-33



SECTION **W** STA. 6+00.00  
SCALE: 1"=10'  
C-34

- NOTES:
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**90% EPA REVIEW**

Client  
**SAN JACINTO RIVER WASTE PITS**  
Project  
**NORTHERN IMPOUNDMENT PRE-FINAL 90% REMEDIAL DESIGN HARRIS COUNTY, TEXAS**

No.	Issue	Drawn	Approved	Date
2	90% EPA REVIEW	MW	CM	06/27/2022

Drawn **MW** Designer **RH**  
Drafting **JC** Design Check **LL**  
Project Coordinator **CM** Date **Jun 27, 2022**  
Scale **1" = 10'**

Original Size  
**Arch D**  
Bar is one inch on original size drawing  
0 1"

Project No. **11215702**

Title  
**SOUTH WALL SECTIONS 2 OF 3**

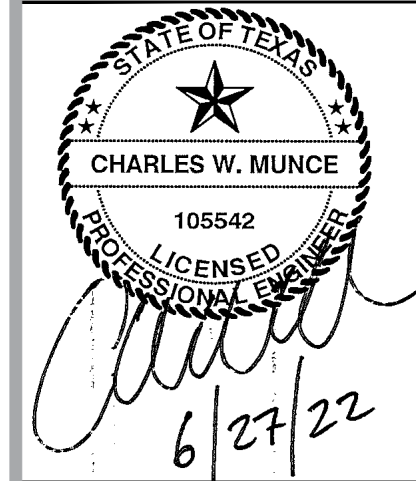
Sheet No.

**C-43**

Sheet - of -



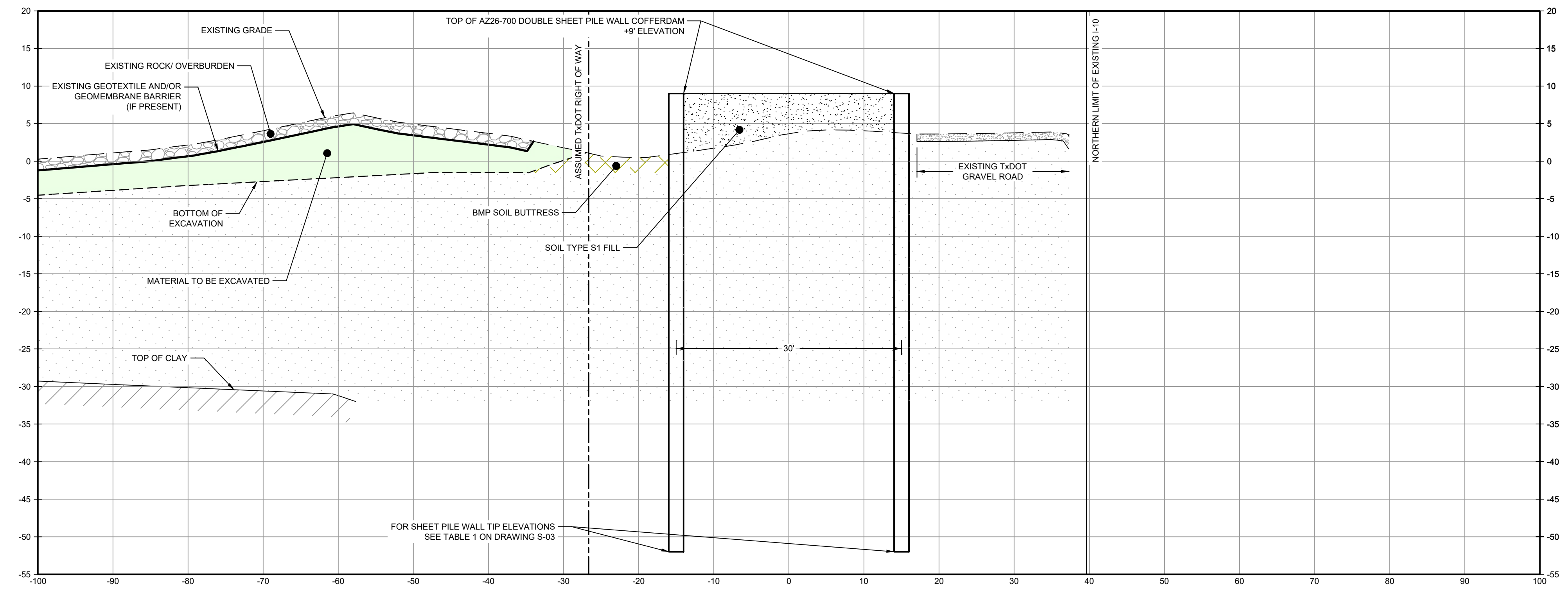
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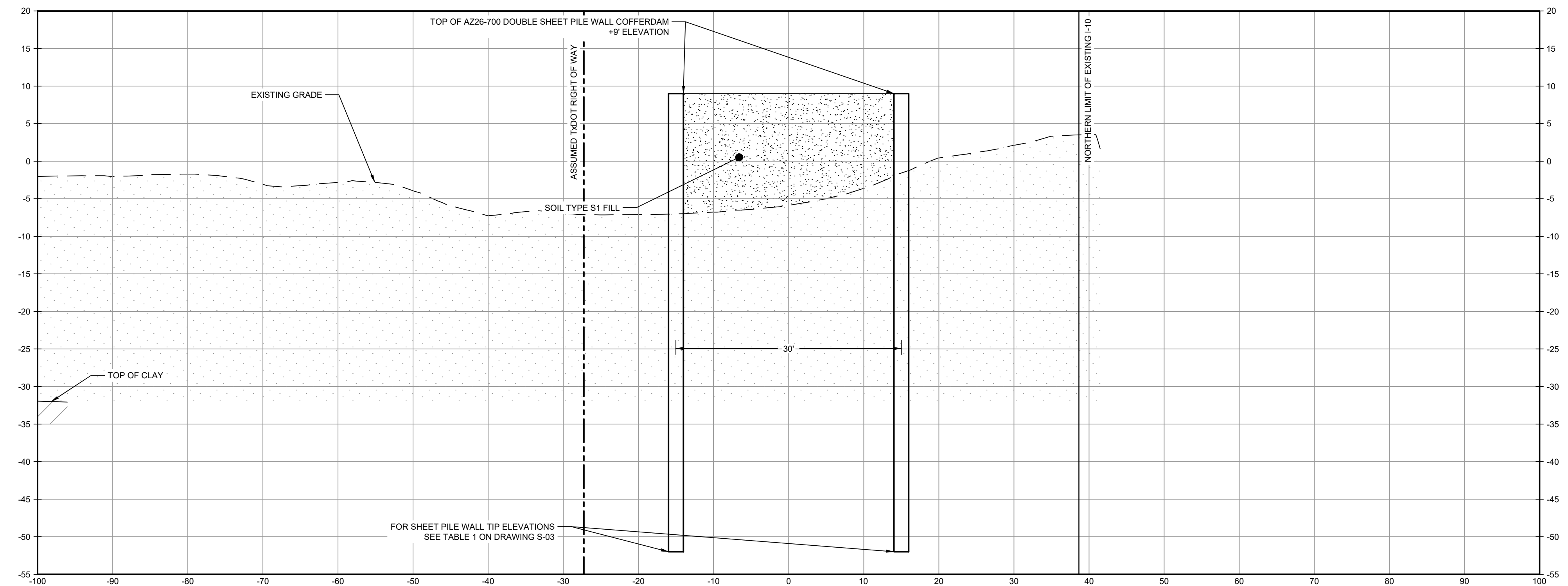
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LEGEND

	MATERIAL TO BE EXCAVATED
	BMP SOIL BUTTRISS



SECTION **X** STA. 8+00.00  
SCALE: 1"=10'  
C-34



SECTION **Y** STA. 8+81.52  
SCALE: 1"=10'  
C-34

- NOTES:
- ASSUMED TxDOT RIGHT OF WAY IS BASED ON INFORMATION PROVIDED BY THE HARRIS COUNTY TAX ASSESSOR'S OFFICE.
  - BOTTOM OF EXCAVATION IS SUBJECT TO CHANGE.

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**GHD SERVICES INC.**  
JOB NO. 11215702 FILE NO. 001  
GHD TEXAS FIRM REGISTRATION NO. 276

**90% EPA REVIEW**

Client  
**SAN JACINTO RIVER WASTE PITS**  
Project  
**NORTHERN IMPOUNDMENT PRE-FINAL 90% REMEDIAL DESIGN HARRIS COUNTY, TEXAS**

2	90% EPA REVIEW	MW	CM	06/27/2022
No.	Issue	Drawn	Approved	Date
Drawn	MW	Designer	RH	
Drafting Check	JC	Design Check	LL	
Project Coordinator	CM	Date	Jun 27, 2022	
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Original Size	Arch D			Bar is one inch on original size drawing 0 1"

Project No. 11215702  
Title

**SOUTH WALL SECTIONS**  
**3 OF 3**

Sheet No.

**C-44**

**GENERAL**

1. VERIFY ALL DIMENSIONS AND EXISTING CONDITIONS BEFORE COMMENCING WORK. REPORT ANY DISCREPANCIES AND/OR INCONSISTENCIES TO THE OWNER FOR CLARIFICATION.
2. TEMPORARILY BRACE PILES AFTER DRIVING UNTIL TIE RODS ARE INSTALLED.

**CODES AND GUIDELINES**

- ASCE MINIMUM DESIGN LOADS AND ASSOCIATED CRITERIA FOR BUILDING AND OTHER STRUCTURES, ASCE 7, 2016
- USACE ENGINEERING MANUAL, DESIGN OF SHEET PILE WALLS BY UNITED STATES ARMY CORPS OF ENGINEERS, EM 1110 2 2504
- AMERICAN INSTITUTE OF STEEL CONTRACTORS, STEEL CONSTRUCTION MANUAL 15TH EDITION, AISC 360-16.
- USACE HURRICANE AND STORM DAMAGE RISK REDUCTION SYSTEM DESIGN GUIDELINES, UPDATED JUNE 2012.
- AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS, LRFD BRIDGE DESIGN SPECIFICATIONS, 2012.

**MATERIALS**

**STEEL:**

- BARS AND C, MC, AND L SHAPES                       ASTM A36, GALV, UNO
- SHEET PILE    ASTM A572, GRADE 60
- PIPE PILES    ASTM A252, GRADE 3 MODIFIED TO MEET ASTM A572 GRADE 55
- TIE ROD ASSEMBLY
  - THREADED BARS                                        GRADE 150 KSI
  - BEARING PLATE   ASTM A572/A588 GRADE 50
  - HARDENED WASHER                                   ASTM F436
  - HEX NUT WITH JAM NUT                             ASTM 108/S576
- GALVANIZED BOLTS FOR SPLICE CONNECTIONS   ASTM A325 WITH A563 NUTS AND HARDENED WASHER

**STRUCTURAL STEEL AND MISCELLANEOUS METAL**

1. WELDING SHALL CONFORM TO "STRUCTURAL WELDING CODE - STEEL" (AWS D1.1).
2. PROVIDE 1" DIAMETER BLEED HOLES IN WALERS AT 10'-0" ON CENTER MAX, AVOID CONTACT WITH SPLICE PLATE CONNECTION.

**CONSTRUCTION SEQUENCE**

**SECTION C1**

1. INSTALL LEFT AND RIGHT SHEET PILE WALL
2. INSTALL FILL UP TO EL. +3 FT UNIFORMLY OVER MIN 10 DAYS
3. INSTALL TIE ROD AT ELEVATION NOTED ON SHEET S-03
4. INSTALL FILL UP TO EL. +9 FT UNIFORMLY OVER MIN 6 DAYS

**SECTION C2**

1. INSTALL LEFT AND RIGHT SHEET PILE WALL
2. INSTALL FILL UP TO EL. -7 FT UNIFORMLY OVER MIN 7 DAYS
3. INSTALL TIE ROD AT ELEVATION NOTED ON SHEET S-03
4. INSTALL FILL UP TO EL. -1 FT UNIFORMLY OVER MIN 7 DAYS
5. INSTALL FILL UP TO EL. +5 FT UNIFORMLY OVER MIN 7 DAYS
6. INSTALL FILL UP TO EL. +9 FT UNIFORMLY OVER MIN 7 DAYS
7. INSTALL 30 FT WIDE BERM, EL. +5 FT UNIFORMLY OVER 7 DAYS

**SECTION C3**

1. INSTALL LEFT AND RIGHT SHEET PILE WALL
2. INSTALL FILL UP TO EL. +0 FT UNIFORMLY OVER MIN 10 DAYS
3. INSTALL TIE ROD AT ELEVATION NOTED ON SHEET S-03
4. INSTALL FILL UP TO EL. +3 FT UNIFORMLY OVER MIN 3 DAYS
5. INSTALL FILL UP TO EL. +9 FT UNIFORMLY OVER MIN 10 DAYS

**SECTION C4A**

1. INSTALL LEFT AND RIGHT SHEET PILE WALL
2. INSTALL FILL UP TO EL. +0 FT UNIFORMLY OVER MIN 10 DAYS
3. INSTALL TIE ROD AT ELEVATION NOTED ON SHEET S-03
4. INSTALL FILL UP TO EL. +9 FT UNIFORMLY OVER MIN 6 DAYS

**SECTION C4**

1. INSTALL LEFT AND RIGHT SHEET PILE WALL
2. INSTALL FILL UP TO EL. -3 FT UNIFORMLY OVER MIN 10 DAYS
3. INSTALL TIE ROD AT ELEVATION NOTED ON SHEET S-03
4. INSTALL FILL UP TO EL. +9 FT UNIFORMLY OVER MIN 6 DAYS

**SECTION C5**

1. INSTALL LEFT AND RIGHT SHEET PILE WALL
2. INSTALL FILL UP TO EL. -1 FT UNIFORMLY OVER MIN 10 DAYS
3. INSTALL TIE ROD AT ELEVATION NOTED ON SHEET S-03
4. INSTALL FILL UP TO EL. +9 FT UNIFORMLY OVER MIN 6 DAYS

**SECTION C6, C7**

1. INSTALL LEFT AND RIGHT SHEET PILE WALL
2. CUT BETWEEN THE SHEET PILES TO ELEVATION 0 FT
3. INSTALL TIE RODS AT ELEVATION NOTED ON SHEET S-03
4. INSTALL FILL UP TO EL. +9 FT UNIFORMLY OVER MIN 6 DAYS

**AFTER INSTALLATION OF THE DOUBLE WALL COFFERDAM**

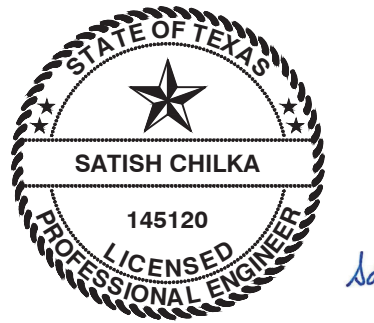
1. MINIMUM TIME FOR DEWATERING TO EXISTING MUDLINE   4 DAYS
2. MINIMUM TIME FOR EXCAVATING TO 50% DEPTH         14 DAYS
3. MINIMUM TIME TO DEWATER TO FINAL LEVEL             3 DAYS
4. MINIMUM TIME FOR EXCAVATING TO 100% DEPTH        14 DAYS

**ABBREVIATIONS**

ANG	ANGLE
ASCE	AMERICAN SOCIETY OF CIVIL ENGINEERS
AWS	AMERICAN WELDING SOCIETY
BEG	BEGINNING
BOW	BOTTOM OF WALL
CONST	CONSTRUCTION
CONT	CONTINUOUS OR CONTINUED
DIA	DIAMETER
DWG	DRAWING
EA	EACH
EL	ELEVATION
E	EASTING
EXIST.	EXISTING
FG	FINISH GRADE
FOW	FACE OF WALL
FS	FINISH SURFACE
FT	FEET
HORIZ	HORIZONTAL
INV	INVERT
JT	JOINT
LF	LINEAR FEET
LT	LEFT
MAX	MAXIMUM
MHW	MEAN HIGH WATER
MIN	MINIMUM
MISC.	MISCELLANEOUS
N	NORTHING
NTS	NOT TO SCALE
NAVD	NORTH AMERICAN VERTICAL DATUM
OC	ON CENTER
PROF	PROFILE
PT	POINT
QTY	QUANTITY
RET	RETAINING
ROW	RIGHT OF WAY
RT	RIGHT
SHT	SHEET
STA	STATION
STD	STANDARD
T&B	TOP AND BOTTOM
TOW	TOP OF WALL
TYP	TYPICAL
UNK	UNKNOWN
UNO	UNLESS NOTED OTHERWISE
USACE	UNITED STATES ARMY CORPS OF ENGINEERS
VERT	VERTICAL
W	WIDTH
W/	WITH



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Client  
**SAN JACINTO RIVER  
WASTE PITS**

Project  
**NORTHERN IMPOUNDMENT  
PRE-FINAL 90% REMEDIAL DESIGN  
HARRIS COUNTY, TEXAS**


2	90% EPA REVIEW	DS	SC	06/27/2022
No.	Issue	Drawn	Approved	Date

Drawn	DS	Designer	KM
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Drafting Check	MW	Design Check	SC
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Project Coordinator	CM	Date	Jun 24, 2022
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Original Size	Bar is one inch on original size drawing
<b>Arch D</b>	0  1"

Project No. **11215702**

Title

**STRUCTURAL  
NOTES**

Sheet No.

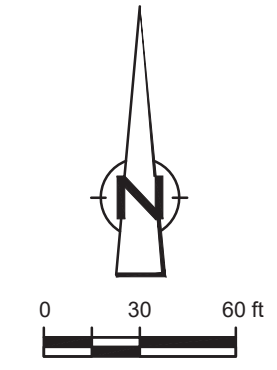
**S-01**

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**LEGEND**

---	ASSUMED TxDOT RIGHT OF WAY
- - - -	TORA CAP PERIMETER
---	EXISTING CONTOUR INTERVAL
- - - -	FENCELINE
---	SHORELINE
---	TOP OF BANK
---	TOE OF SLOPE
---	OVERHEAD ELECTRICAL
---	GUARDRAIL
---	PIPELINE
●	BORING LOCATION
●	MONITORING WELL
●	POWER POLE
●	LIGHT POLE
○	WELL
---	MATERIAL TO BE EXCAVATED
---	EXISTING BERM TO EXCAVATED
---	EXISTING BERM
---	NORTHWEST CORNER
---	CONCRETE
---	GRAVEL
---	ASPHALT
---	AZ26-700 PILE
---	AZ40-700 PILE

Client  
**SAN JACINTO RIVER WASTE PITS**

Project  
**NORTHERN IMPOUNDMENT PRE-FINAL 90% REMEDIAL DESIGN HARRIS COUNTY, TEXAS**

2	90% EPA REVIEW	DS	SC	06/27/2022
No.	Issue	Drawn	Approved	Date
Drawn	DS	Designer	KM	
Drafting Check	MW	Design Check	SC	
Project Coordinator	CM	Date	Jun 24, 2022	
		Scale	1" = 60'	
Original Size		Bar is one inch on original size drawing		

SOURCE: TOPOGRAPHIC, HYDROGRAPHIC, & MAGNETOMETER SURVEY OF SAN JACINTO RIVER WASTE PITS, HARRIS COUNTY, TEXAS. MORRISON SURVEYING INC., 190608. JULY 8, 2019 TO AUGUST 2, 2019.  
 UPDATED BATHYMETRY DATA PROVIDED BY ANCHOR OEA OCTOBER 2021

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 GHD TEXAS FIRM REGISTRATION NO. 276

Project No. 11215702

Title  
**STRUCTURAL LAYOUT PLAN**

Sheet No.

