

PLAN SYMBOLS

	EXISTING	CENTERLINE
	PROPOSED	
	EXISTING	RIGHT-OF-WAY LINE
	PROPOSED	
	EXISTING	EASEMENT LINE
	PROPOSED	
	LOT SECTION	PROPERTY LINE
	CONSTRUCTION LIMITS	CLEAR ZONE
	EXISTING	EXISTING CONTOURS
	PROPOSED	PROPOSED CONTOURS
	EXISTING	DITCH LINE
	PROPOSED	
	EXISTING COUNTY	
	BIO / EROSION CONTROL LOG	
	SILT FENCE	
	WETLAND BOUNDARY	
	EXISTING TREES (TO REMAIN)	
	BENCH MARK / IRON MONUMENT	
	LIGHT POLE / BOLLARD	
	SOIL BORING	
	BUILDING	
	PROPOSED	RIPRAP
	MB	MAILBOX
	EXISTING	SIGN
	PROPOSED	

UTILITY SYMBOLS

	GAS	GAS LINE
	PETRO	PETROLEUM LINE
	OHE / UGE	ELECTRIC
	T	UNDERGROUND TELEPHONE LINE
	CATV	UNDERGROUND CABLE TV LINE
	FO	UNDERGROUND FIBER OPTIC LINE
	MANHOLE / JUNC. BOX	TELEPHONE STRUCTURES
	X	ELECTRIC JUNC. BOX
	TV	CABLE TV JUNC. BOX
	F	FIBER OPTIC STRUCTURES
	EXISTING	POWER POLE AND GUY WIRE
	EXISTING / PROPOSED	STORM DRAIN LINE
	EXISTING / PROPOSED	FLARED END SECTION
	EXISTING / PROPOSED	CATCH BASIN
	EXISTING / PROPOSED	MANHOLE
	W	WELL
		BALE BARRIER

HATCH LEGEND

	BITUMINOUS	REMOVALS
	CONCRETE	
	EROSION CONTROL BLANKET	
	GRAVEL	
	HYDROMULCH	
	CONCRETE	
	BITUMINOUS	

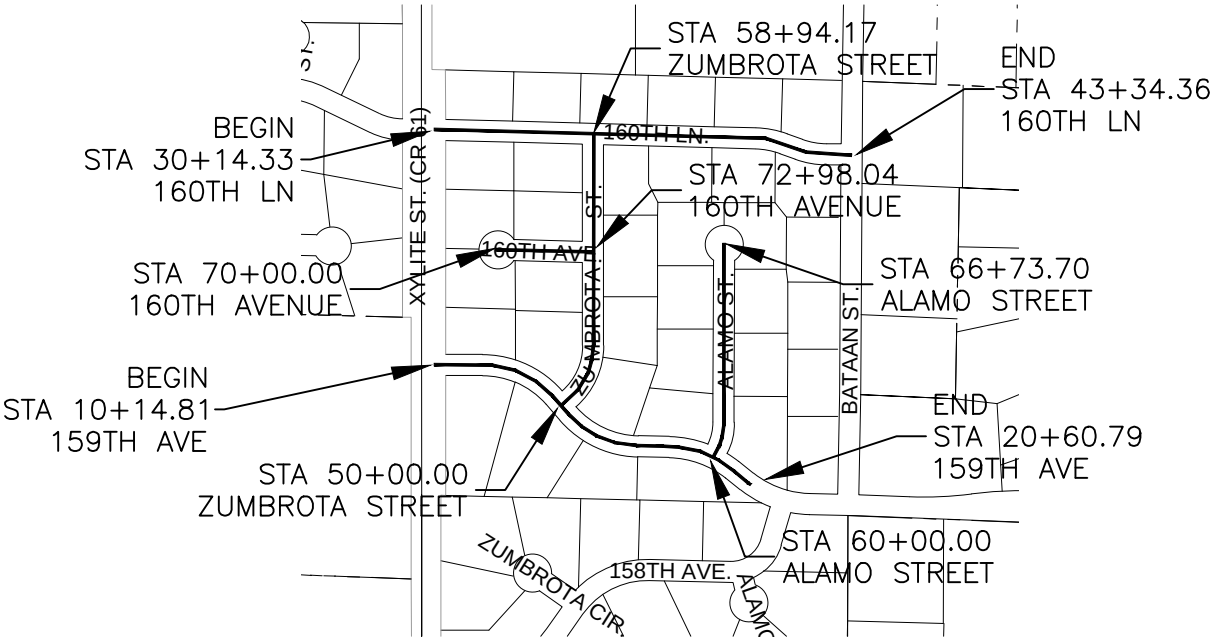
MINNESOTA DEPARTMENT OF TRANSPORTATION
City of Ham Lake, Minnesota

CONSTRUCTION PLAN FOR GRADING, AGGREGATE BASE, PLANT MIXED BITUMINOUS SURFACE,
STORM DRAINS, AND CONCRETE CURB

LOCATED ON 159TH AVENUE FROM XYLITE STREET TO BATAAN STREET, ZUMBROTA STREET FROM 159TH AVENUE TO 160TH LANE, 160TH AVENUE FROM ZUMBROTA STREET TO CDS, ALAMO STREET FROM 159TH AVENUE TO CDS, AND 160TH LANE FROM XYLITE STREET TO BATAAN STREET.

HAM LAKE PROJECT NO. 1907

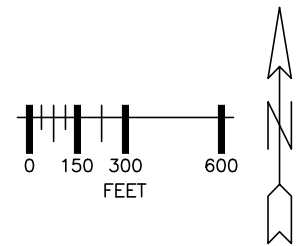
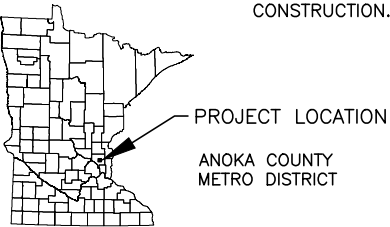
GROSS LENGTH	4,231.92 FEET	0.80 MILES
BRIDGES LENGTH	0 FEET	0 MILES
EXCEPTIONS LENGTH	0 FEET	0 MILES
NET LENGTH	4,231.92 FEET	0.80 MILES



ALL TRAFFIC CONTROL DEVICES AND SIGNING SHALL CONFORM TO THE MN MUTCD, INCLUDING FIELD MANUAL FOR TEMPORARY TRAFFIC CONTROL ZONE LAYOUTS.

THE SUBSURFACE UTILITY INFORMATION IN THIS PLAN IS UTILITY QUALITY LEVEL D. THIS UTILITY QUALITY LEVEL WAS DETERMINED ACCORDING TO THE GUIDELINES OF CI/ASCE 38-02, ENTITLED "STANDARD GUIDELINES FOR THIS COLLECTION AND DEPICTION OF EXISTING SUBSURFACE UTILITY DATA"

THE UTILITIES SHOWN ARE BASED UPON THE BEST INFORMATION AVAILABLE AND MAY NOT REFLECT THE ACTUAL EFFECTS ON THE UTILITIES BY CONSTRUCTION. ACTUAL DETERMINATIONS WILL BE MADE IN THE FIELD DURING CONSTRUCTION.



PLAN REVISIONS		
DATE	SHEET NO.	APPROVED BY

GOVERNING SPECIFICATIONS

THE 2018 EDITION OF THE MINNESOTA DEPARTMENT OF TRANSPORTATION "STANDARD SPECIFICATIONS FOR CONSTRUCTION" SHALL GOVERN.

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ALL APPLICABLE FEDERAL, STATE AND LOCAL LAWS AND ORDINANCES WILL BE COMPLIED WITH IN THE CONSTRUCTION OF THIS PROJECT.

THIS PLAN CONTAINS 44 SHEETS

I HEREBY CERTIFY THAT THIS PLAN 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.

SIGNED,
David A. Krugler

DATE: REG. NO. 48768

APPROVED, DATE:
CITY ENGINEER - HAM LAKE

I HEREBY CERTIFY THAT THE FINAL FIELD REVISIONS, IF ANY, OF THIS PLAN WERE MADE BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

SIGNED,
DATE: REG. NO.

RFC ENGINEERING, INC.
Consulting Engineers

13635 Johnson Street NE Telephone 763-862-8000
Ham Lake, MN 55304 Fax 763-862-8042

JOB NO. 1907 SHEET NO. 1 OF 44 SHEETS
FILE: 35-1-130

STATEMENT OF ESTIMATED QUANTITIES						
TAB	SHEET	NOTES	ITEM NO.	ITEM	UNIT	ENTIRE PROJECT
						ESTIMATED QUANTITIES
			2021.501	8% MOBILIZATION COST	LUMP SUM	1
AA	3	6	2104.502	REMOVE SIGN	EACH	12
AD	3	10	2104.502	REMOVE MAIL BOX SUPPORT	EACH	34
BA	4		2104.503	SAWING CONCRETE PAVEMENT (FULL DEPTH) – DRIVEWAYS	LIN FT	145
BA	4		2104.503	SAWING BITUMINOUS PAVEMENT (FULL DEPTH) – DRIVEWAYS	LIN FT	405
AB	3		2104.503	REMOVE METAL CULVERT	LIN FT	159
AG	3		2104.503	REMOVE CHAIN LINK FENCE	LIN FT	132
BA	4		2104.504	REMOVE CONCRETE DRIVEWAY PAVEMENT	SQ YD	411
BA	4		2104.504	REMOVE BITUMINOUS DRIVEWAY PAVEMENT	SQ YD	735
AC	3		2104.504	REMOVE BITUMINOUS PAVEMENT – ROADWAYS	SQ YD	11896
AE	3		2104.513	SAWING BITUMINOUS PAVEMENT (FULL DEPTH)	LIN FT	231
AF	3		2104.618	SALVAGE AND REINSTALL BRICK PAVERS	SQ FT	388
AH	3	4	2105.501	COMMON EXCAVATION	CU YD	3316
AH	3		2105.521	GRANULAR BORROW (CV)	CU YD	823
BB	4		2211.501	AGGREGATE BASE, CLASS 5 AND/OR 7	TON	2850
BA	4		2211.604	AGGREGATE BASE (CV) CLASS 5 4.0" THICK – BIT DRIVEWAY	SQ YD	757
BA	4	8	2360.504	TYPE SP 9.5 WEARING COURSE MIXTURE (3;C) 2.0" THICK	SQ YD	757
BC	4	9	2360.509	TYPE SP 9.5 WEARING COURSE MIXTURE (2;C)	TON	746
BD	4		2360.509	TYPE SP 12.5 WEARING COURSE MIXTURE (2;C)	TON	1493
	23–25		2501.502	36" GS PIPE APRON	EACH	2
	23–25		2501.502	12" RC PIPE APRON	EACH	4
	23–25		2501.502	15" RC PIPE APRON	EACH	1
	23–25		2501.602	TRASH GUARD FOR 15" PIPE APRON	EACH	1
	23–25		2501.602	TRASH GUARD FOR 36" PIPE APRON	EACH	1
	23–25	1	2503.511	15" CP PIPE SEWER (SMOOTH)	LIN FT	27
	23–25	1	2503.511	36" CP PIPE SEWER (SMOOTH)	LIN FT	64
	23–25	1	2503.541	12" RC PIPE SEWER DESIGN 3006 CLASS IV	LIN FT	153
	23–25	1	2503.541	15" RC PIPE SEWER DESIGN 3006 CLASS IV	LIN FT	656
	23–25	1	2503.541	18" RC PIPE SEWER DESIGN 3006 CLASS IV	LIN FT	20
	23–25	1	2503.541	21" RC PIPE SEWER DESIGN 3006 CLASS IV	LIN FT	841
	23–25	1	2503.541	24" RC PIPE SEWER DESIGN 3006 CLASS IV	LIN FT	28
	23–25	1	2503.541	30" RC PIPE SEWER DESIGN 3006 CLASS IV	LIN FT	555
	23–25	2	2506.502	CONSTRUCT DRAINAGE STRUCTURE DESIGN SPECIAL	EACH	4
	23–25	2	2506.502	CONSTRUCT DRAINAGE STRUCTURE DESIGN SPECIAL 1	EACH	4
	23–25	2	2506.502	CONSTRUCT DRAINAGE STRUCTURE DESIGN SPECIAL 2	EACH	9
	23–25	2	2506.502	CONSTRUCT DRAINAGE STRUCTURE DESIGN SPECIAL 3	EACH	4
	23–25	2	2506.502	CONSTRUCT DRAINAGE STRUCTURE DESIGN SPECIAL 4	EACH	3
	23–25	2	2506.502	CONSTRUCT DRAINAGE STRUCTURE DESIGN SPECIAL 5	EACH	1
	23–25	2	2506.502	CONSTRUCT DRAINAGE STRUCTURE DESIGN SPECIAL 6	EACH	2
	23–25	2	2506.502	RAIN GUARDIAN	EACH	3
BN	4		2511.504	GEOTEXTILE FILTER TYPE 4	SQ YD	93
BL	4		2511.507	RANDOM RIPRAP CLASS III	CU YD	25
BE	4		2531.501	CONCRETE CURB & GUTTER DESIGN D312 (MODIFIED)	LIN FT	8200
BA	4	8	2531.507	6" CONCRETE DRIVEWAY PAVEMENT	SQ YD	384
BF	4	10	2540.602	MAIL BOX SUPPORT – SWING TYPE	EACH	34
AF	3		2540.618	INSTALL BRICK PAVERS	SQ FT	327
			2563.601	TRAFFIC CONTROL	LUMP SUM	1
BH	4	6	2564.518	SIGN PANELS TYPE C	SQ FT	69
		7	2573.501	STABILIZED CONSTRUCTION EXIT	LUMP SUM	1
BI	28	7	2573.502	SILT FENCE, TYPE HEAVY DUTY	LIN FT	5078
BJ	4	7	2573.502	STORM DRAIN INLET PROTECTION	EACH	30
BK	4	7	2573.502	CULVERT END CONTROLS	EACH	2
BG	28	7	2573.503	SEDIMENT CONTROL LOG TYPE STRAW	LIN FT	263
BM	4	7	2575.504	EROSION CONTROL BLANKETS CATEGORY 0	SQ YD	18
BM	28	3	2575.605	TURF ESTABLISHMENT	ACRE	2.47

NOTES:

1. SELECT GRANULAR BORROW, STRUCTURAL EXCAVATION, AND GRANULAR BACKFILL FOR STORM PIPES ARE INCIDENTAL.
2. FILTER FABRIC AND FABRIC WRAP FOR MANHOLES ARE INCIDENTAL.
3. ALL DISTURBED AREAS DETERMINED NOT TO BE PAVED, AGGREGATE SURFACE, CONCRETE SURFACE OR RIPRAPPED SHALL HAVE 4 INCHES OF TOPSOIL. FERTILIZER TYPE 2, MULCH MATERIAL, AND SEED MIXTURES NO. 34–181, MULCH TYPE 3 (WEED FREE MULCH) WITH NO FERTILIZER AND 25–151 PER MNDOT STANDARD SPECIFICATION 3876, APPLY TYPE 1 MULCH AT THE RATE OF 2 (TWO) TONS PER ACRE (TO ACHIEVE A 90% UNIFORM GROUND COVERAGE). SEED MIXTURE, WATER, TYPE 2 FERTILIZER, MULCH, AND DISK ANCHORING ARE INCIDENTAL. SOIL TESTING TO DETERMINE FERTILIZER MIXTURE RATIO AND RATE OF APPLICATION IS INCIDENTAL.
4. MATERIAL FOUND IN THE SUBCUTS THAT IS UNSUITABLE FOR FILL IN THE ROADBED SHALL BE REMOVED OFF–SITE.
5. THE CONTRACTOR SHALL NOT DISTURB AREAS OUTSIDE THE CONSTRUCTION LIMITS.
6. SIGNS INCLUDE POSTS.
7. INSTALLATION AND MAINTENANCE ARE INCIDENTAL.
8. QUANTITY SHOWN USED FOR DRIVEWAY CONSTRUCTION. SEE DETAIL RFC–363A3.
9. BITUMINOUS MATERIAL FOR TACK COAT SHALL BE INCIDENTAL.
10. REMOVE SUPPORTS AND SALVAGE MAIL BOXES. SALVAGE MAIL BOXES ARE INCIDENTAL.

SEED MIX 25–151: RESIDENTIAL TURF
MULCH TYPE 1
PLANT APRIL 1ST – JUNE 1ST FOR SPRING PLANTING OR JULY 20TH – SEPTEMBER 20TH FOR FALL PLANTING

SEED MIX 34–181: EMERGENT WETLAND
MULCH TYPE 3
PLANT APR 15TH – JUL 20TH FOR SPRING PLANTING OR SEPT 20TH – OCT 20TH FOR FALL PLANTING

THE FOLLOWING STANDARD PLATES, APPROVED BY THE FEDERAL HIGHWAY ADMINISTRATION, SHALL APPLY

PLATE NO.	STANDARD PLATES – RFC ENGINEERING (IN THE PLANS)
RFC–355A	CONCRETE CURB AND GUTTER
RFC–363A3	PRIVATE DRIVEWAY/FIELD ENTRANCE – SEE PLANS
RFC–365A1	TYPICAL SUBGRADE EXCAVATION
RFC–366E3	TYPICAL STREET SECTION
RFC–366E15	TYPICAL STREET SECTION
RFC–367A3	TEMPORARY RESIDENTIAL CUL–DE–SAC
RFC–459B	RECTANGULAR CATCH BASIN
RFC–463	FABRIC AROUND CATCH BASIN
RFC–465A1	RECTANGULAR INLET FOR ROUND MANHOLE
RFC–465A2	RECTANGULAR INLET FOR ROUND MANHOLE – 4’ SUMP
RFC–465B3	RECTANGULAR INLET FOR ROUND MANHOLE – VARIABLE SUMP HEIGHT
RFC–465C1	ROUND INLET FOR ROUND MANHOLE
RFC–466B	RCP TRASH GUARD
RFC–466C	CPP TRASH GUARD
RFC–654	STORM DRAIN BEDDING FOR RIGID AND FLEXIBLE PIPE *MNDOT DETAIL
RFC–752A	MAILBOX RESTORATION
RFC–857	SILT FENCE AT FES

PLATE NO.	MnDOT STANDARD PLATES
3000L	REINFORCED CONCRETE PIPE (5 SHEETS)
3006G	GASKET JOINT FOR R.C. PIPE (2 SHEETS)
3100G	CONCRETE APRON FOR R.C. PIPE
3129A	METAL APRON FOR CORRUGATED POLYETHYLENE PIPE
3133D	RIPRAP AT R.C. PIPE OUTLETS
3134D	RIPRAP AT CSP OUTLET
3145G	CONCRETE PIPE TIES
7100H	CONCRETE CURB & GUTTER
8000J	CHANNELIZERS (3 SHEETS)
9350A	MAILBOX SUPPORT (SWING–AWAY TYPE)

BASIS FOR ESTIMATED QUANTITIES

AGGREGATE BASE 105 LBS/S.Y./INCH
BITUMINOUS MIXTURE 110 LBS/S.Y./INCH
TACK COAT 0.05 GAL./S.Y.
TYPE I MULCH 2 TONS/ACRE



800-252-1166 651-454-0002

UTILITIES: CENTURYLINK (763) 712–5017
CENTERPOINT ENERGY (763) 323–2760
COMCAST (952) 607–4078
CONNEXUS ENERGY (763) 323–4268
XCEL ENERGY (612) 526–4508

DATE	REVISION HISTORY

I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION, AND THAT I AM A DULY REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

DATE _____ REG. NO. _____

RFC ENGINEERING, INC.
Consulting Engineers

13635 Johnson Street
Ham Lake, MN 55304
Telephone 763–862–8000
Fax 763–862–8042

HAM LAKE IMPROVEMENT PROJECT 1907
LUND’S LAKEVIEW FOREST RECONSTRUCTION
159TH AVE NE, 160TH LN NE, AND OTHERS

STATEMENT OF ESTIMATED QUANTITIES

DWG: 1907 QTY 1
DATE: 04/23/21
JOB NUMBER: 1907
SHEET: 2 OF 44
FILE: 35–1–162

DESIGN BY: GJM DRAWN BY: GJM CHECKED BY: TPC

REMOVE SIGN					AA
STATION	LOCATION	SIGN NO.	POST	CODE NO.	PANEL LEGEND
10+30	159TH AVE. – LT	C–20	SINGLE		STREET
10+36	159TH AVE. – LT	C–21	SINGLE	R1–1	STOP
14+49	159TH AVE. – LT	C–20	SINGLE		STREET
14+73	159TH AVE. – RT	C–22	SINGLE	W1–7	DOUBLE ARROW
19+74	159TH AVE. – LT	C–20	SINGLE		STREET
30+31	160TH LN. – LT	C–21	SINGLE	R1–1	STOP
30+36	160TH LN. – RT	C–20	SINGLE		STREET
31+23	160TH LN. – RT	C–23	SINGLE	R2–1–30	SPEED LIMIT
43+18	160TH LN. – RT	C–20	SINGLE		STREET
58+54	ZUMBROTA ST. – RT	C–20	SINGLE		STREET
72+59	160TH AVE. – LT	C–24	SINGLE	W14–1	DEAD END
72+73	160TH AVE. – RT	C–20	SINGLE		STREET
		TOTAL	12		

REMOVE CULVERTS			AB
STATION	SIZE	LOCATION	LENGTH (LIN FT)
10+29	12" CMP	159TH AVE. – ACROSS	50
12+77	18" CMP	159TH AVE. – ACROSS	59
30+28	12" CMP	160TH LN. – ACROSS	50
TOTAL			159

REMOVE BITUMINOUS PAVEMENT		AC
STATION	LOCATION	SQ YD
10+14.81 TO 20+60.79	159TH AVENUE – ROADWAY	2,629.5
60+00.00 TO 66+73.70	ALAMO STREET – ROADWAY	2,265.5
50+00.00 TO 58+94.17	ZUMBROTA STREET – ROADWAY	2,204.6
70+00.00 TO 72.98.04	160TH AVENUE – ROADWAY	1,407.4
30+14.33 TO 43+34.36	160TH LANE – ROADWAY	3,389.1
* TOTAL		11,896.2

