HoustonEngineering Inc.

LAKE REDWOOD RECLAMATION PROJECT

PHASE II: HYDRAULIC DREDGING OF LAKE REDWOOD

in cooperation with

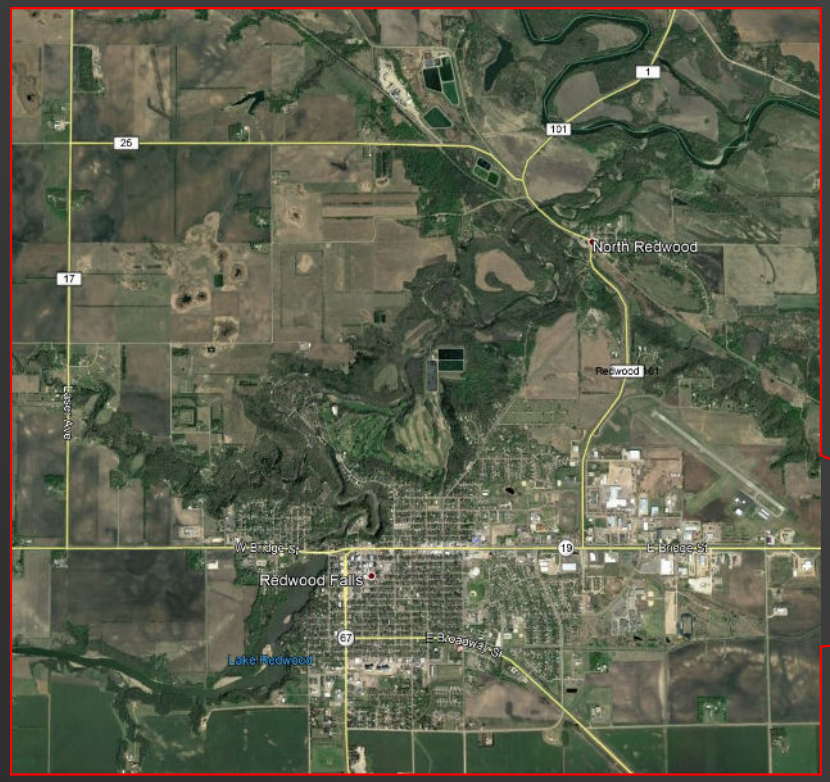
City of Redwood Falls

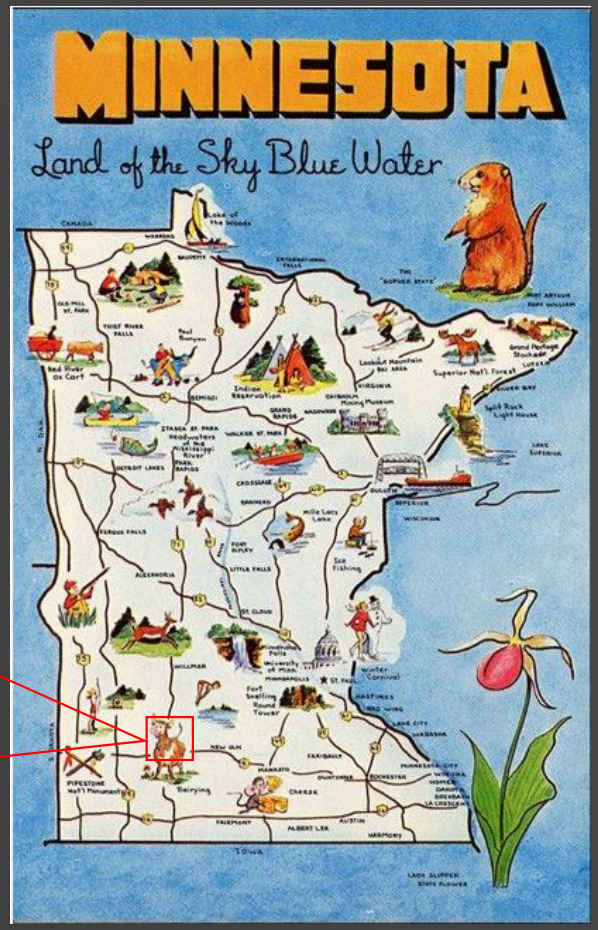
RCRCA
Redwood-Cottonwood Rivers Control Area

INTRO

- Meeting Purpose
  - What….Where….Why….When….
  - Develop Interest in Project
  - Identify Project Needs/Revisions…
    ..Ahead of bidding

PROJECT LOCATION





City of Redwood Falls

RCRCA

PRESENTATION OUTLINE

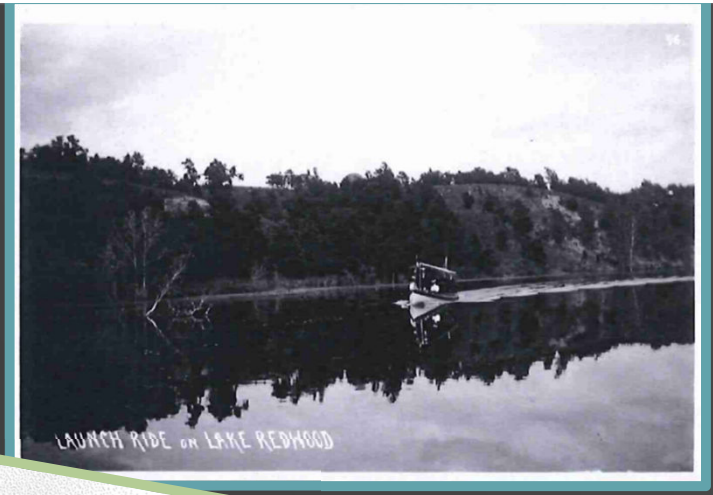
- Project History
- Schedule & Project Status
- Dredging Operations
- Confined Disposal Facility (CDF)
- Agency Permitting and Coordination

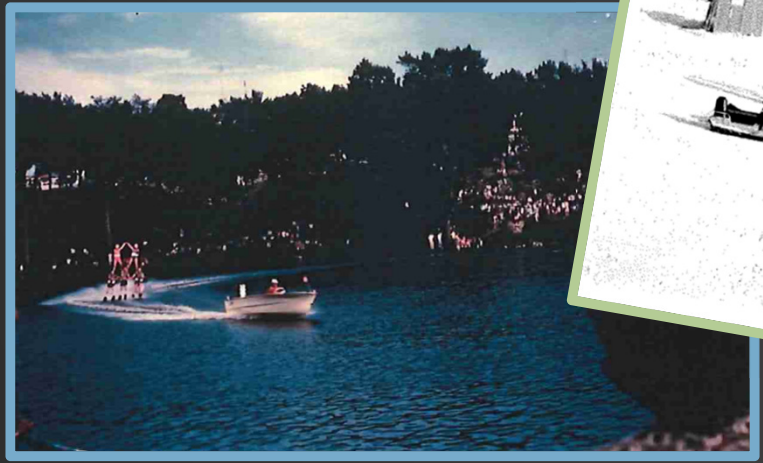
PROJECT HISTORY

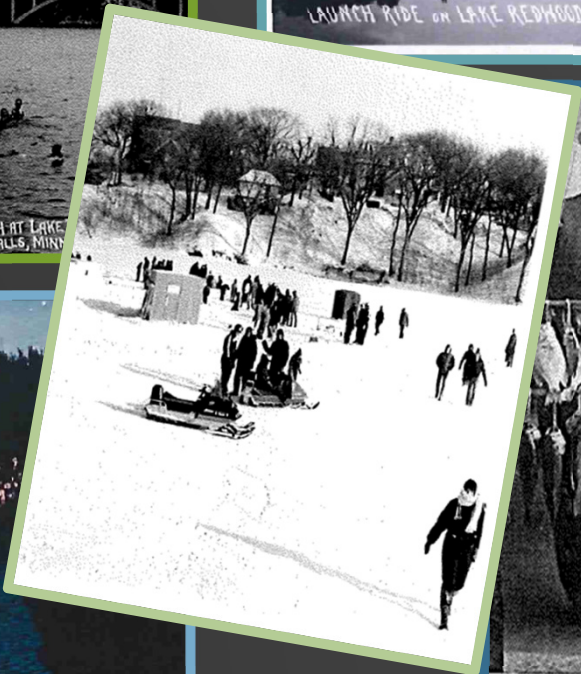
Lake Redwood:
Man-made
Reservoir

PROJECT HISTORY

Lake Usage







Catch at Lake Redwood
1908

PROJECT HISTORY

Current Conditions

City of Redwood Falls

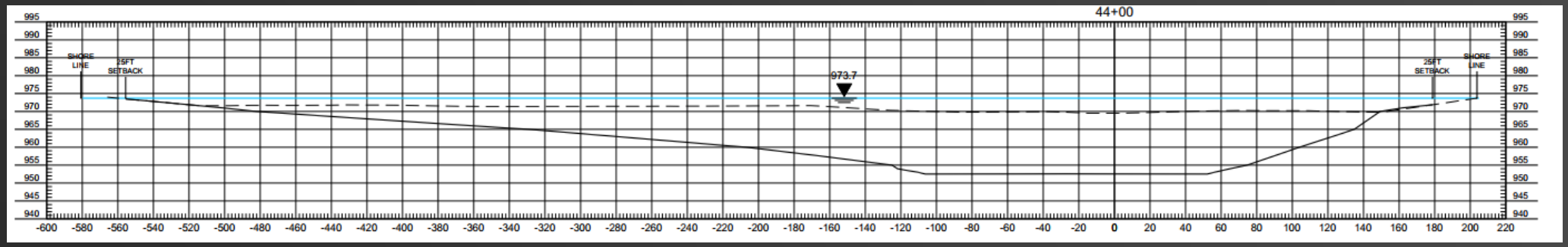
RCRCA

BACKGROUND

- Overview of RCRCA
- RCRCA Partnership with City of Redwood Falls for Project
- Project Previously permitted in 2008
- Sources of Funding
  - General Obligation Bond (Grant) from State of MN - $7.3 million
  - City of Redwood - $900,000
- Project costs so far
  - Land acquisition for Upland disposal area (CDF)
  - Construction of CDF

PROJECT GOALS

- Improve Water Quality in Lake Redwood receiving waters
- Restore recreational opportunities in Lake Redwood
- Increase water depth and clarity for aquatic habitat
- Improve hydroelectric dam reliability for the City of Redwood Falls



PROJECT TIMELINE

2008

Project Initiated and Previously Permitted

2019

RCRCA receives Grant from State of Minnesota

2020

Phase I Construction (CDF)