**S-02**

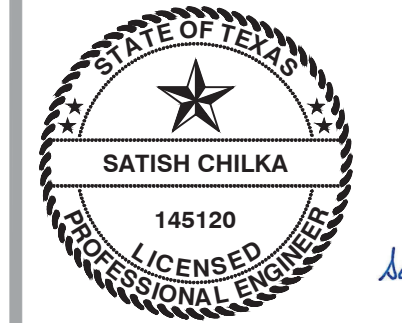
**90% EPA REVIEW**

Sheet - of -



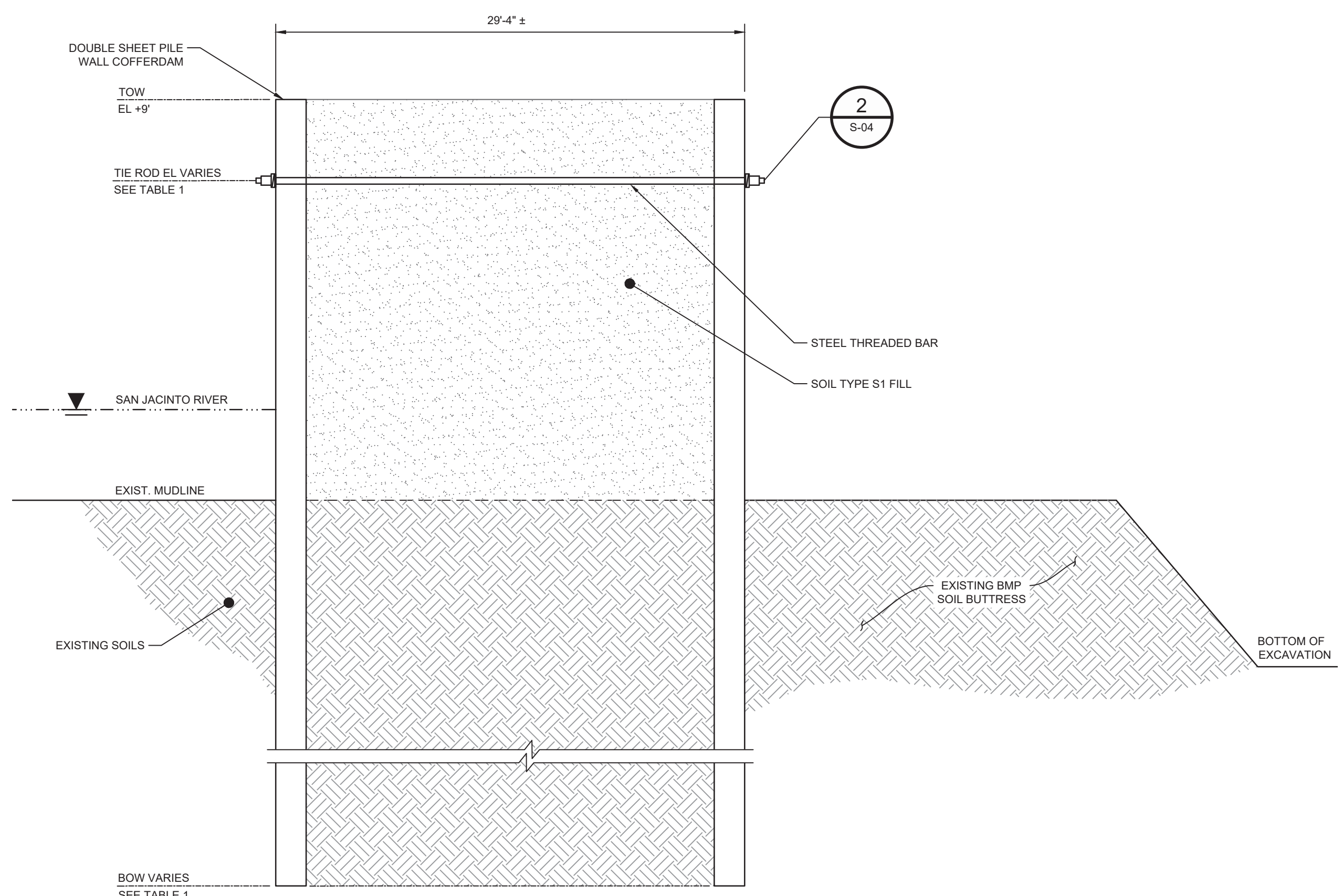


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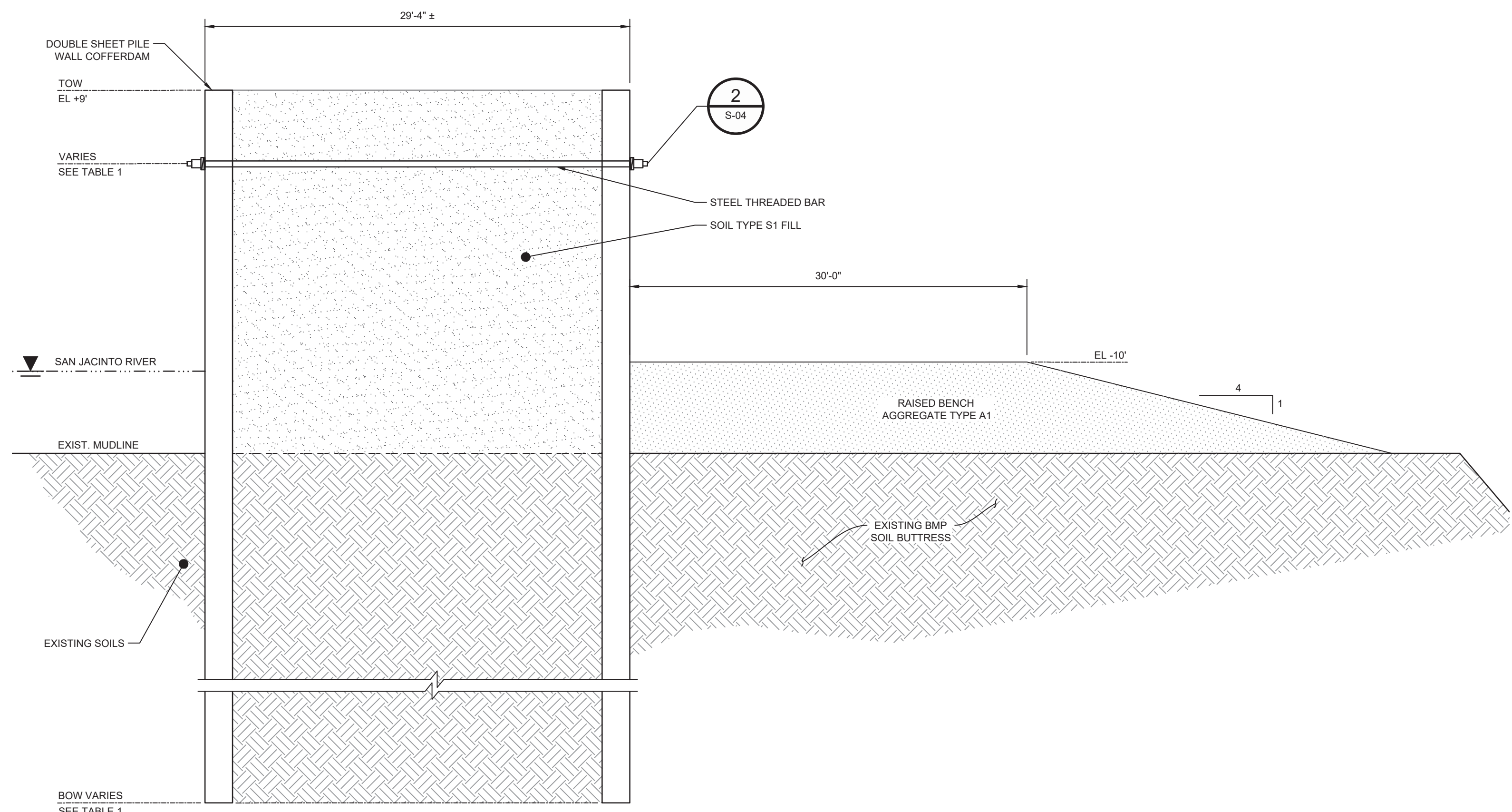


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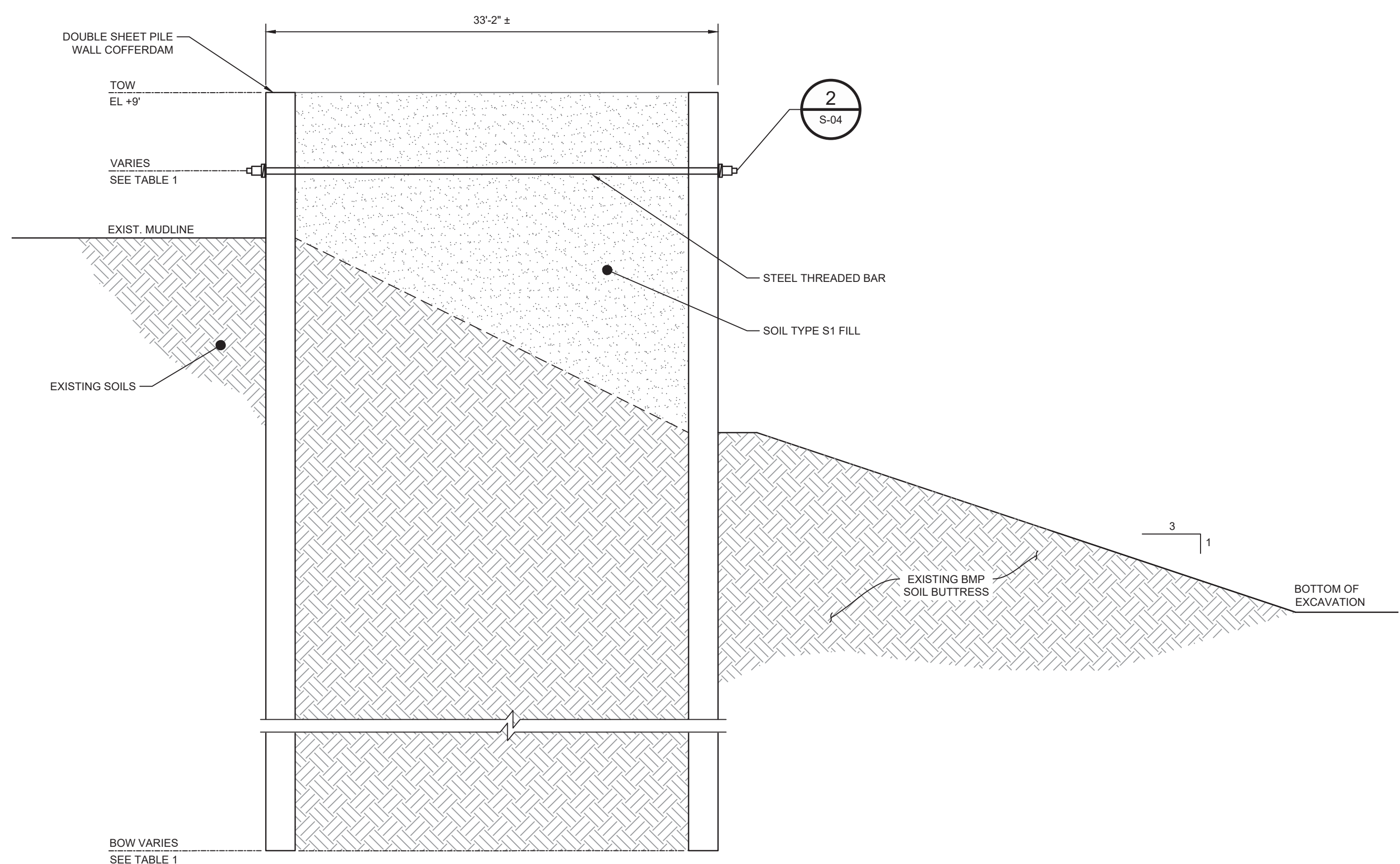
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DETAIL **A** TYPICAL WALL SECTION  
N.T.S. S-01



DETAIL **B** TYPICAL WALL SECTION  
N.T.S. S-01



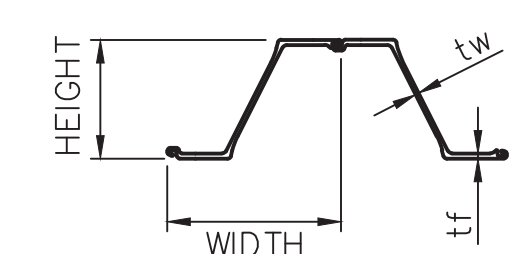
DETAIL **C** TYPICAL WALL SECTION  
N.T.S. S-01

**TABLE 1**

WALL SEGMENT	START STA	END STA	DETAIL	SHEET PILE SECTION	SHEET PILE LENGTH (FT)	TIE ROD NOMINAL DIAMETER (IN)	TIE ROD SPACING (FT)	TIE ROD EL (FT)
C1	-1+10	2+50	A	AZ26-700	50	2.25	5	3
C2	2+50	9+75	B	AZ40-700N	55	3.00	5	-5
C3	9+75	14+00	A	AZ26-700	50	2.25	5	0
C4	14+00	17+00	A	AZ26-700	50	2.25	5	0
C4A	17+00	23+00	A	AZ26-700	50	2.25	5	6
C5	23+00	24+33	A	AZ26-700	60	2.25	5	0
C6	0+00	4+00	C	AZ26-700	60	2.25	5	0
C7	4+00	8+82	C	AZ26-700	60	2.25	5	0

**MINIMUM STEEL SHEET PILE**

SSP SECTION	ASTM	YIELD STRENGTH (KSI)	WIDTH w (IN)	HEIGHT h (IN)	THICKNESS (IN)		WEIGHT		ELASTIC MODULUS (IN <sup>3</sup> /FT)
					FLANGE tf	WEB tw	SINGLE PILE (LB/FT)	WALL AREA (LB/FT <sup>2</sup> )	
AZ26-700	A572	60	27.56	18.11	0.480	0.480	69.12	30.10	48.4
AZ40-700N	A572	60	27.56	19.72	0.669	0.520	90.16	39.26	74.3



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**GHD SERVICES INC.**  
JOB NO. 11215702 FILE NO. 001  
GHD TEXAS FIRM REGISTRATION NO. 276

Client **SAN JACINTO RIVER WASTE PITS**  
Project **NORTHERN IMPOUNDMENT PRE-FINAL 90% REMEDIAL DESIGN HARRIS COUNTY, TEXAS**

No.	Issue	Drawn	Approved	Date
2	90% EPA REVIEW	DS	SC	06/27/2022

Drawn DS Designer KM  
Drafting Check MW Design Check SC  
Project Coordinator CM Date Jun 24, 2022  
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Original Size Arch D Bar is one inch on original size drawing 0 1"