REMOVE MAILBOX SUPPORT		AD
STATION	LOCATION	TYPE
11+24	159TH AVE. – LT	SINGLE
11+69	159TH AVE. – LT	SINGLE
11+83	159TH AVE. – LT	SINGLE
15+33	159TH AVE. – LT	SINGLE
16+56	159TH AVE. – LT	SINGLE
17+42	159TH AVE. – LT	SINGLE
31+03	160TH LN. – RT	SINGLE
32+15	160TH LN. – RT	SINGLE
33+43	160TH LN. – RT	SINGLE
34+40	160TH LN. – RT	SINGLE
36+47	160TH LN. – LT	DOUBLE
37+61	160TH LN. – RT	SINGLE
38+50	160TH LN. – RT	SINGLE
39+61	160TH LN. – RT	SINGLE
39+67	160TH LN. – LT	SINGLE
41+44	160TH LN. – RT	SINGLE
41+52	160TH LN. – LT	SINGLE
51+66	ZUMBROTA ST. – LT	SINGLE
52+95	ZUMBROTA ST. – LT	SINGLE
53+20	ZUMBROTA ST. – LT	SINGLE
53+73	ZUMBROTA ST. – LT	SINGLE
55+43	ZUMBROTA ST. – LT	SINGLE
57+03	ZUMBROTA ST. – LT	SINGLE
61+83	ALAMO ST. – LT	SINGLE
63+21	ALAMO ST. – LT	SINGLE
63+79	ALAMO ST. – LT	DOUBLE
64+42	ALAMO ST. – LT	SINGLE
65+31	ALAMO ST. – LT	SINGLE
66+03	ALAMO ST. – RT	SINGLE
66+06	ALAMO ST. – LT	SINGLE
70+52	160TH AVE. – RT	DOUBLE
TOTAL		34

SAWCUT BITUMINOUS PAVEMENT		AE
STATION	LOCATION	LIN FT
10+14.81	159TH AVE. – ROADWAY	66.6
20+60.79	159TH AVE. – ROADWAY	26.2
30+14.39	160TH LN. – ROADWAY	66.5
43+34.13	160TH LN. – ROADWAY	71.5
TOTAL		230.8

SALVAGE AND REINSTALL BRICK PAVERS		AF
STATION	LOCATION	SQ. FT.
53+39	ZUMBROTA St. DRIVEWAY – LT	388
TOTAL		388

REMOVE CHAIN LINK FENCE		AG
STATION	LOCATION	LIN FT
70+92 TO 72+24	160TH AVE. – RT	132
TOTAL		132

NOTES

1. TOP OF GRADING SUBGRADE IS DEFINED AS THE BOTTOM OF THE CLASS 5 AGGREGATE BASE.
2. BITUMINOUS AND CONCRETE DISTURBED BY CONSTRUCTION SHALL BECOME THE PROPERTY OF THE CONTRACTOR AND SHALL BE DISPOSED OF OFFSITE IN ACCORDANCE WITH MnDOT SPEC. 2104.3C3.
3. COMPACTION OF ALL GRADING AND BASE ITEMS SHALL BE BY THE "QUALITY COMPACTION METHOD".
4. USE TACK COAT BETWEEN ALL BITUMINOUS LAYERS AND BETWEEN BITUMINOUS AND CONCRETE CURB AND GUTTER.
5. STRIP ALL TOPSOIL AREAS TO BE DISTURBED BY CONSTRUCTION AND REUSE TOPSOIL OR USE AS FILL OUTSIDE OF ROAD CORE.
6. WHENEVER THE WORD "INCIDENTAL" IS USED IN THIS PLAN, IT SHALL MEAN THIS WORK SHALL BE INCIDENTAL FOR WHICH NO DIRECT COMPENSATION WILL BE MADE.
7. STATIONING FOR LOCATION OF EXISTING AND NEW SIGNS IS APPROXIMATE.
8. EXCESS MATERIAL TO BE HAULED AWAY TO CITY OF HAM LAKE PUBLIC WORKS.

EARTHWORK SUMMARY		AH
EXCAVATION (CU YD) TOPSOIL 1,034 CU YD. (EV) COMMON 2,282 CU YD (EV) 3,316 CU YD (EV) ① EMBANKMENT (CU YD) TOPSOIL 1,034 CU YD (EV)/1.1 = 940. CU YD (CV) COMMON EX 2,282 CU YD (EV)/1.3 = 1,755. CU YD (CV) Granular Fill 823. CY YD (CV) 3,518 CU YD (CV) ②		
NOTES: ① TOTAL EXCAVATION (EV) REQUIRED FOR PROJECT. ② TOTAL EMBANKMENT (CV) REQUIRED FOR PROJECT.		

RESIDENTIAL DRIVEWAYS									BA
STATION	LOCATION	REMOVE (S.Y.)			SAWCUT (L.F.)		PLACE (S.Y.)		CL5
		CONC	BIT	GRAVEL*	CONC	BIT	CONC	BIT	
11+82	RT.	29.2			15.9		28.4		
12+38	LT.		13.5			15.3		12.6	12.6
15+50	RT.	58.7			16.3		56.6		
16+80	LT.		45.2			18.5		29.3	29.3
16+80	RT.		14.8			12.3		17.8	17.8
17+64	RT.			42.4				38.1	38.1
31+10	LT.		14.8			19.2		13.4	13.4
32+00	RT.		16.7			18.1		12.8	12.8
33+67	LT.		13.1			18.6		12.2	12.2
34+11	RT.	57.9			17.6		52.8		
36+25	RT.		82.5			18.6		76.2	76.2
36+25	LT.		13.2			16.7		12.0	12.0
37+43	LT.		26.1			15.6		24.0	24.0
38+67	RT.		34.7			19.5		29.4	29.4
39+50	RT.		40.9			18.5		36.0	36.0
40+00	LT.		20.1			23.3		13.8	13.8
41+27	LT.		23.8			27.8		16.1	16.1
41+65	RT.		43.7			17.8		39.0	39.0
51+08	RT.			24.7				24.1	24.1
51+88	LT.	50.0			16.1		49.5		
53+00	RT.		57.6			17.6		53.9	53.9
53+39	LT.	8.6					12.3		
55+62	RT.	67.8			24.5		61.2		
56+87	LT.		56.7			19.2		51.3	51.3
61+58	RT.	27.0			20.6		25.1		
61+58	LT.	67.2			17.3		61.6		
63+33	LT.		15.1			11		10.2	10.2
63+66	RT.		24.0			13.5		21.1	21.1
64+26	RT.	44.5			17		36.6		
65+50	LT.		18.1			16.9		13.9	13.9
66+74	LT.		78.7			15.5		81.7	81.7
66+85	RT.		60.6			19.6		70.5	70.5
69+75	LT.		9.5			15.2		22.0	22.0
69+83	RT.		11.7			16.7		25.2	25.2
TOTAL		410.9	734.9	67.1	145.3	405.0	384.1	756.7	756.7

*GRAVEL INCLUDED IN COMMON EXCAVATION

AGGREGATE BASE CLASS 5		BB
STATION TO STATION	LOCATION	TON
10+14.81 TO 20+60.79	159TH AVENUE – ROADWAY	656.7
60+00.00 TO 66+73.70	ALAMO STREET – ROADWAY	524.5
50+00.00 TO 58+94.17	ZUMBROTA STREET – ROADWAY	542.8
70+00.00 TO 72+98.04	160TH AVENUE – ROADWAY	295.1
30+14.33 TO 43+34.36	160TH LANE – ROADWAY	831.1
TOTAL TO USE		2,850.3
TOTAL NEEDED		2,850.3

NOTES:

1. TOP OF GRADING SUBGRADE IS DEFINED AS THE BOTTOM OF THE CLASS 5 AGGREGATE BASE.
2. BITUMINOUS AND CONCRETE DISTURBED BY CONSTRUCTION SHALL BECOME THE PROPERTY OF THE CONTRACTOR AND SHALL BE DISPOSED OF OFFSITE IN ACCORDANCE WITH MnDOT SPEC. 2104.3C3.
3. COMPACTION OF ALL GRADING AND BASE ITEMS SHALL BE BY THE "QUALITY COMPACTION METHOD".
4. USE TACK COAT BETWEEN ALL BITUMINOUS LAYERS AND BETWEEN BITUMINOUS AND CONCRETE CURB AND GUTTER.
5. STRIP ALL TOPSOIL AREAS TO BE DISTURBED BY CONSTRUCTION AND REUSE TOPSOIL OR USE AS FILL OUTSIDE OF ROAD CORE.
6. WHENEVER THE WORD "INCIDENTAL" IS USED IN THIS PLAN, IT SHALL MEAN THIS WORK SHALL BE INCIDENTAL FOR WHICH NO DIRECT COMPENSATION WILL BE MADE.
7. STATIONING FOR LOCATION OF EXISTING AND NEW SIGNS IS APPROXIMATE.
8. SIGN AND POST INSTALLED BY OTHERS

TYPE SP 9.5 BITUMINOUS WEARING COURSE MIXTURE (SPWEA240C)			BC
STATION TO STATION	LOCATION	SQ. YD. (1 IN)	TON
10+14.81 TO 20+60.79	159TH AVENUE – ROADWAY	2842.9	172.0
30+14.39 TO 43+19.39	160TH LANE – ROADWAY	3597.7	217.7
50+12.00 TO 58+70.00	ZUMBROTA STREET – ROADWAY	2349.9	142.2
60+12.00 TO 67+13.70	ALAMO STREET – ROADWAY	2270.7	137.4
69+60 TO 72+86.04	160TH AVENUE – ROADWAY	1277.6	77.3
TOTAL			746.6

TYPE SP 12.5 BITUMINOUS WEARING COURSE MIXTURE (SPWEB240C)			BD
STATION TO STATION	LOCATION	SQ. YD. (2 IN)	TON
10+14.81 TO 20+60.79	159TH AVENUE – ROADWAY	2842.9	344.0
30+14.39 TO 43+19.39	160TH LANE – ROADWAY	3597.7	435.3
50+12.00 TO 58+70.00	ZUMBROTA STREET – ROADWAY	2349.9	284.3
60+12.00 TO 67+13.70	ALAMO STREET – ROADWAY	2270.7	274.8
69+60 TO 72+86.04	160TH AVENUE – ROADWAY	1277.6	154.6
TOTAL			1,493.0

CONCRETE CURB & GUTTER DESIGN D312 MODIFIED		BE
STATION TO STATION	LOCATION	LIN FT
10+67.37 TO 14+35.57	159TH AVE. – LT	374.1
10+67.37 TO 2060.79	159TH AVE. – RT	984.9
15+08.35 TO 19+55.00	159TH AVE. – LT	442.3
20+25.00 TO 20+60.79	159TH AVE. – LT	37.2
TOTAL NEEDED	159TH AVE.	1,838.5
30+68.80 TO 34+91.19	160TH LN. – RT	422.4
30+68.80 TO 43+34.13	160TH LN. – LT	1,279.6
35+29.13 TO 43+34.13	160TH LN. – RT	780.0
TOTAL NEEDED	160TH LN.	2,482.0
50+12 TO 58+70.00	ZUMBROTA ST. – RT	894.1
50+12 TO 54+74.20	ZUMBROTA ST. – LT	465.0
55+52.25 TO 58+70.00	ZUMBROTA ST. – LT	331.6
TOTAL NEEDED	ZUMBROTA ST.	1,690.7
60+12.00 TO 67+13.70	ALAMO ST. – BOTH	1,446.3
69+60.00 TO 72+86.04	160TH AVE. – BOTH	742.6
TOTAL		8,200

MAILBOX SUPPORT (SWING–AWAY TYPE)		BF
STATION	LOCATION	TYPE
11+24	159TH AVE. – LT	SINGLE
11+69	159TH AVE. – LT	SINGLE
11+83	159TH AVE. – LT	SINGLE
15+33	159TH AVE. – LT	SINGLE
16+56	159TH AVE. – LT	SINGLE
17+42	159TH AVE. – LT	SINGLE
31+03	160TH LN. – RT	SINGLE
32+15	160TH LN. – RT	SINGLE
33+43	160TH LN. – RT	SINGLE
34+40	160TH LN. – RT	SINGLE
36+47	160TH LN. – LT	DOUBLE
37+61	160TH LN. – RT	SINGLE
38+50	160TH LN. – RT	SINGLE
39+61	160TH LN. – RT	SINGLE
39+67	160TH LN. – LT	SINGLE
41+44	160TH LN. – RT	SINGLE
41+52	160TH LN. – LT	SINGLE
51+66	ZUMBROTA ST. – LT	SINGLE
52+95	ZUMBROTA ST. – LT	SINGLE
53+20	ZUMBROTA ST. – LT	SINGLE
53+73	ZUMBROTA ST. – LT	SINGLE
55+43	ZUMBROTA ST. – LT	SINGLE
57+03	ZUMBROTA ST. – LT	SINGLE
61+83	ALAMO ST. – LT	SINGLE
63+21	ALAMO ST. – LT	SINGLE
63+79	ALAMO ST. – LT	DOUBLE
64+42	ALAMO ST. – LT	SINGLE
65+31	ALAMO ST. – LT	SINGLE
66+03	ALAMO ST. – RT	SINGLE
66+06	ALAMO ST. – LT	SINGLE
70+52	160TH AVE. – RT	DOUBLE
TOTAL		34

SEDIMENT CONTROL LOG		BG
STATION	LOCATION	LIN. FT.
13+85 TO 15+00	159TH AVE. – RT	210.9
54+84 TO 55+07	ZUMBROTA ST. – RT	29.5
66+22 TO 66+29	ALAMO ST. – LT	22.7
TOTAL		263.1

SIGN PANELS TYPE C							BH	
SIGN NO.	NOTE	TOTAL QTY.	POST	PANEL			CODE NO.	PANEL LEGEND
				SIZE (IN)	AREA (SQ. FT.)	TOTAL AREA (SQ. FT.)		
C-1		7	SINGLE	30 X 30	6.25	43.8	R1-1	STOP
C-2	9	7	SINGLE	HAM LAKE				STREET
C-3		1	SINGLE	24 X 30	5	5.0	R2-1-30	SPEED LIMIT
C-4		1	SINGLE	48 X 24	8	8.0	W1-7	DOUBLE ARROW
C-5		2	SINGLE	30 X 30	6.25	12.5	W14-1	DEAD END
TOTAL						69.3		

SILT FENCE		BI
STATION TO STATION	LOCATION	LIN. FT.
10+31 TO 11+69	159TH AVE – RT.	162.3
11+86 TO 13+79	159TH AVE – RT.	167.8
12+00 TO 12+29	159TH AVE – LT.	29.1
12+50 TO 14+33	159TH AVE – LT.	236.6
14+18 TO 15+50	159TH AVE – RT.	131.9
15+02 TO 15+61	159TH AVE – LT.	61.2
16+91 TO 17+55	159TH AVE – RT.	69.6
17+80 TO 20+59	159TH AVE – RT.	261.3
19+23 TO 19+79	159TH AVE – LT.	48.0
20+23 TO 20+58	159TH AVE – LT.	37.1
30+15 TO 30+93	160TH LN – LT.	94.1
30+29 TO 31+84	160TH LN – RT.	170.8
31+26 TO 33+51	160TH LN – LT.	224.5
32+18 TO 32+80	160TH LN – RT.	61.2
33+85 TO 36+10	160TH LN – LT.	226.3
36+42 TO 37+31	160TH LN – LT.	88.2
37+60 TO 39+90	160TH LN – LT.	231.6
40+23 TO 41+07	160TH LN – LT.	92.7
41+50 TO 43+27	160TH LN – LT.	182.0
42+79 TO 43+27	160TH LN – RT.	71.6
50+27 TO 50+92	ZUMBROTA ST. – RT.	75.9
50+33 TO 51+69	ZUMBROTA ST. – LT.	116.1
51+17 TO 52+16	ZUMBROTA ST. – RT.	108.5
52+00 TO 53+23	ZUMBROTA ST. – LT.	120.2
53+50 TO 54+78	ZUMBROTA ST. – LT.	131.4
53+59 TO 55+40	ZUMBROTA ST. – RT.	210.6
55+47 TO 56+66	ZUMBROTA ST. – LT.	120.9
55+82 TO 56+23	ZUMBROTA ST. – RT.	40.0
57+07 TO 58+46	ZUMBROTA ST. – LT.	138.3
60+36 TO 61+17	ALAMO ST. – LT.	73.9
60+36 TO 61+43	ALAMO ST. – RT.	119.7
62+00 TO 63+24	ALAMO ST. – LT.	124.6
63+37 TO 65+29	ALAMO ST. – RT.	195.6
65+67 TO 66+55	ALAMO ST. – LT.	112.4
66+30 TO 66+70	ALAMO ST. – RT.	47.8
67+00 TO 67+45	ALAMO ST. – BOTH	135.6
69+86 TO 72+66	160TH AVE. – LT.	287.8
69+96 TO 72+58	160TH AVE. – RT.	271.2
TOTAL		5,078

STORM INLET PROTECTION		BJ
STATION	LOCATION	QUANTITY
12+71	159TH AVE. – BOTH	2
12+76	159TH AVE. – LT	1
13+65	159TH AVE. – RT	1
13+68	159TH AVE. – LT	1
14+49	159TH AVE. – LT	1
14+89	159TH AVE. – LT	1
15+85	159TH AVE. – BOTH	2
17+29	159TH AVE. – LT	1
19+72	159TH AVE. – LT	1
22+28	159TH AVE. – RT	1
32+78	160TH LN. – BOTH	2
34+78	160TH LN. – BOTH	2
51+50	ZUMBROTA ST. – LT	1
52+50	ZUMBROTA ST. – LT	1
54+72	ZUMBROTA ST. – BOTH	2
55+06	ZUMBROTA ST. – RT	1
55+33	ZUMBROTA ST. – BOTH	2
56+68	ZUMBROTA ST. – BOTH	2
57+60	ZUMBROTA ST. – BOTH	2
58+64	ZUMBROTA ST. – LT	1
61+08	ALAMO ST. – RT	1
66+65	ALAMO ST. – LT	1
70+65	160TH AVE. – RT	1
TOTAL		30

CULVERT END CONTROL		BK
STATION	LOCATION	QUANTITY
10+28	159TH AVE. – LT	2
14+88	159TH AVE. – RT	1
30+28	160TH AVE. – LT	2
66+30	ALAMO ST. – LT	1
67+27	ALAMO ST. – END	1
TOTAL		7

RIPRAP CLASS 3		BL
STATION	LOCATION	CU. YD.
13+65	159TH AVE. – RT	12.3
54+99	ZUMBROTA ST. – RT	6.4
66+29	ALAMO ST. – LT	6.4
TOTAL		25.1

EROSION CONTROL BLANKET		BM
STATION	LOCATION	SQ. YD.
10+28	159TH AVE. – RT	8.9
30+28	160TH AVE. – RT	9.0
TOTAL		17.9

GEOTEXTILE FABRIC		BN
STATION	LOCATION	SQ. YD.
13+65	159TH AVE. – RT	41.6
54+99	ZUMBROTA ST. – RT	25.6
66+29	ALAMO ST. – LT	25.6
TOTAL		92.8



UTILITIES: CENTURYLINK (763) 712–5017
CENTERPOINT ENERGY (763) 323–2760
COMCAST (952) 607–4078
CONNEXUS ENERGY (763) 323–4268
XCEL ENERGY (612) 526–4508

DATE	REVISION HISTORY

I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION, AND THAT I AM A DULY REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

DATE _____ REG. NO. _____

RFC ENGINEERING, INC.
Consulting Engineers

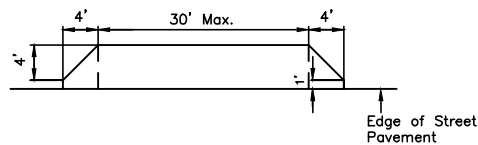
13635 Johnson Street
Ham Lake, MN 55304
Telephone 763–862–8000
Fax 763–862–8042

DESIGN BY: GJM DRAWN BY: GJM CHECKED BY: TPC

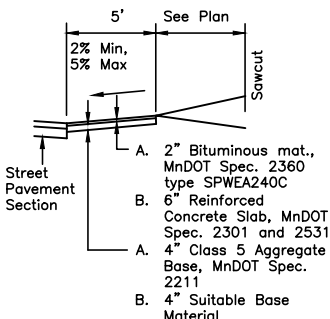
HAM LAKE IMPROVEMENT PROJECT 1907
LUND'S LAKEVIEW FOREST RECONSTRUCTION
159TH AVE NE, 160TH LN NE, AND OTHERS

TABULATIONS

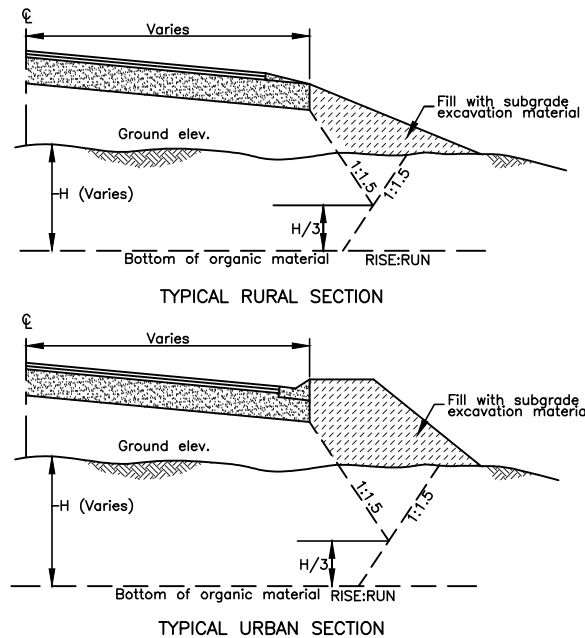
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DATE: 04/23/21
JOB NUMBER: 1907
SHEET: 4 OF 44
FILE: 35–1–133



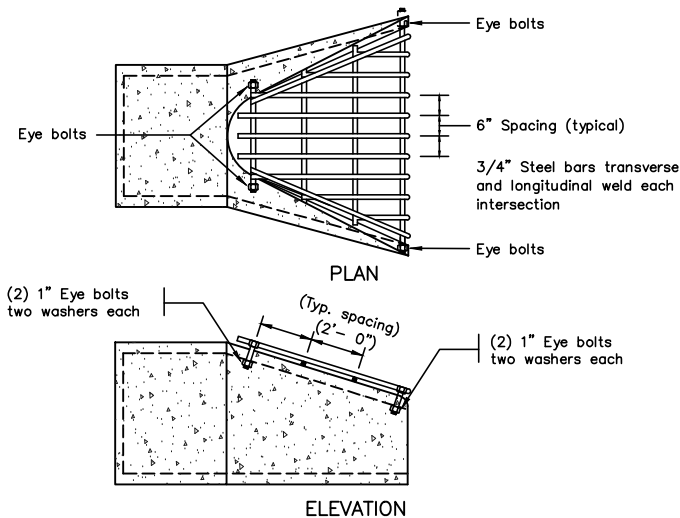
- Note:
- Match existing driveway width and elevation at matchline unless otherwise directed by engineer (See Plans).
 - If existing driveway is concrete, apron and driveway shall be constructed of 6" concrete with 6" x 6" - 6/6 welded wire fabric per MnDOT Spec. 3303 in flat sheets, not rolls. Epoxy coated dowel bars conforming to MnDOT Spec. 3302 shall be placed in the existing driveway pavement along the sawcut line. Dowel bars shall be properly coated with a MnDOT approved lubricant. Dowel bars shall be size #4 and placed at 24" OC. All work shall conform to MnDOT Spec. 2301 and 2531. Concrete shall be ready-mix 3,900 PSI at 28 days, with air content of 5% to 7%, coarse aggregate shall be 1" max, class A and per MnDOT Spec. 3137. Joint sealer shall be hot-poured, low modulus, mastic type per MnDOT Spec. 3725. Membrane curing compound shall be per MnDOT Specs. 3754 and 2301.3M.
 - If existing driveway is gravel, apron and driveway within R/W shall be constructed per existing bituminous driveways. Gravel driveways matching beyond R/W shall be 6" Class 5.
 - If existing driveway is bituminous, apron and driveway behind apron shall be bituminous per A. above. All bituminous work shall conform to MnDOT Specifications 2112, 2211, 2357 and 2360. Tack coat is to be applied between concrete and bituminous surfaces.
 - Driveways in fill sections to slope up from 1" curb lip to end of apron (5' from back of curb) at min of 2% then slope to matchline. See Plan for slope.