2021

Phase II Initiation – Hydraulic Dredging

2022

Phase II Substantial Completion – Hydraulic Dredging

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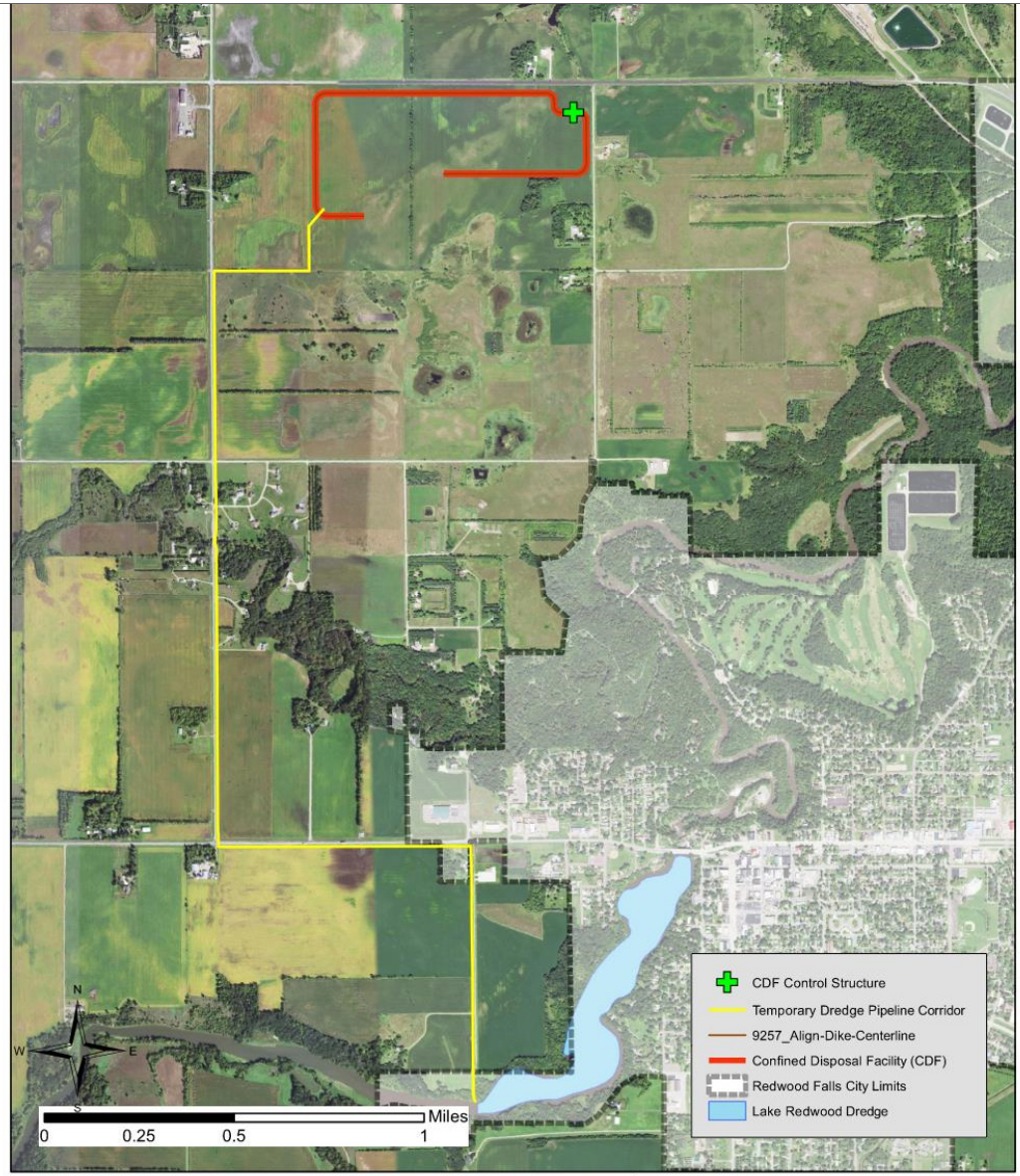
PROJECT OVERVIEW

LAKE OPERATIONS
DISPOSAL PIPELINE
CONFINED DISPOSAL FACILITY



DREDGING OPERATIONS - RESTRICTIONS

- Noise
- Working Days/Times
- In Lake Restrictions
- Proximity to Existing Residents
- Booster Locations
  - (Later in Presentation)

	7am-6pm	6pm-10pm	10pm-7am
10 min. or less	75 dB	70 dB	60 dB
10 min. 2 hrs	70 dB	60 dB	50 dB
2 hrs or more	60 dB	50 dB	50 dB

City of Redwood Falls

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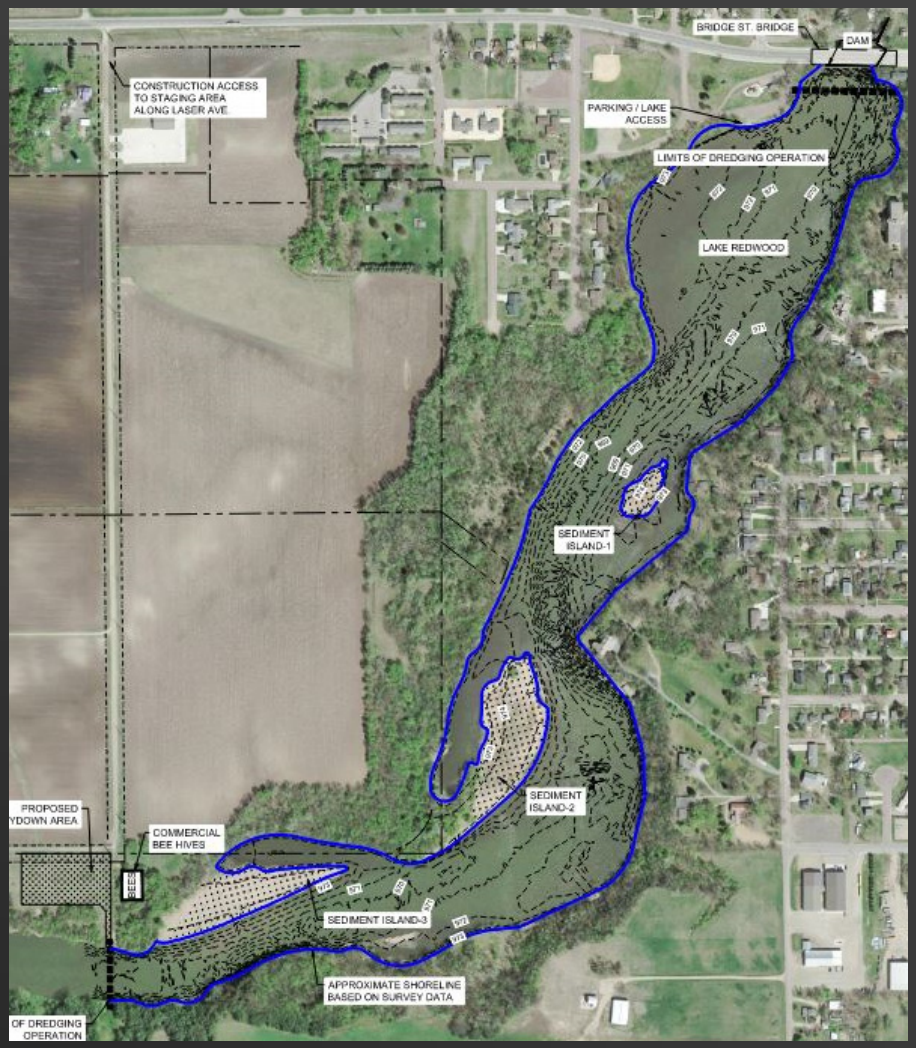

HYDRAULIC DREDGING

EXISTING LAKE SURVEY: 9-19-2019

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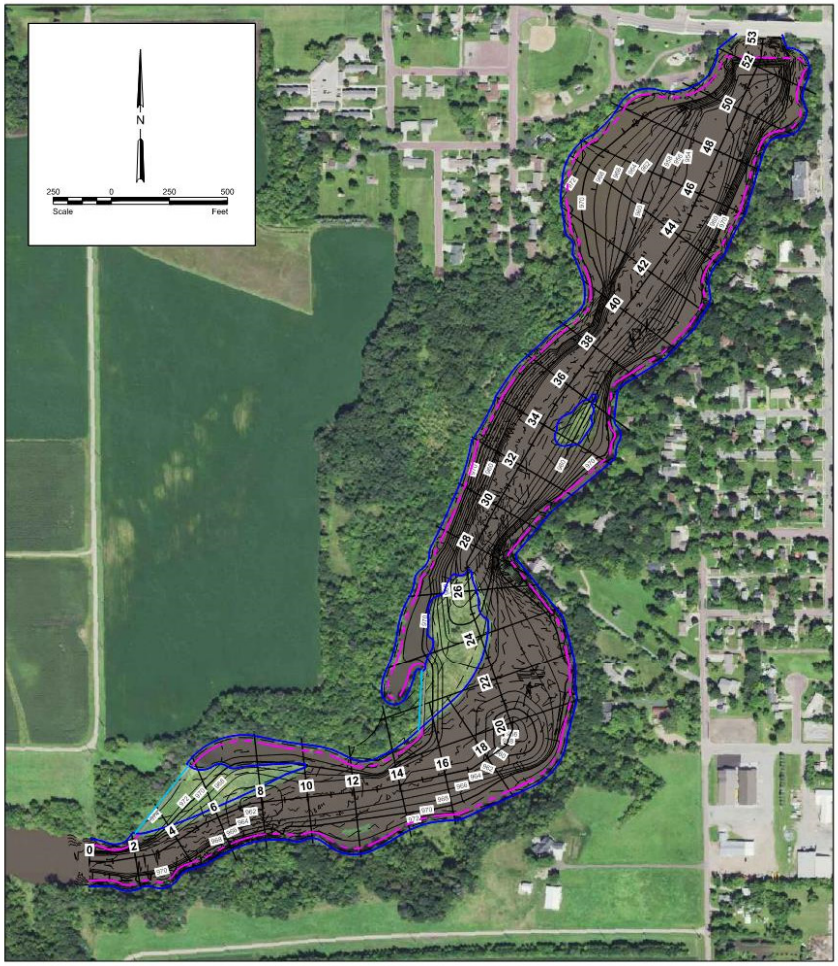
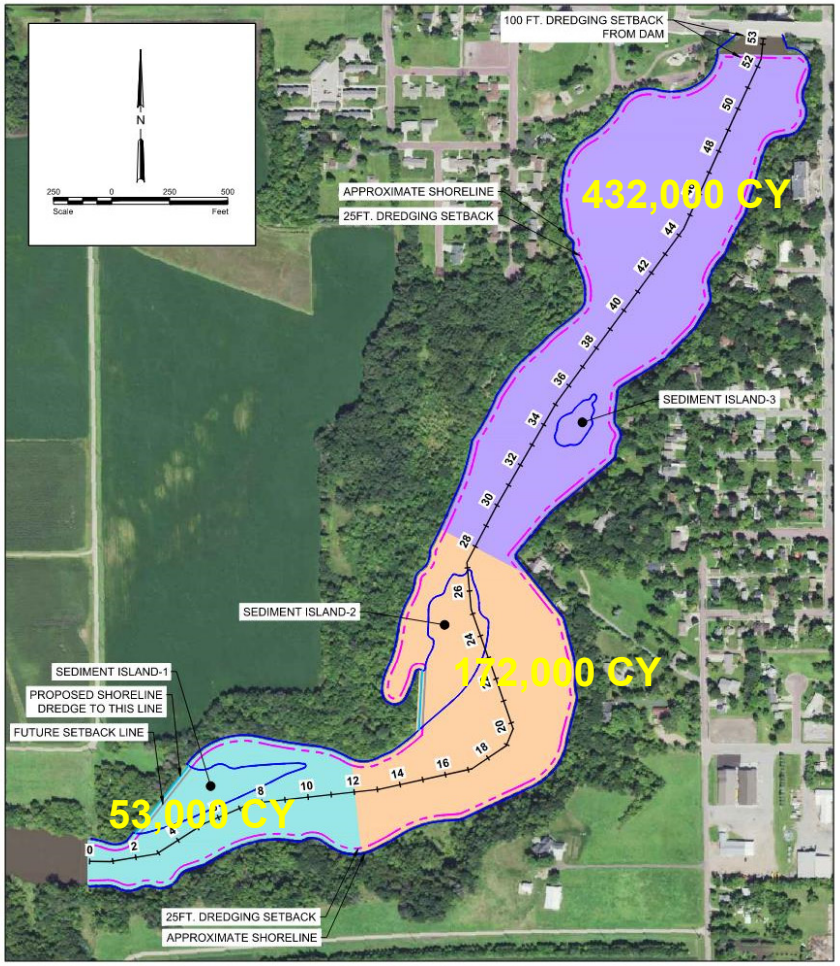