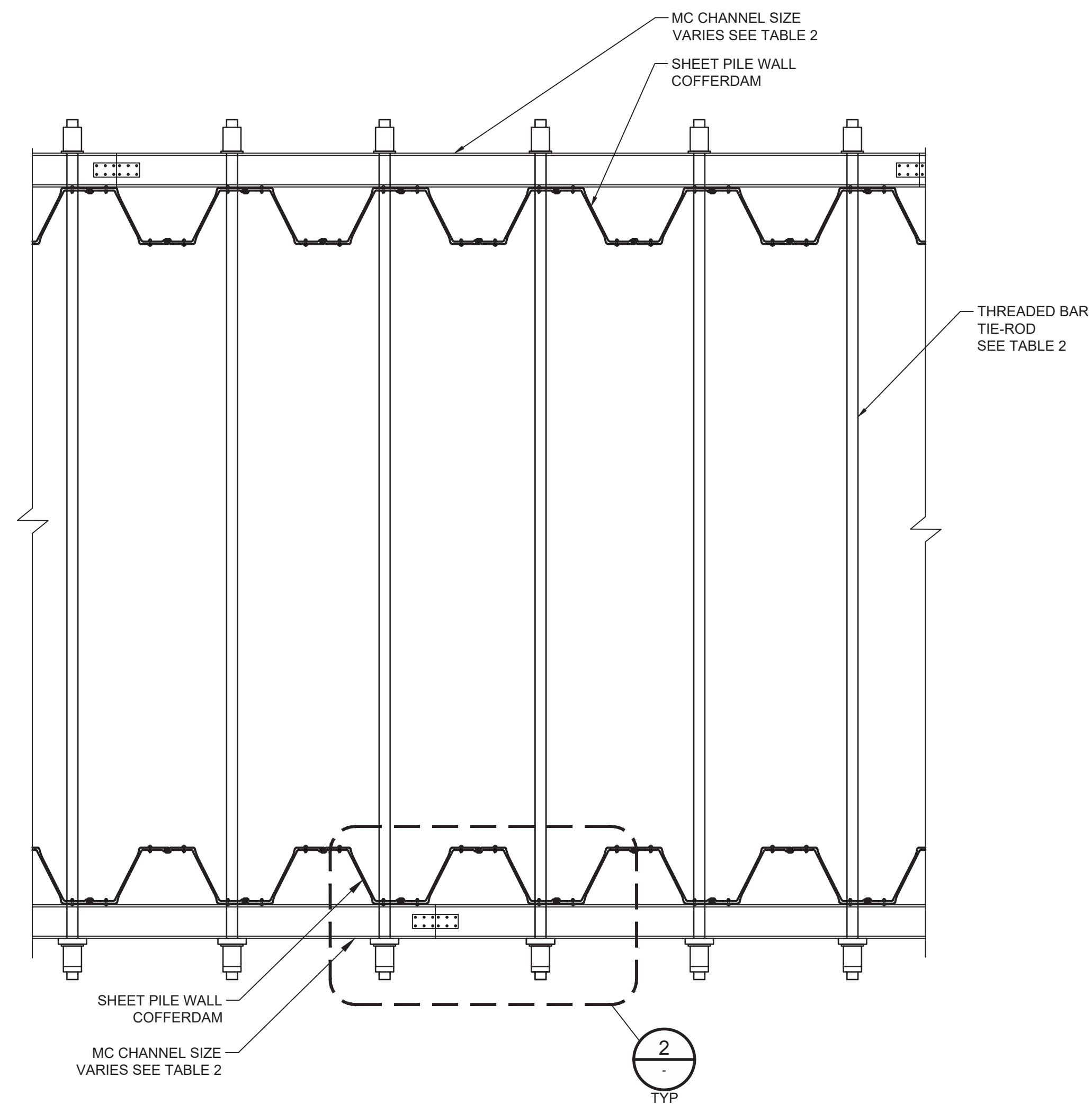
Project No. 11215702

Title **STRUCTURAL SECTIONS**

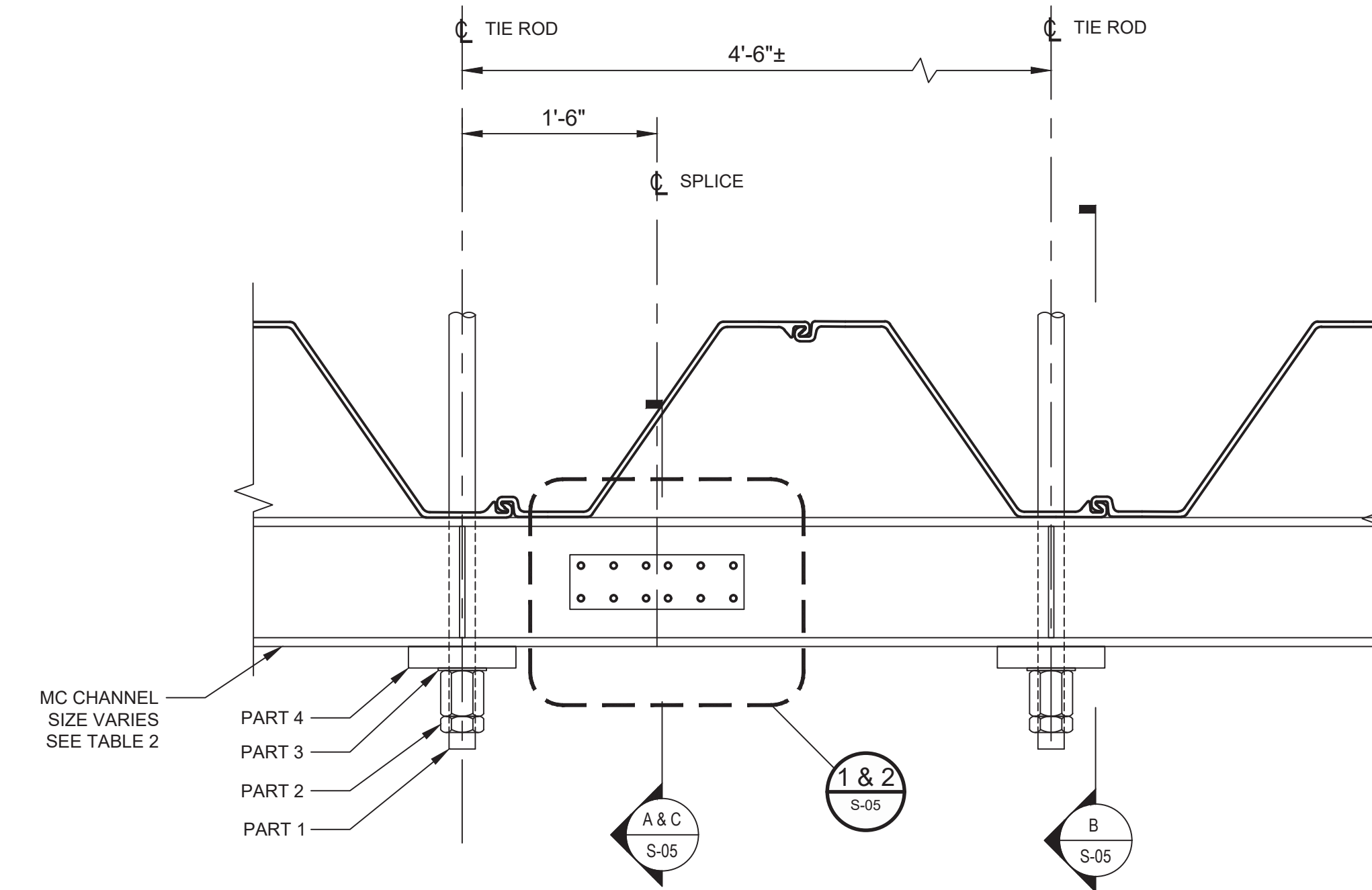
Sheet No.

**S-03**

**90% EPA REVIEW**

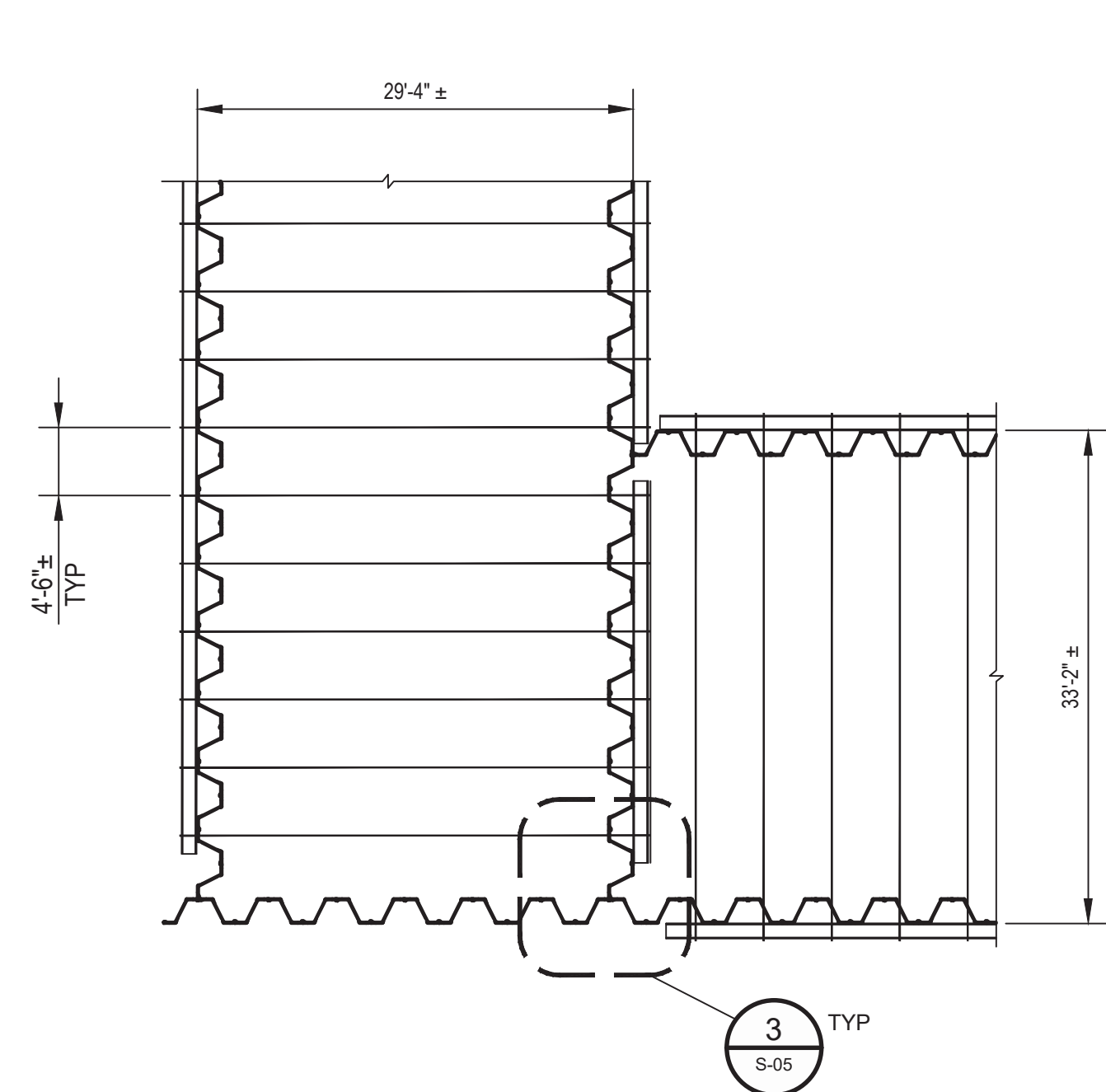


DETAIL 1 PLAN VIEW  
SCALE: 1"=3'-0"

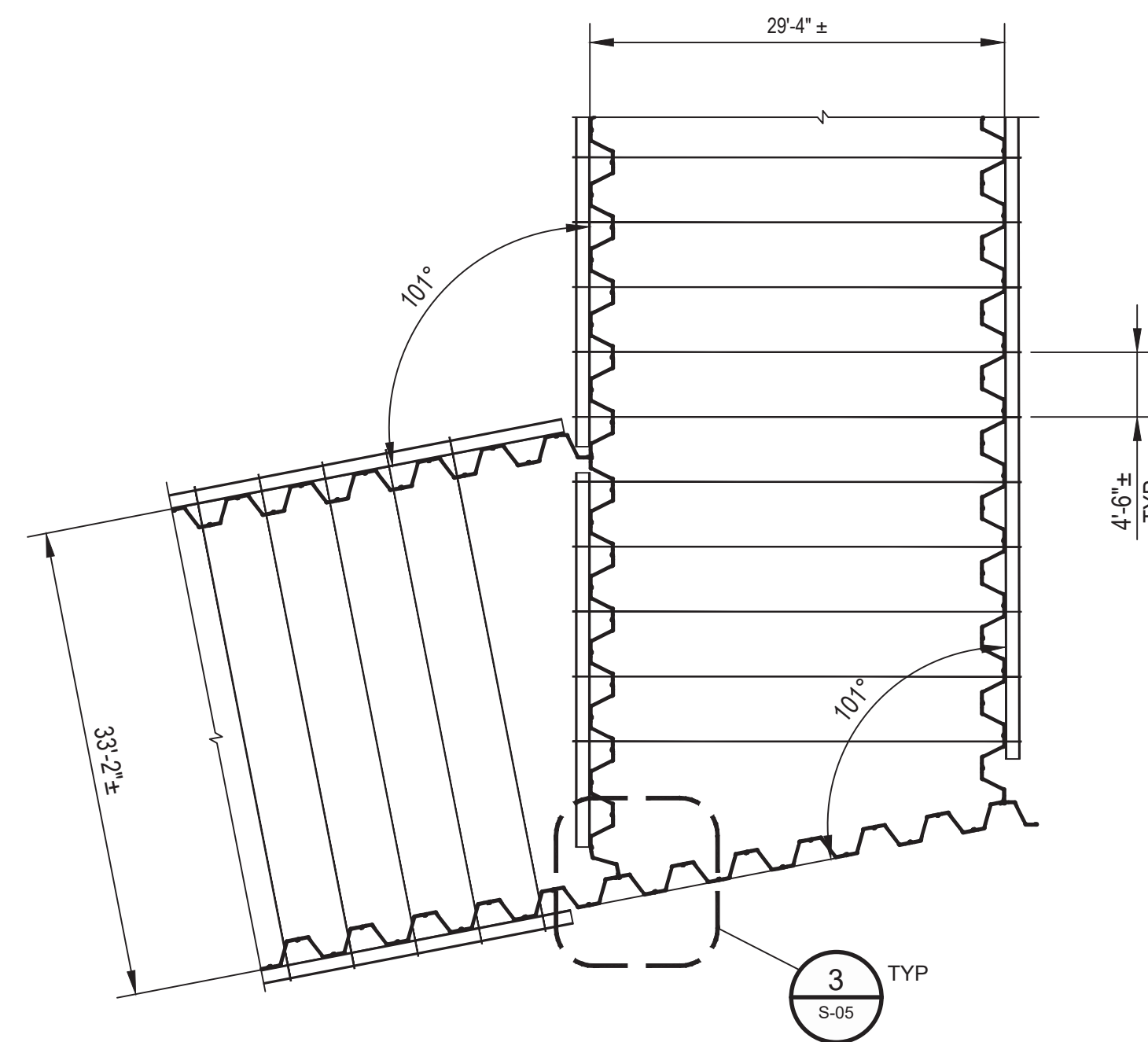


NOTE:  
1. STAGGER WALER SPLICE ON INTERIOR AND EXTERIOR WALL BY 10'-0" +/-  
2. WELD 1/2" THICK STEEL PLATES BETWEEN T&B WALERS TO MAINTAIN SPACING

DETAIL 2 PLAN VIEW  
SCALE: 1"=1'-0"

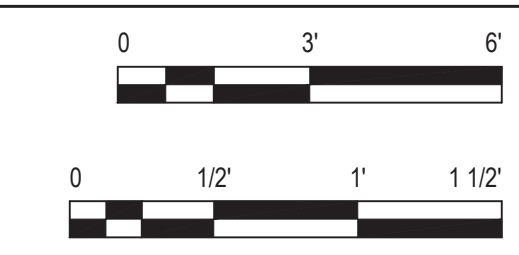


DETAIL 3 PLAN VIEW  
SCALE: 3/32"=1'-0"



DETAIL 4 PLAN VIEW  
SCALE: 3/32"=1'-0"

TABLE 2					
WALL SEGMENT	TIE ROD NOMINAL DIAMETER PART 1 (IN)	TIE ROD HEX NUT AND JAM NUT O.D. PART 2 (IN)	TIE ROD WASHER O.D. PART 3 (IN)	BEARING PLATE PART 4 (IN)	WALER SECTION
C1	2.25	3.50	4.50	10 x 10 x 2	MC12 x 35
C2	3.00	4.50	6.00	10 x 10 x 2.5	MC18 x 45.8
C3	2.25	3.50	4.50	10 x 10 x 2	MC12 x 35
C4	2.25	3.50	4.50	10 x 10 x 2	MC12 x 35
C4A	2.25	3.50	4.50	10 x 10 x 2	MC12 x 35
C5	2.25	3.50	4.50	10 x 10 x 2	MC12 x 35
C6	2.25	3.50	4.50	10 x 10 x 2	MC12 x 35
C7	2.25	3.50	4.50	10 x 10 x 2	MC12 x 35



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Client  
**SAN JACINTO RIVER WASTE PITS**

Project  
**NORTHERN IMPOUNDMENT PRE-FINAL 90% REMEDIAL DESIGN HARRIS COUNTY, TEXAS**

2	90% EPA REVIEW	DS	SC	06/27/2022
No.	Issue	Drawn	Approved	Date
Drawn	DS	Designer	KM	
Drafting Check	MW	Design Check	SC	
Project Coordinator	CM	Date	Jun 24, 2022	
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Original Size	Bar is one inch on original size drawing			
Arch D	0 1"			

Project No. 11215702

Title  
**STRUCTURAL DETAILS 1 of 2**

Sheet No.

**S-04**

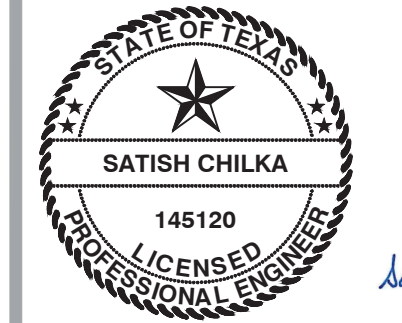
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**90% EPA REVIEW**