PRIVATE DRIVEWAY/FIELD ENTRANCE RFC-363A3
NOT TO SCALE



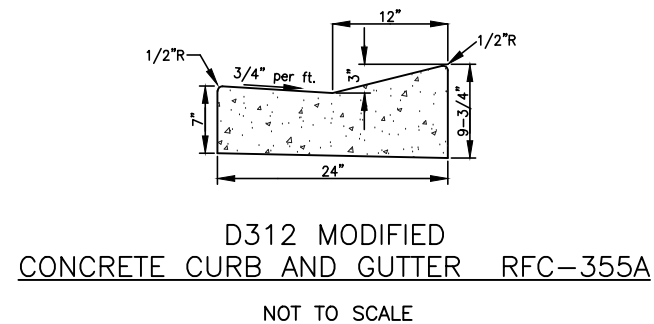
WHERE ORGANIC MATERIAL COMPLETELY REMOVED
TYP. SUBGRADE EXCAVATION RFC-365A1
NOT TO SCALE



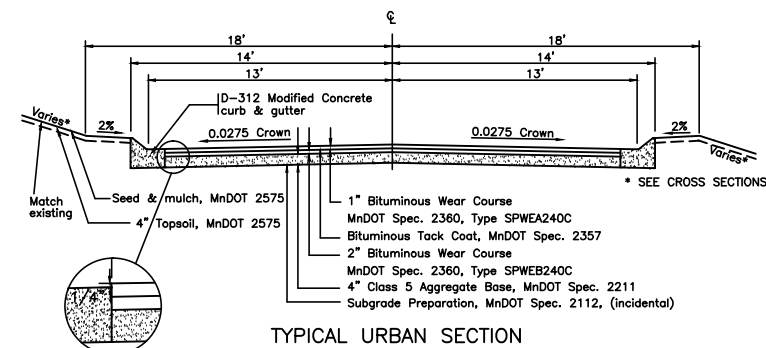
- Note:
- Trash guard to be galvanized after fabrication.
 - The size of each trash guard will vary to fit the apron size.
 - All bolts to be non-rusting stainless steel.
 - Weld all bolts to prevent entry after final storm sewer cleaning.
 - Round all steel bars such that ends are smooth and free of burrs.

FOR PIPE DIAMETERS 30" AND SMALLER

RCP TRASH GUARD RFC-466B
NOT TO SCALE

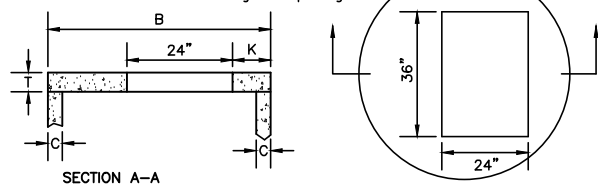


D312 MODIFIED CONCRETE CURB AND GUTTER RFC-355A



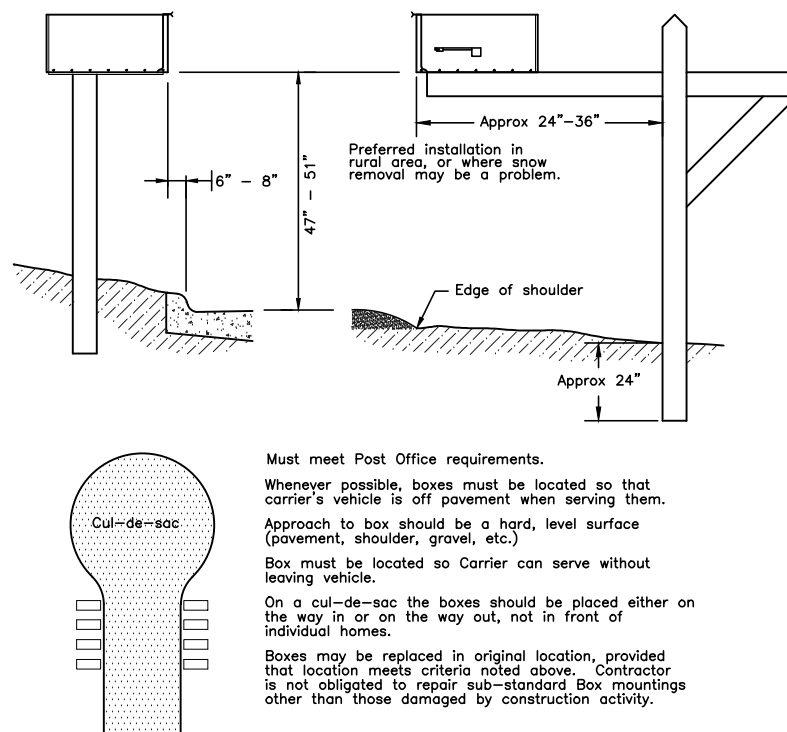
TYPICAL STREET SECTION RFC-366E3
NOT TO SCALE

NOTE:
HS20 Roadway Loading Catch Basin Cover Slab of Precast Reinforced Concrete with Rectangular Opening.

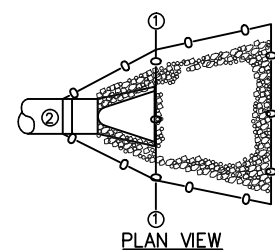


- Note:
- Steps needed for structure height greater than 4'.
 - Cover Slab to Rest on Bed of Mortar on Full Thickness of Structure Walls, not to Rest on Pipe Tongue or Groove.
 - Location of Structure as Shown in Plans.
 - See Plan for Box and Grate Type.
- Adjusting Rings, 2 Min., 3 Max., Full 3/8" Bed of Mortar Between Rings. Plaster Exterior Only with 2" Min. Thick Coat. Strike Off Interior. No shims permitted. Stagger on the Adjustment Rings Not to Exceed 3/4" Total.
- SECTIONAL VIEW
- RECTANGULAR INLET FOR ROUND MANHOLE RFC-465A1
NOT TO SCALE
SPECIAL 2, 3, 4

D	B	C	E	T	K
48"	58"	8"	8"	6"	14"
54"	65"	8"	8"	8"	14"
60"	72"	8"	8"	8"	14"
66"	79"	8"	8"	8"	14"
72"	86"	8"	8"	8"	14"
78"	93"	8"	8"	8"	14"
84"	100"	8"	8"	8"	14"

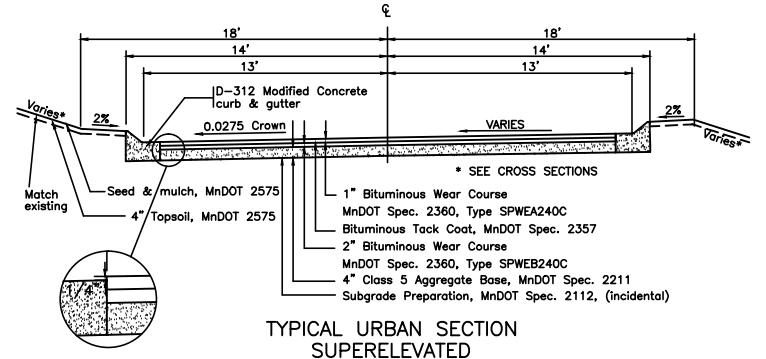


MAILBOX INSTALLATION RFC-752A
NOT TO SCALE



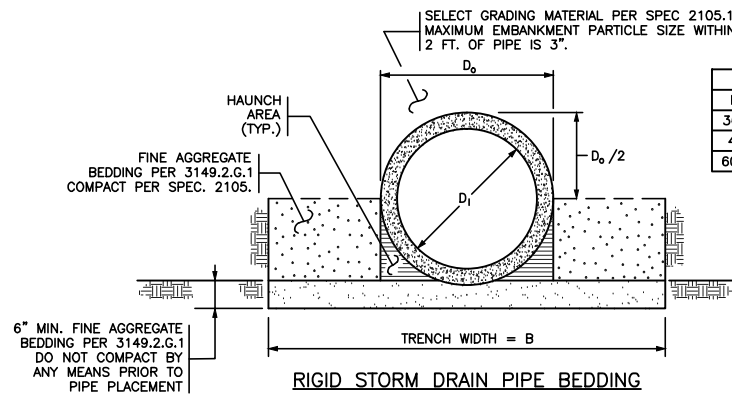
- SEQUENCING:
- Place silt fence along construction limits, the portion of silt fence in front of the pipe shall be removed during flared end section placement.
 - Once the flared end section is placed, silt fence shall be furnished and installed around the top of the flared end section and surrounding the riprap.
 - Any additional outlet protection shall be added as required.
 - Contractor may substitute silt fence for bio-roll or rock log to act as weir for flow into culvert.

SILT FENCE AT FES RFC-857
NOT TO SCALE



TYPICAL STREET SECTION RFC-366E15
NOT TO SCALE

160TH AVENUE FROM 69+70 TO 72+00 EAST BOUND LANE SUPER-ELEVATED
ALAMO STREET FROM 65+30 TO 67+10 NORTH BOUND LANE SUPER-ELEVATED

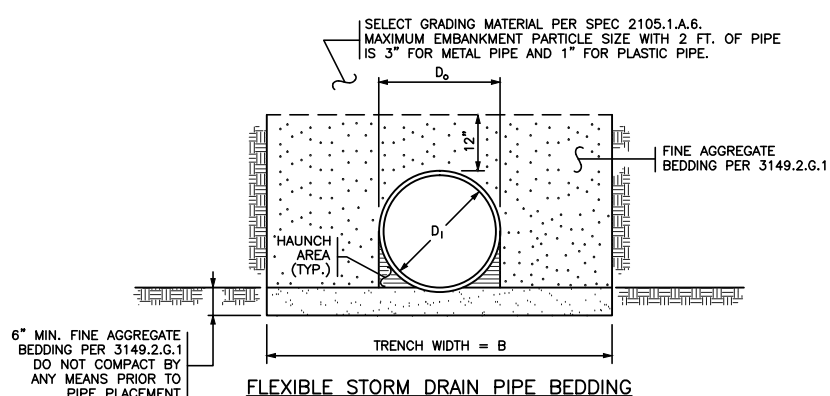


TRENCH BASE WIDTH	
PIPE DIA. D ₁	TRENCH WIDTH B
36" OR LESS	D ₀ + 24"
42" TO 54"	1.5 x D ₀
60" OR OVER	D ₀ + 36"

MODIFY TRENCH WIDTH & SLOPE AS NECESSARY TO COMPLY WITH OSHA REQUIREMENTS.

6" MIN. FINE AGGREGATE BEDDING PER 3149.2.G.1 DO NOT COMPACT BY ANY MEANS PRIOR TO PIPE PLACEMENT

RIGID STORM DRAIN PIPE BEDDING



TRENCH BASE WIDTH	
PIPE DIA. D ₁	TRENCH WIDTH B
36" OR LESS	D ₀ + 24"
42" TO 48"	1.5 x D ₀

MODIFY TRENCH WIDTH & SLOPE AS NECESSARY TO COMPLY WITH OSHA REQUIREMENTS.

6" MIN. FINE AGGREGATE BEDDING PER 3149.2.G.1 DO NOT COMPACT BY ANY MEANS PRIOR TO PIPE PLACEMENT

FLEXIBLE STORM DRAIN PIPE BEDDING

CONSTRUCTION SEQUENCE

1. LOOSELY PLACE 6" OF FINE AGGREGATE BEDDING MATERIAL TO GRADE, DO NOT COMPACT PRIOR TO PIPE PLACEMENT.
2. FOR PIPES WITH BELL, REMOVE MATERIAL IN BELL AREA PRIOR TO PLACEMENT.
3. FURNISH AND INSTALL PIPE TO GRADE.
4. AFTER PLACEMENT OF THE PIPE, PLACE ADDITIONAL BEDDING AND COMPACT THE FULL LENGTH ON BOTH SIDES OF THE PIPE UNDERNEATH THE HAUNCH AREA BY FIRST SHOVEL SLICING (MANUALLY SHOVEL THE BLADE END OF SHOVEL AT AN ANGLE DOWN THE ENTIRE LENGTH OF THE HAUNCH UNDER THE PIPE) THEN COMPACT THE HAUNCH AT AN ANGLE USING A POWERED MECHANICAL OR PNEUMATIC DEVICE (I.E. POLE TAMPER, JUMPING JACK, OR SIMILAR). COMPACT THE REMAINING MATERIAL OUTSIDE THE HAUNCH AREA TO THE REQUIREMENTS OF THE APPLICABLE MATERIAL TYPE ENSURING THAT THE ENTIRE LENGTH OF PIPE IS SUPPORTED UNIFORMLY BY BEDDING.
5. PLACE AND COMPACT BACKFILL EVENLY AND SIMULTANEOUSLY IN 6" LIFTS ON EACH SIDE OF THE PIPE UP TO THE MID-HEIGHT WHEN COMPACTED.
6. COMPLETE REMAINING BACKFILL.

NOTES

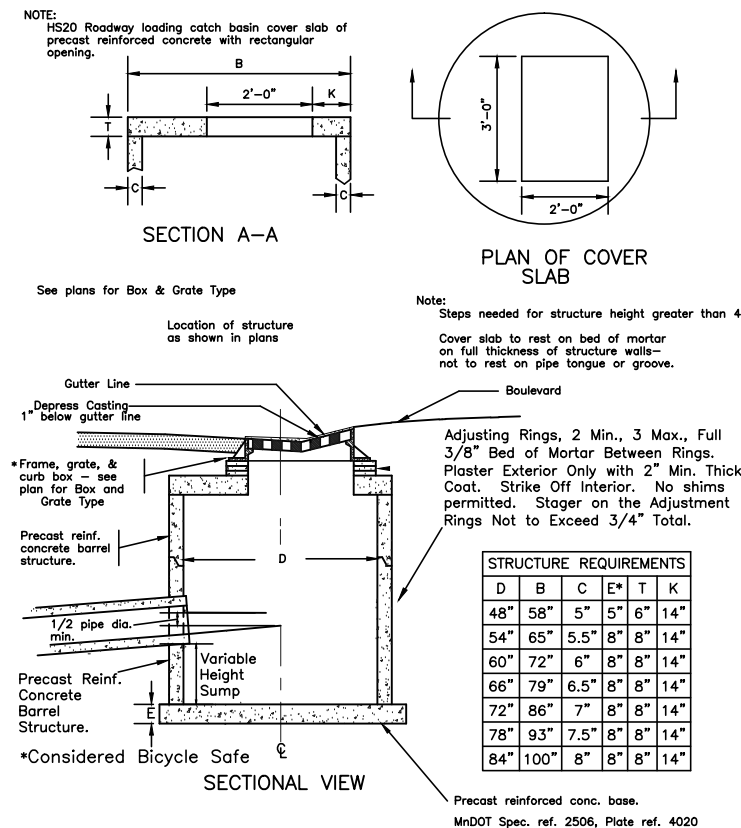
EXCAVATE & CONSTRUCT ALL TRENCHES AND SLOPES PER OSHA REQUIREMENTS. PIPE SIZE IS BASED ON THE NOMINAL INSIDE DIAMETER. PROTECT ALL PIPE DURING CONSTRUCTION PER SPEC. 2501 OR 2503.

CONSTRUCTION SEQUENCE

1. LOOSELY PLACE 6" OF FINE AGGREGATE BEDDING MATERIAL TO GRADE, DO NOT COMPACT PRIOR TO PIPE PLACEMENT.
2. FOR PIPES WITH BELL, REMOVE MATERIAL IN BELL AREA PRIOR TO PLACEMENT.
3. FURNISH AND INSTALL PIPE TO GRADE.
4. AFTER PLACEMENT OF THE PIPE, PLACE ADDITIONAL BEDDING AND COMPACT THE FULL LENGTH ON BOTH SIDES OF THE PIPE UNDERNEATH THE HAUNCH AREA BY FIRST SHOVEL SLICING (MANUALLY SHOVEL THE BLADE END OF SHOVEL AT AN ANGLE DOWN THE ENTIRE LENGTH OF THE HAUNCH UNDER THE PIPE) THEN COMPACT THE HAUNCH AT AN ANGLE USING A POWERED MECHANICAL OR PNEUMATIC DEVICE (I.E. POLE TAMPER, JUMPING JACK, OR SIMILAR). COMPACT THE REMAINING MATERIAL OUTSIDE THE HAUNCH AREA TO THE REQUIREMENTS OF THE APPLICABLE MATERIAL TYPE ENSURING THAT THE ENTIRE LENGTH OF PIPE IS SUPPORTED UNIFORMLY BY BEDDING.
5. PLACE AND COMPACT BACKFILL EVENLY AND SIMULTANEOUSLY IN 6" LIFTS ON EACH SIDE OF THE PIPE UP TO THE MID-HEIGHT WHEN COMPACTED.
6. COMPLETE REMAINING BACKFILL.

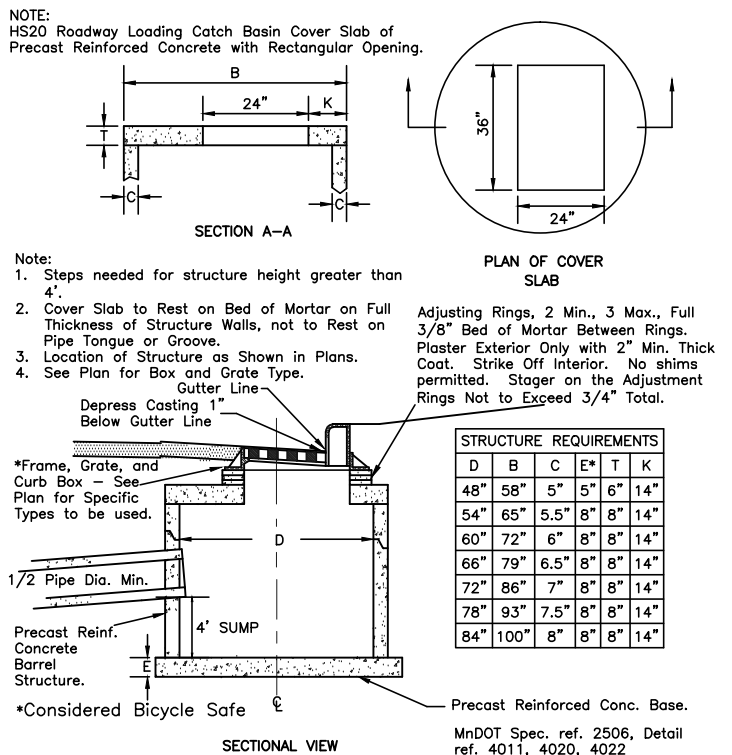
NOTES

EXCAVATE & CONSTRUCT ALL TRENCHES AND SLOPES PER OSHA REQUIREMENTS. PIPE SIZE IS BASED ON THE NOMINAL INSIDE DIAMETER. PROTECT ALL PIPE DURING CONSTRUCTION PER SPEC. 2501 OR 2503.