NOTE:

LEGEND

No.	Revision	Date	By

LAKE REDWOOD RECLAMATION PROJECT - DREDGING OPERATIONS

LAKE REDWOOD
REDWOOD FALLS, MINNESOTA

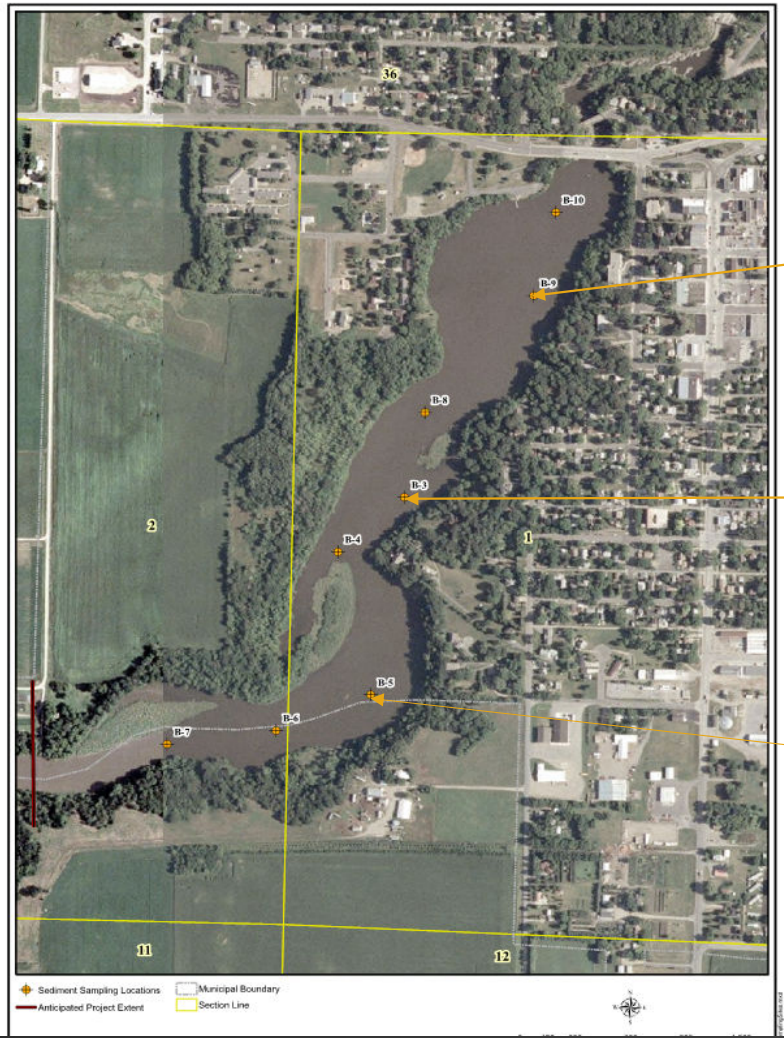
CROSS SECTION SAMPLE LINES / BID DREDGE AREAS

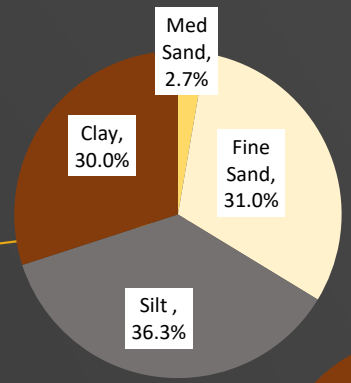
HoustonEngineering Inc.
Maple Grove
P: 763.493.4522
F: 763.493.5572

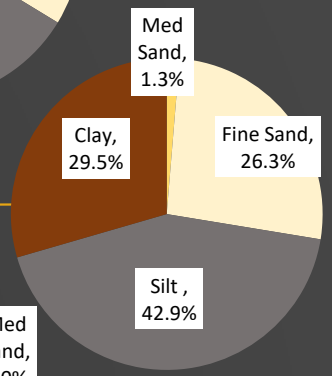
57_Lake_X-Sect.dwg:13 9257_Lake_X-Sect - XSEC-SAMP-01:10/23/2020 1:07 PM:(olson-holmly)

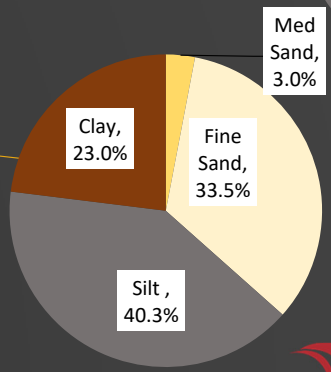
ADDITIONAL INFO

Soil Boring Investigation: January 2006









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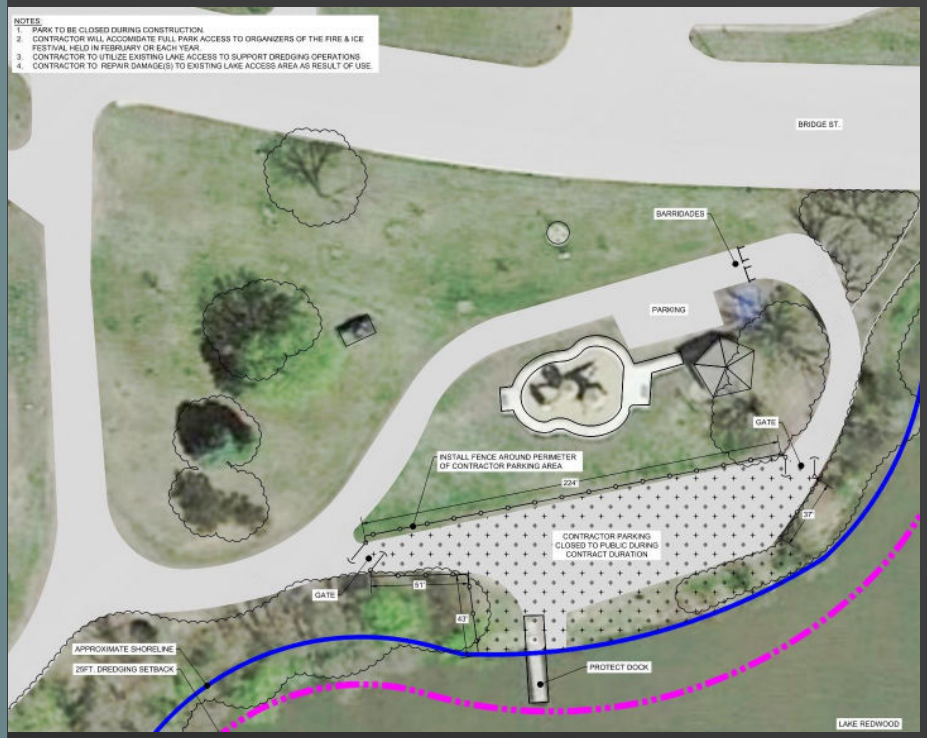
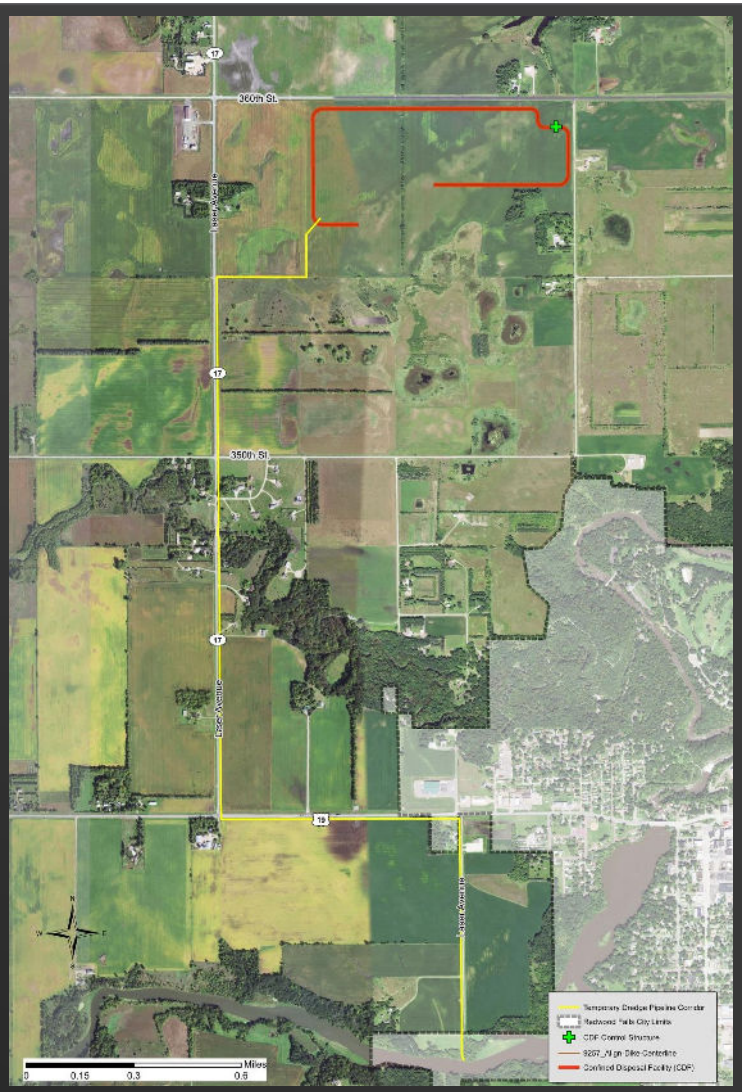
LAY DOWN AREAS – LAKE REDWOOD

Anticipated Locations

Uses at Locations

LAY DOWN AREAS – LAKE REDWOOD





PIPELINE ROUTE

Total Length = 3.25 Miles
Vertical Elevation Change 51 Feet

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Redwood-Cottonwood Rivers Control Area