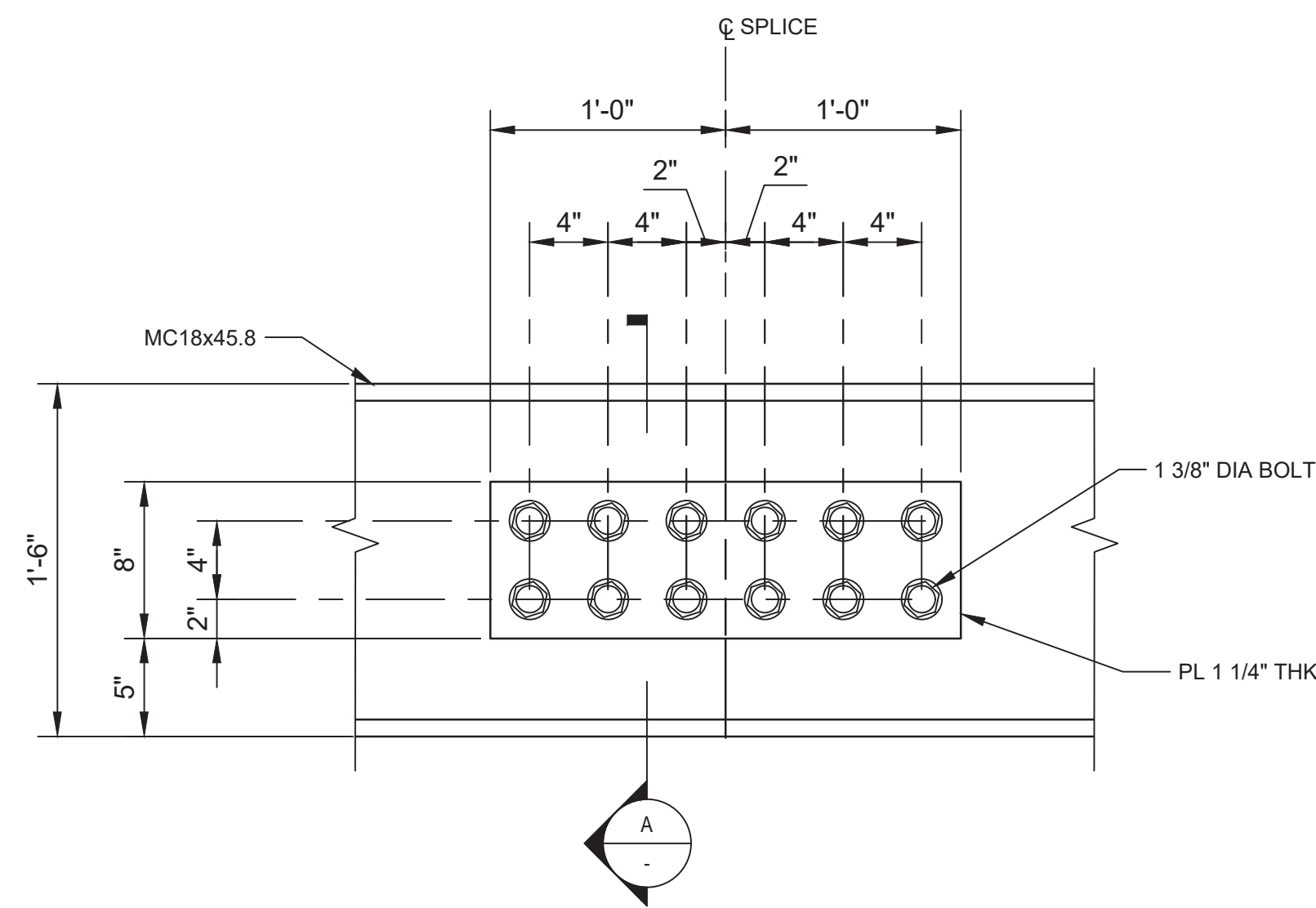


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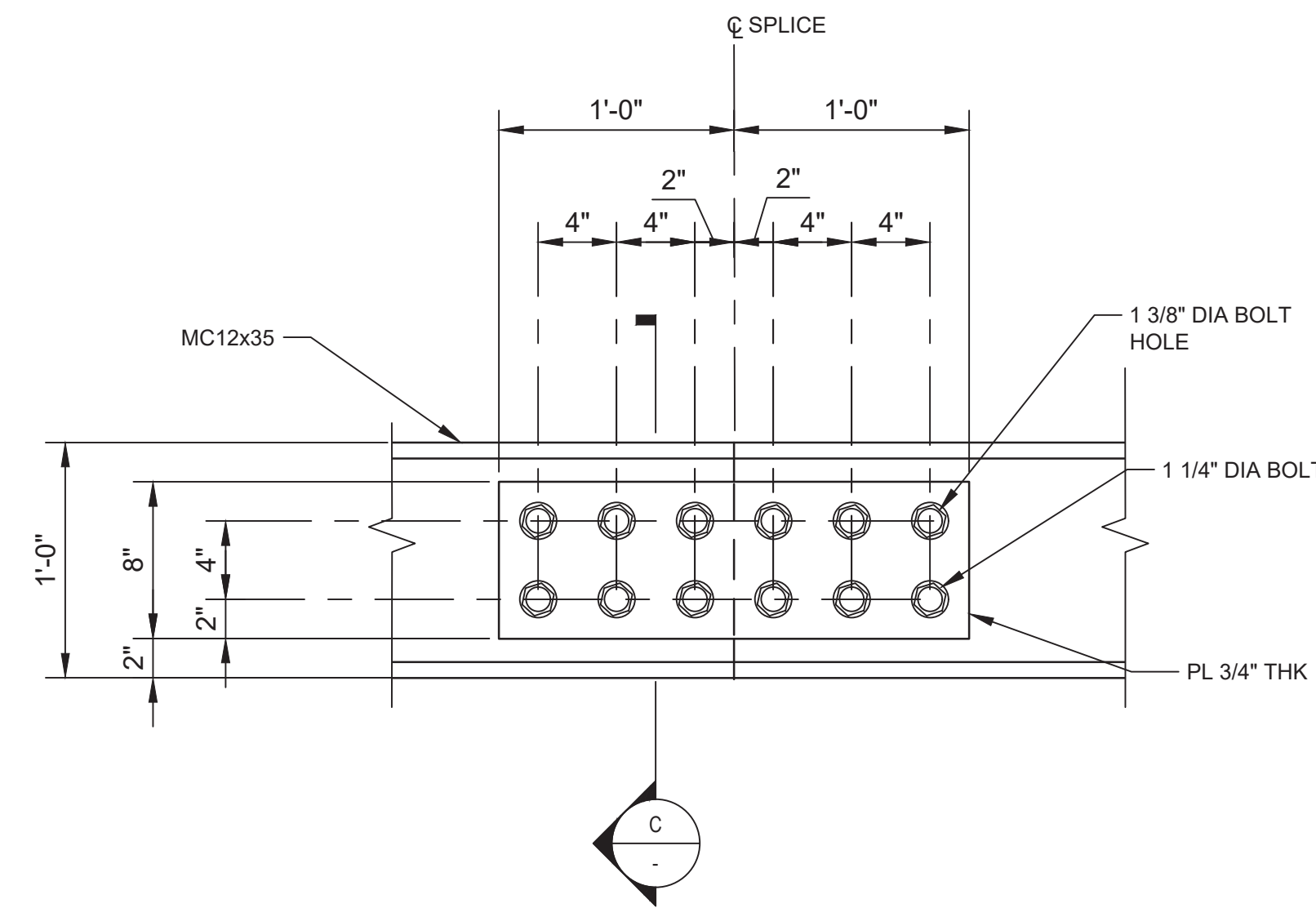


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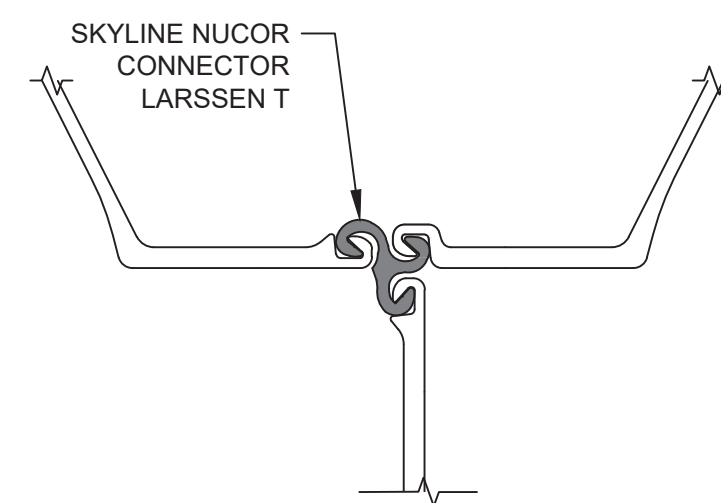
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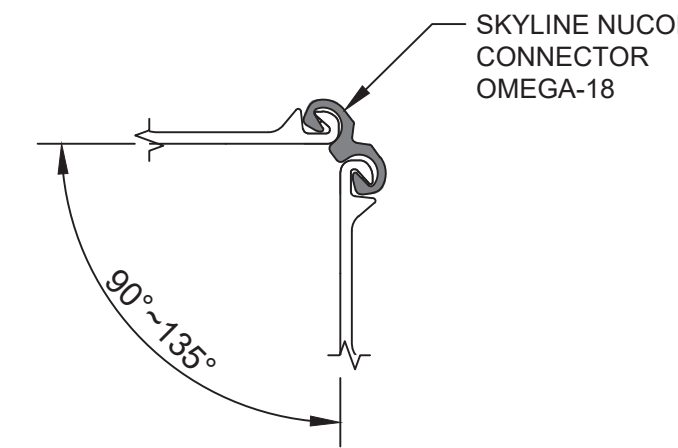
DETAIL 1 PLAN - SPLICE CONNECTION - WALER MC 18X45.8  
SCALE: 1 1/2"=1'-0"



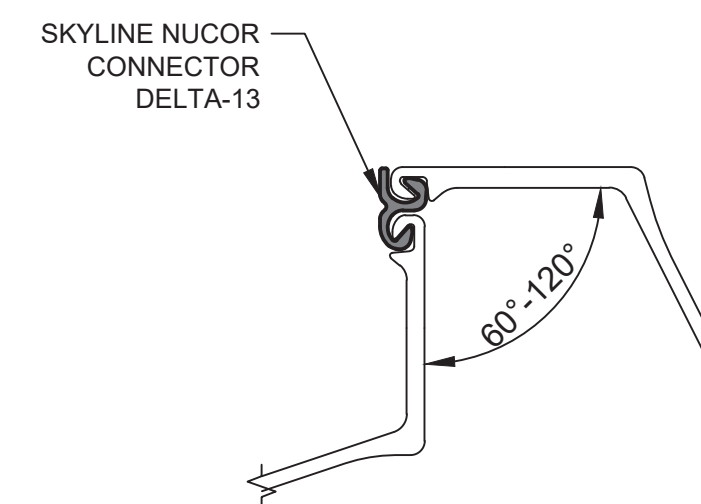
DETAIL 2 PLAN - SPLICE CONNECTION - WALER MC 12X35  
SCALE: 1 1/2"=1'-0"



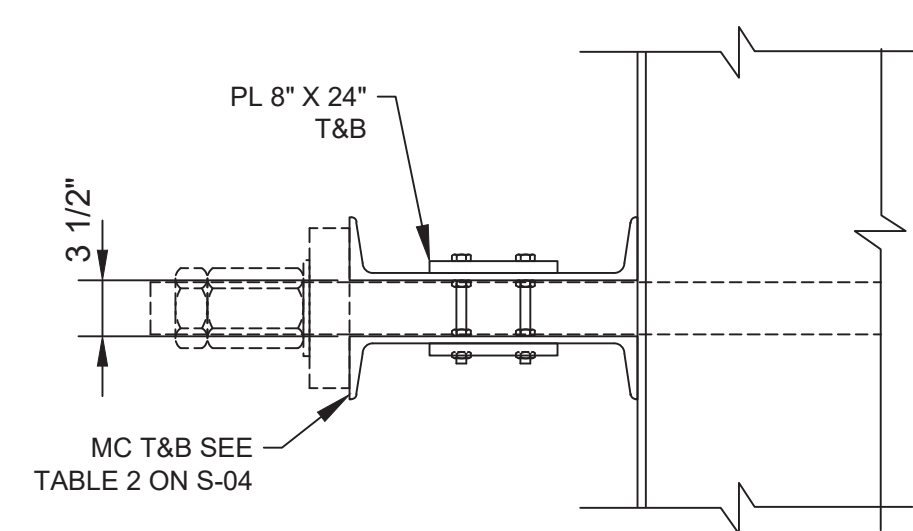
DETAIL 3 THREE SHEET PILE CONNECTOR  
SCALE: NTS



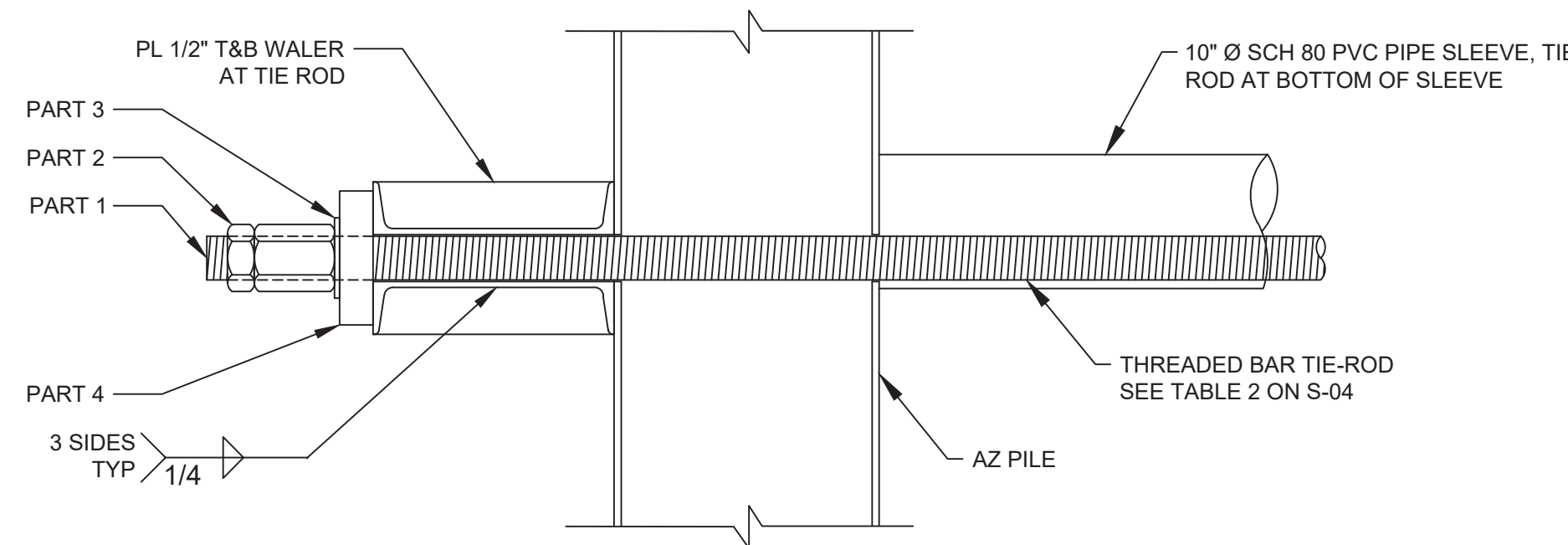
DETAIL 4 CORNER CONNECTOR ALTERNATIVE A  
SCALE: NTS



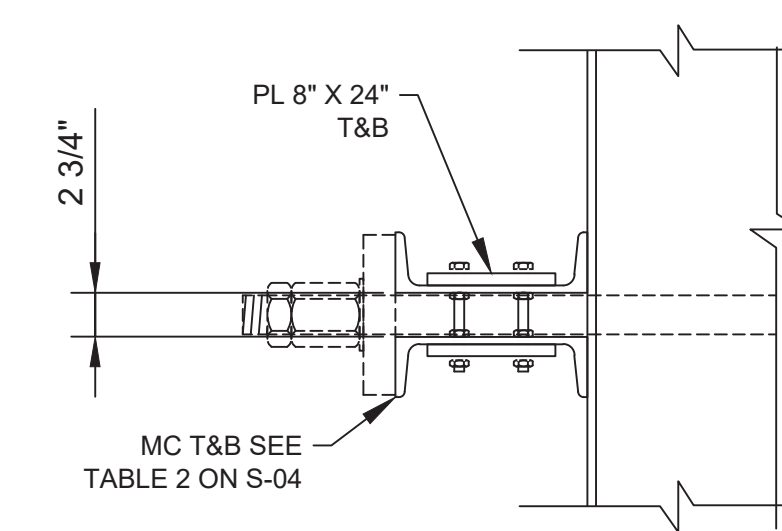
DETAIL 5 CORNER CONNECTOR ALTERNATIVE B  
SCALE: NTS



SECTION A SPLICE CONNECTION  
SCALE: 1"=1'-0"



SECTION B TIE ROD CONNECTION  
SCALE: 1"=1'-0"



SECTION C SPLICE CONNECTION  
SCALE: 1"=1'-0"

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GHD SERVICES INC.  
JOB NO. 11215702 FILE NO. 001  
GHD TEXAS FIRM REGISTRATION NO. 276

Client **SAN JACINTO RIVER WASTE PITS**  
Project **NORTHERN IMPOUNDMENT PRE-FINAL 90% REMEDIAL DESIGN HARRIS COUNTY, TEXAS**

No.	Issue	Drawn	Approved	Date
2	90% EPA REVIEW	DS	SC	06/27/2022

Drawn DS Designer KM  
Drafting Check MW Design Check SC  
Project Coordinator CM Date Jun 24, 2022  
Scale AS SHOWN

Original Size  
**Arch D**  
Bar is one inch on original size drawing  
0 1"

Project No. 11215702

Title  
**STRUCTURAL DETAILS 2 OF 2**

Sheet No.

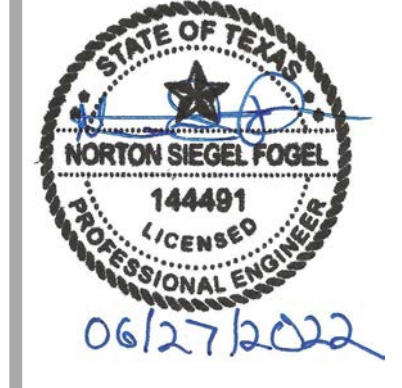
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Sheet - of -

**90% EPA REVIEW**

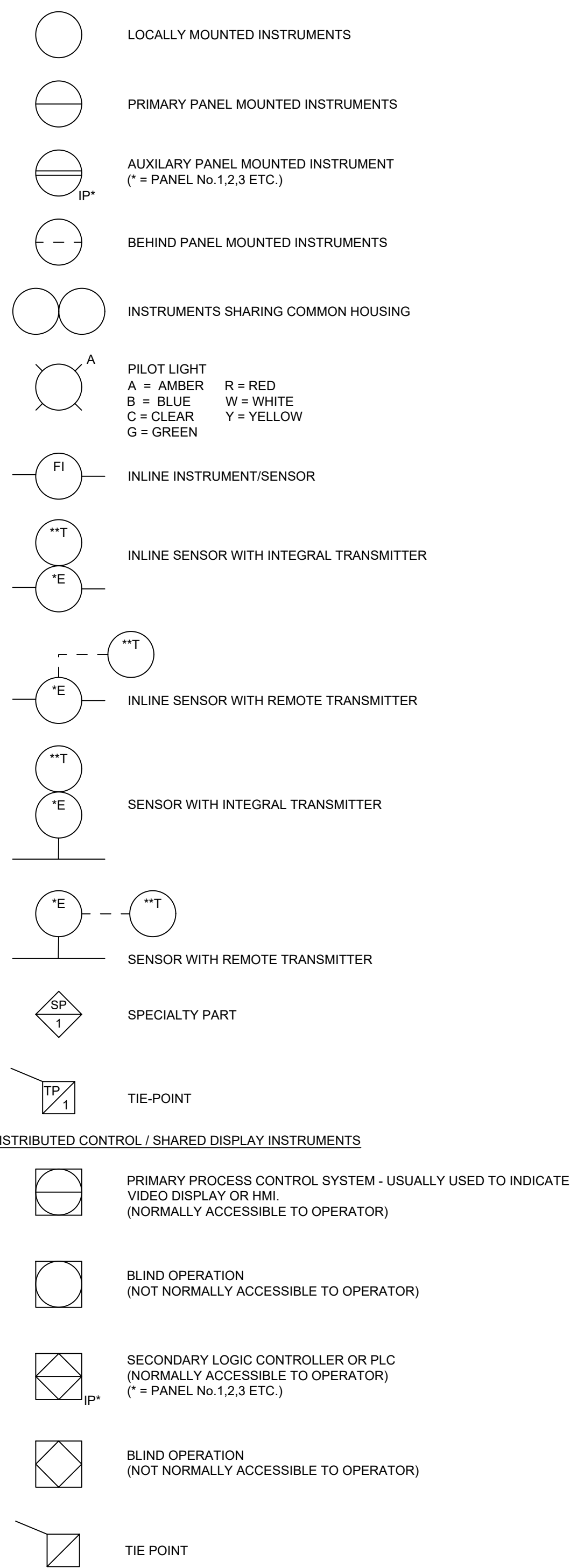


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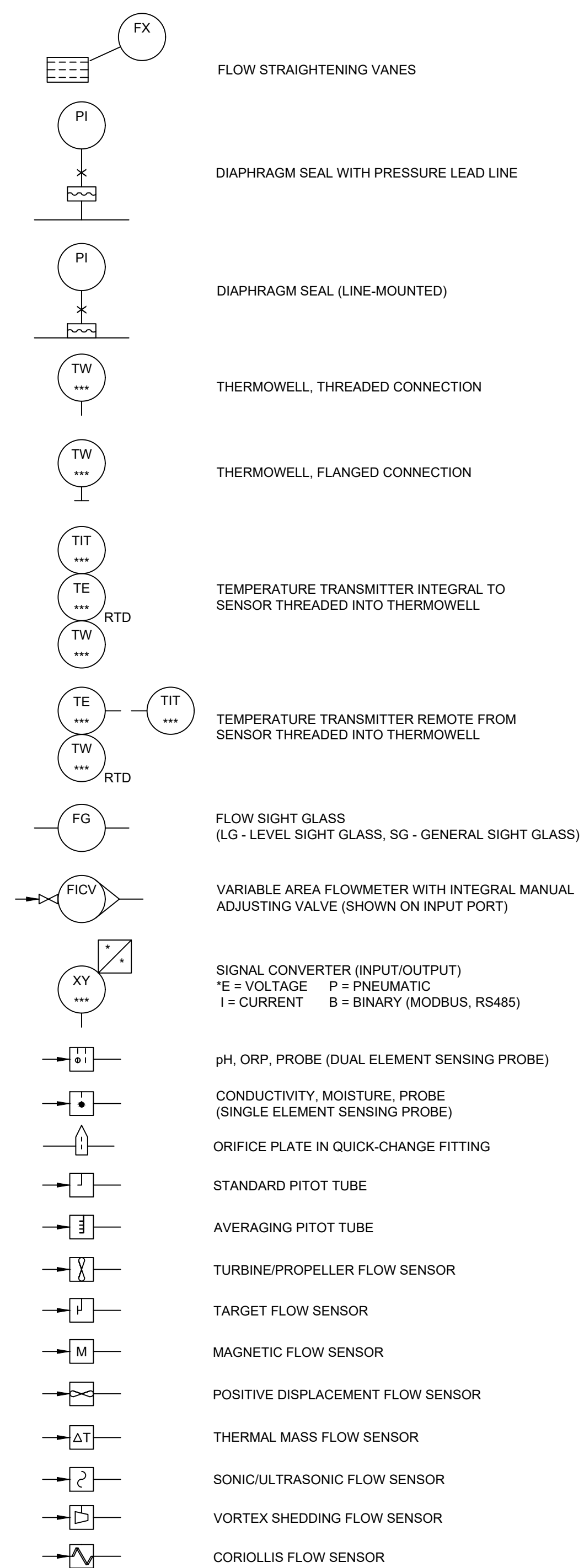