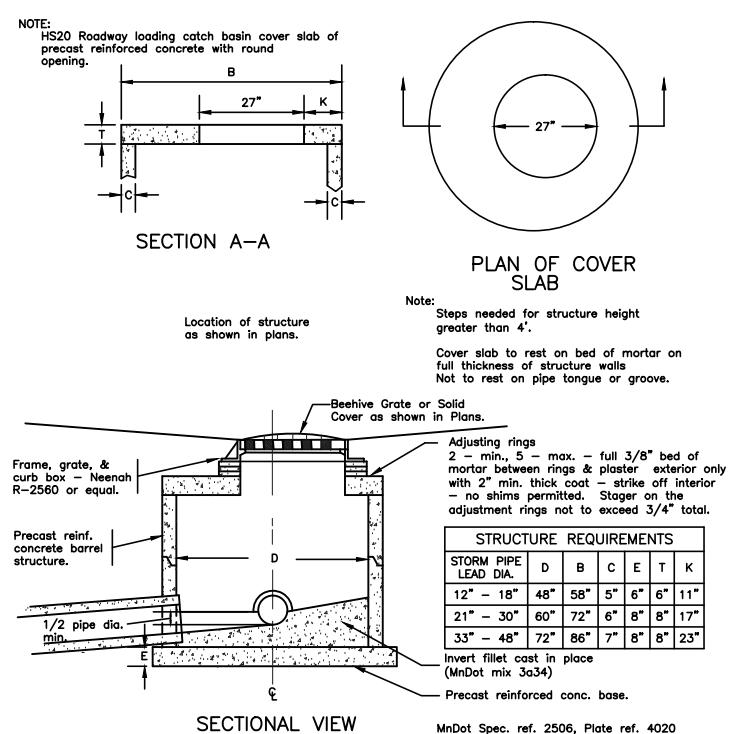
RECTANGULAR INLET FOR ROUND MANHOLE RFC-465B3

NOT TO SCALE
SPECIAL 5



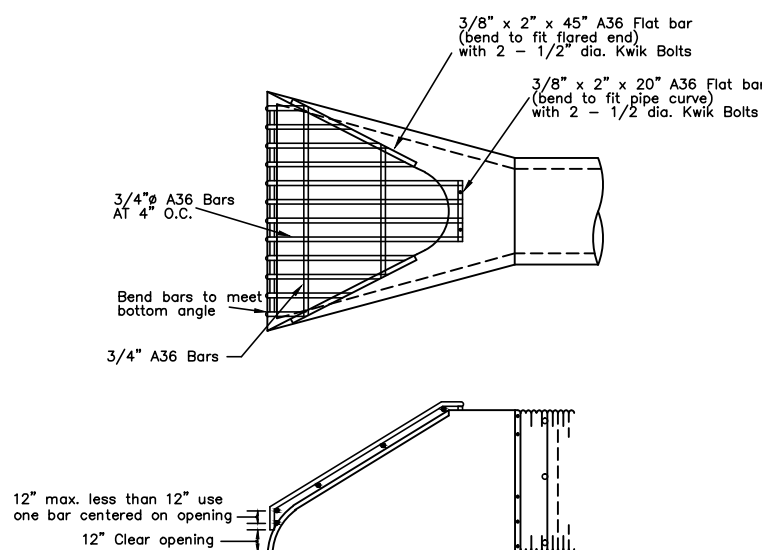
RECTANGULAR INLET FOR ROUND MANHOLE RFC-465A2

NOT TO SCALE
SPECIAL 6



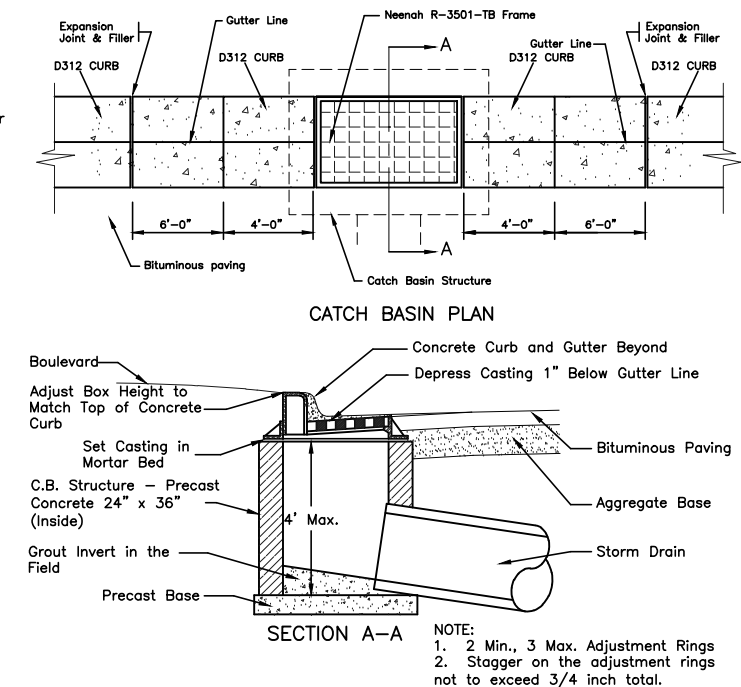
ROUND INLET FOR ROUND MANHOLE RFC-465C1

NOT TO SCALE
SPECIAL 1



CPP TRASH GUARD RFC-466C

NOT TO SCALE



RECTANGULAR CATCH BASIN RFC-459B

NOT TO SCALE



UTILITIES: CENTURYLINK (763) 712-5017
CENTERPOINT ENERGY (763) 323-2760
COMCAST (952) 607-4078
CONNEXUS ENERGY (763) 323-4268
XCEL ENERGY (612) 526-4508

DATE	REVISION HISTORY

I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION, AND THAT I AM A DULY REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.
DATE REG. NO.

RFC ENGINEERING, INC.
Consulting Engineers

13635 Johnson Street
Ham Lake, MN 55304
Telephone 763-862-8000
Fax 763-862-8042

DESIGN BY: GJM

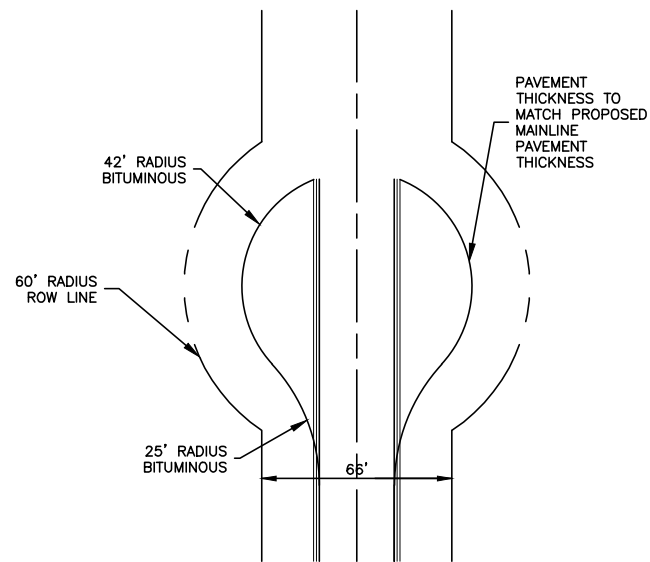
DRAWN BY: GJM

CHECKED BY: TPC

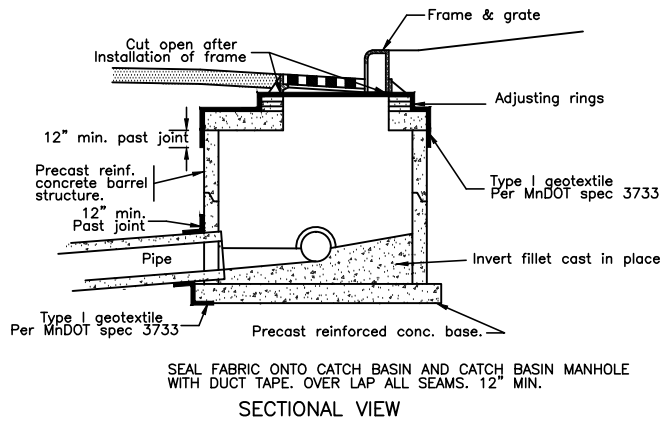
HAM LAKE IMPROVEMENT PROJECT 1907
LUND'S LAKEVIEW FOREST RECONSTRUCTION
159TH AVE NE, 160TH LN NE, AND OTHERS

DETAILS

DWG: 1907 DETAIL 2
DATE: 04/23/21
JOB NUMBER: 1907
SHEET: 6 OF 44
FILE: 35-1-135



TEMPORARY RESIDENTIAL CUL-DE-SAC
 RFC-367A3
 NOT TO SCALE



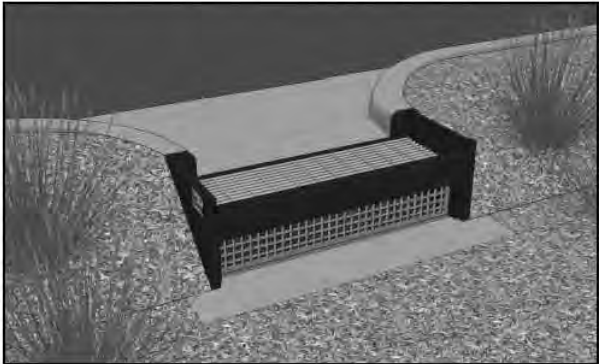
FABRIC AROUND CATCH BASIN RFC-463
 NOT TO SCALE

FOR REVIEW
 PURPOSES ONLY

PLAN VIEW NOTES

1. INLET WIDTH AND DISTANCE BETWEEN BACK OF CURB AND RAIN GUARDIAN BUNKER MAY VARY WITH SITE CONDITIONS. INSTALLATION FLUSH WITH THE BACK OF THE CURB CAN ALSO BE COMPLETED WITH THE RAIN GUARDIAN BUNKER.
2. CONCRETE PAD EXTENDS BEYOND THE FILTER WALL OF THE RAIN GUARDIAN BUNKER TO SERVE AS A SPLASH DISSIPATOR.

INSTALLED VIEWS

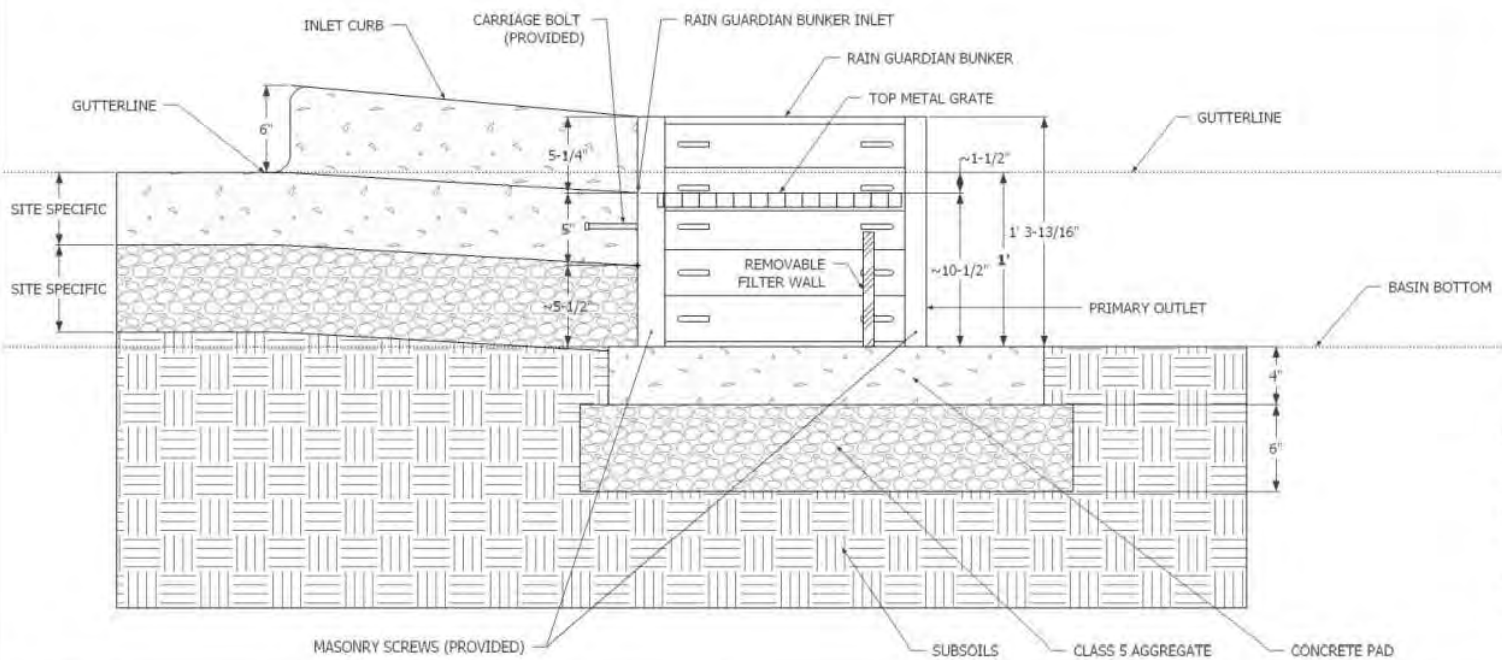
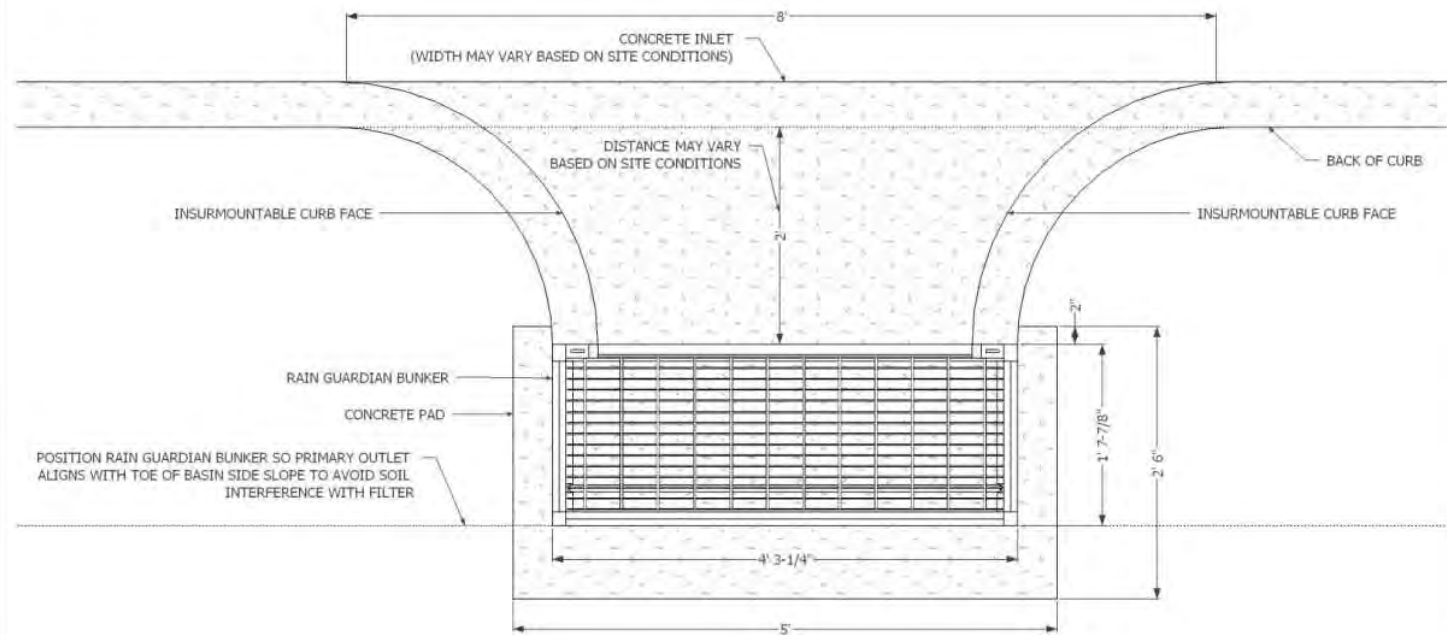


CROSS-SECTION VIEW NOTES

1. THE TOP OF THE CLASS 5 BASE (COMPACTED TO 95% STANDARD PROCTOR) IS PRECISELY 1'4" BELOW THE GUTTERLINE ELEVATION.
2. THE TOP OF THE CONCRETE PAD IS PRECISELY 1' BELOW THE GUTTERLINE.

INSTALLATION NOTES

1. INSTALL THE CONCRETE PAD WITH A 1' 10" OFFSET FROM THE BACK OF THE CURB TO ACCOMMODATE THE CONCRETE INLET. THIS DISTANCE MAY VARY BASED ON SITE CONDITIONS, BUT CONSIDERATIONS SHOULD INCLUDE SLOPE OF THE INLET AND BASIN SIDE SLOPES ADJACENT TO THE RAIN GUARDIAN BUNKER. POSITION RAIN GUARDIAN BUNKER SO PRIMARY OUTLET ALIGNS WITH TOE OF BASIN SIDE SLOPE TO AVOID SOIL INTERFERENCE WITH REMOVABLE FILTER WALL. THE CONCRETE PAD SHOULD BE REINFORCED WITH REBAR.
2. EXCAVATE 1' 10" BELOW THE GUTTERLINE ELEVATION (I.E. THE BIORETENTION OVERFLOW ELEVATION) TO ACCOMMODATE THE 1' PONDING DEPTH, 6" CLASS 5 AGGREGATE, AND 4" CONCRETE PAD TO WHICH THE RAIN GUARDIAN BUNKER WILL BE SECURED. THEREFORE, THE TOP OF THE FINISHED CONCRETE PAD IS PRECISELY 1' BELOW THE GUTTERLINE ELEVATION. THE TOP OF THE RAIN GUARDIAN BUNKER METAL GRATE WILL BE 10-1/2" ABOVE THE TOP OF THE CONCRETE PAD AND 1-1/2" BELOW THE GUTTERLINE ELEVATION TO ACCOMMODATE A SLOPED INLET FROM THE GUTTER TO THE RAIN GUARDIAN BUNKER.
3. THE RAIN GUARDIAN BUNKER SHOULD BE POSITIONED 2" FROM THE EDGE OF THE CONCRETE PAD CLOSEST TO THE BACK OF THE CURB. THEREFORE, THE RAIN GUARDIAN BUNKER WILL BE 2' FROM THE BACK OF THE CURB.
4. USING THE PILOT HOLE IN EACH OF THE FOUR CORNER POSTS, PREDRILL 5/32" HOLES INTO THE CONCRETE PAD WITH A 4-1/2" MASONRY BIT AND HAMMER DRILL.
5. SECURE RAIN GUARDIAN BUNKER TO CONCRETE PAD WITH FOUR 3/16" X 2-3/4" MASONRY SCREWS (PROVIDED).
6. INSTALL FRAMING FOR INLET BETWEEN RAIN GUARDIAN BUNKER AND BACK OF CURB. TOP ELEVATIONS OF THE FRAMING SHOULD MATCH THE TOP OF THE CURB ON THE STREET SIDE AND THE TOP OF THE RAIN GUARDIAN BUNKER ON THE BIORETENTION SIDE.
7. WHEN POURING THE CONCRETE INLET, ENSURE THE CARRIAGE BOLTS ON THE RAIN GUARDIAN BUNKER ARE SURROUNDED BY AT LEAST 2" OF CONCRETE ON ALL SIDES.
8. SIDE CURBS OF THE POURED INLET MUST HAVE AN INSURMOUNTABLE PROFILE TO PREVENT WATER FLOW FROM OVERTOPPING THE DOWNSTREAM SIDE OF THE INLET.
9. WRAP CABLE THROUGH TOP METAL GRATE AND SECURE WITH PROVIDED CLAMP. ENSURE SUFFICIENT SLACK EXISTS IN CABLE TO ALLOW FOR GRATE REMOVAL AND PLACEMENT IN CONCRETE INLET DURING CLEANING. REMOVABLE FILTER WALL SHOULD BE INSTALLED WITH FILTER FABRIC FACING THE RAIN GUARDIAN BUNKER INLET.



RAIN GUARDIAN
U.S. PATENT NO. 8,501,016

PRETREATMENT FOR BIORETENTION

Rain Gardens • Swales • Filtration Basins • Infiltration Basins

www.RainGuardian.biz

**RAIN GUARDIAN BUNKER
PRETREATMENT CHAMBER
BIORETENTION PONDING DEPTH: 1'
TYPICAL DETAIL**

REVISION HISTORY			
REV	BY	DATE	DESCRIPTION
A	MDH	12/1/15	BUNKER-1'
SCALE		VARIABLE	
U.S. PATENT		8,501,016	

ANOKA CONSERVATION DISTRICT

Anoka Conservation District
1318 McKay Dr. NE, Suite 300
Ham Lake, MN 55304
763-434-2030

800-252-1166 651-454-0002

UTILITIES: CENTURYLINK (763) 712-5017
CENTERPOINT ENERGY (763) 323-2760
COMCAST (952) 607-4078
CONNEXUS ENERGY (763) 323-4268
XCEL ENERGY (612) 526-4508

DATE	REVISION HISTORY

I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION, AND THAT I AM A DULY REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

DATE _____ REG. NO. _____

RFC ENGINEERING, INC.
Consulting Engineers

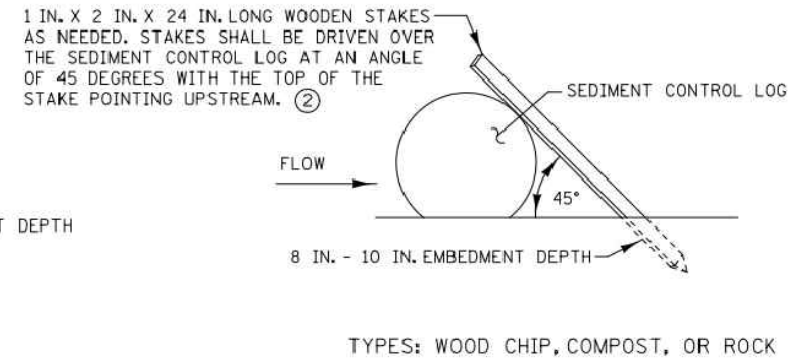
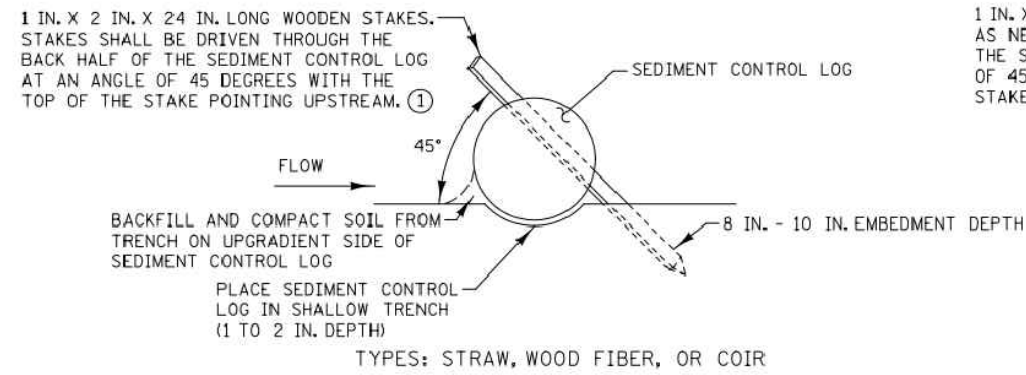
13635 Johnson Street
Ham Lake, MN 55304
Telephone 763-862-8000
Fax 763-862-8042

DESIGN BY: GJM DRAWN BY: GJM CHECKED BY: TPC

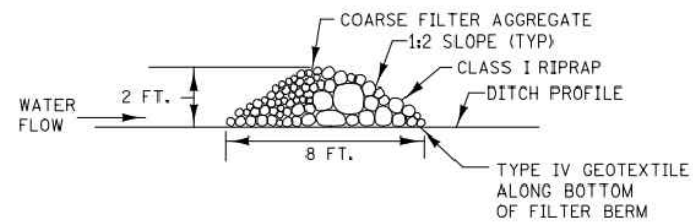
HAM LAKE IMPROVEMENT PROJECT 1907
LUND'S LAKEVIEW FOREST RECONSTRUCTION
159TH AVE NE, 160TH LN NE, AND OTHERS

RAIN GUARDIAN DETAIL

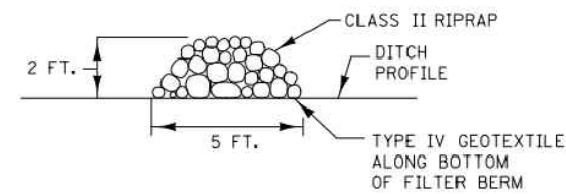
DWG: 1907 DETAIL 4
DATE: 04/23/21
JOB NUMBER: 1907
SHEET: 8 OF 44
FILE: 35-1-137