TEMPORARY DREGDE DISPOSAL PIPELINE

- 12” – 14” dredge anticipated
- Maximum flowrate: 7,000 gpm or 15 CFS

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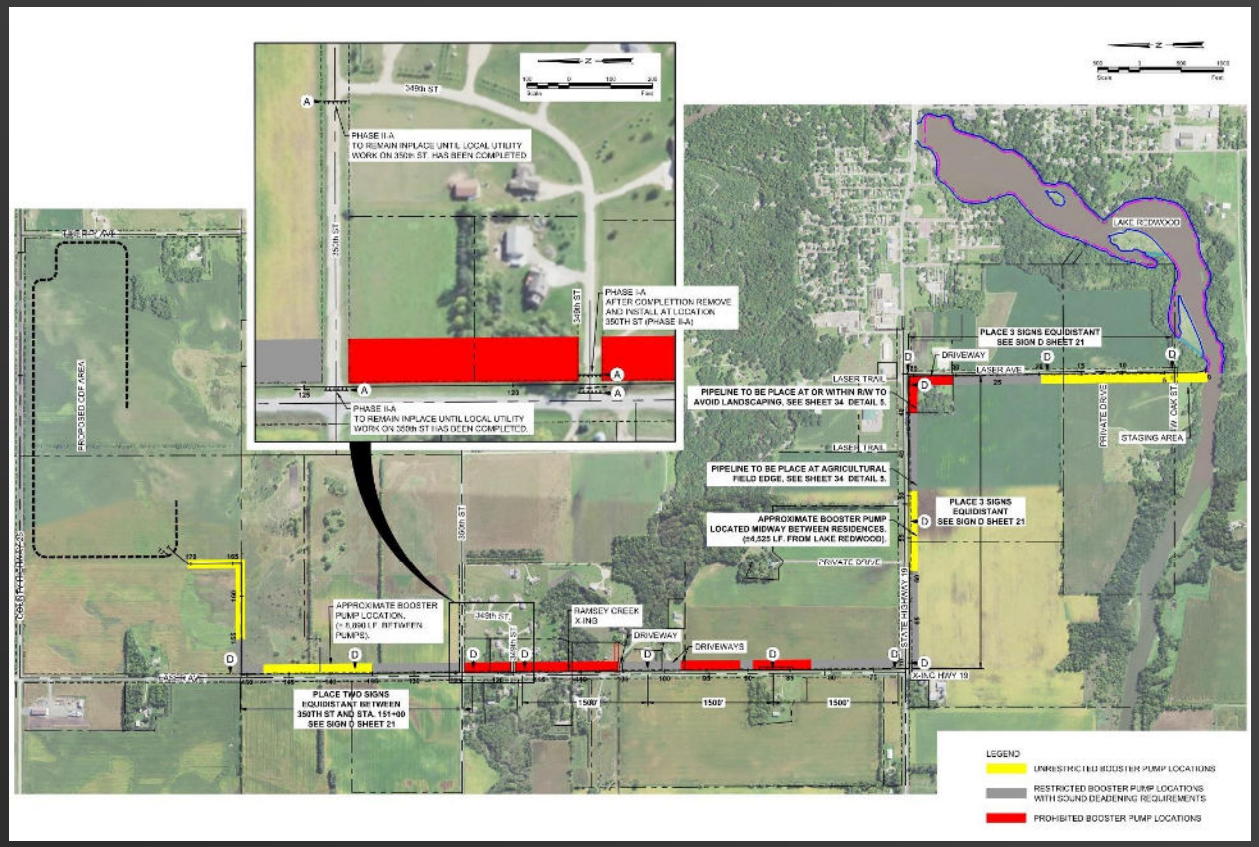
TEMPORARY DREGDE DISPOSAL PIPELINE



DREDGE DISPOSAL PIPELINE

Booster Pump Restrictions

City of Redwood Falls

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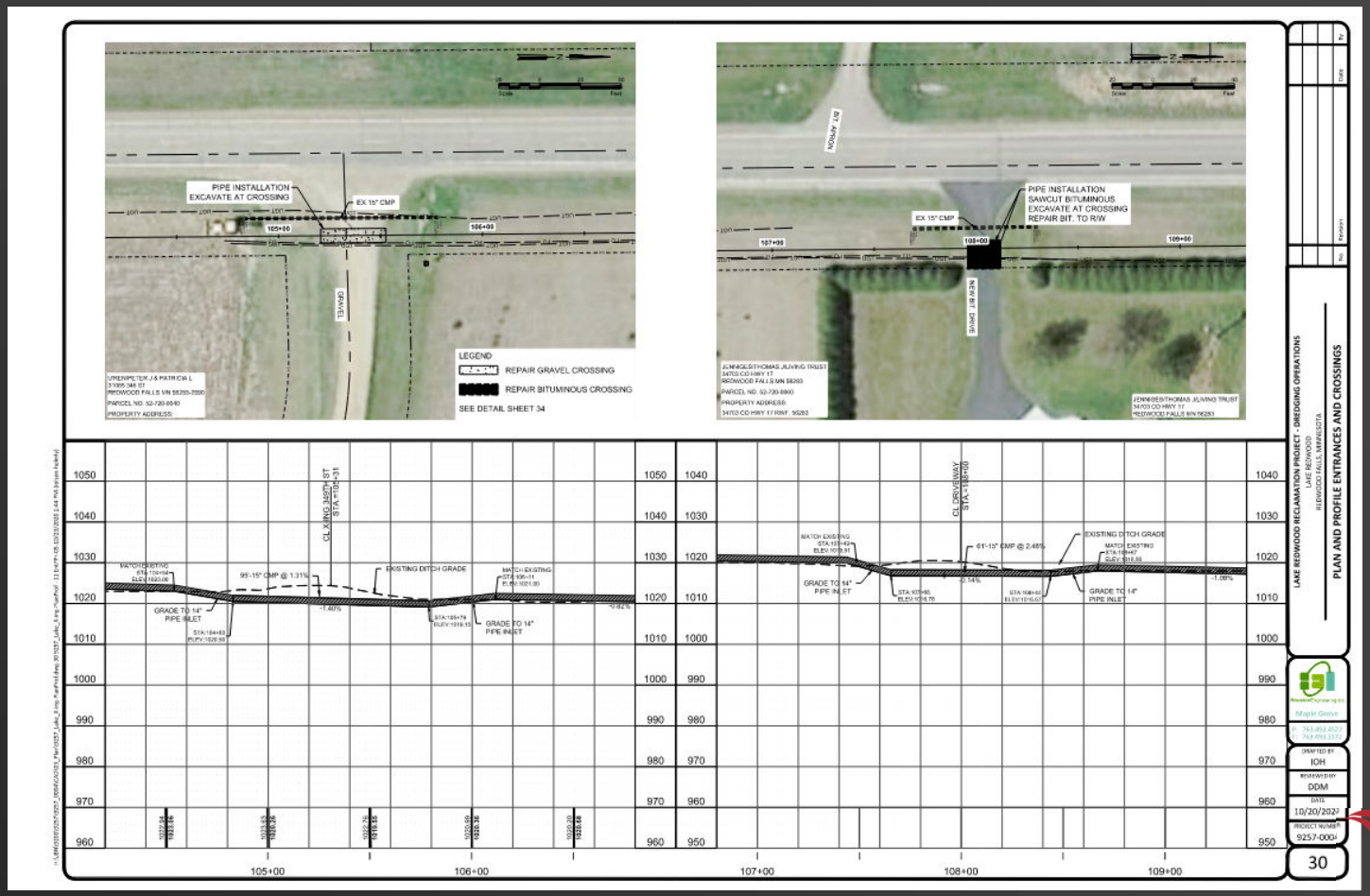
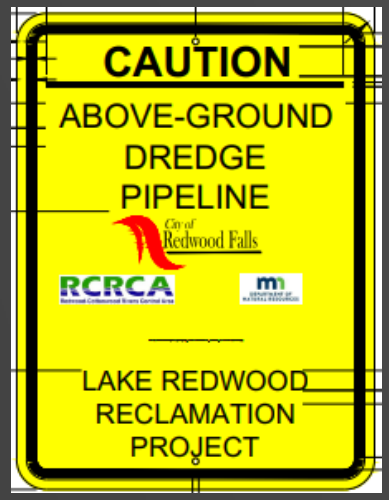
TEMPORARY DREDGE DISPOSAL PIPELINE





City of Redwood Falls

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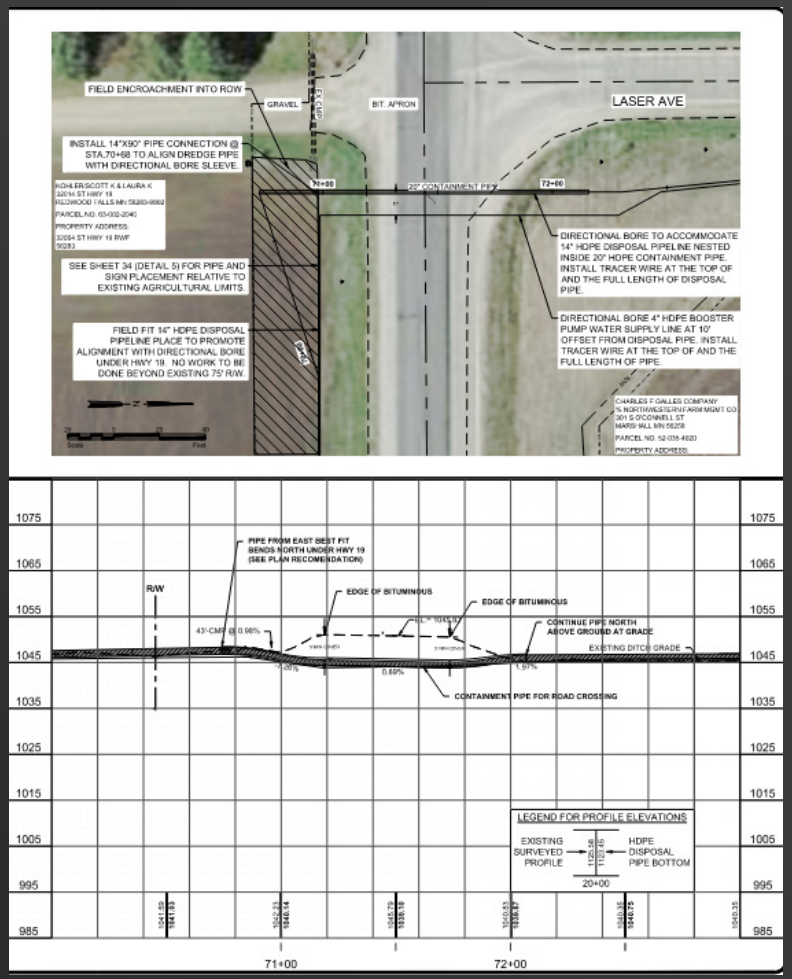
TEMPORARY DREDGE DISPOSAL PIPELINE



- Trenchless Installation
- Dual – Contained HDPE
- Secondary Water Supply Pipe Crossing