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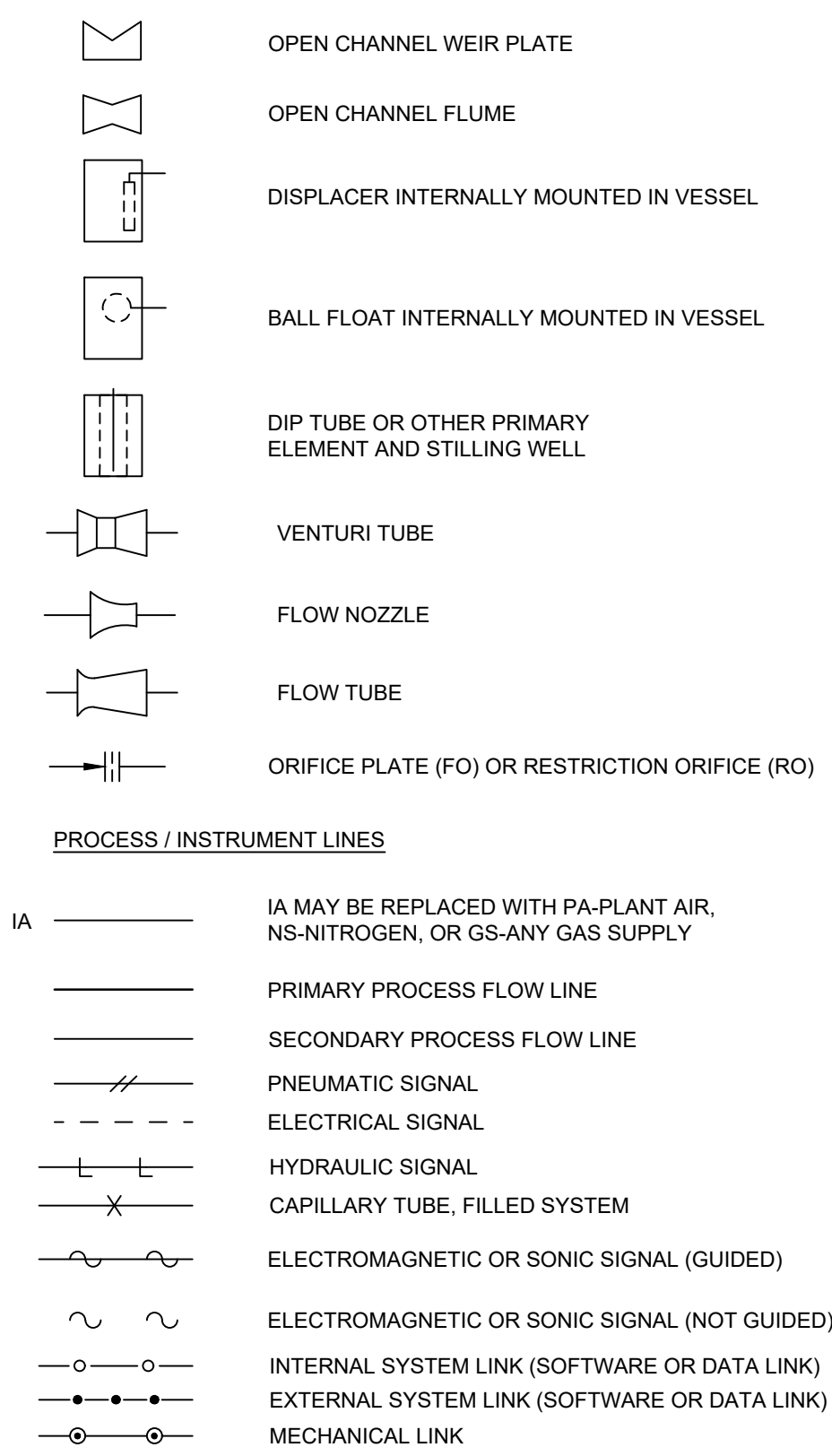
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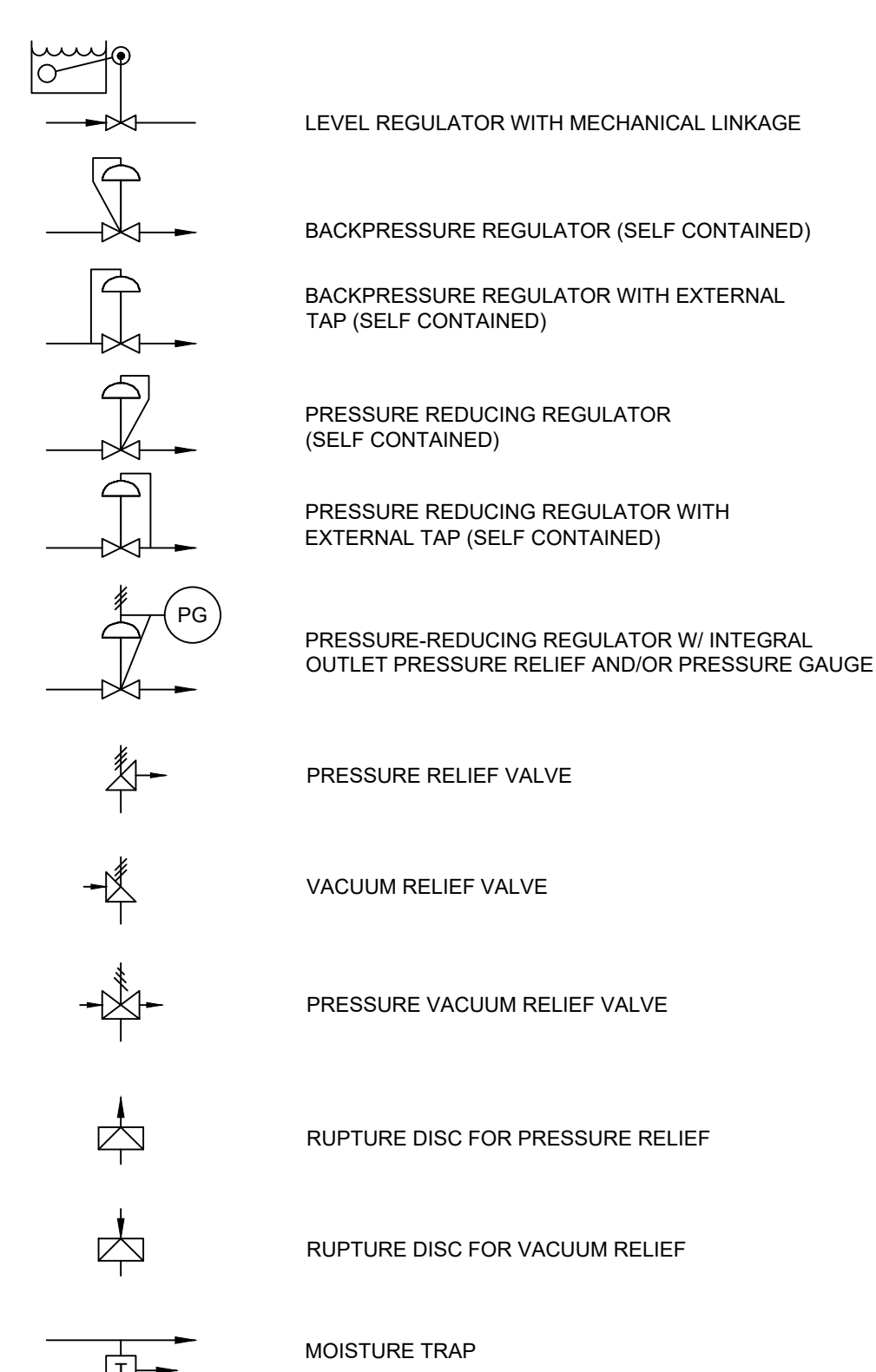
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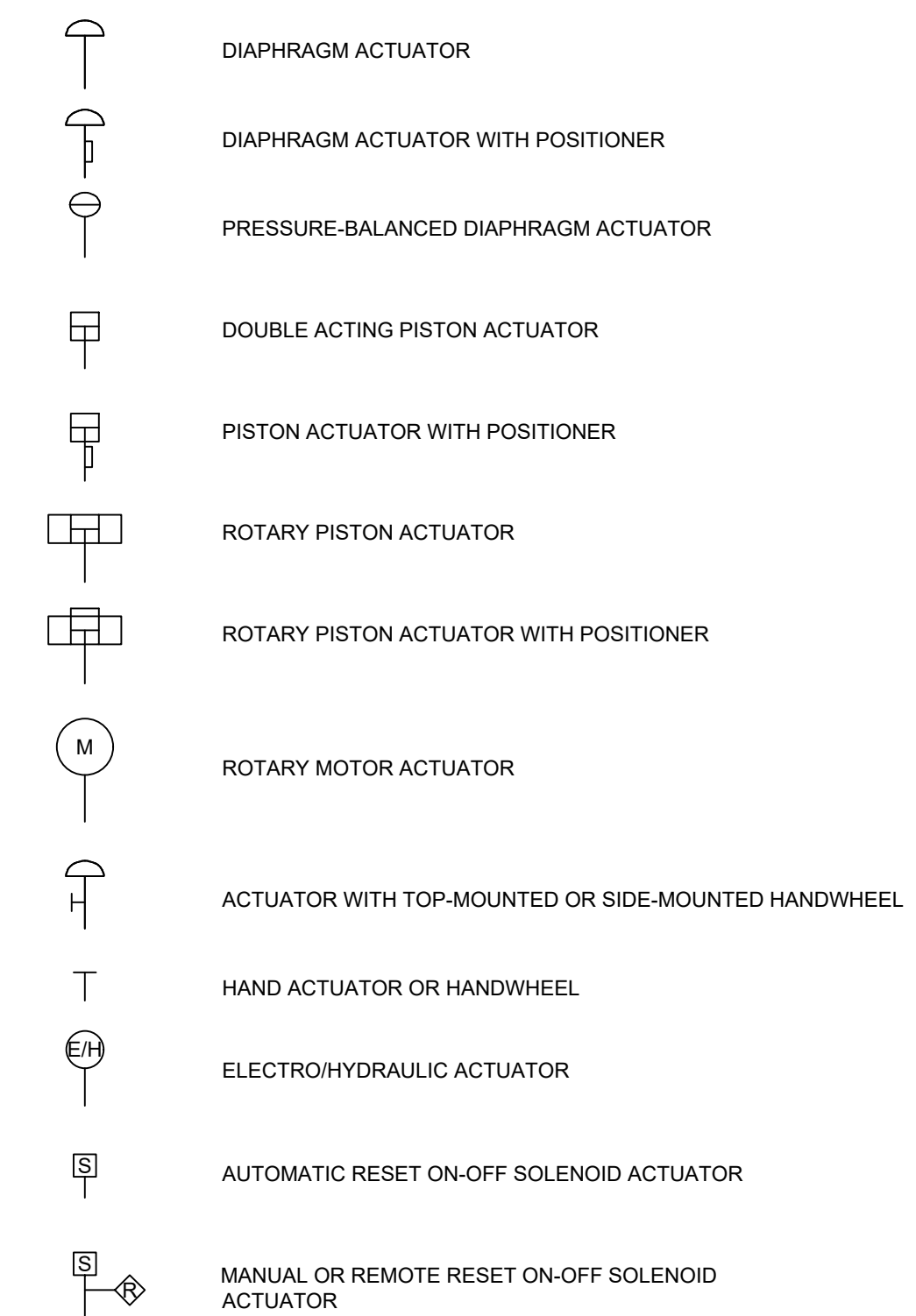
PRIMARY ELEMENT SYMBOLS (CONT'D)



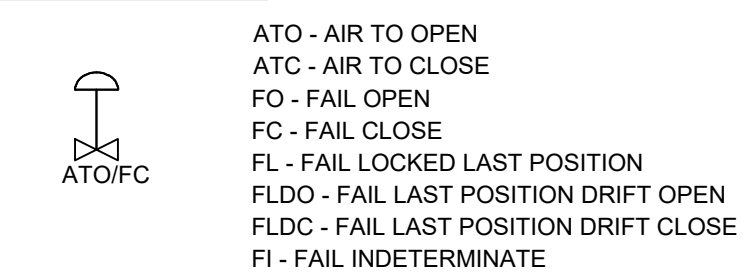
SELF-ACTUATED REGULATORS, VALVES, AND OTHER DEVICES



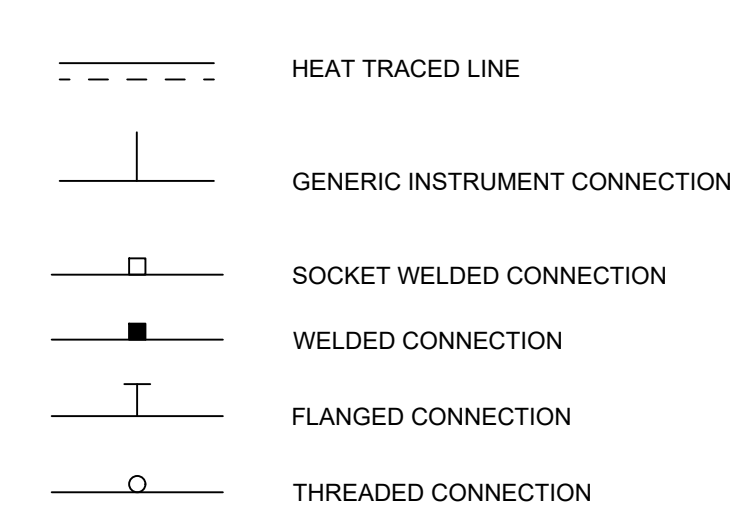
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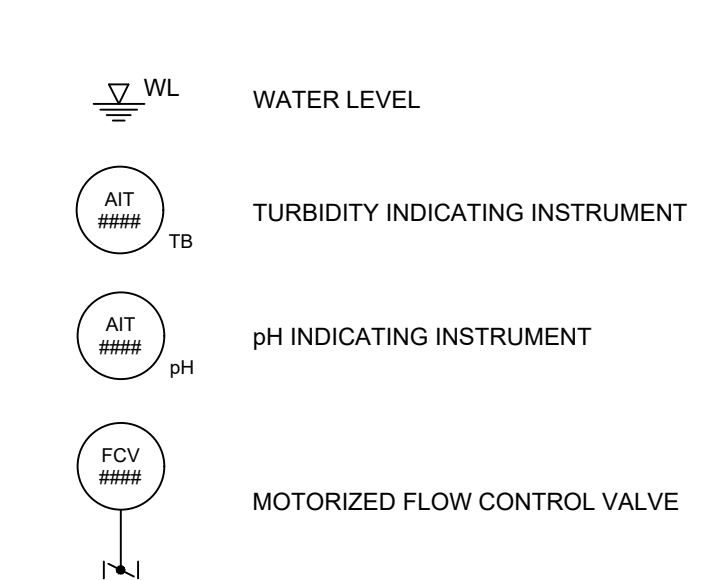
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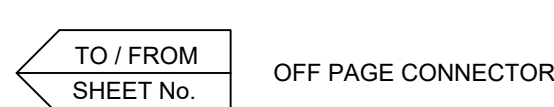
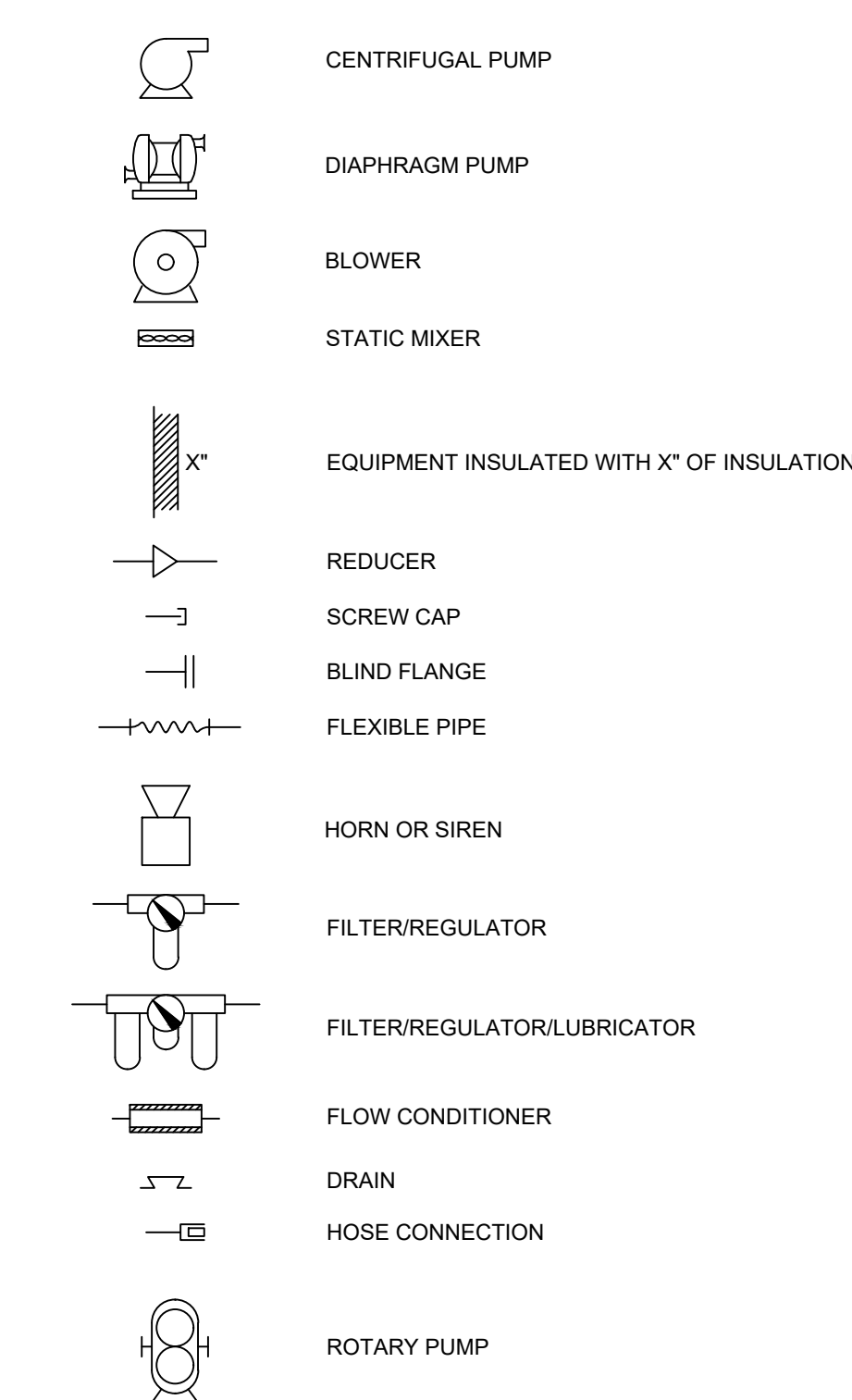
INSTRUMENT TO PROCESS/EQUIP. CONNECTIONS