SEDIMENT CONTROL LOGS

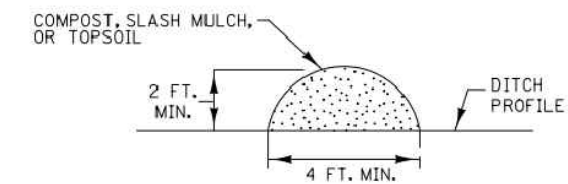


TYPE 3 (ROCK WEEPER)

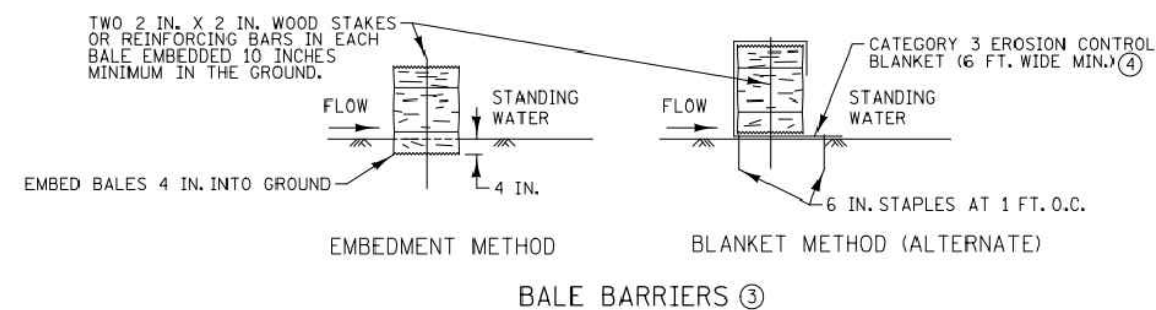


TYPE 5 (ROCK)

FILTER BERMS



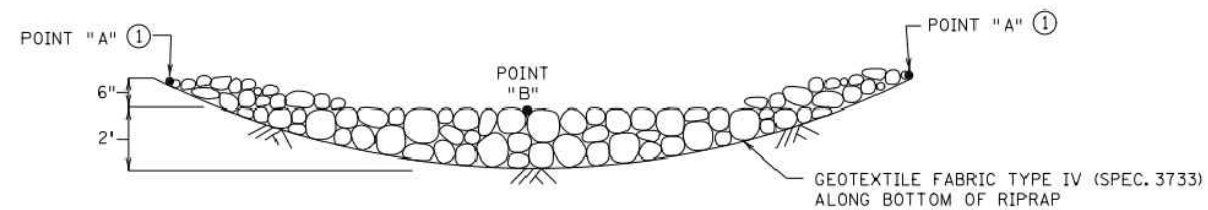
TYPE 1 (COMPOST), TYPE 2 (SLASH MULCH), OR TYPE 4 (TOPSOIL)



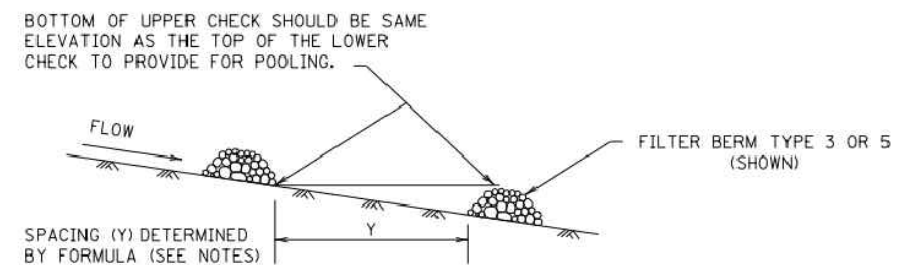
NOTES:

SEE SPECS. 2573, 3149, 3874, 3882, 3886, & 3897.

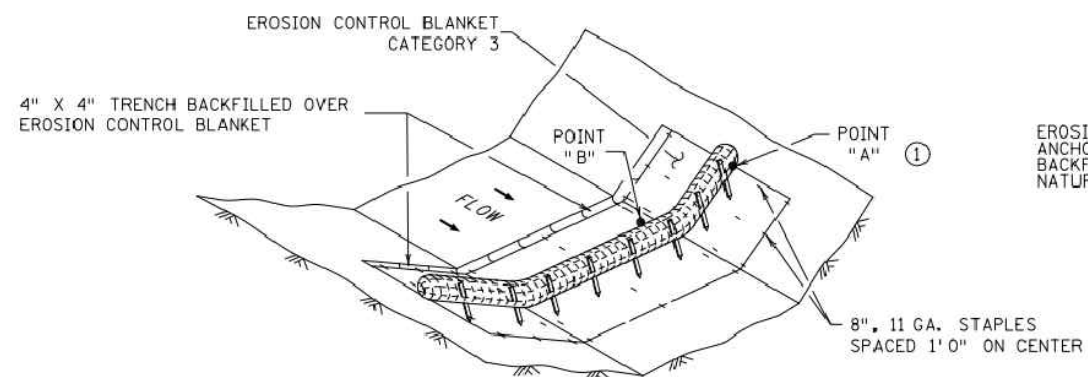
- ① SPACE BETWEEN STAKES SHALL BE A MAXIMUM OF 1 FOOT FOR DITCH CHECKS OR 2 FEET FOR OTHER APPLICATIONS.
- ② PLACE STAKES AS NEEDED TO PREVENT MOVEMENT OF SEDIMENT CONTROL LOGS PLACED ON SLOPES OR AS NEEDED DUE TO OTHER FACTORS. STAKES SHALL BE INCIDENTAL.
- ③ TO BE USED FOR CRITICAL PERIMETER CONTROL AREAS WHERE STANDING WATER OCCURS (6 INCH MAX. DEPTH). BALES SHALL CONSIST OF TYPE 1 MULCH OF APPROXIMATELY 14 IN. X 18 IN. X 36 IN. LONG. BALES SHALL BE PLACED ON EDGE AND BUTTED TIGHT TO ADJACENT BALES.
- ④ INSTEAD OF TRENCHING, PLACE BALE ON THE BLANKET AND WRAP BLANKET AROUND THE BALE. PLACE STAKE THROUGH BALE AND BLANKET.



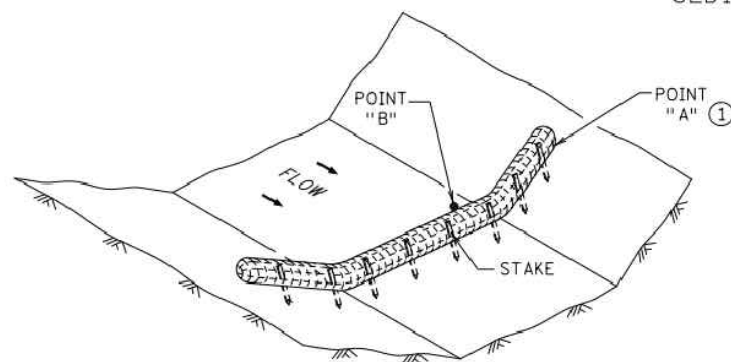
ROCK DITCH CHECKS
FILTER BERMS TYPE 3 (ROCK WEEPER) OR FILTER TYPE 5 (ROCK) ②③
(FOR USE ON ROUGH GRADED AREAS)



DITCH CHECK SPACING
(FOR ALL FILTER BERM TYPES)



SEDIMENT CONTROL LOG TYPE BLANKET SYSTEM ④



SEDIMENT CONTROL LOG TYPE WOOD FIBER, OR TYPE COMPOST ⑤
(FOR USE ON ROUGH GRADED AREAS)

NOTES:

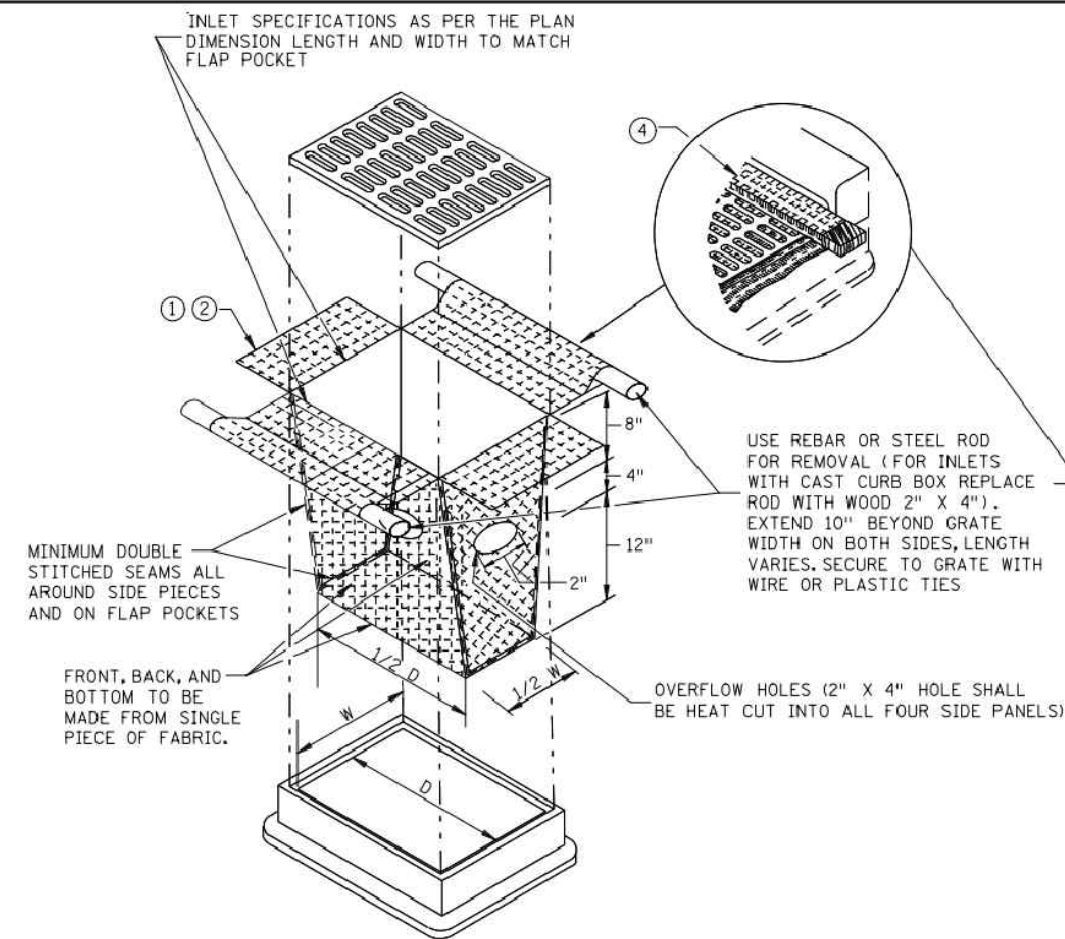
SEE SPECS. 2573, 3601, 3733, 3885, 3886 & 3889.

FOR DITCH CHECKS, PLACE SEDIMENT CONTROL LOG PERPENDICULAR TO FLOW AND IN A CRESCENT SHAPE WITH THE ENDS FACING UPSTREAM.

APPROXIMATE SPACING BETWEEN EACH DITCH CHECK SHOULD BE DETERMINED FROM THE FOLLOWING SPACING FORMULA:

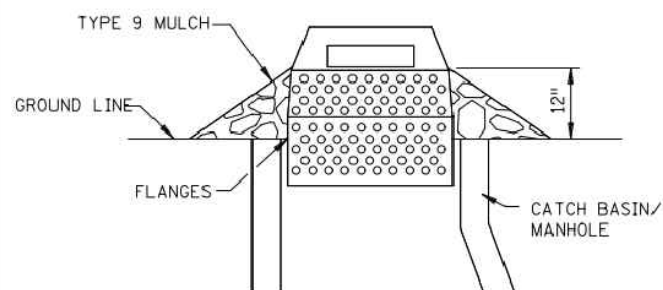
$$\text{APPROXIMATE SPACING OF DITCH CHECKS (FT.)} = Y = \frac{\text{DITCH CHECK HEIGHT (FT)}}{\% \text{ CHANNEL SLOPE}} \times 100$$

- ① POINT "A" MUST BE A MINIMUM OF 6 INCHES HIGHER THAN POINT "B" TO ENSURE THAT WATER FLOWS OVER THE DIKE AND NOT AROUND THE ENDS.
- ② PERMANENT ROCK DITCH CHECKS PLACED WITHIN THE CLEAR ZONE ARE TO BE 18" OR LESS IN HEIGHT. A 1:6 APPROACH AND DEPARTURE SLOPE SHALL BE PROVIDED.
- ③ DITCH GRADE 3% - 5%, MAX. FLOW VELOCITY 12 FT./SEC..
- ④ DITCH GRADE 1.5% - 3%, MAX. FLOW VELOCITY 4.5 FT./SEC..
- ⑤ DITCH GRADE 1.5% - 3%, MAX. FLOW VELOCITY 1.5 FT./SEC..



FILTER BAG INSERT ③

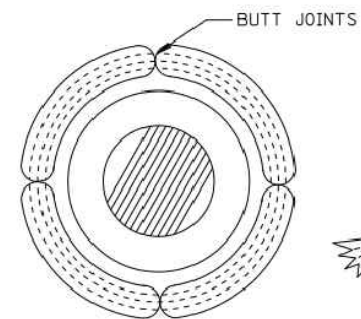
(CAN BE INSTALLED IN ANY INLET TYPE WITH OR WITHOUT A CURB BOX)



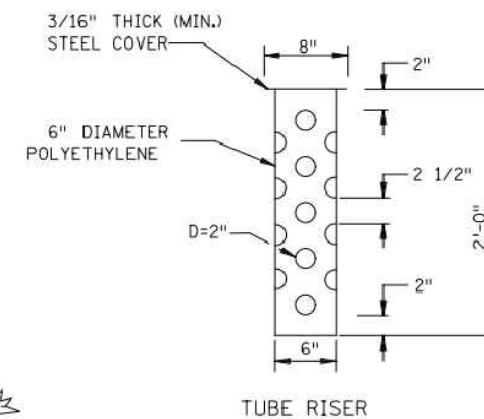
SEDIMENT CONTROL INLET HAT

NOTE:
THE SEDIMENT CONTROL BARRIER SHALL BE A METAL OR PLASTIC/POLYETHYLENE RISER SIZED TO FIT INSIDE THE CATCH BASIN/MANHOLE; HAVE PERFORATIONS TO ALLOW FOR WATER INFILTRATION; HAVE AN OVERFLOW OPENING, FLANGES AND A LID/COVER.

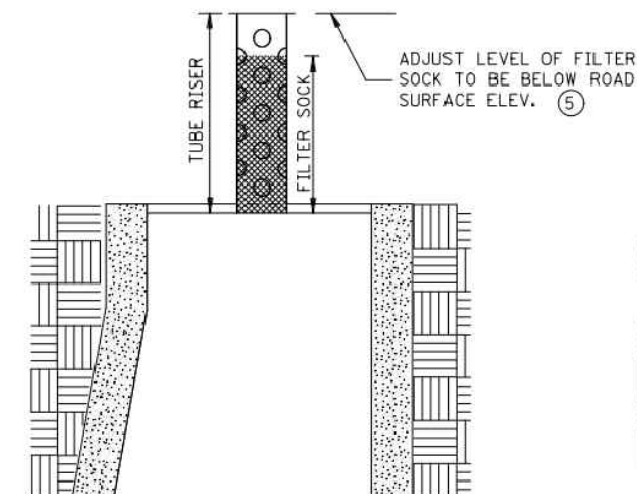
ENDS SECURELY CLOSED TO PREVENT LOSS OF OPEN GRADED AGGREGATE FILL. SECURED WITH 50 PSI. ZIP TIE.



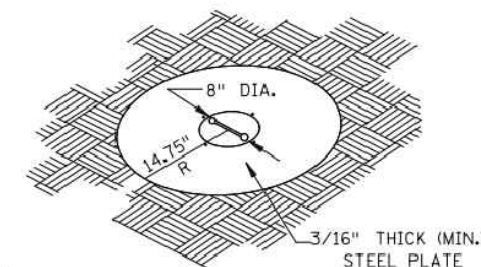
ROCK LOG/COMPOST LOG



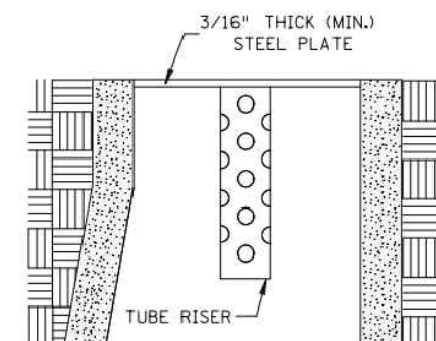
TUBE RISER



SECTION (UP POSITION)

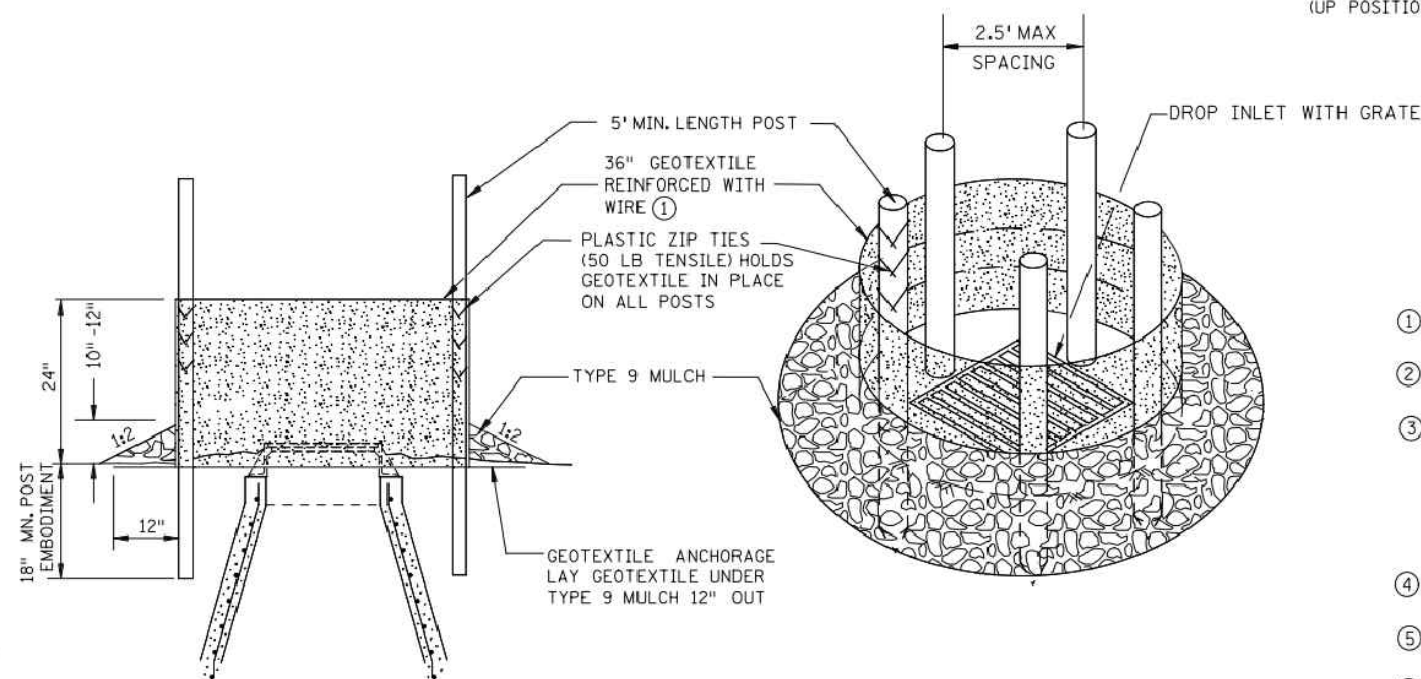


PERSPECTIVE VIEW



SECTION (DOWN POSITION)

POP-UP HEAD



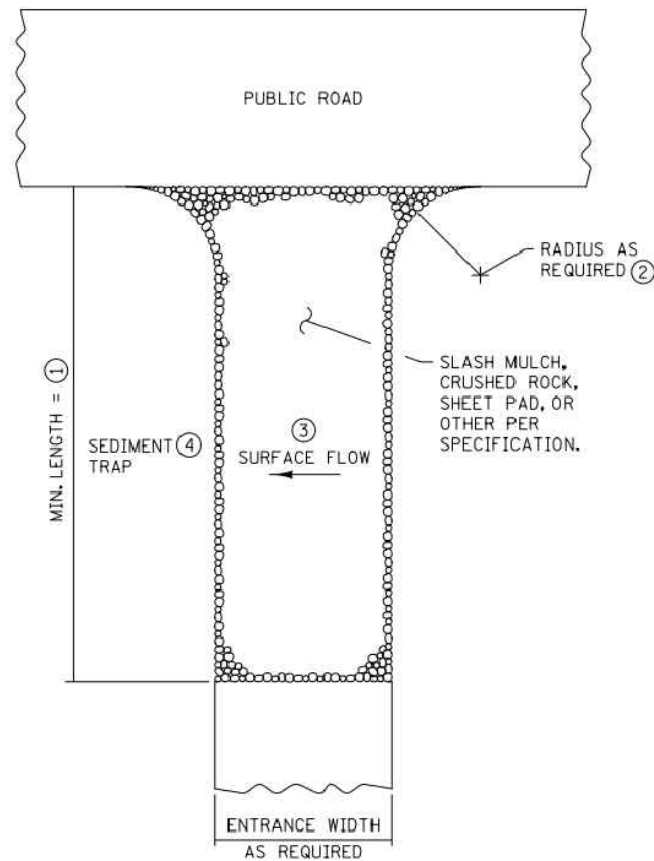
SILT FENCE RING AND ROCK FILTER BERM
USE WHERE INLET DRAINS IN AN AREA WITH SLOPES AT 1:3 OR LESS

NOTES:

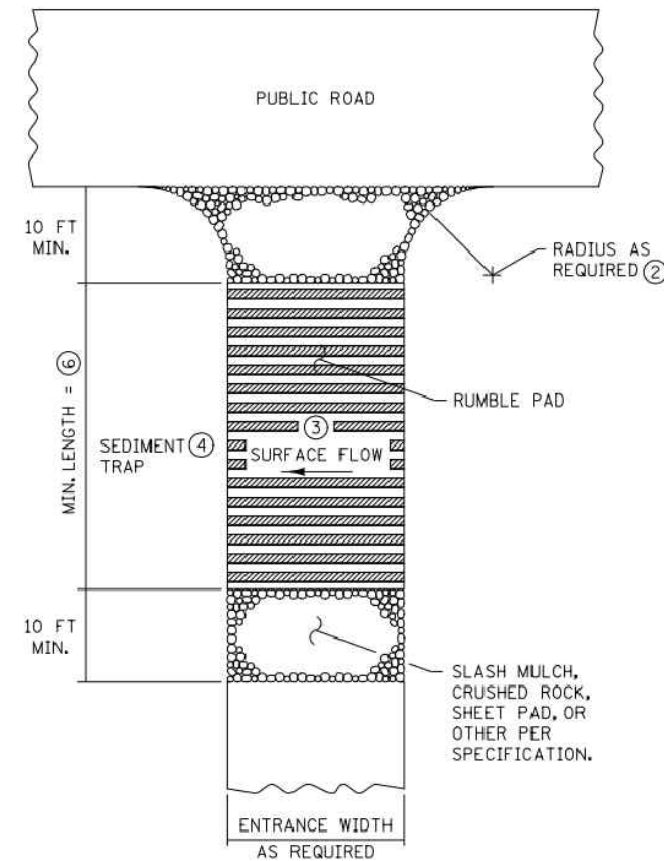
SEE SPECS. 2573, 3137, & 3886.