City of Redwood Falls

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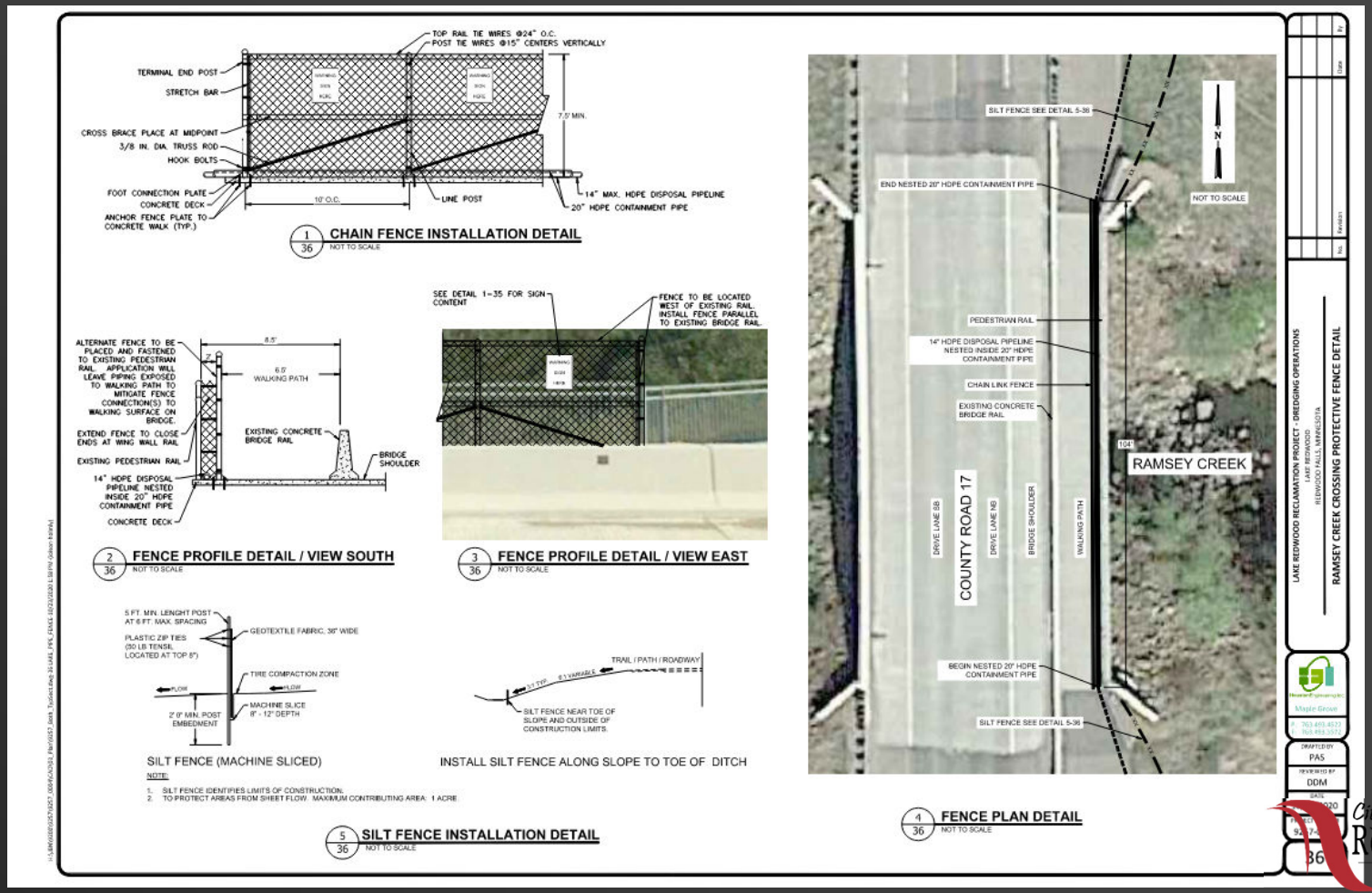
TEMPORARY DISPOSAL PIPELINE – RAMSEY CREEK



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Redwood-Cottonwood Rivers Control Area

WATER AVAILABILITY

- Ramsey Creek
- Municipal Water Supply

Per City of Redwood….

……"cost alone would be prohibitive. The City charges $5.80 per 100 cubic foot of water usage to the residents. 100 gpm yields $1,116.58 per day in charges. 250 gpm yields $2,791.25 per day in cost.

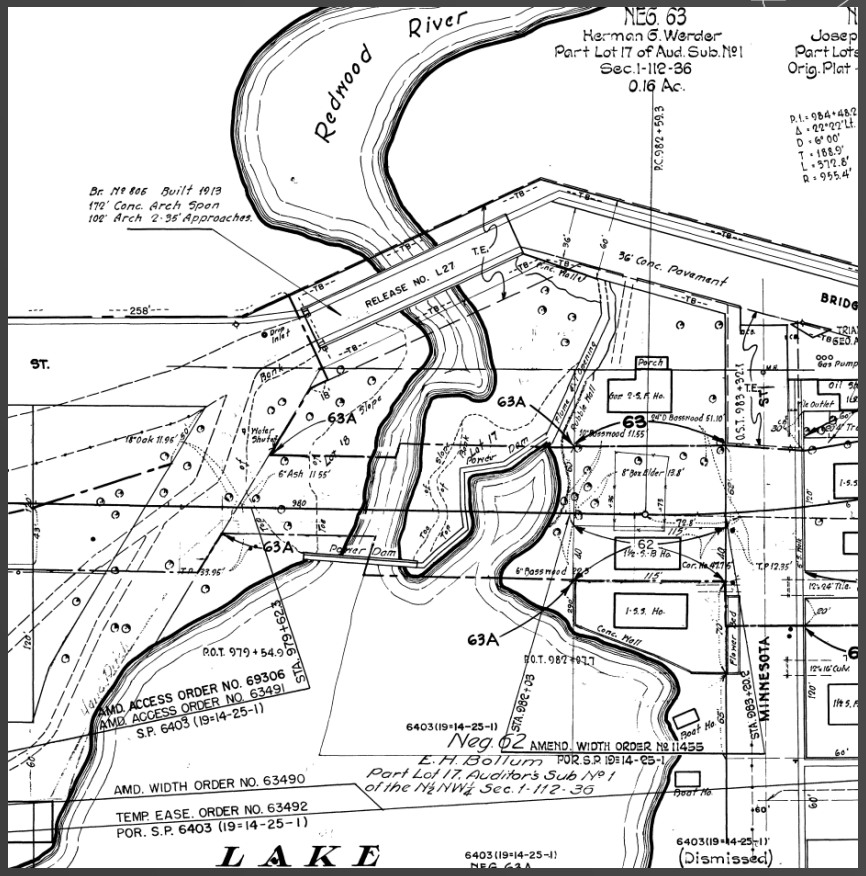
We cannot supply that volume of water. We have a 1.5 MGD facility and during the summer months we are pushing .8 to 1.2MGD for demand."

- Water Wells

Per HEI Hydrogeologist…..

A desktop survey suggests that there is no reasonable likelihood that a sufficient pumping rate (100-250 gpm) is attainable from known groundwater sources within 2,500 feet of the proposed transmission pipeline and attempts to procure water in this area are likely to adversely affect water levels and yields at existing well locations. **As such, an alternate water source(s) is required.**

- Lake Redwood & CDF



City of Redwood Falls

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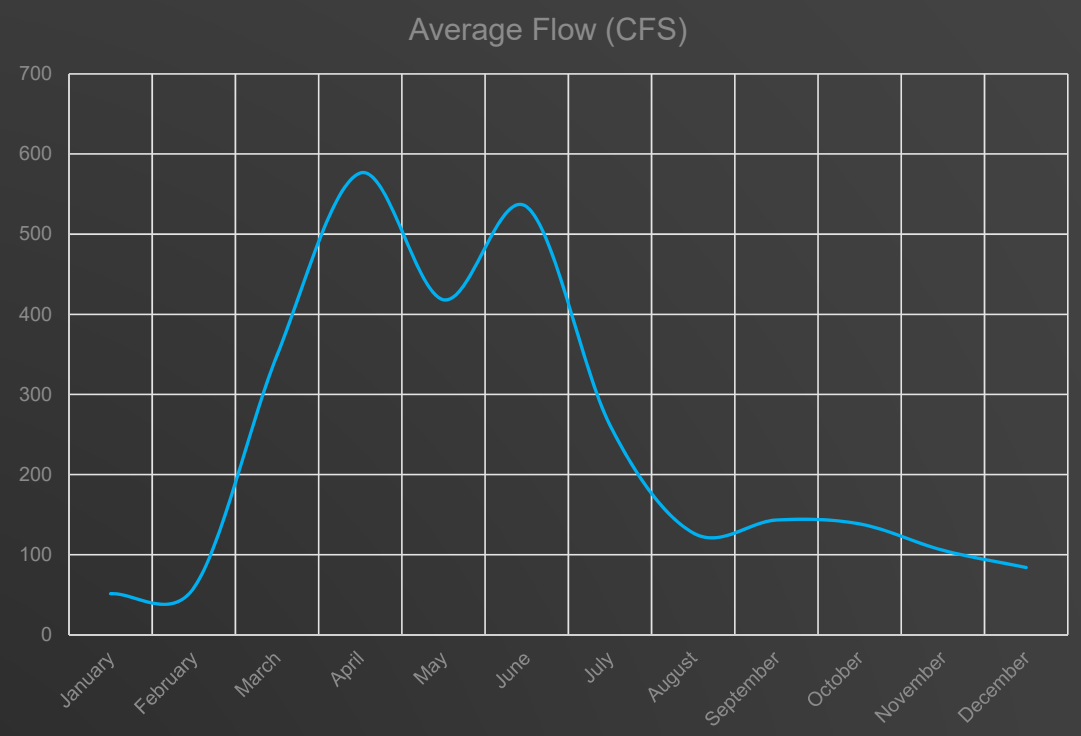
LAKE REDWOOD FLOWS



Calculation Period 1987-2017

Low Flow Considerations

City of Redwood Falls

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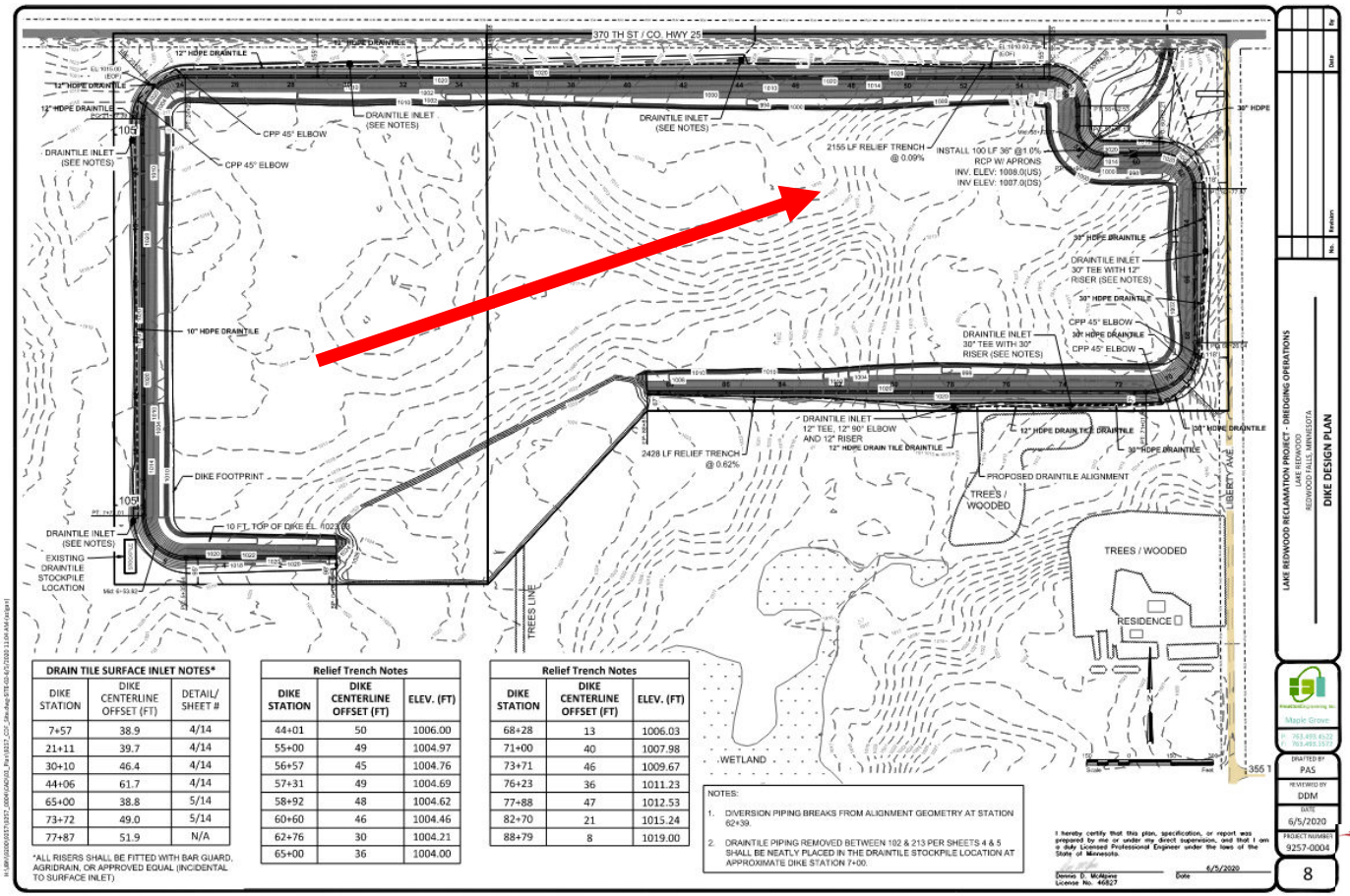
CONFINED DISPOSAL FACILITY (CDF)