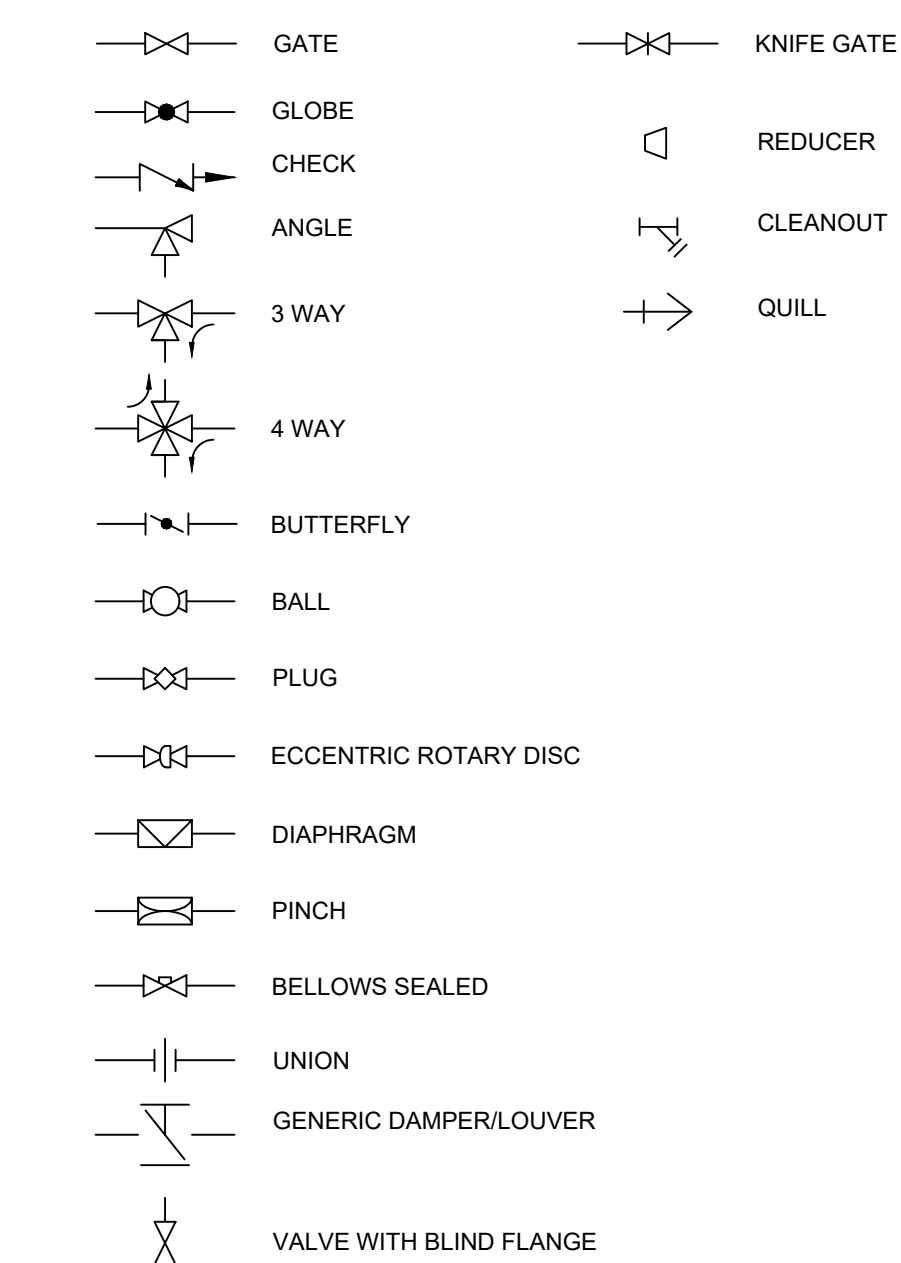
MISCELLANEOUS SYMBOLS



EQUIPMENT/PIPING SYMBOLS



VALVE SYMBOLS



Client  
**SAN JACINTO RIVER WASTE PITS**  
Project  
**NORTHERN IMPOUNDMENT PRE-FINAL 90% REMEDIAL DESIGN HARRIS COUNTY, TEXAS**

4 90% EPA REVIEW RS NF 08/27/2022

No. Issue Drawn Approved Date

Drawn RS Designer NF

Drafting Check MW Design Check NF

Project Coordinator CM Date Jun 27, 2022

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Project No. 11215702

Title  
**WATER TREATMENT SYSTEM PROCESS FLOW DIAGRAM SYMBOLS**

Sheet No.

**P-00A**

Sheet - of -

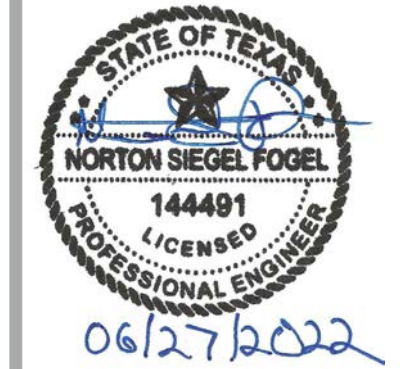
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TYPICAL INTERNATIONAL SOCIETY OF AUTOMATION LETTER COMBINATIONS

First-Letters	Initiating or Measured Variable	Controllers				Readout Devices		Switches and Alarm Devices *			Transmitters			Solenoids, Relays, Computing Devices	Primary Element	Test Point	Well or Probe	Viewing Device, Glass	Safety Device	Final Element
		Recording	Indicating	Blind	Self-Actuated Control Valves	Recording	Indicating	High **	Low	Comb	Recording	Indicating	Blind							
A	Analysis	ARC	AIC	AC		AR	AI	ASH	ASL	ASHL	ART	AIT	AT	AY	AE	AP	AW		AV	
B	Burner/Combustion	BRC	BIC	BC		BR	BI	BSH	BSL	BSHL	BRT	BIT	BT	BY	BE		BW	BG	BZ	
C	User's Choice																			
D	User's Choice																			
E	Voltage	ERC	EIC	EC		ER	EI	ESH	ESL	ESHL	ERT	EIT	ET	EY	EE				EZ	
F	Flow Rate	FRC	FIC	FC	FCV, FICV	FR	FI	FSH	FSL	FSHL	FRT	FIT	FT	FY	FE	FP		FG	FV	
FQ	Flow Quantity	FQRC	FQIC			FQR	FQI	FQSH	FQSL		FQIT	FQT	FQY	FQE					FQV	
FF	Flow Ratio	FFRC	FFIC	FFC		FFR	FFI	FFSH	FFSL										FFV	
G	User's Choice																			
H	Hand		HIC	HC						HS									HV	
I	Current	IRC	IIC			IR	II	ISH	ISL	ISHL	IRT	IIT	IT	IY	IE				IZ	
J	Power	JRC	JIC			JR	JI	JSH	JSL	JSHL	JRT	JIT	JT	JY	JE				JV	
K	Time	KRC	KIC	KC	KCV	KR	KI	KSH	KSL	KSHL	KRT	KIT	KT	KY	KE				KV	
L	Level	LRC	LIC	LC	LCV	LR	LI	LSH	LSL	LSHL	LRT	LIT	LT	LY	LE		LW	LG	LV	
M	User's Choice																			
N	User's Choice																			
O	User's Choice																			
P	Pressure/Vacuum	PRC	PIC	PC	PCV	PR	PI	PSH	PSL	PSHL	PRT	PIT	PT	PY	PE	PP		PSV, PSE	PV	
PD	Pressure, Differential	PDR	PDIC	PDC	PDCV	PDR	PDI	PDSH	PDSL		PDR	PDIT	PDT	PDY	PE	PP			PDV	
Q	Quantity	QRC	QIC			QR	QI	QSH	QSL	QSHL	QRT	QIT	QT	QY	QE				QZ	
R	Radiation	RRC	RIC	RC		RR	RI	RSH	RSL	RSHL	RRT	RIT	RT	RY	RE		RW		RZ	
S	Speed/Frequency	SRC	SIC	SC	SCV	SR	SI	SSH	SSL	SSHL	SRT	SIT	ST	SY	SE				SV	
T	Temperature	TRC	TIC	TC	TCV	TR	TI	TSH	TSL	TSHL	TRT	TIT	TT	TY	TE	TP	TW	TSE	TV	
TD	Temperature, Differential	TDR	TDIC	TDC	TDCV	TDR	TDI	TDSH	TDSL		TDR	TDIT	TDT	TDY	TE	TP	TW		TDV	
U	Multivariable					UR	UI							UY					UV	
V	Vibration/Machinery Analysis					VR	VI	VSH	VSL	VSHL	VRT	VIT	VT	VY	VE				VZ	
W	Weight/Force	WRC	WIC	WC	WCV	WR	WI	WSH	WSL	WSHL	WRT	WIT	WT	WY	WE				WZ	
WD	Weight/Force, Differential	WDR	WDIC	WDC	WDCV	WDR	WDI	WDSH	WDSL		WDR	WDIT	WDT	WDY	WE				WDZ	
X	Unclassified																			
Y	Event/State/Presence		YIC	YC		YR	YI	YSH	YSL			YT	YY	YE					YZ	
Z	Position/Dimension	ZRC	ZIC	ZC	ZCV	ZR	ZI	ZSH	ZSL	ZSHL	ZRT	ZIT	ZT	ZY	ZE				ZV	
ZD	Gauging/Deviation	ZDR	ZDIC	ZDC	ZDCV	ZDR	ZDI	ZDSH	ZDSL		ZDR	ZDIT	ZDT	ZDY	ZDE				ZDV	

NOTE: THIS TABLE IS NOT ALL-INCLUSIVE.

OTHER POSSIBLE COMBINATIONS:

\* A, ALARM, THE ANNUNCIATING DEVICE, MAY BE USED IN THE SAME FASHION AS S, SWITCH, THE ACTUATING DEVICE.  
 \*\* THE LETTERS H AND L MAY BE OMITTED IN THE UNDEFINED CASE.

IDENTIFICATION LETTERS

FIRST-LETTER	SUCCEEDING-LETTERS
MEASURED OR INITIATING VARIABLE	READOUT OR PASSIVE FUNCTION
A Analysis	Alarm
B Burner/Combustion	User's Choice
C User's Choice	User's Choice
D User's Choice	User's Choice
E Voltage	Conductivity
F Flow Rate	Differential, Density
FQ Flow Quantity	Sensor (Primary Element)
FF Flow Ratio	Ratio (Fraction)
G User's Choice	Glass, Viewing Device, Gauge
H Hand	Indicate
I Current (Electrical)	High
J Power	Scan
K Time, Time Schedule	Time Rate of Change
L Level	Control Station
M User's Choice	Light
N User's Choice	Low
O User's Choice	Momentary, Moisture
P Pressure, Vacuum	User's Choice
Q Quantity	Orifice, Restriction
R Radiation	Point (Test) Connection
S Speed, Frequency	Record
T Temperature	Integrate, Totalize
U Multivariable	Safety
V Vibration, Machinery Analysis	Switch
W Weight, Force	Transmit
X Unclassified	Multifunction
Y Event, State, or Presence	Multifunction
Z Position, Dimension	Unclassified

ABBREVIATIONS:

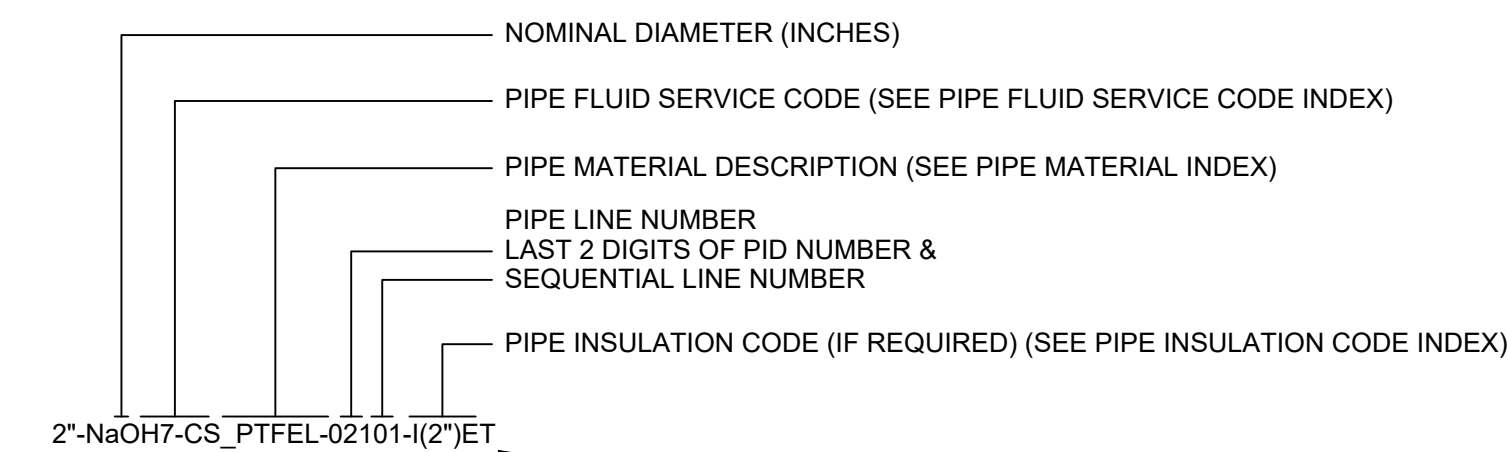
HOA - HAND/OFF/AUTO  
 LOR - LOCAL/OFF/REMOTE  
 OPN - OPEN  
 CLS - CLOSE  
 STPT - SETPOINT  
 ES - EMERGENCY STOP  
 DA - DOUBLE ACTING

NC - NORMALLY CLOSED  
 NO - NORMALLY OPEN  
 ST - START / ENABLE  
 SP - STOP / DISABLE  
 JOG - PUMP MOTOR  
 SA - SINGLE ACTING

PIPE FLUID SERVICE CODE INDEX  
 SEE PIPING SPECIFICATIONS FOR DETAILS

PROCESS MEDIA CODE	SERVICE
CL21	CHLORINE LIQUID OR GAS
CTW1	COOLING TOWER WATER
CW3	PROCESS WATER
CW4	CHILLED WATER
NaOH7	CAUSTIC SODA SOLUTION
GCO	GLYCOL
N20	NITROGEN (DRY COMPRESSED GAS)
SI	STEAM
CI	CONDENSATE
PV	PROCESS VENT
STS	STORM SEWER
PR	PROCESS RELIEF
GW	GROUNDWATER
DR	DRAIN
IA	INSTRUMENT AIR
VE	VAPOR EXTRACTION
NPW	NON POTABLE WATER
H2SO4	SULFURIC ACID
DW	DOMESTIC WATER
INF	INFLUENT WATER (CONTACT WATER)
EFF	EFFLUENT WATER (TREATED WATER)
SLG	SLUDGE
BW	BACKWASH
COAG	COAGULANT
POLY	POLYMER
OS	ORGANOSULFIDE
DEC	DECANT WATER
CONT	WTS CONTAINMENT AREA DRAINAGE

LINE DESIGNATION



PIPE MATERIAL INDEX  
 SEE PIPING SPECIFICATIONS FOR DETAILS

MAT'L	DESCRIPTION	SPEC
CS_40	CARBON STEEL SCHEDULE 40 PIPE	
CS_80	CARBON STEEL SCHEDULE 80 PIPE	
316L_10	316L STAINLESS STEEL SCHEDULE 10 PIPE	
304_40	304 STAINLESS STEEL SCHEDULE 40 PIPE	
316L_ST	316L STAINLESS STEEL TUBING	
304_ST	304 STAINLESS STEEL TUBING	
CS_T	CARBON STEEL TUBING	
CU_T	COPPER TUBING	
PE_T	POLYETHYLENE TUBING	
CS_PTFEL	CARBON STEEL PTFE LINED PIPE	
CS-PFAL	CARBON STEEL PFA LINED PIPE	
CS-GL	CARBON STEEL GLASS LINED PIPE	
CPVC_80	CPVC SCHEDULE 80 PIPE	
PCV_80	PVC SCHEDULE 80 PIPE	
304_10	304 STAINLESS STEEL SCHEDULE 10 PIPE	
FRP	FIBERGLASS REINFORCED PIPE	
HDPE_11	HIGH-DENSITY POLYETHYLENE SDR-11	
FRH	FLEXIBLE RUBBER HOSE	
304L_ST	304L STAINLESS STEEL TUBING	
304L_10	304L STAINLESS STEEL SCHEDULE 10 PIPE	
304L_ST	TEFLON TUBING-CARRIER WITH CPVC CONTAINMENT PIPE	
HDPE_DW	HDPE DOUBLE WALLED PIPE SDR-11 CARRIER AND CONTAINMENT PIPE	
PTFE_CPVC	TEFLON TUBING - CARRIER WITH CPVC CONTAINMENT PIPE	

PIPE INSULATION CODE INDEX  
 SEE PIPING SPECIFICATIONS FOR DETAILS

PROCESS MEDIA CODE	DESCRIPTION
I(2")	INSULATED (2")
NI	NOT INSULATED
JKT	JACKETED PIPE
I(2")ET	INSULATED (2") AND ELECTRICALLY TRACED
I(2")ST	INSULATED (2") AND STEAM TRACED
I(2")JKT	INSULATED (2") AND JACKETED