DEVICES MUST BE ADJUSTED ACCORDINGLY AS TO NOT CAUSE FLOODING ON ROADWAY THAT WOULD IMPEED TRAFFIC FLOW.

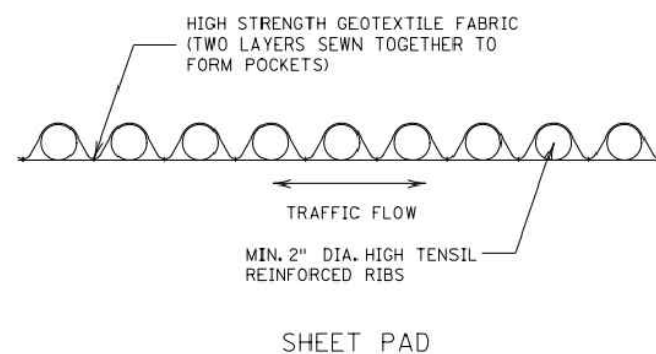
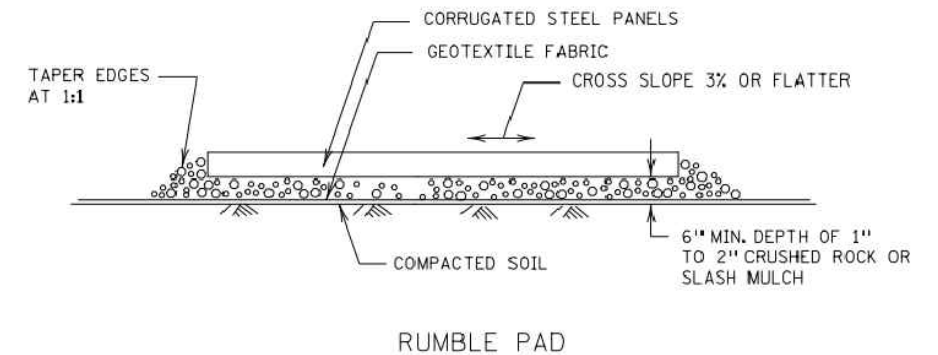
- ① ALL GEOTEXTILE USED FOR INLET PROTECTION SHALL BE MONOFILAMENT IN BOTH DIRECTIONS, MEETING SPEC. 3886.
- ② FINISHED SIZE, INCLUDING POCKETS WHERE REQUIRED SHALL EXTEND A MINIMUM OF 10 INCHES AROUND THE PERIMETER TO FACILITATE MAINTENANCE OR REMOVAL.
- ③ INSTALLATION NOTES:
DO NOT PLACE FILTER BAG INSERT IN INLETS SHALLOWER THAN 30 INCHES, MEASURED FROM THE BOTTOM OF THE INLET TO THE TOP OF THE GRATE. THE PLACED BAG SHALL HAVE A MINIMUM SIDE CLEARANCE OF 3 INCHES BETWEEN THE INLET WALLS AND THE BAG, MEASURED AT THE BOTTOM OF THE OVERFLOW HOLES. WHERE NECESSARY THE CONTRACTOR SHALL CLINCH THE BAG, USING PLASTIC ZIP TIES, TO ACHIEVE THE 3 INCH SIDE CLEARANCE.
- ④ FLAP POCKETS SHALL BE LARGE ENOUGH TO ACCEPT WOOD 2 INCH X 4 INCH OR USE A ROCK SOCK OR SAND BAGS IN PLACE OF THE FLAP POCKETS.
- ⑤ SOCK HEIGHT MUST NOT BE SO HIGH AS TO SLOW DOWN WATER FILTRATION TO CAUSE FLOODING OF THE ROADWAY.
- ⑥ GEOTEXTILE SOCK BETWEEN 4-10 FEET LONG AND 4-6 INCH DIAMETER. SEAM TO BE JOINED BY TWO ROWS OF STITCHING WITH A PLASTIC MESH BACKING OR PROVIDE A HEAT BONDED SEAM (OR APPROVED EQUIVALENT). FILL ROCK LOG WITH OPEN GRADED AGGREGATE CONSISTING OF SOUND DURABLE PARTICLES OF COARSE AGGREGATE CONFORMING TO SPEC. 3137 TABLE 3137-1; CA-3 GRADATION.



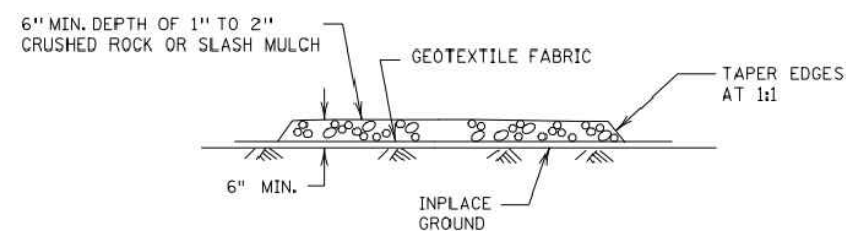
SLASH MULCH, CRUSHED ROCK, OR SHEET PAD CONSTRUCTION EXIT ⑤⑦



RUMBLE PAD CONSTRUCTION EXIT ⑤⑦



SHEET PAD



SLASH MULCH OR CRUSHED ROCK

NOTES:

SEE SPECS. 2573 & 3882.

- ① MINIMUM LENGTH SHALL BE THE GREATER OF 50 FEET OR A LENGTH SUFFICIENT TO ALLOW A MINIMUM OF 5 TIRE ROTATIONS ON THE PROVIDED PAD. MINIMUM LENGTH SHALL BE CALCULATED USING THE LARGEST TIRE WHICH WILL BE USED IN TYPICAL OPERATIONS.
- ② PROVIDE RADIUS OR WIDEN PAD SUFFICIENTLY TO PREVENT VEHICLE TIRES FROM TRACKING OFF OF PAD WHEN LEAVING SITE.
- ③ IF RUNOFF FROM DISTURBED AREAS FLOWS TOWARD CONSTRUCTION EXITS, PREVENT RUNOFF FROM DRAINING DIRECTLY TO PUBLIC ROAD OVER CONSTRUCTION EXIT BY CROWNING THE EXIT OR SLOPING TO ONE SIDE. IF SURFACE GRADING IS INSUFFICIENT, PROVIDE OTHER MEANS OF INTERCEPTING RUNOFF.
- ④ IF RUNOFF FROM CONSTRUCTION EXITS WILL DRAIN OFF OF PROJECT SITE, PROVIDE SEDIMENT TRAP WITH STABILIZED OVERFLOW.
- ⑤ IF A TIRE WASH OFF IS REQUIRED THE CONSTRUCTION EXITS SHALL BE GRADED TO DRAIN THE WASH WATER TO A SEDIMENT TRAP.
- ⑥ MINIMUM LENGTH OF RUMBLE PAD SHALL BE 20 FEET, OR AS REQUIRED TO REMOVE SEDIMENT FROM TIRES. IF SIGNIFICANT SEDIMENT IS TRACKED FROM THE SITE, THE RUMBLE PAD SHALL BE LENGTHENED OR THE DESIGN MODIFIED TO PROVIDE ADDITIONAL VIBRATION. WASH-OFF LENGTH SHALL BE AS REQUIRED TO EFFECTIVELY REMOVE CONSTRUCTION SEDIMENT FROM VEHICLE TIRES.
- ⑦ MAINTENANCE OF CONSTRUCTION EXITS SHALL OCCUR WHEN THE EFFECTIVENESS OF SEDIMENT REMOVAL HAS BEEN REDUCED. MAINTENANCE SHALL CONSIST OF REMOVING SEDIMENT AND CLEANING THE MATERIALS OR PLACING ADDITIONAL MATERIAL (SLASH MULCH OR CRUSHED ROCK) OVER SEDIMENT FILLED MATERIAL TO RESTORE EFFECTIVENESS.

REVISION:
APPROVED: 2-28-2017
[Signature]
CHIEF ENVIRONMENTAL OFFICER

S.A.P. 197-124-004

S.P. 0208-143 (TH 65)

m
MINNESOTA
DEPARTMENT
OF
TRANSPORTATION

[Signature]
STATE DESIGN ENGINEER

REVISED:

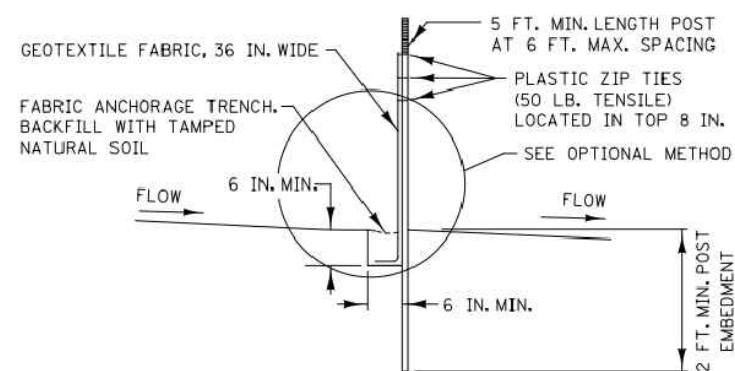
APPROVED:

2-28-2017

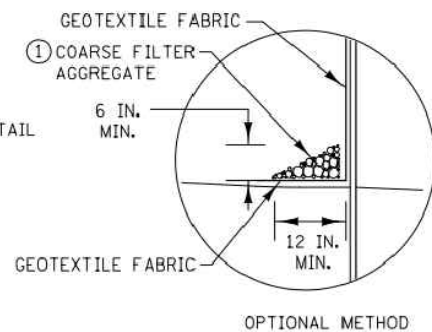
TEMPORARY SEDIMENT CONTROL 5 OF 8
STABILIZED CONSTRUCTION EXIT

STANDARD PLAN 5-297.405

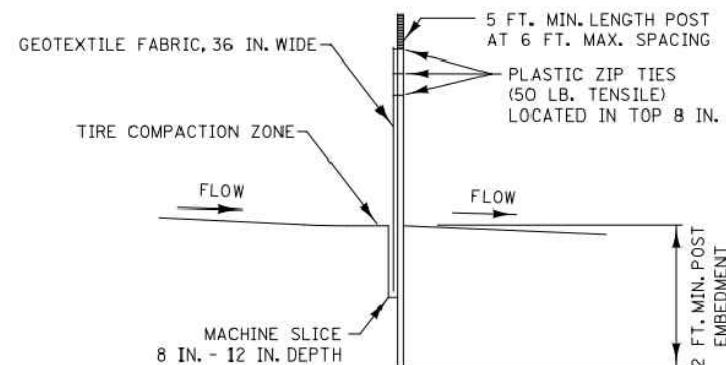
12 OF 44



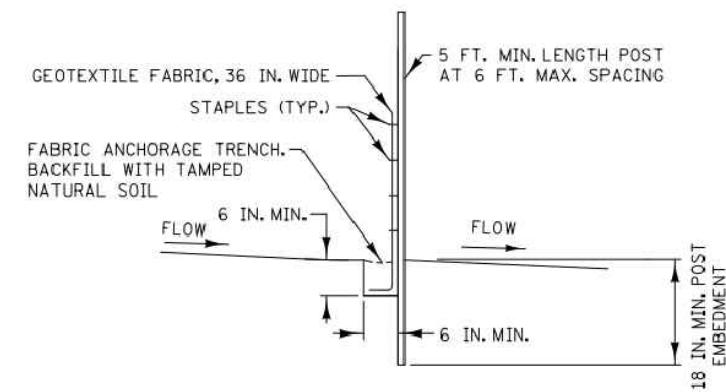
SILT FENCE TYPE HI ②
(HAND INSTALLED)



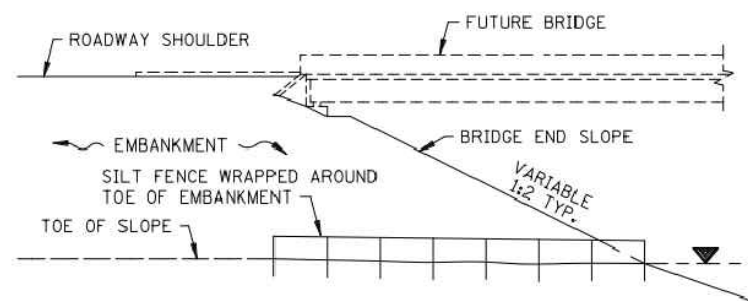
OPTIONAL METHOD



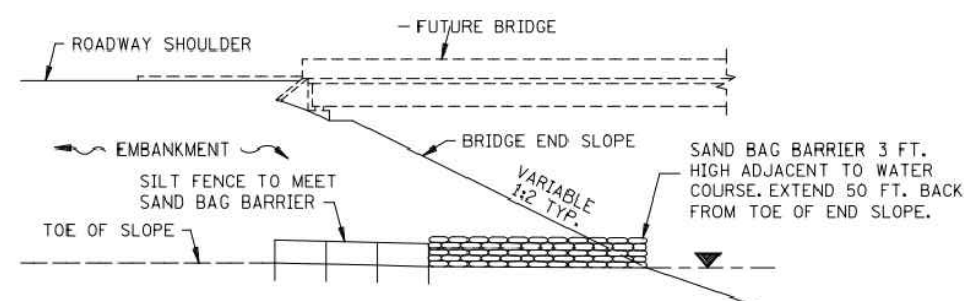
SILT FENCE TYPE MS ②
(MACHINE SLICED)



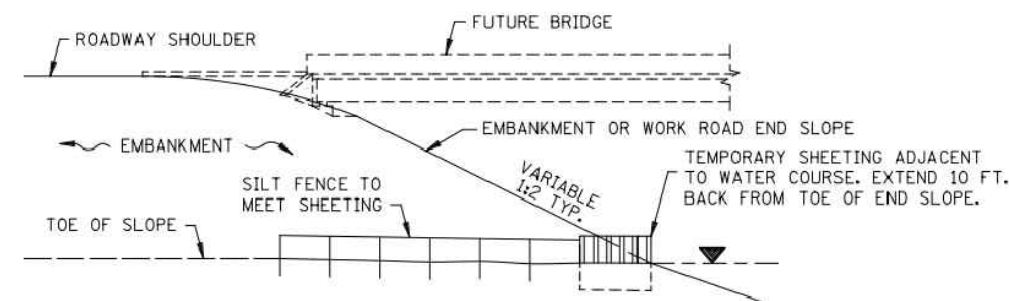
SILT FENCE TYPE PA ③
(PREASSEMBLED)



SILT FENCE ONLY ④

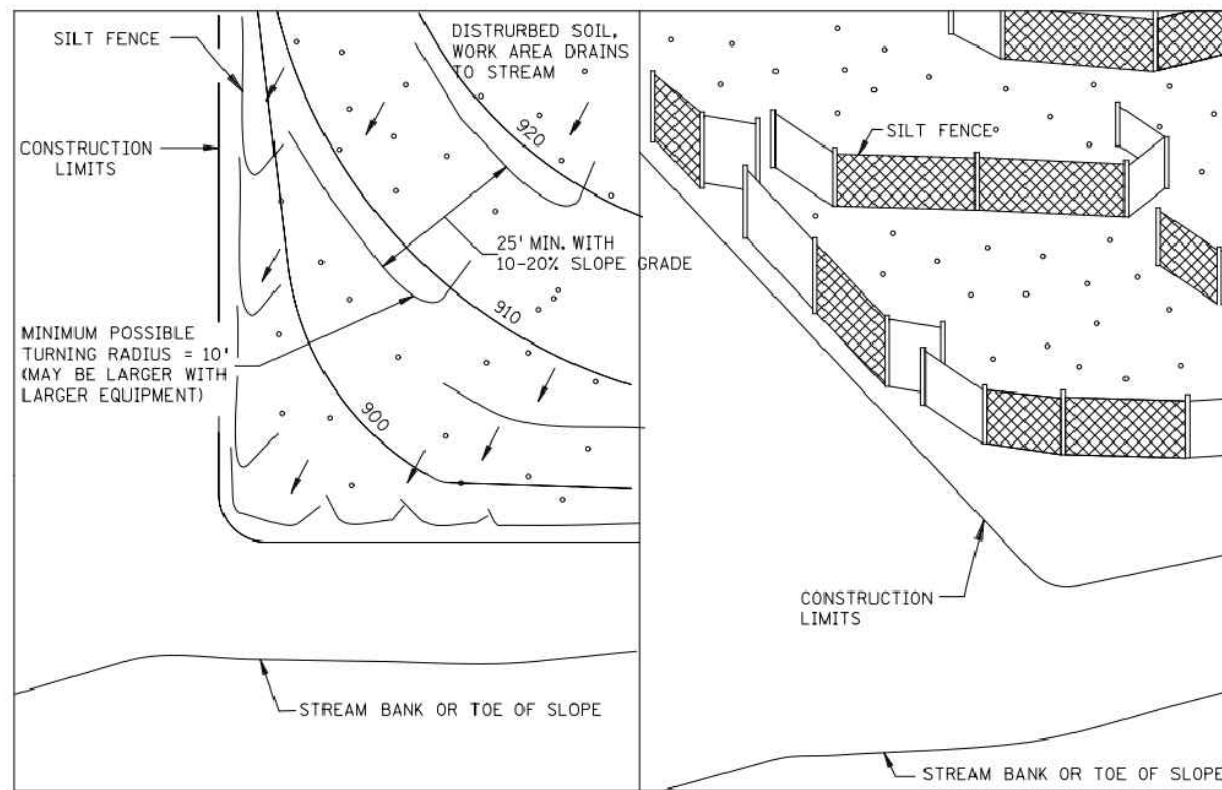


SILT FENCE WITH SAND BAGS ⑤



SILT FENCE WITH SHEETING ⑥

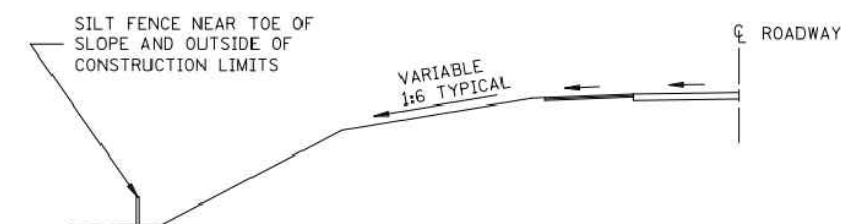
INSTALLATION AT BRIDGE EMBANKMENT ADJACENT TO WATER



PLAN VIEW

PERSPECTIVE VIEW

J-HOOK INSTALLATION



LOCATION AT TOE OF ROADWAY EMBANKMENT

NOTES:

SEE SPECS. 2573, 3149 & 3886.

- ① COARSE FILTER AGGREGATE (SPEC. 3149) SHALL BE INCIDENTAL.
- ② TO PROTECT AREAS FROM SHEET FLOW. MAXIMUM CONTRIBUTING AREA: 1 ACRE.
- ③ TO PROTECT AREAS FROM SHEET FLOW. MAXIMUM CONTRIBUTING AREA: 0.25 ACRE.
- ④ WATER COURSE FLOW VELOCITY: STANDING. CONTRIBUTING SLOPE AREA: 1/2 ACRE.
- ⑤ WATER COURSE FLOW VELOCITY: 1 TO 7 FT./SEC. CONTRIBUTING SLOPE AREA: 1 ACRE.
- ⑥ WATER COURSE FLOW VELOCITY: 8 TO 15 FT./SEC. CONTRIBUTING SLOPE AREA: 3 ACRES.