DRAIN TILE SURFACE INLET NOTES*		
DIKE STATION	DIKE CENTERLINE OFFSET (FT)	DETAIL/ SHEET #
7+57	38.9	4/14
21+11	39.7	4/14
30+10	46.4	4/14
44+06	61.7	4/14
65+00	38.8	5/14
73+72	49.0	5/14
77+87	51.9	N/A

*ALL RISERS SHALL BE FITTED WITH BAR GUARD, AGRIDRAIN, OR APPROVED EQUAL (INCIDENTAL TO SURFACE INLET)

Relief Trench Notes		
DIKE STATION	DIKE CENTERLINE OFFSET (FT)	ELEV. (FT)
44+01	50	1006.00
55+00	49	1004.97
56+57	45	1004.76
57+31	49	1004.69
58+92	48	1004.62
60+60	46	1004.46
62+76	30	1004.21
65+00	36	1004.00

Relief Trench Notes		
DIKE STATION	DIKE CENTERLINE OFFSET (FT)	ELEV. (FT)
68+28	13	1006.03
71+00	40	1007.98
73+71	46	1009.67
76+23	36	1011.23
77+88	47	1012.53
82+70	21	1015.24
88+79	8	1019.00

NOTES:

1. DIVERSION PIPING BREAKS FROM ALIGNMENT GEOMETRY AT STATION 62+39.
2. DRAINTILE PIPING REMOVED BETWEEN 102 & 213 PER SHEETS 4 & 5 SHALL BE NEATLY PLACED IN THE DRAINTILE STOCKPILE LOCATION AT APPROXIMATE DIKE STATION 7+00.

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision, and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Dennis D. McAlpine License No. 46827 — Date 6/5/2020

DISPOSAL SITE STAGE VS STORAGE DATA TOP OF DAM = ELEV. 1023.33					
ELEVATION (FEET)	AREA (SQ. FT.)	AVG. AREA SQ. FT.)	DEPTH (FEET)	VOLUME CU. YDS.)	CUM. VOL. (CU. YDS.)
999	20,560		3		0
		49,347		5,483	
1002	78,133		3		5,483
		127,008		14,112	
1005	175,883		3		19,595
		252,128		28,014	
1008	328,372		3		47,609
		559,081		62,120	
1011	789,790		3		109,729
		1,166,010		129,557	
1014	1,542,230		3		239,286
		2,399,483		266,609	
1017	3,256,735		3		505,895
		3,771,738		419,082	
1020	4,286,740		3		924,977
		4,381,794		486,866	
1021	4,476,848		1		1,411,843
		4,568,553		169,206	
1023	4,660,257				1,581,049

City of Redwood Falls

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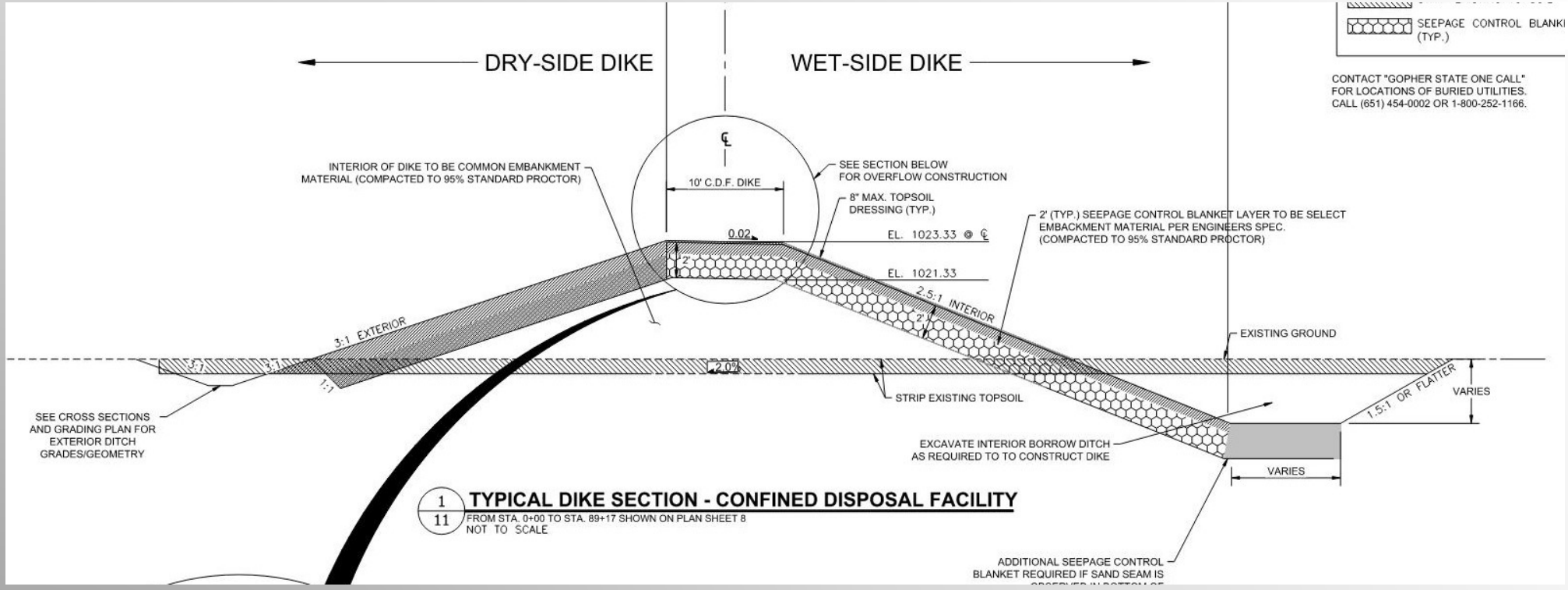
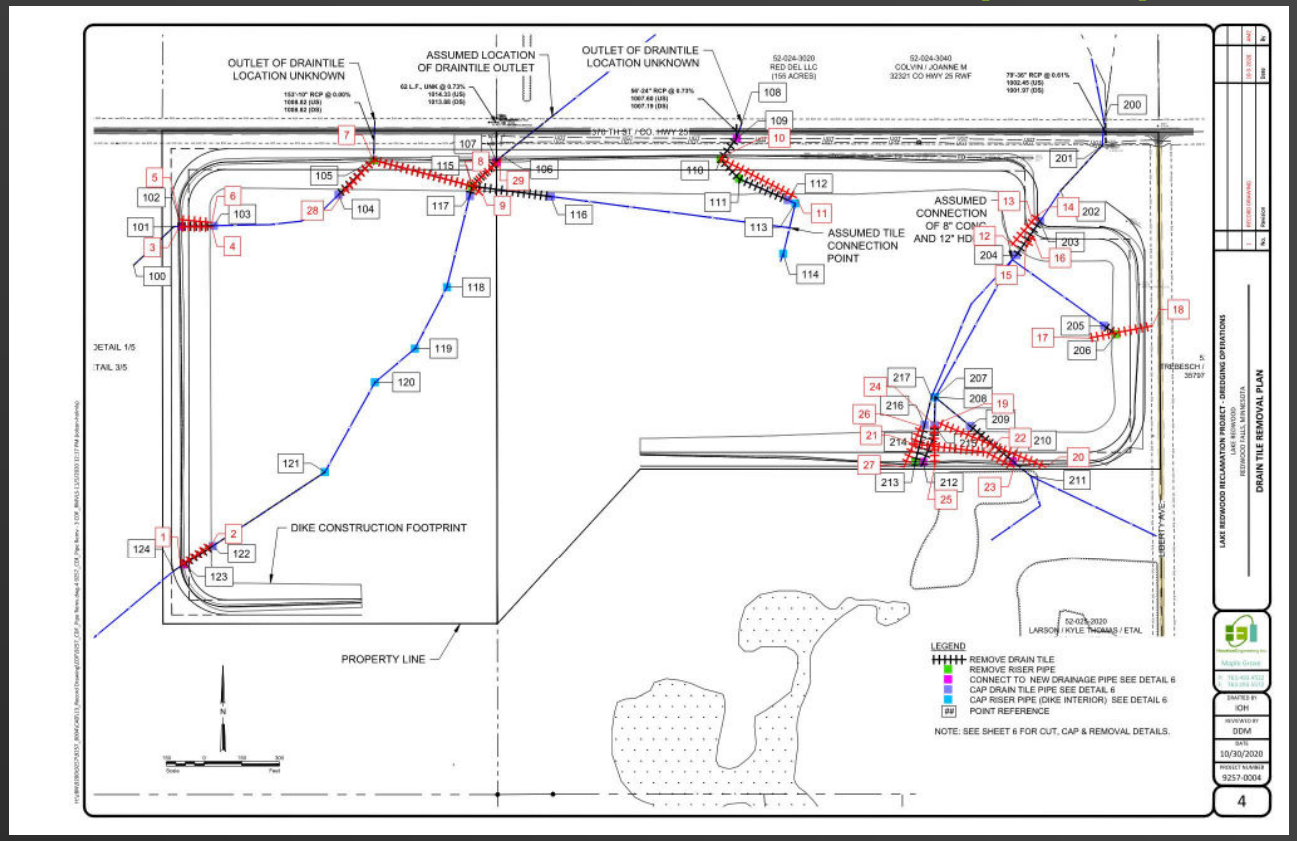
Redwood-Cottonwood Rivers Control Area



CONFINED DISPOSAL FACILITY (CDF)

- Area:
  - 140 Acre Area CDF
- Volume
  - 1,412,000 CY at Overflow Elevation

CONFINED DISPOSAL FACILITY (CDF)