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 GHD TEXAS FIRM REGISTRATION NO. 276

Client: **SAN JACINTO RIVER WASTE PITS**  
 Project: **NORTHERN IMPOUNDMENT PRE-FINAL 90% REMEDIAL DESIGN HARRIS COUNTY, TEXAS**

No.	Issue	Drawn	Approved	Date
4	90% EPA REVIEW	RS	NF	06/27/2022

Drawn **RS** Designer **NF**  
 Drafting Check **MW** Design Check **NF**  
 Project Coordinator **CM** Date **June 3, 2022**  
 Scale **N.T.S.**

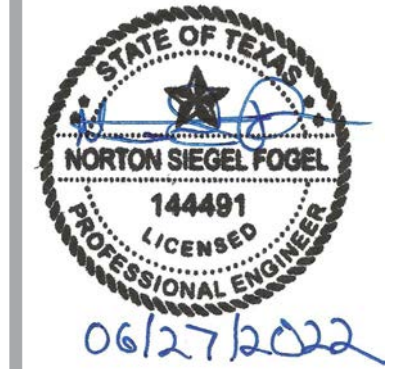
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 Project No. **11215702**  
 Title **WATER TREATMENT SYSTEM PROCESS FLOW DIAGRAM SCHEDULES**

Sheet No. **P-00B**

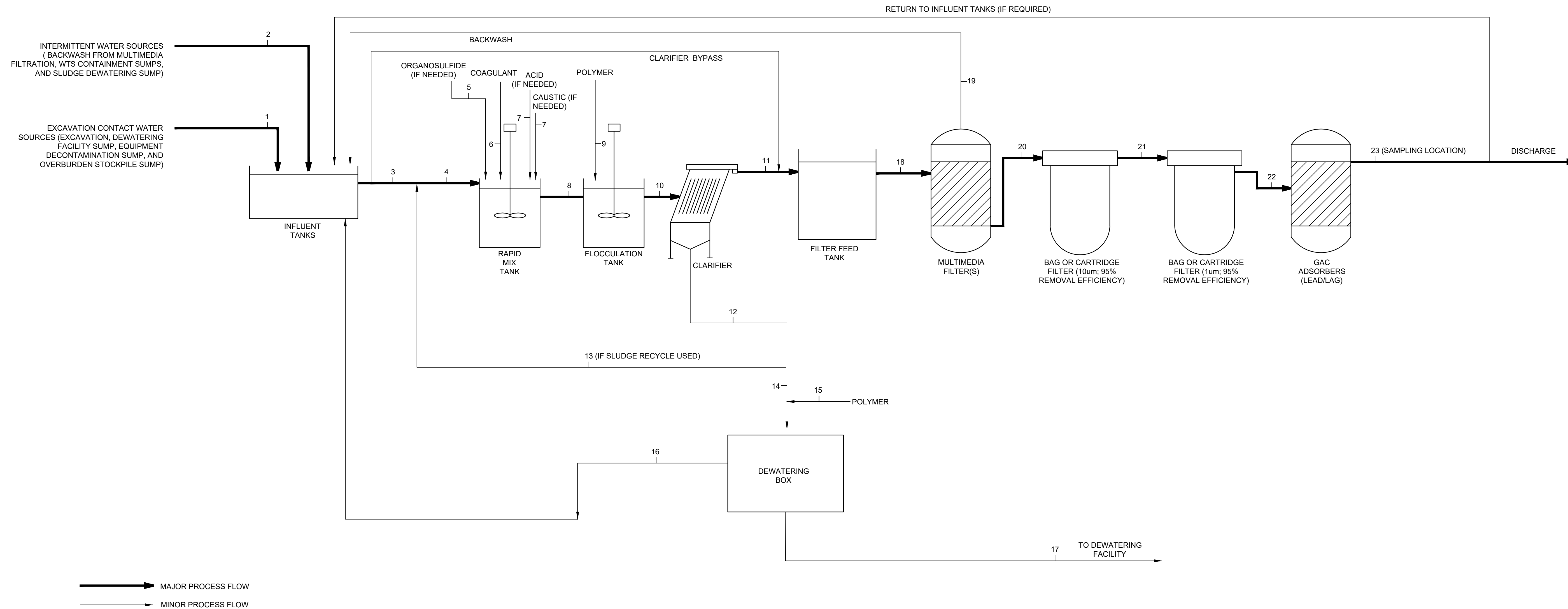
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MAJOR PROCESS FLOW  
MINOR PROCESS FLOW

WATER TREATMENT PLANT PROCESS STREAMS<sup>1</sup>

Streams		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
	Units	Excavation Contact Water	Containment Water Sources <sup>2</sup>	WTS Treatment Flowrate	Rapid Mix Tank Influent	Organosulfide Feed	Coagulant Feed	Acid or Caustic Feed	Flocculation Tank Influent	Polymer Feed	Clarifier Influent	Clarifier Effluent	Clarifier Underflow	Sludge Recycle	Sludge to Dewatering Box	Dewatering Box Polymer Feed	Dewatering Box Decant to Influent Tank	Sludge to Dewatering Facility	Influent to Multimedia Filters	Backwash	Bag Filter Feed (10 um)	Bag Filter Feed (1 um)	GAC Adsorber Feed	Discharge Sampling Location
Volumetric Flow	GPM	1,000	400	300	357	0.01	0.03	TBD	357	0.01	357	282	75	0	75	0.01	57	18	282	200	282	282	282	282
Suspended Solids	PPM	4,000	varies	4,000	4,000	-	-	TBD	4,149	-	4,174	50	19,566	19,566	19,566	-	515	80,000	50	63	5	2	2	2
Chemical Feed	PPM	-	-	-	-	50	100	TBD	-	25	-	-	-	-	-	200	-	-	-	-	-	-	-	-
Mass Flow Solids	LB/HR	2,000	800	622	715	8.93	17.86	TBD	741	4.47	746	7	734	0	734	7.3	15	720	7.1	6.4	0.7	0.3	0.3	0.3
Specific Gravity		1.0	1.0	1.0	1.0	1.2	1.2	TBD	1.0	1.0	1.0	1.0	-	-	-	1.0	1.0	-	1.0	1.0	1.0	1.0	1.0	1.0
Density	LB/CF	62.4		62.4	62.4	74.9	74.9	TBD	62.4	62.4	62.4	62.4	-	-	-	62.4	62.4	-	62.4	62.4	62.4	62.4	62.4	62.4

NOTES:  
1. FOR INFORMATION PURPOSES ONLY  
2. FLOW ARE INTERMITTENT AND CONCENTRATIONS MAY VARY

Client  
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Project  
**NORTHERN IMPOUNDMENT PRE-FINAL 90% REMEDIAL DESIGN HARRIS COUNTY, TEXAS**

4	90% EPA REVIEW	RS	NF	06/27/2022
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Drafting Check	MW	Design Check	NF	
Project Coordinator	CM	Date	Jun 27, 2022	
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Project No. **11215702**  
Title  
**WATER TREATMENT SYSTEM  
PROCESS FLOW DIAGRAM/  
MASS BALANCE**

Sheet No.  
**P-01**  
Sheet - of -

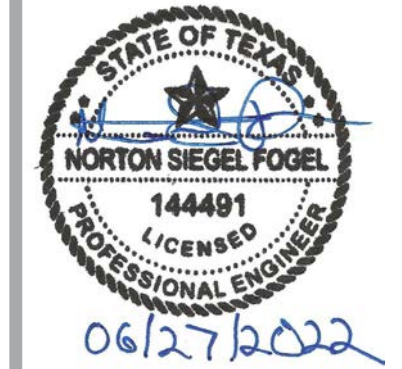
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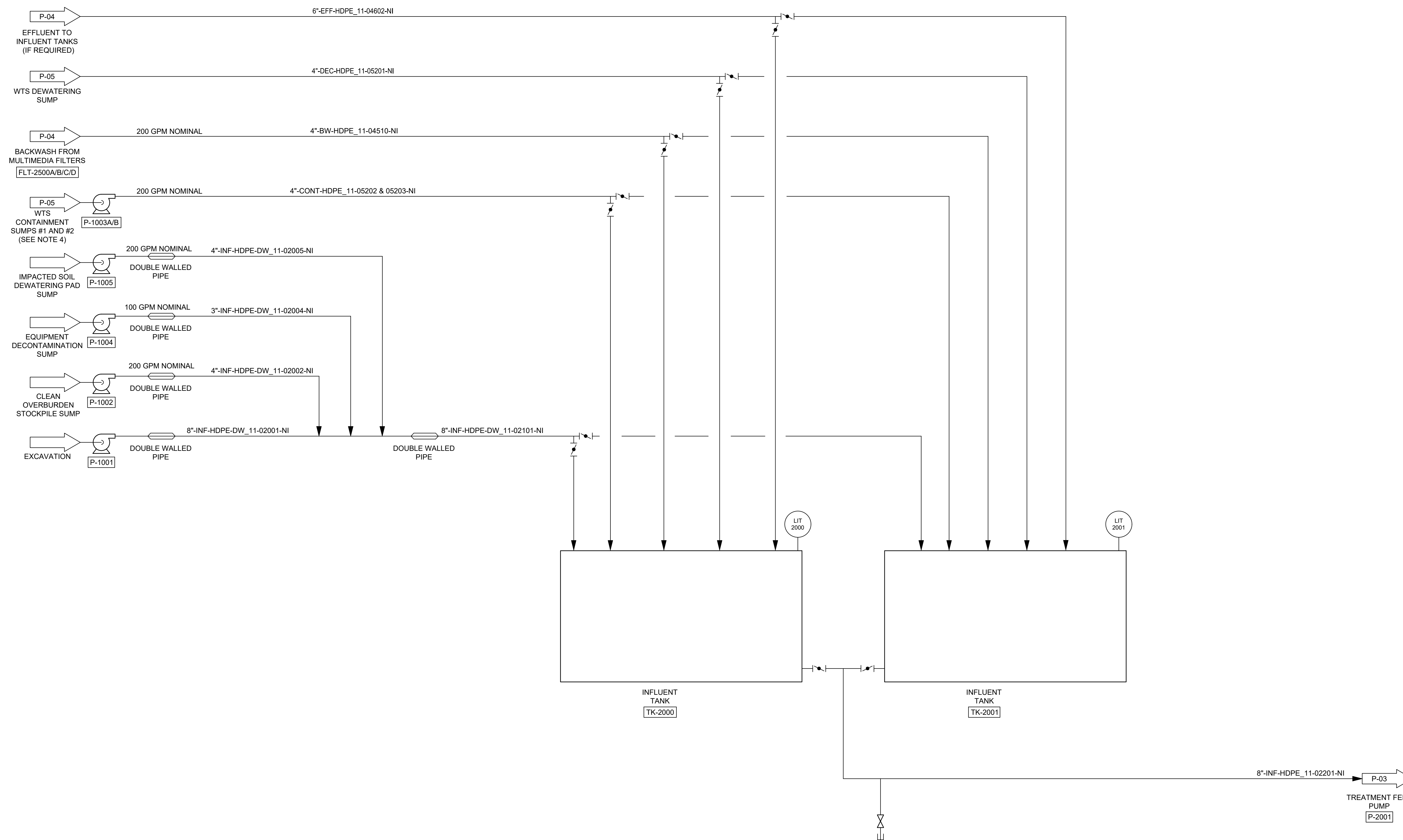
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Project  
**NORTHERN IMPOUNDMENT PRE-FINAL 90% REMEDIAL DESIGN HARRIS COUNTY, TEXAS**

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Drawn	BP	Designer	KJ	
Drafting Check	MW	Design Check	NF	
Project Coordinator	CM	Date	Jun 27, 2022	
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Project No. 11215702  
Title  
**WATER TREATMENT SYSTEM P&ID (1 OF 4)**

Sheet No.  
**P-02**  
Sheet - of -



- NOTES:
- FOR CLARITY NOT ALL SYSTEM ELEMENTS (E.G. VALVES, PIPE SIZES) HAVE BEEN SHOWN. P&IDs ARE CONCEPTUAL ONLY AND ARE TO BE FINALIZED BY CONTRACTOR.
  - THE TREATMENT SYSTEM DESIGNS ARE PRELIMINARY AND SUBJECT TO CHANGE.
  - CONTRACTOR SHALL PROVIDE PROVISIONS TO DIRECT EQUIPMENT DECONTAMINATION WATER TO WATER TREATMENT SYSTEM OR TO AN ADJACENT CONTAINMENT AREA WITH PUMPING SYSTEM.
  - CONTRACTOR PROVIDE AN ADEQUATE NUMBER OF SUMPS AND PUMPS TO DEWATER CONTAINMENT AREA AFTER A LARGE RAIN EVENT TO RESUME ACTIVITIES.

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Project  
**NORTHERN IMPOUNDMENT PRE-FINAL 90% REMEDIAL DESIGN HARRIS COUNTY, TEXAS**

4	90% EPA REVIEW	RS	NF	06/27/2022
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No.	Issue	Drawn	Approved	Date
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Drawn	BP	Designer	KJ
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Drafting Check	MW	Design Check	NF
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Project Coordinator	CM	Date	Jun. 27, 22
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Original Size	Arch D	Scale	N.T.S.
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Project No.	11215702
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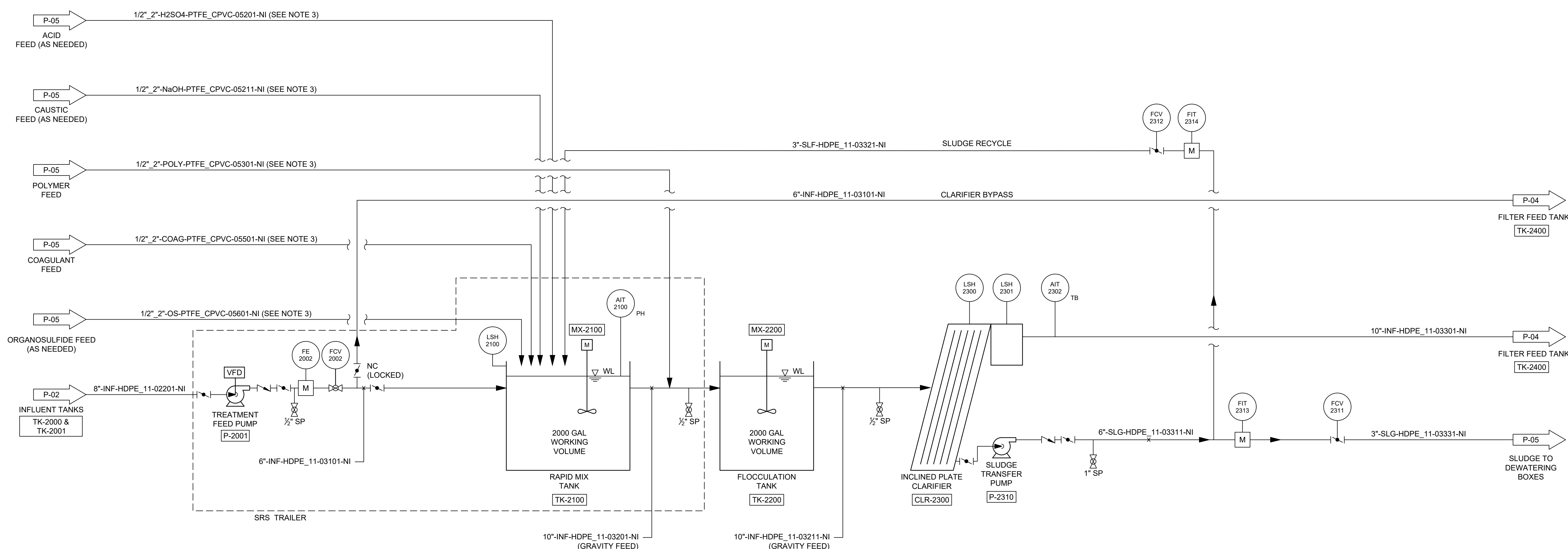
Title

**WATER TREATMENT SYSTEM P&ID (2 OF 4)**

Sheet No.

**P-03**

Sheet - of -



NOTE:  
1. FOR CLARITY NOT ALL SYSTEM ELEMENTS (E.G. VALVES, PIPE SIZES) HAVE BEEN SHOWN. P&IDs ARE CONCEPTUAL ONLY AND ARE TO BE FINALIZED BY CONTRACTOR.  
2. THE TREATMENT SYSTEM DESIGNS ARE PRELIMINARY AND SUBJECT TO CHANGE.  
3. ALL CHEMICAL TUBING SHALL BE INSIDE 2" CPVC CONTAINMENT PIPE.

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**GHD SERVICES INC.**  
JOB NO. 11215702 FILE NO. 001  
GHD TEXAS FIRM REGISTRATION NO. 276

**90% EPA REVIEW**





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Client  
**SAN JACINTO RIVER WASTE PITS**  
Project  
**NORTHERN IMPOUNDMENT PRE-FINAL 90% REMEDIAL DESIGN HARRIS COUNTY, TEXAS**

No.	Issue	Drawn	Approved	Date
4	90% EPA REVIEW	RS	NF	06/27/2022

Drawn BP Designer KJ  
Drafting Check MW Design Check NF  
Project Coordinator CM Date Jun. 27, 22  
Scale N.T.S.

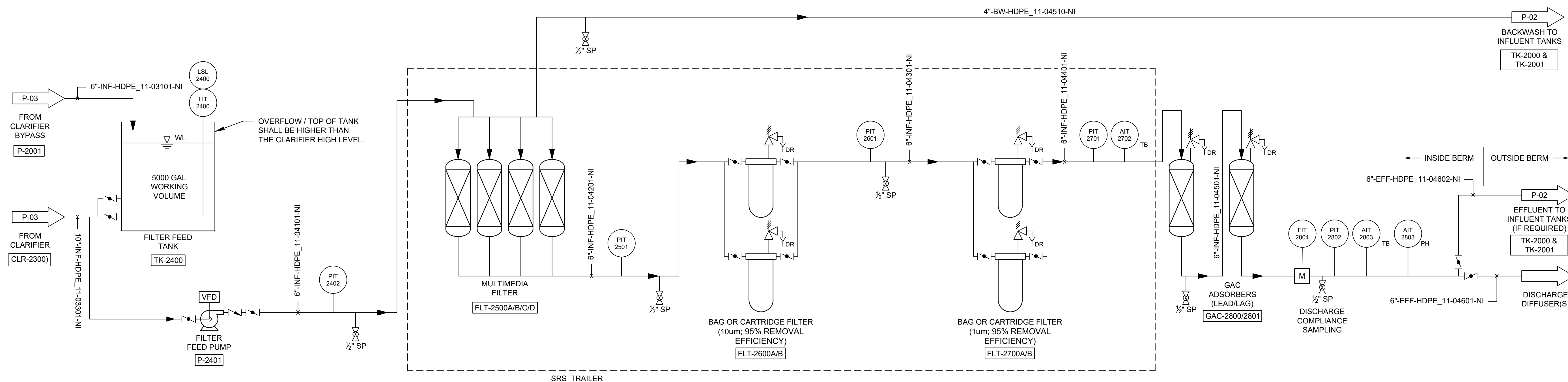
Project No. 11215702

Title  
**WATER TREATMENT SYSTEM P&ID (3 OF 4)**

Sheet No.