REVISION:
APPROVED: 2-28-2017
CHIEF ENVIRONMENTAL OFFICER

S.A.P. 197-124-004

S.P. 0208-143 (TH 65)

MINNESOTA
DEPARTMENT
OF
TRANSPORTATION

STATE DESIGN ENGINEER

REVISED:

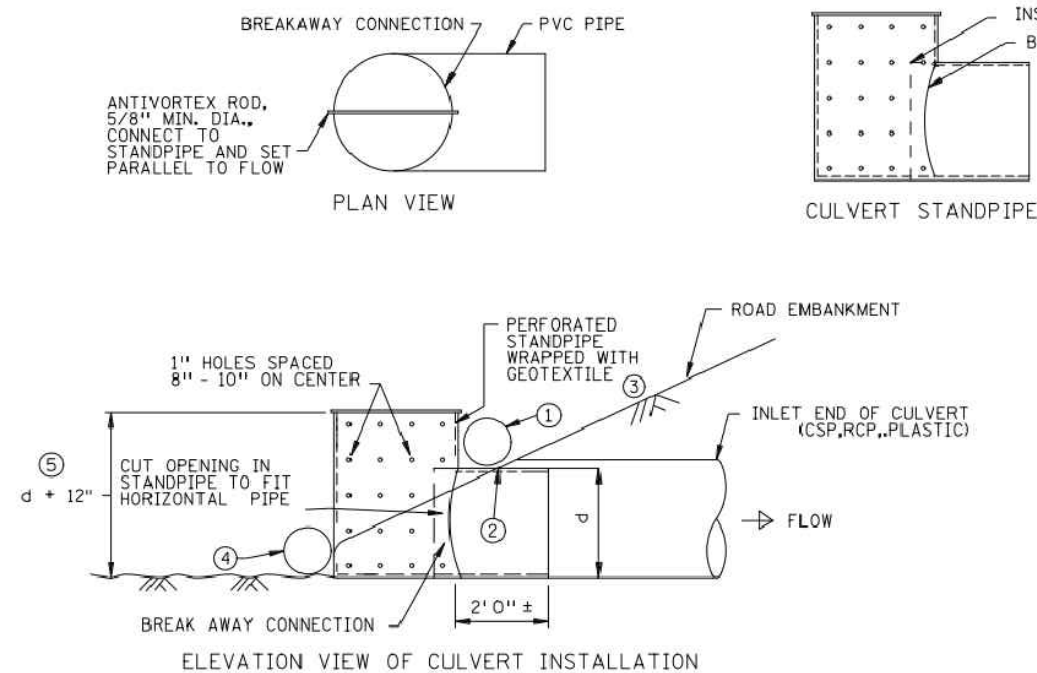
APPROVED:

2-28-2017

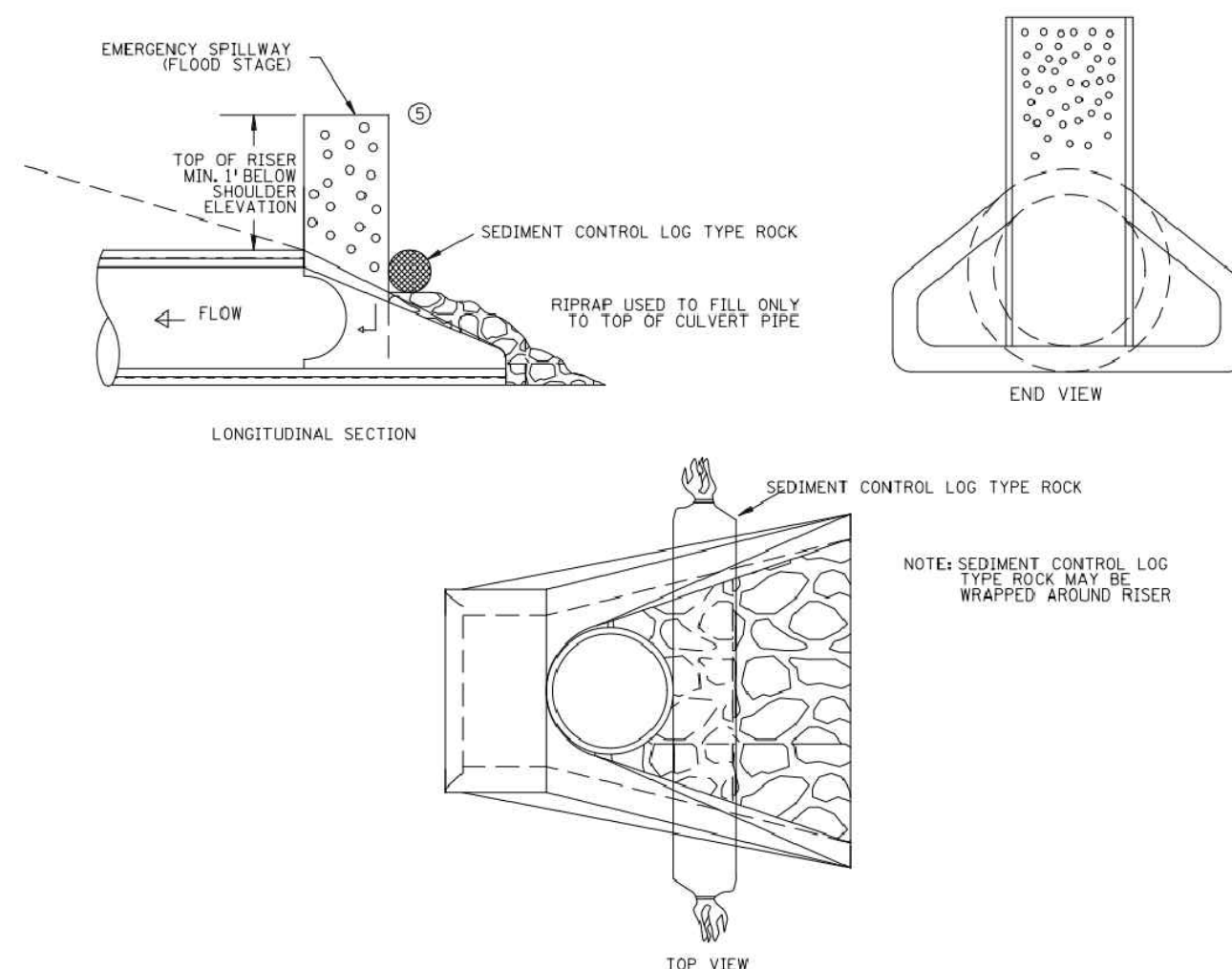
TEMPORARY SEDIMENT CONTROL 6 OF 8
SILT FENCE

STANDARD PLAN 5-297.405

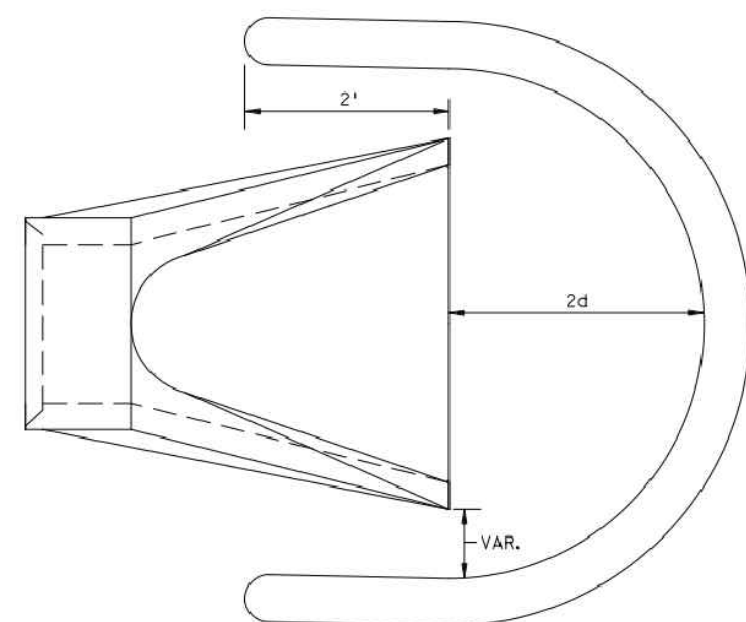
13 OF 44



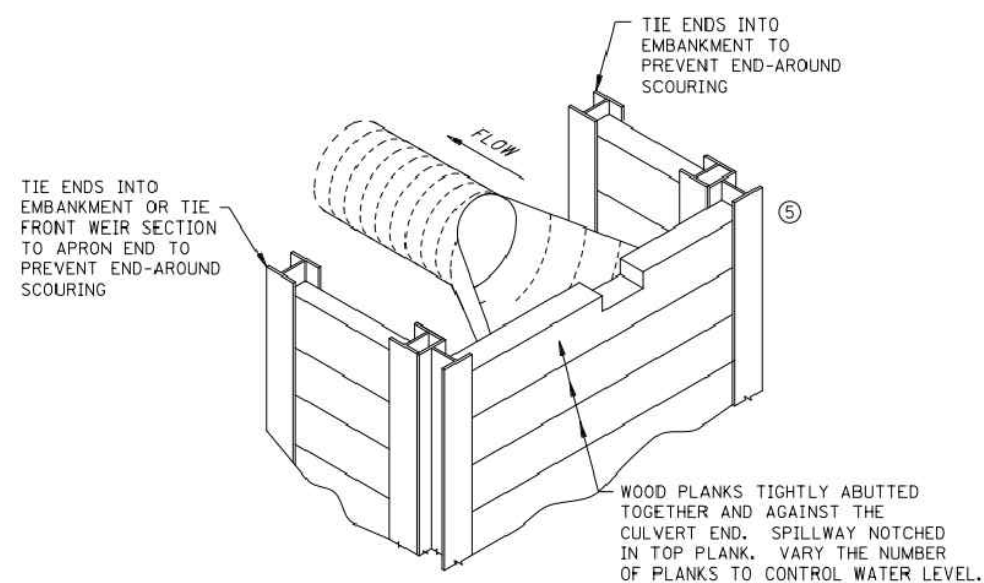
CULVERT STANDPIPE INSERT (D-RISER)
d = CULVERT SIZE: 12" - 36"



CULVERT STANDPIPE INSERT (D-RISER)



SEDIMENT CONTROL LOG WEIR
(COMPOST, WOOD CHIP, OR ROCK)
d = CULVERT SIZE: 12" - 36"



WOOD PLANK WEIR

- NOTES:
- SEE SPECS. 2573, 3891 & 3893.
- FOR USE WHEN TEMPORARY PONDING IS NEEDED IN DITCH SECTIONS FOR SEDIMENT CONTROL.
- MANUFACTURED ALTERNATIVES LISTED ON MnDOT'S APPROVED PRODUCTS LIST MAY BE SUBSTITUTED AT NO ADDITIONAL COST.
- ROCK LOG OR SANDBAG TO HOLD STANDPIPE AND ACT AS A SEAL BETWEEN RISER PIPE AND CULVERT.
 - PLACE CULVERT APRON AND SLIDE TEMPORARY STANDPIPE INTO CSP OR RCP CULVERT.
 - ALL GEOTEXTILE USED FOR CULVERT PROTECTION SHALL BE MONOFILAMENT IN BOTH DIRECTIONS, MEETING SPEC. 3886 FOR MACHINE SLICED.
 - ROCK LOG OR RIP RAP TO HOLD STANDPIPE AND ACT AS A FILTER BETWEEN RISER PIPE AND CULVERT.
 - HEIGHT OVERFLOW NOT TO CAUSE FLOODING OF ROAD OR ADJACENT PROPERTIES.

REVISION:

APPROVED: 2-28-2017

CHIEF ENVIRONMENTAL OFFICER

S.A.P. 197-124-004

S.P. 0208-143 (TH 65)

MINNESOTA
DEPARTMENT
OF
TRANSPORTATION

STATE DESIGN ENGINEER

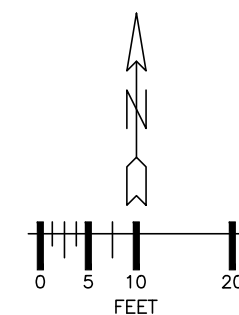
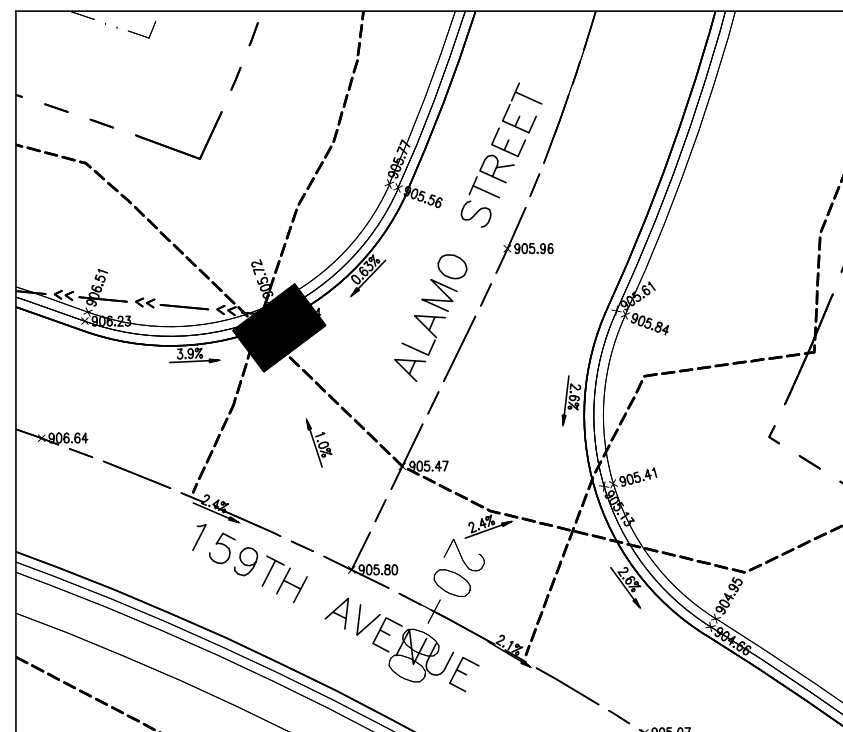
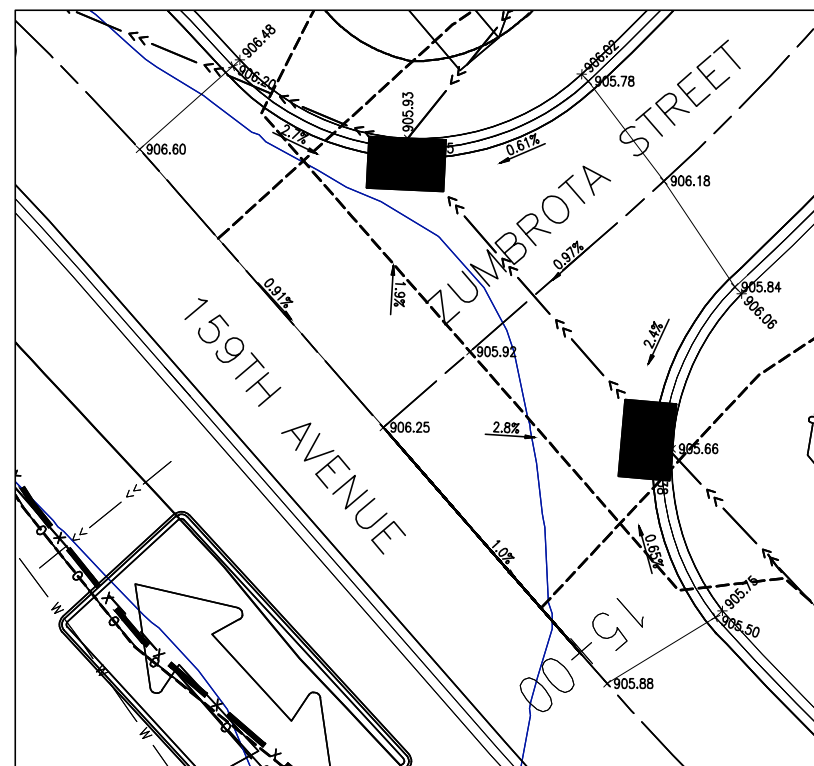
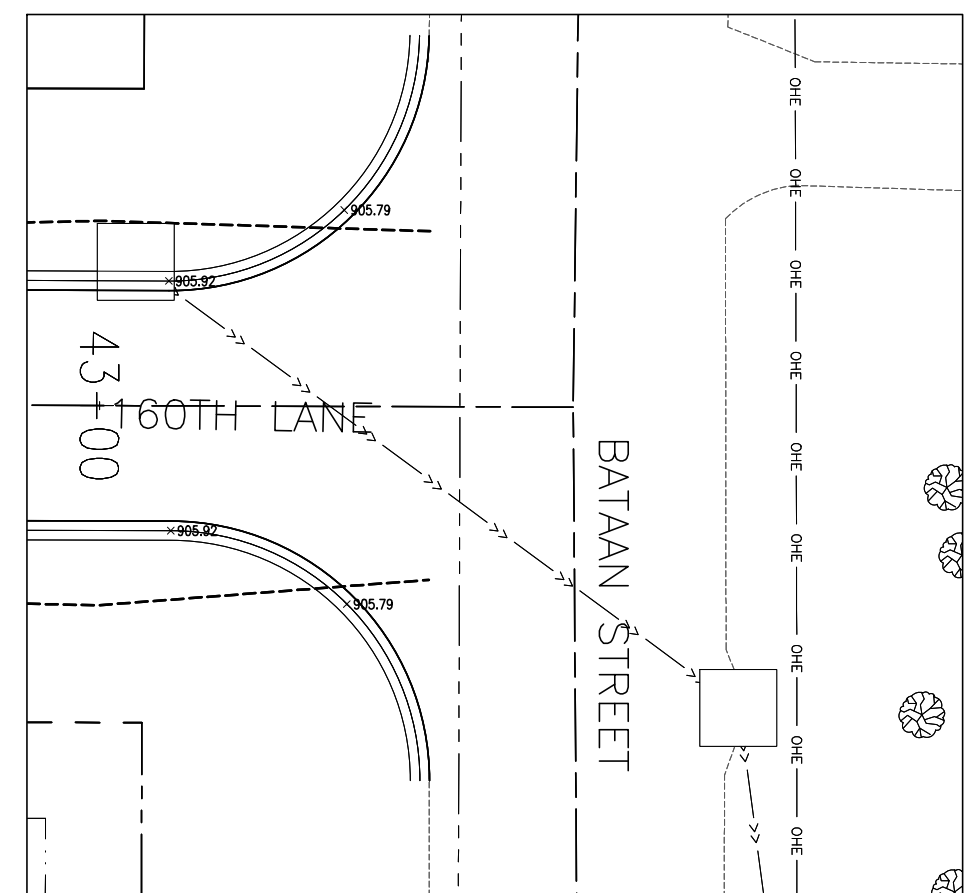
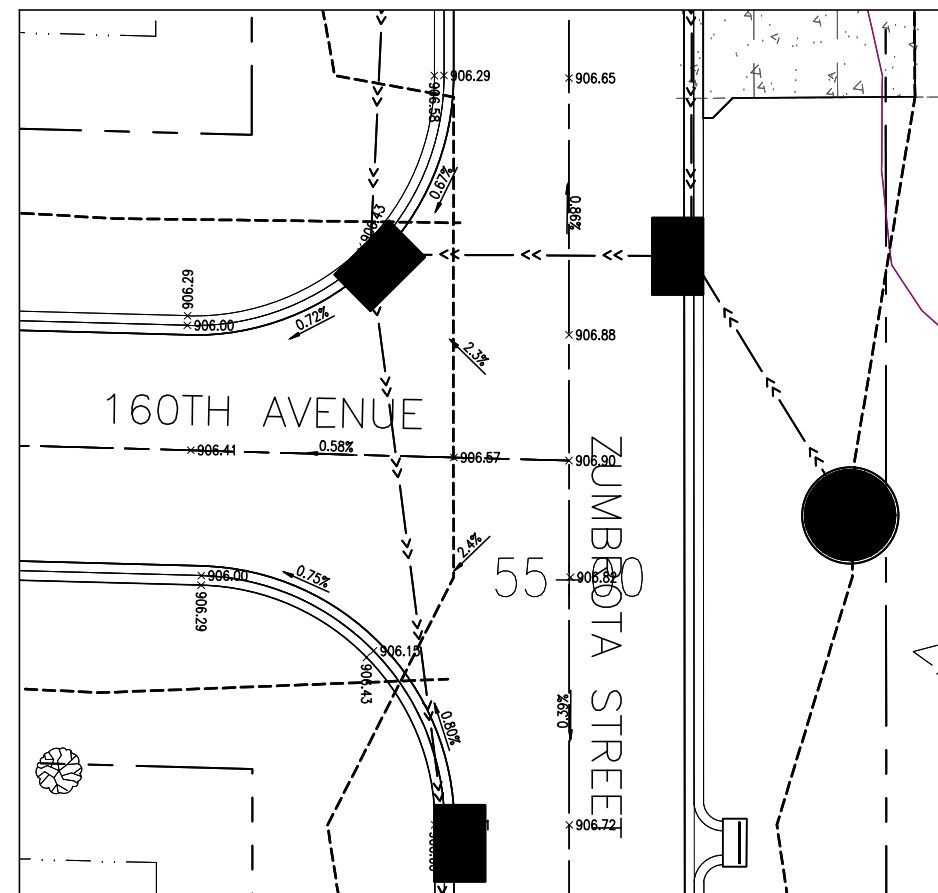
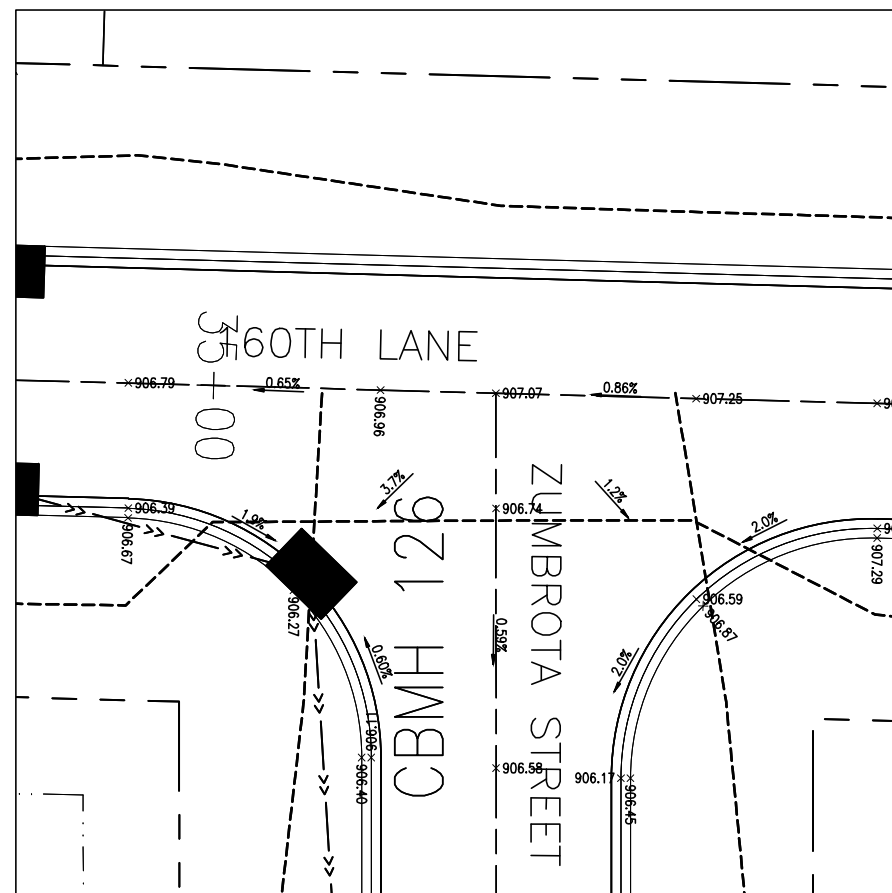
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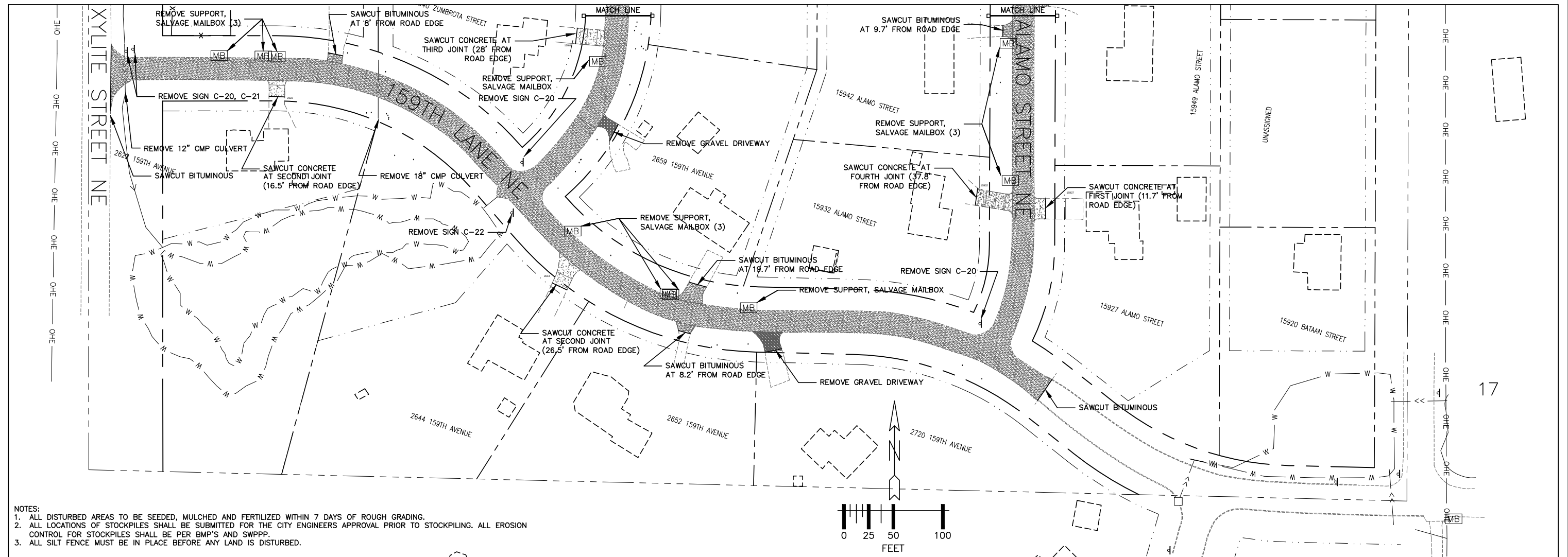
APPROVED:

2-28-2017

TEMPORARY SEDIMENT CONTROL 8 OF 8
CULVERT END CONTROLS

STANDARD PLAN 5-297.405 14 OF 44





NOTES:

1. ALL DISTURBED AREAS TO BE SEEDED, MULCHED AND FERTILIZED WITHIN 7 DAYS OF ROUGH GRADING.
2. ALL LOCATIONS OF STOCKPILES SHALL BE SUBMITTED FOR THE CITY ENGINEERS APPROVAL PRIOR TO STOCKPILING. ALL EROSION CONTROL FOR STOCKPILES SHALL BE PER BMP'S AND SWPPP.
3. ALL SILT FENCE MUST BE IN PLACE BEFORE ANY LAND IS DISTURBED.