City of Redwood Falls

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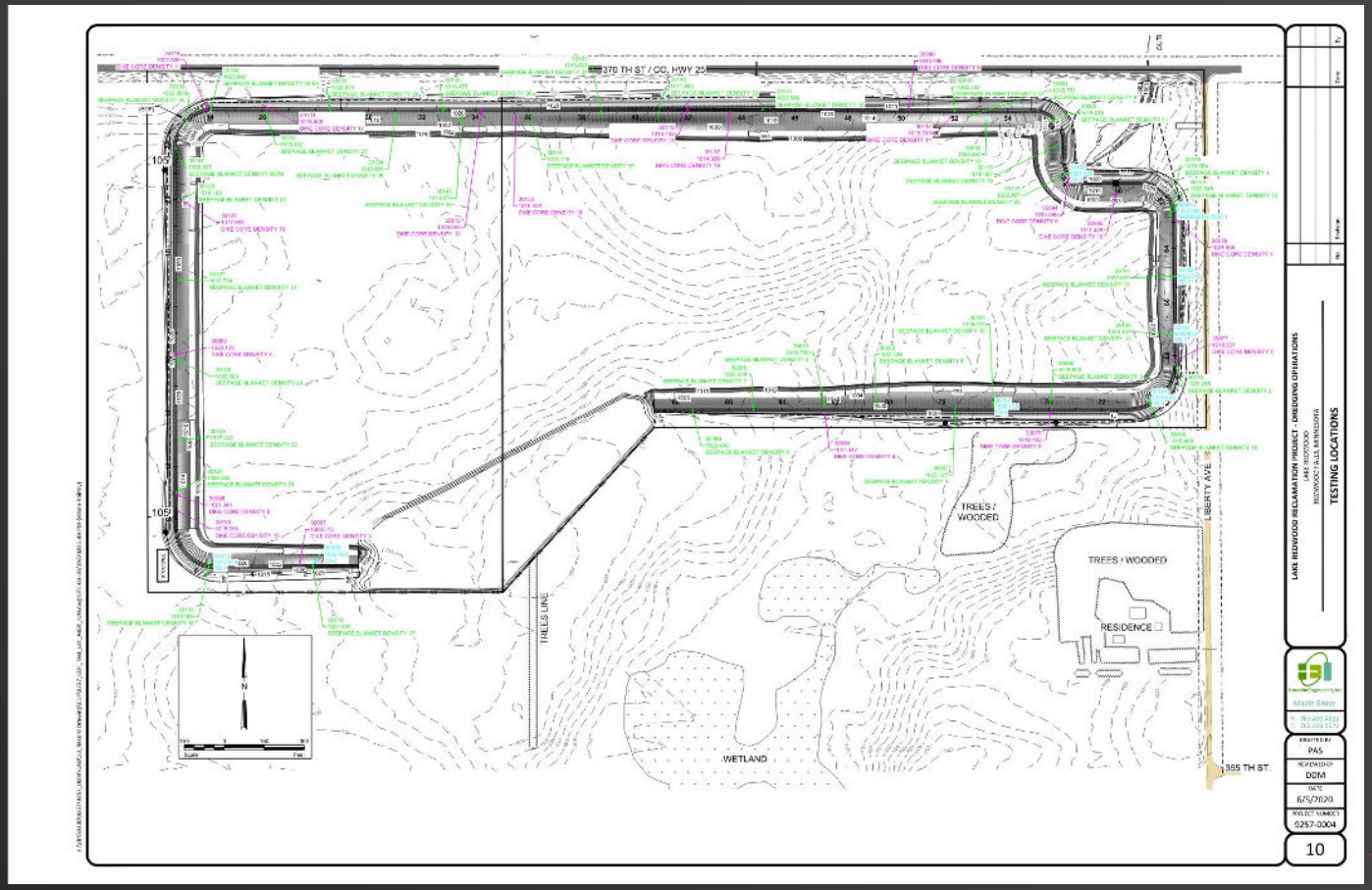
CONFINED DISPOSAL FACILITY (CDF)



CQA TESTING SUMMARY

Dike Core

Percentage Fines (ASTM D1140-17)
1 test per 10k CY
(14 required, 19 observed)

Nuclear Density & Moisture (ASTM D6938)
1 test per 10k CY
(14 required, 19 observed)

Standard Proctor (ASTM D698)
1 test per 50k CY (3 required, 3 observed)

Seepage Control Blanket Layer

Percentage Fines (ASTM D1140-17)
1 test per 5k CY
(35 required, 38 observed)

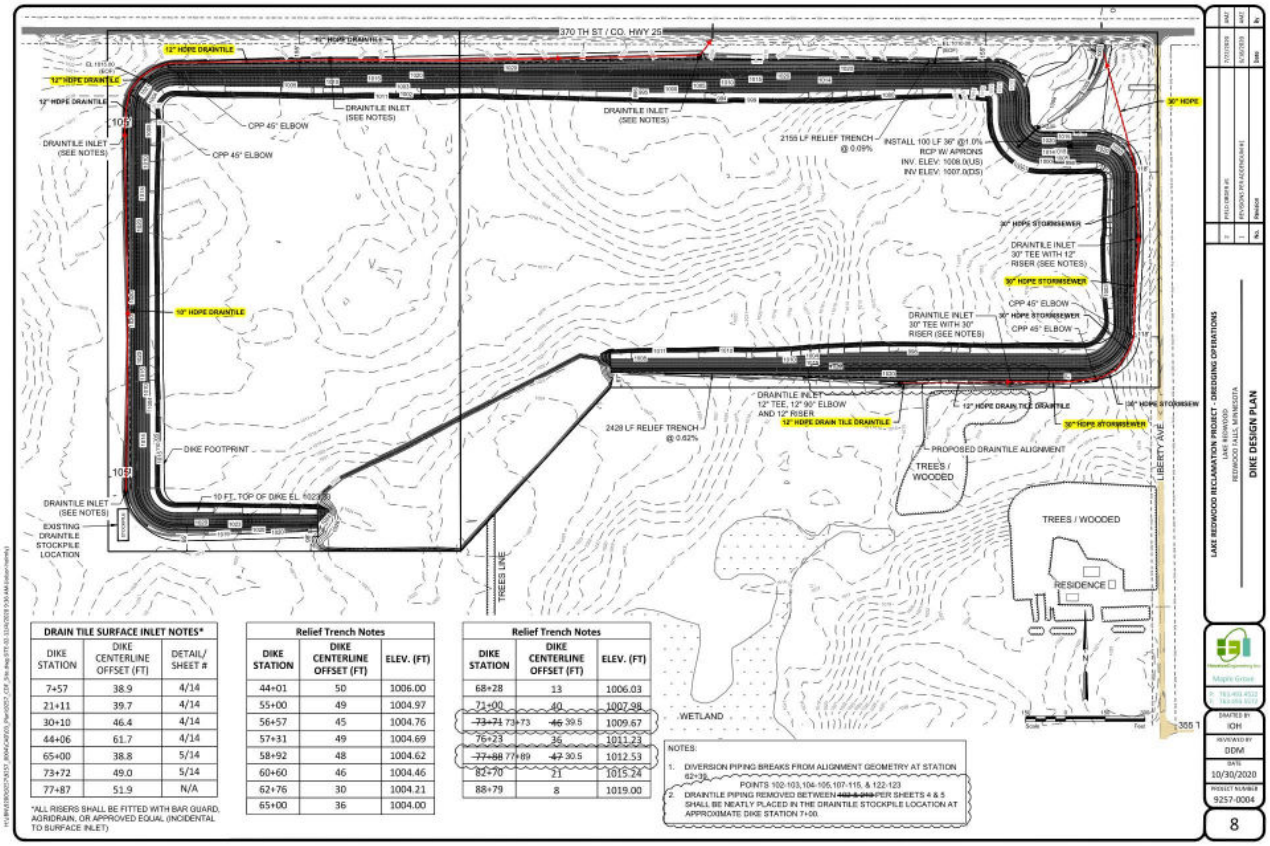
Nuclear Density & Moisture (ASTM D6938)
1 test per 5k CY
(35 required, 38 observed)

Standard Proctor (ASTM D698)
1 test per 50k CY (3 required, 4 observed)

City of Redwood Falls

RCRCA
Redwood-Cottonwood Rivers Control Area

CONFINED DISPOSAL FACILITY (CDF)



DRAIN TILE SURFACE INLET NOTES*		
DIKE STATION	DIKE CENTERLINE OFFSET (FT)	DETAIL/ SHEET #
7+57	38.9	4/14
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Relief Trench Notes		
DIKE STATION	DIKE CENTERLINE OFFSET (FT)	ELEV. (FT)
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55+00	49	1004.97
56+57	45	1004.76
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60+60	46	1004.46
62+76	30	1004.21
65+00	36	1004.00

Relief Trench Notes		
DIKE STATION	DIKE CENTERLINE OFFSET (FT)	ELEV. (FT)
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~~73+71~~ 73+73	~~46~~ 39.5	1009.67
76+23	36	1011.23
~~77+88~~ 77+89	~~47~~ 30.5	1012.53
82+70	21	1015.24
88+79	8	1019.00

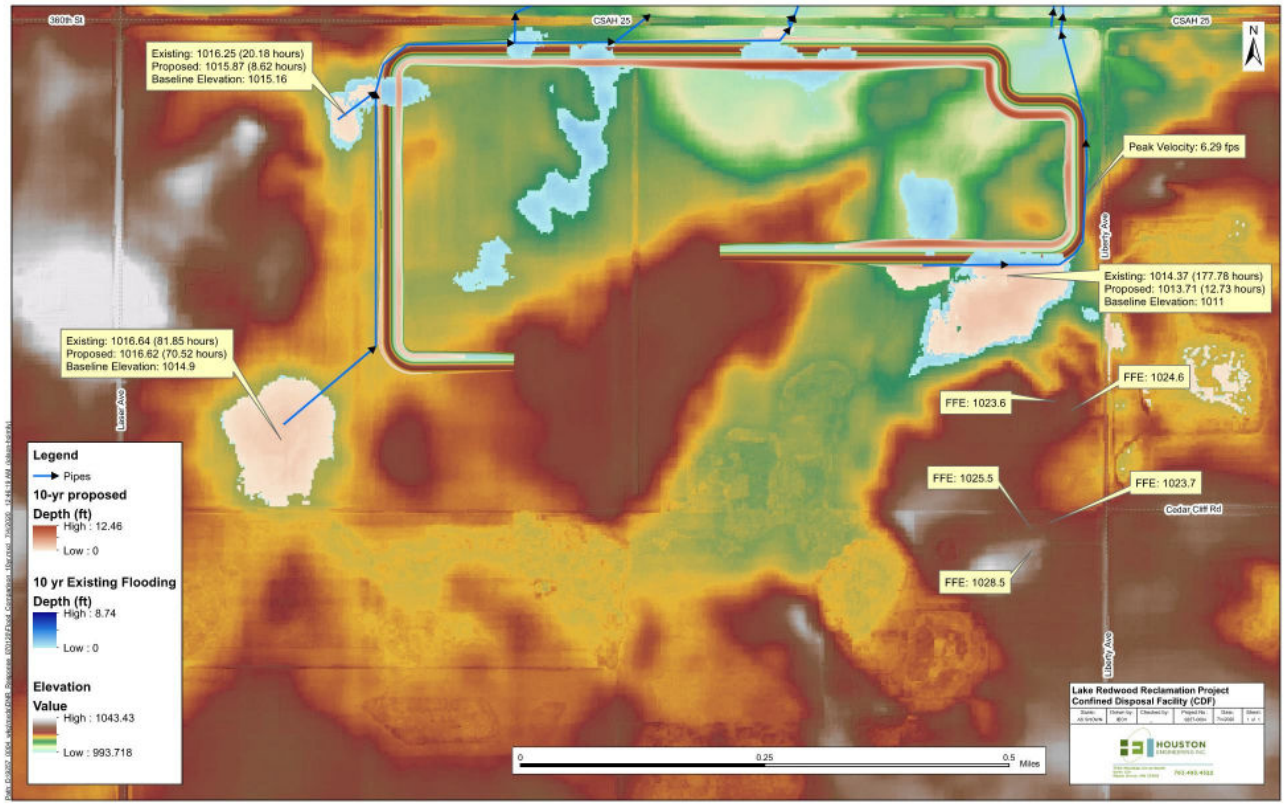
NOTES:

1. DIVERSION PIPING BREAKS FROM ALIGNMENT GEOMETRY AT STATION 62+36.
2. DRAINTILE PIPING REMOVED BETWEEN ~~[illegible]~~ POINTS 102-103,104-105,107-115, & 122-123 PER SHEETS 4 & 5 SHALL BE NEATLY PLACED IN THE DRAINTILE STOCKPILE LOCATION AT APPROXIMATE DIKE STATION 7+00.