**P-04**

Sheet - of -



NOTE:  
1. FOR CLARITY NOT ALL SYSTEM ELEMENTS (E.G. VALVES, PIPE SIZES) HAVE BEEN SHOWN. P&IDs ARE CONCEPTUAL ONLY AND ARE TO BE FINALIZED BY CONTRACTOR.  
2. THE TREATMENT SYSTEM DESIGNS ARE PRELIMINARY AND SUBJECT TO CHANGE.

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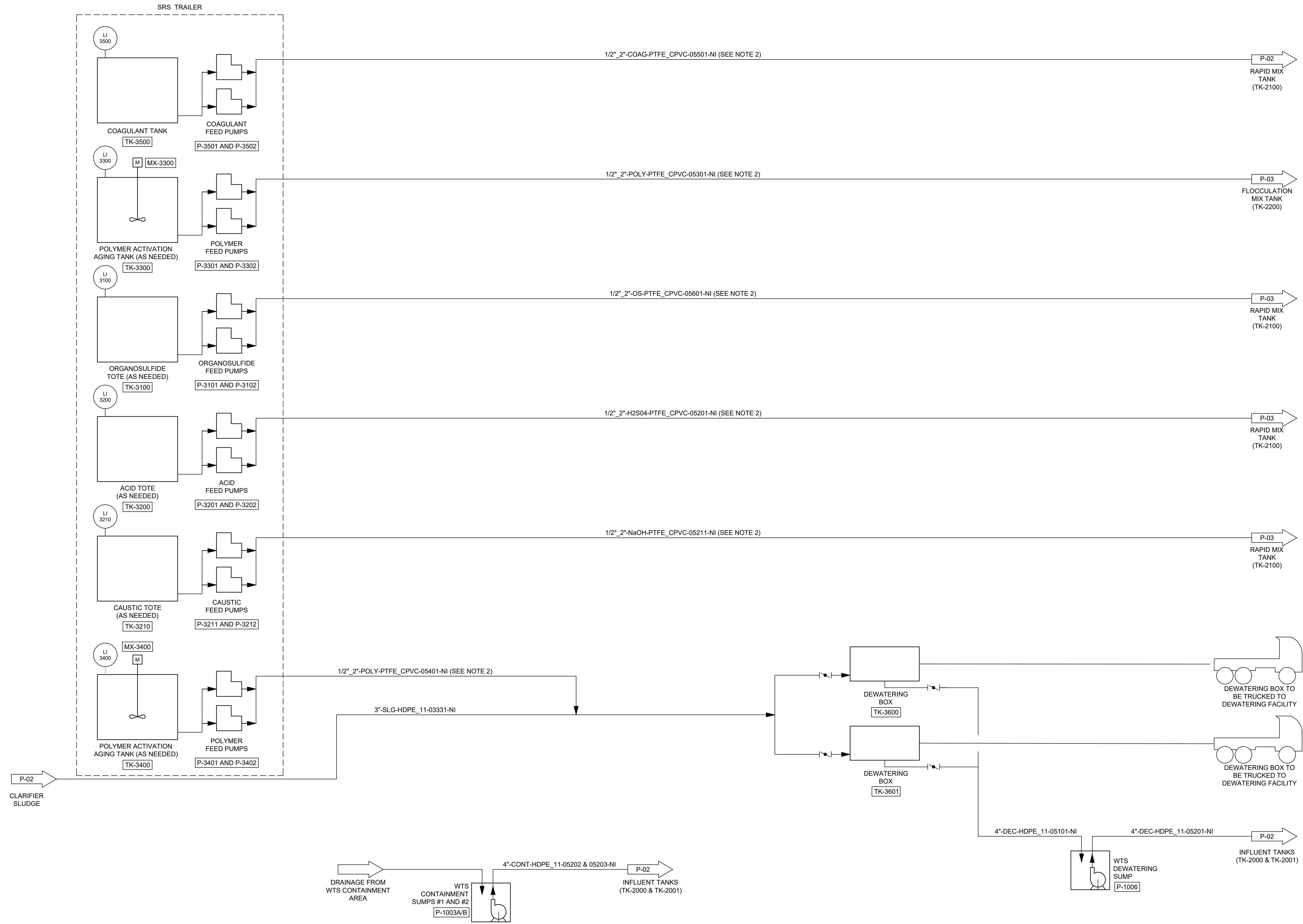
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Client  
**SAN JACINTO RIVER WASTE PITS**  
Project  
**NORTHERN IMPOUNDMENT PRE-FINAL 90% REMEDIAL DESIGN HARRIS COUNTY, TEXAS**

4	90% EPA REVIEW	RS	NF	06/27/2022
No.	Issue	Drawn	Approved	Date
Drawn	BP	Designer	KJ	
Drafting Check	MW	Design Check	NF	
Project Coordinator	CM	Date	Jun. 27, 22	
Original Size	This document shall not be used for construction unless signed and sealed for construction.			
Arch D	Scale N.T.S.			
		Bar is one inch on original size drawing 0 1"		

Project No. **11215702**  
Title  
**WATER TREATMENT SYSTEM P&ID (4 OF 4)**

Sheet No.  
**P-05**  
Sheet - of -

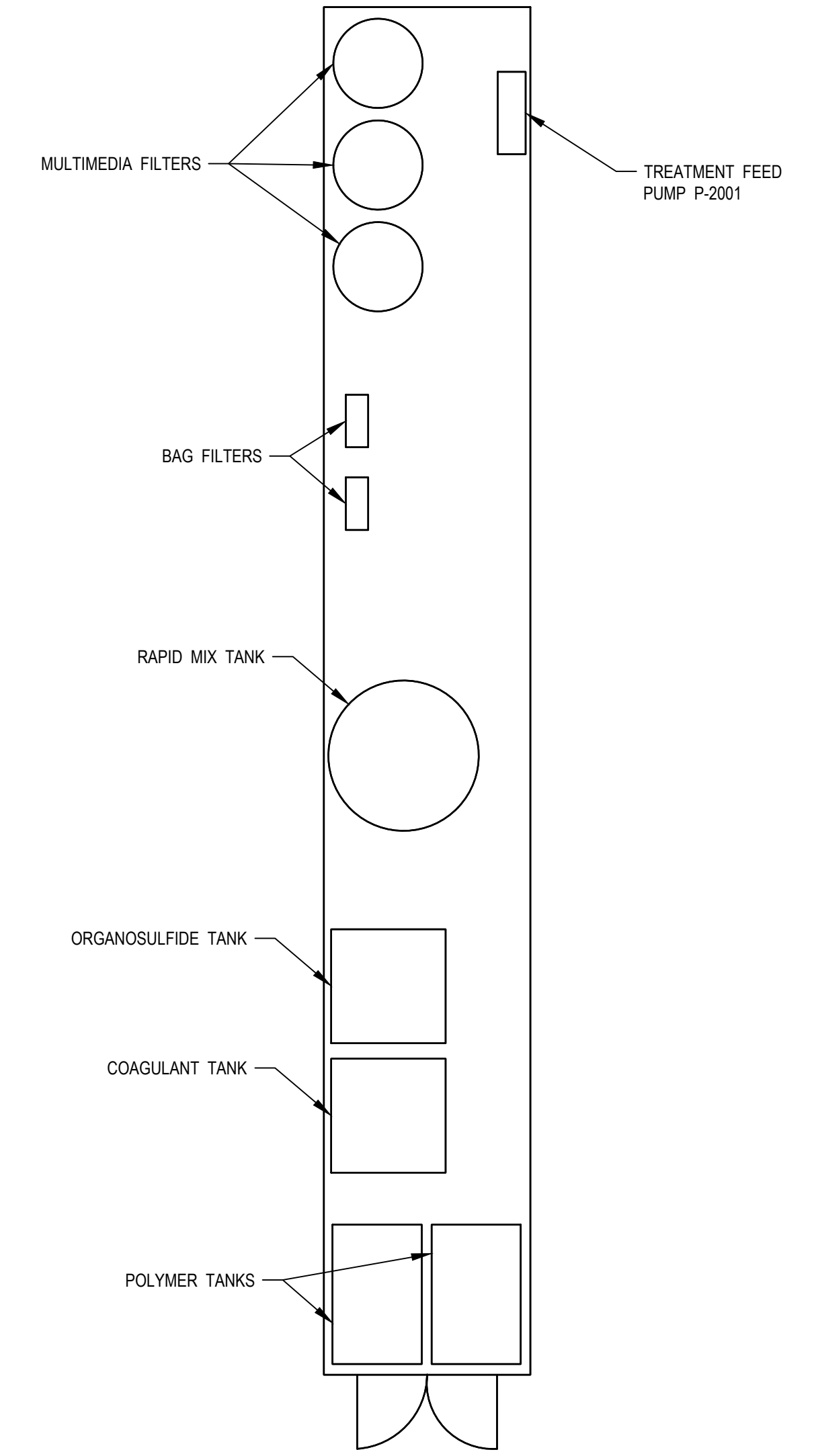
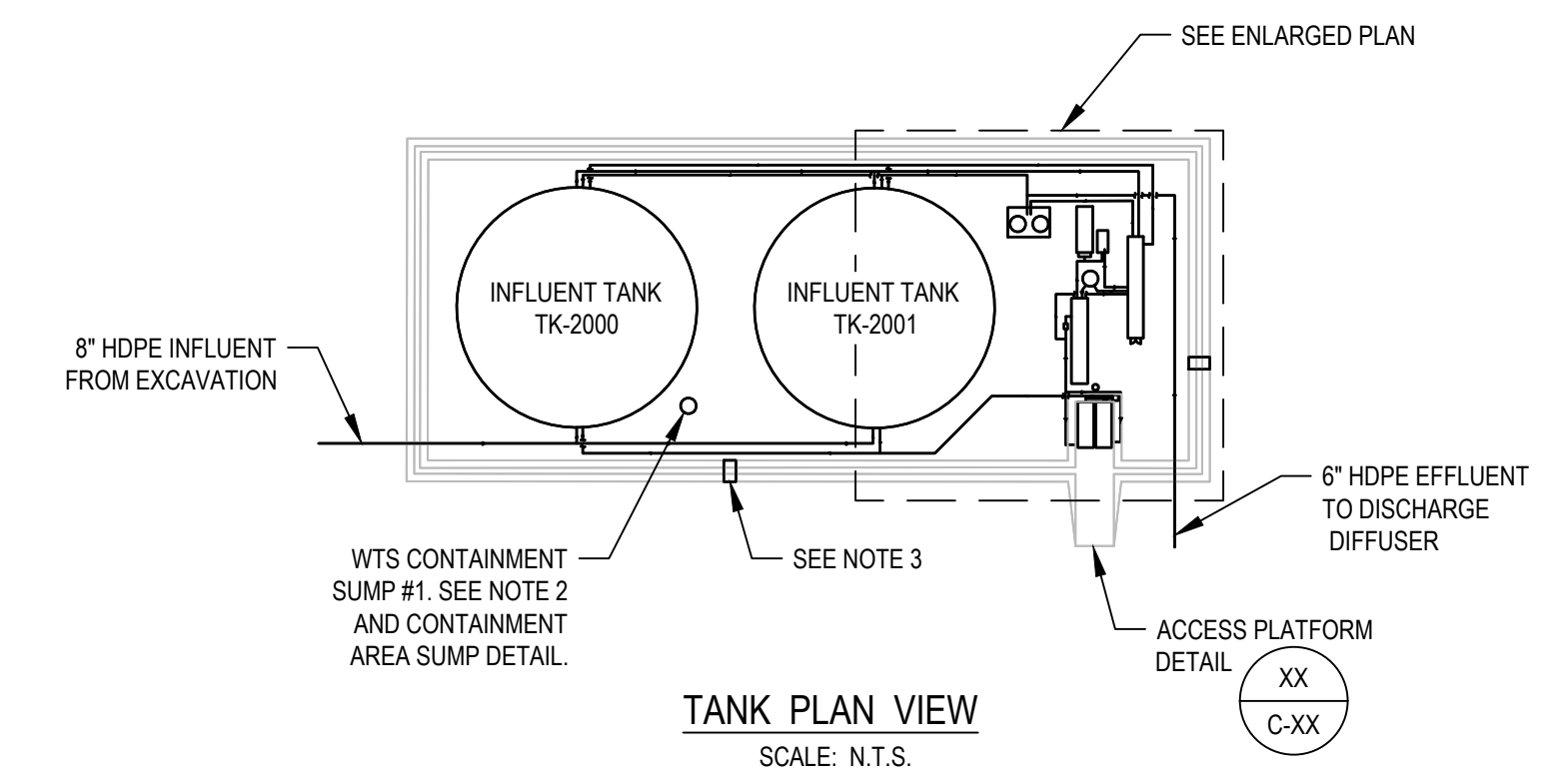
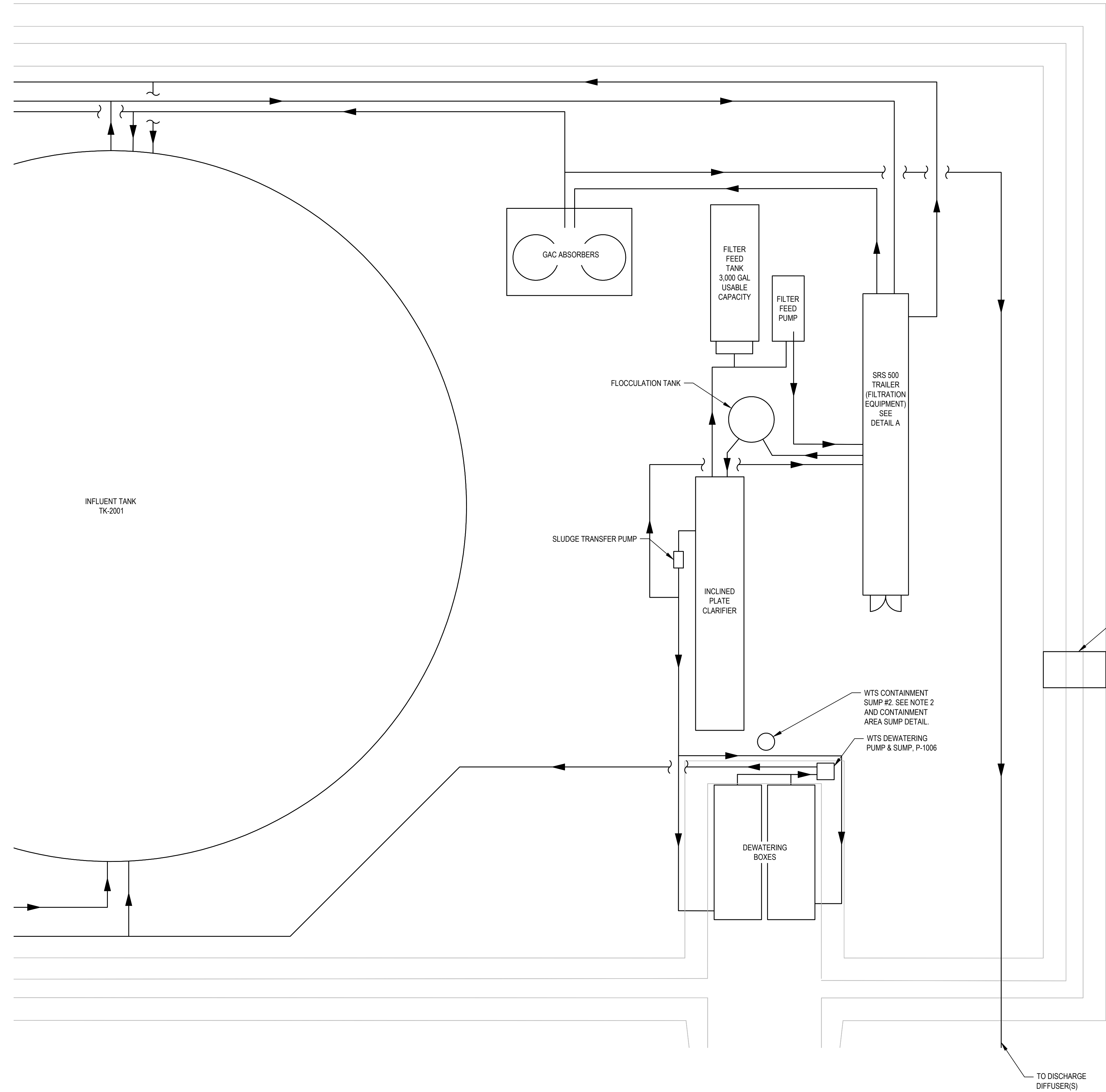


NOTE:  
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**90% EPA REVIEW**



DETAIL A: SRS 500 TRAILER  
SCALE: N.T.S.

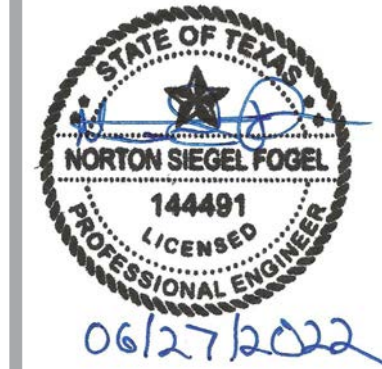
- NOTES:
1. EVOQUA RENTAL SYSTEM, INCLUDING SRS 500 TRAILER, IS SHOWN AS BASIS OF DESIGN BUT ALTERNATIVES MAY BE PROPOSED.
  2. CONTAINMENT AREA FLOOR TO SLOPE 1.0% (TYP.) TOWARDS CONTAINMENT AREA SUMPS.
  3. PROVIDE MODULAR STAIRWAYS OVER BERM FOR WALKWAY ACCESS.
  4. REFER TO P&ID FOR PIPING SIZING. PIPING SHOWN IS BASIC LAYOUT OF SYSTEM. CONTRACTOR TO PROVIDE ALL PIPING REQUIRED FOR COMPLETE AND OPERABLE SYSTEM.

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**NORTHERN IMPOUNDMENT PRE-FINAL 90% REMEDIAL DESIGN HARRIS COUNTY, TEXAS**

4	90% EPA REVIEW	RS	NF	06/27/2022
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No.	Issue	Drawn	Approved	Date
Drawn	BP	Designer	KJ	

Drafting Check	MW	Design Check	NF
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Project Coordinator	CM	Date	Jun 27, 2022
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Original Size	Arch D	Scale	N.T.S.
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Bar is one inch on original size drawing  
 0 1"

Project No. 11215702

Title

**SITE PLAN WATER TREATMENT SYSTEM SEASON 3-6**

Sheet No.

**P-06**

**90% EPA REVIEW**

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