City of Redwood Falls

RCRCA
Redwood-Cottonwood Rivers Control Area

CONFINED DISPOSAL FACILITY (CDF)

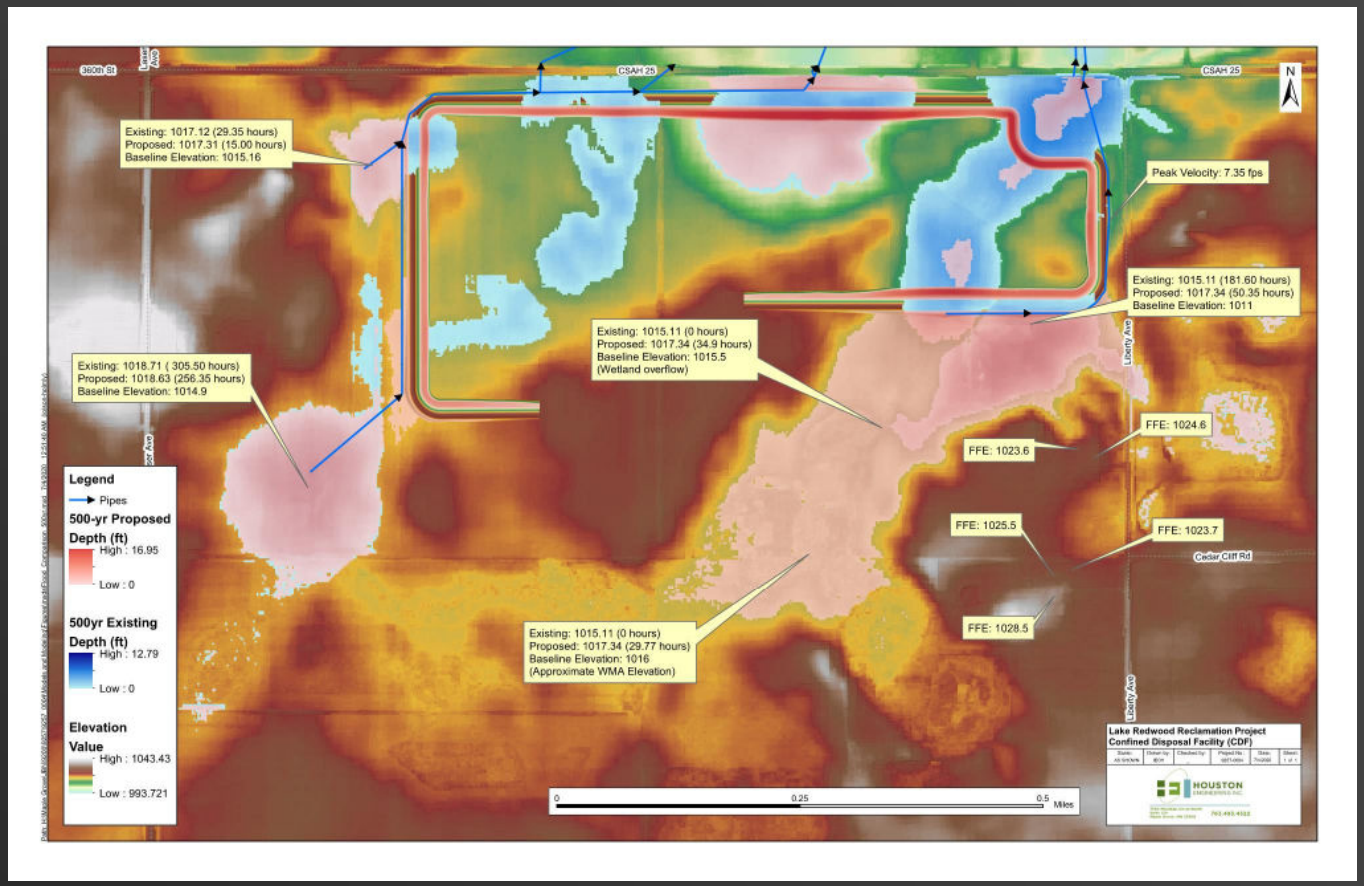


Designed to accommodate 10-year 24-hour storm event

City of Redwood Falls

RCRCA
Redwood-Cottonwood Rivers Control Area

CONFINED DISPOSAL FACILITY (CDF)



City of Redwood Falls

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CDF – COMPLETED 2020

AGENCY PERMITTING AND COORDINATION

Figure 2: CDF Sheet Pile Outlet Structure – Plan

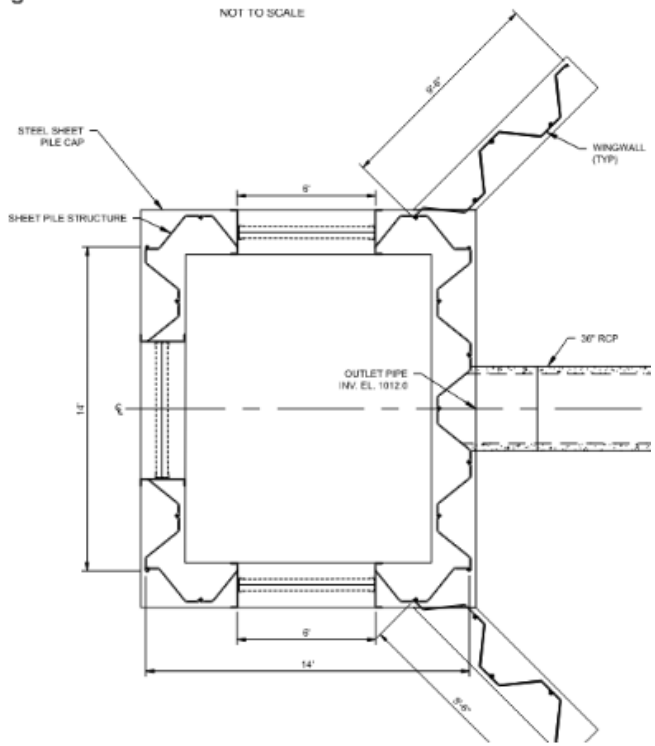
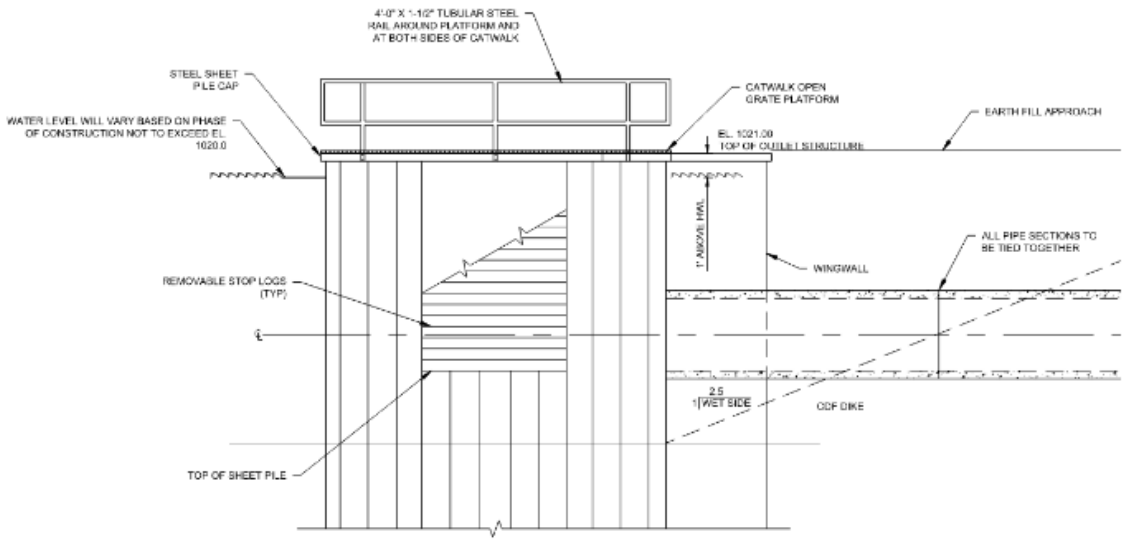


Figure 3: CDF Sheet Pile Outlet Structure – Elevation



City of Redwood Falls

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CDF – OUTLET CONSIDERATIONS

Outlet Control – Not constructed in Phase I
Open to Contractor preference

DISCHARGE FROM CDF

- To Minnesota River
  - Discharge Requirement
  - Water Clarity Requirement

City of Redwood Falls

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PERMITTING AND REGULATORY CONSIDERATIONS

- Minnesota Wetland Conservation Act Notice of Decision (Redwood County SWCD)
- Minnesota Department of Natural Resources Dam Safety Permit No. 2008-0576
- Minnesota Department of Natural Resources Water Appropriations Permit
- Minnesota Department of Natural Resources Public Waters Work Permit
- United States Army Corps of Engineers Section 404 Clean Water Act, and Minnesota Pollution Control
- Agency Section 401 Clean Water Act
- Redwood County Utility Permit on County Highway Right of Way – for temporary dredge disposal pipeline placement adjacent to County Highway 17
- Minnesota Department of Transportation – Utility Accommodation on Trunk Highway Right of Way – for temporary dredge disposal pipeline placement adjacent to and crossing Highway 19
- Redwood County Conditional Land Use Permit
- Environmental Assessment Worksheet, Findings of Fact, Conclusions of Law, and Decision of Redwood-Cottonwood Rivers Control Area (RCRCA), as RGU, for Negative Declaration on need for EIS
- Redwood Falls Township Authorization for placement of pipeline in Right of Way
- Private Access Agreements and Maps for dredge pipeline alignment and Contractor staging.

City of Redwood Falls

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NEXT STEPS

PHASE 2: SOLICITATION WINTER 2020