UTILITIES:	CENTURYLINK	(763)	712-5017
	CENTERPOINT ENERGY	(763)	323-2760
	COMCAST	(952)	607-4078
	CONNEXUS ENERGY	(763)	323-4268
	XCEL ENERGY	(612)	526-4508

I HEREBY CERTIFY THAT THIS PLAN WAS
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DIRECT SUPERVISION AND THAT I AM A
DULY REGISTERED PROFESSIONAL
ENGINEER UNDER THE LAWS OF THE
STATE OF MINNESOTA.

DATE _____ REG. NO. _____

RFC ENGINEERING, INC.
Consulting Engineers

13635 Johnson Street
Ham Lake, MN 55304
Telephone 763-862-8000
Fax 763-862-8042

DESIGN BY: GJM

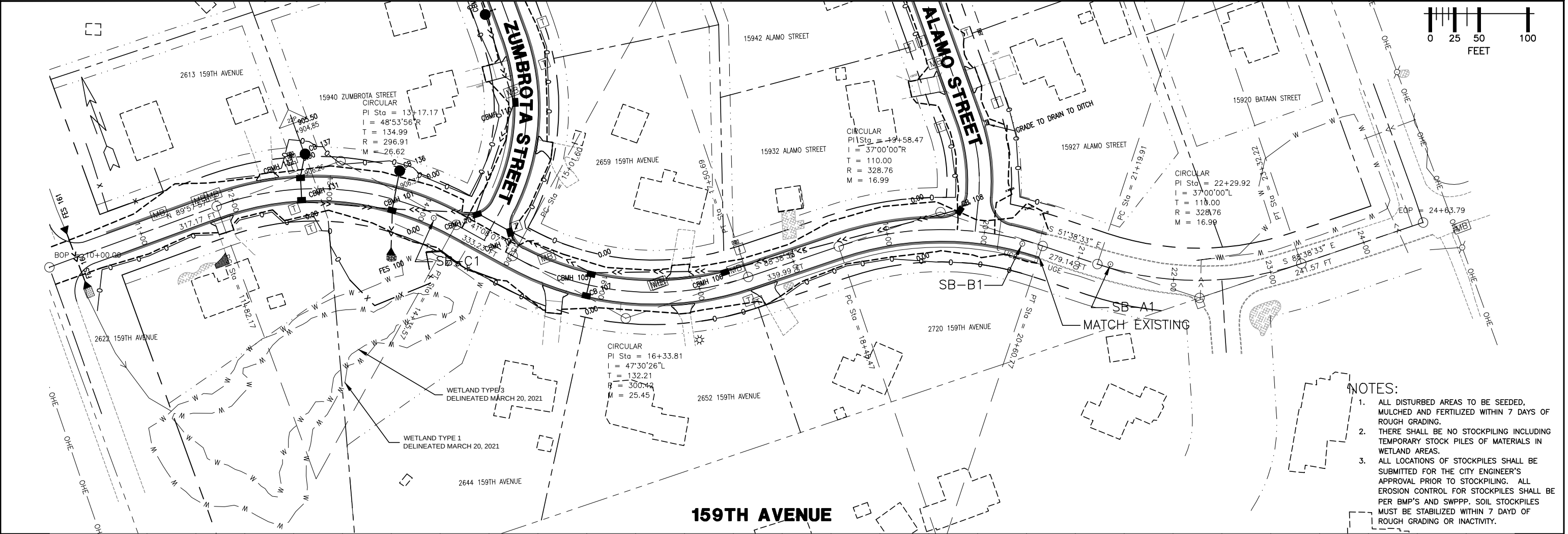
DRAWN BY: GJM

CHECKED BY: TPC

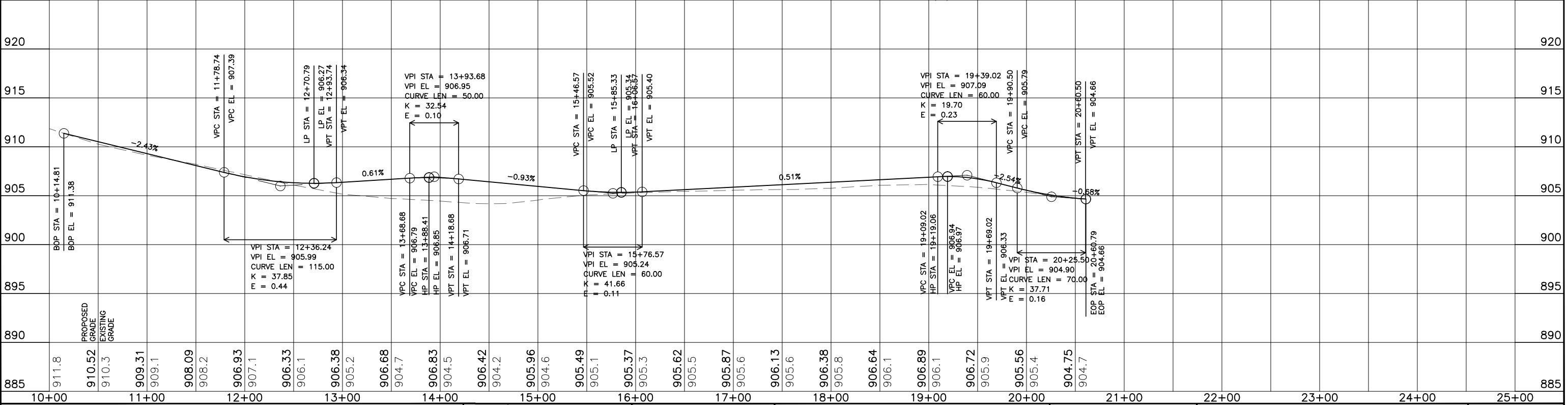
HAM LAKE IMPROVEMENT PROJECT 1907
LUND'S LAKEVIEW FOREST RECONSTRUCTION
159TH AVE NE, 160TH LN NE, AND OTHERS

159TH LANE AND 160TH LANE
REMOVALS

DWG:	1907 REMOVAL 1
DATE:	04/23/21
JOB NUMBER:	1907
SHEET:	16 OF 44
FILE:	35-1-145



- NOTES:**
1. ALL DISTURBED AREAS TO BE SEEDED, MULCHED AND FERTILIZED WITHIN 7 DAYS OF ROUGH GRADING.
 2. THERE SHALL BE NO STOCKPILING INCLUDING TEMPORARY STOCK PILES OF MATERIALS IN WETLAND AREAS.
 3. ALL LOCATIONS OF STOCKPILES SHALL BE SUBMITTED FOR THE CITY ENGINEER'S APPROVAL PRIOR TO STOCKPILING. ALL EROSION CONTROL FOR STOCKPILES SHALL BE PER BMP'S AND SWPPP. SOIL STOCKPILES MUST BE STABILIZED WITHIN 7 DAY OF ROUGH GRADING OR INACTIVITY.





800-252-1166 651-454-0002
PLOT DATE: 4/23/2021 12:30

UTILITIES:

CENTURYLINK	(763) 712-5017
CENTERPOINT ENERGY	(763) 323-2760
COMCAST	(952) 607-4078
CONNEXUS ENERGY	(763) 323-4268
XCEL ENERGY	(612) 526-4508

DATE	REVISION HISTORY

HEREBY CERTIFY THAT THIS PLAN WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

FOR REVIEW PURPOSES ONLY

DATE: _____ REG. NO. _____

RFC ENGINEERING, INC.
Consulting Engineers

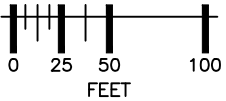
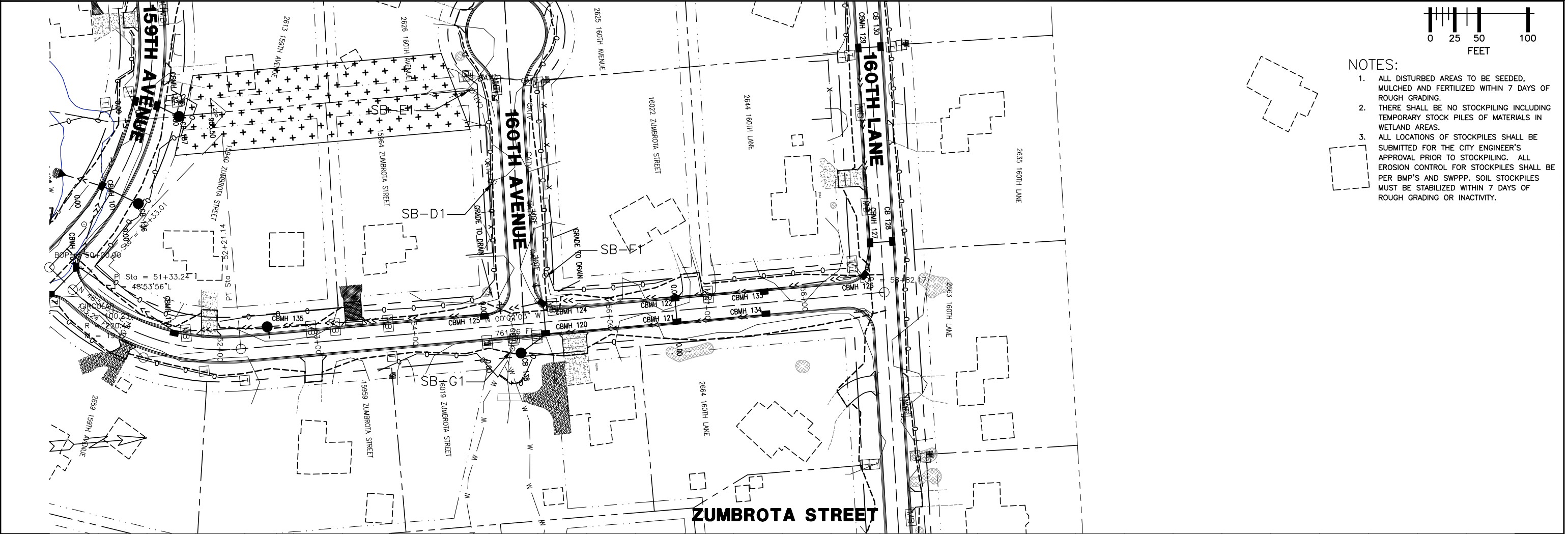
13635 Johnson Street
Ham Lake, MN 55304
Telephone 763-862-8000
Fax 763-862-8042

HAM LAKE IMPROVEMENT PROJECT 1907
LUND'S LAKEVIEW FOREST RECONSTRUCTION
159TH AVE NE, 160TH LN NE, AND OTHERS

159TH AVENUE PLAN AND PROFILE

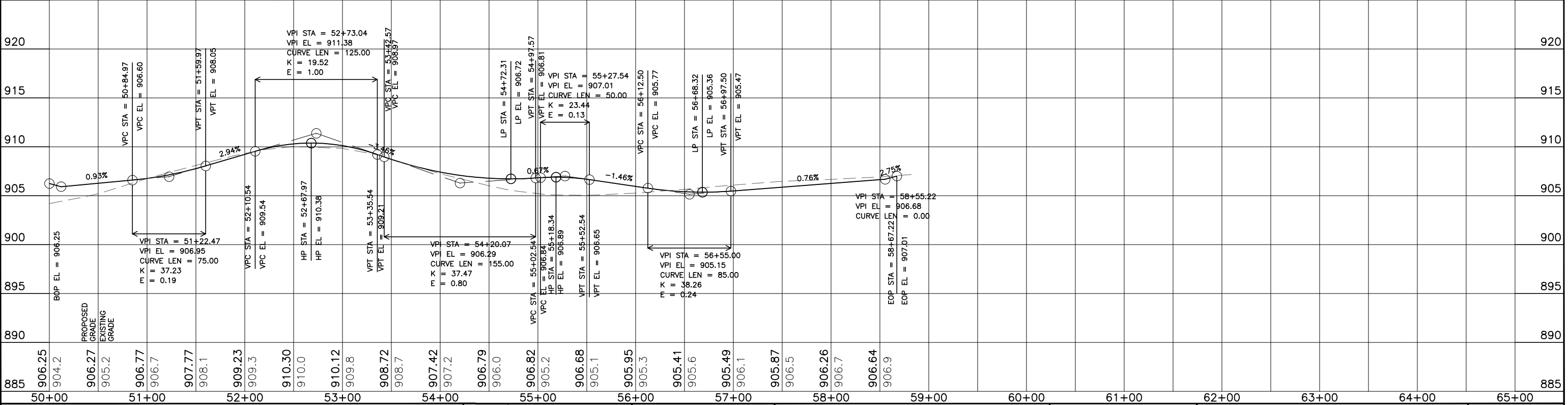
DWG:	RCP01001
DATE:	04/23/21
JOB NUMBER:	1907
SHEET:	18 OF 44
FILE:	35-1-147

DESIGN BY: GJM DRAWN BY: GJM CHECKED BY: TPC



NOTES:

1. ALL DISTURBED AREAS TO BE SEEDED, MULCHED AND FERTILIZED WITHIN 7 DAYS OF ROUGH GRADING.
2. THERE SHALL BE NO STOCKPILING INCLUDING TEMPORARY STOCK PILES OF MATERIALS IN WETLAND AREAS.
3. ALL LOCATIONS OF STOCKPILES SHALL BE SUBMITTED FOR THE CITY ENGINEER'S APPROVAL PRIOR TO STOCKPILING. ALL EROSION CONTROL FOR STOCKPILES SHALL BE PER BMP'S AND SWPPP. SOIL STOCKPILES MUST BE STABILIZED WITHIN 7 DAYS OF ROUGH GRADING OR INACTIVITY.





800-252-1166 651-454-0002
PLOT DATE: 4/23/2021 12:30

UTILITIES:

CENTURYLINK	(763) 712-5017
CENTERPOINT ENERGY	(763) 323-2760
COMCAST	(952) 607-4078
CONNEXUS ENERGY	(763) 323-4268
XCEL ENERGY	(612) 526-4508

DATE	REVISION HISTORY

DATE _____ REG. NO. _____

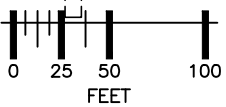
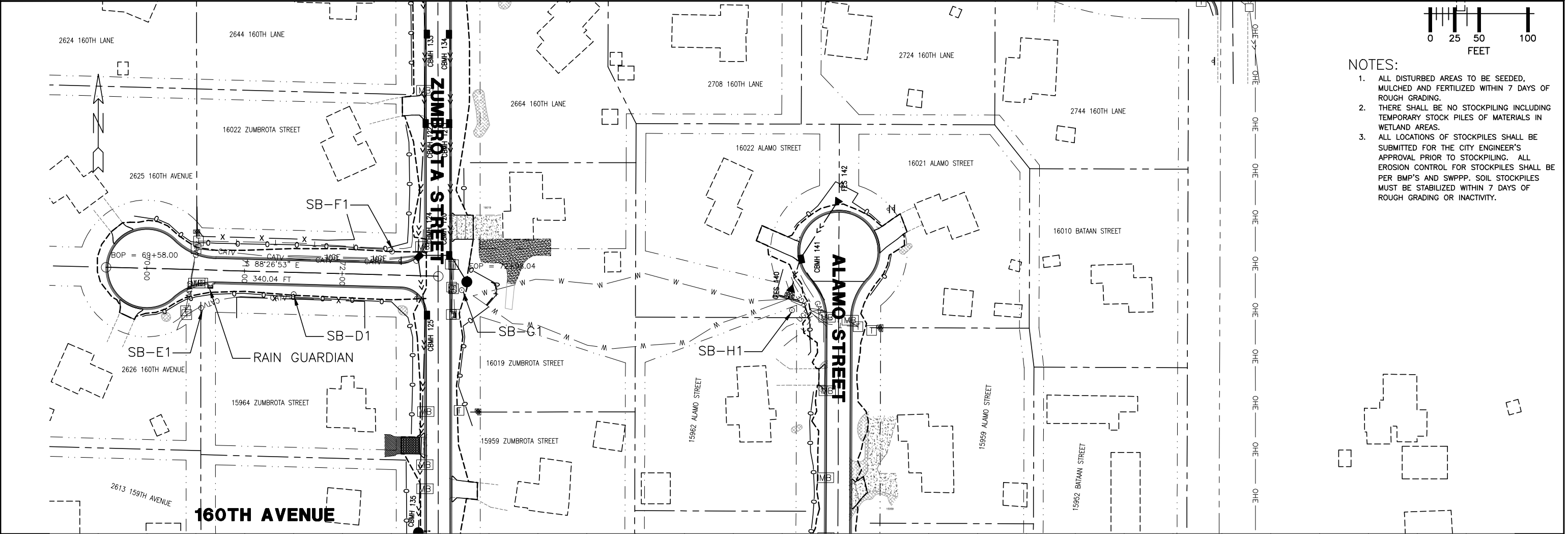
RFC ENGINEERING, INC.
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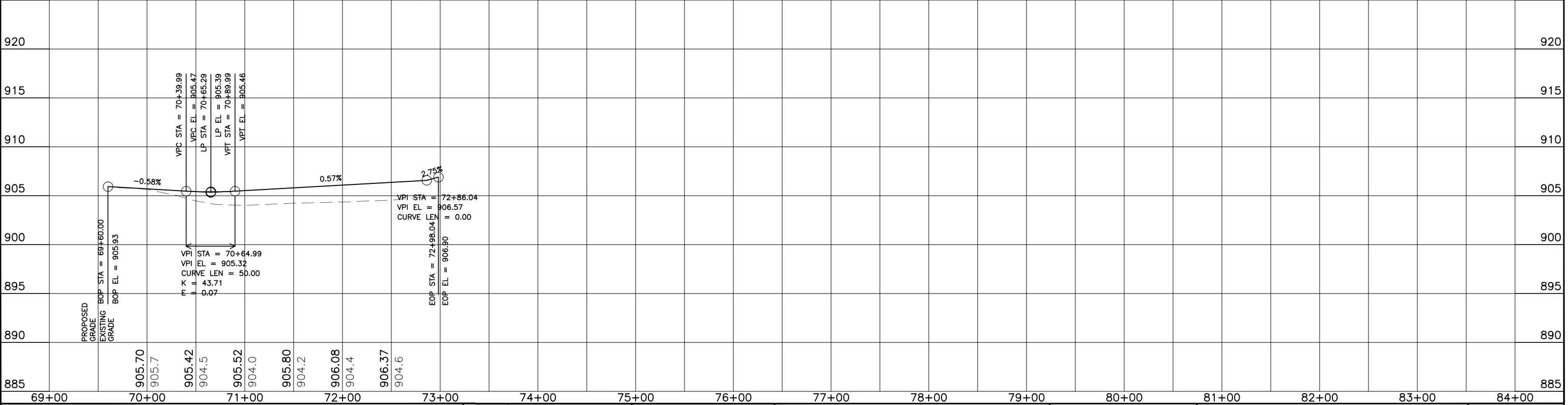
HAM LAKE IMPROVEMENT PROJECT 1907
LUND'S LAKEVIEW FOREST RECONSTRUCTION
159TH AVE NE, 160TH LN NE, AND OTHERS
ZUMBROTA STREET PLAN AND PROFILE

DWG: RCP01003
DATE: 04/23/21
JOB NUMBER: 1907
SHEET: 20 OF 44
FILE: 35-1-149

DESIGN BY: GJM DRAWN BY: GJM CHECKED BY: TPC



- NOTES:
1. ALL DISTURBED AREAS TO BE SEEDED, MULCHED AND FERTILIZED WITHIN 7 DAYS OF ROUGH GRADING.
 2. THERE SHALL BE NO STOCKPILING INCLUDING TEMPORARY STOCK PILES OF MATERIALS IN WETLAND AREAS.
 3. ALL LOCATIONS OF STOCKPILES SHALL BE SUBMITTED FOR THE CITY ENGINEER'S APPROVAL PRIOR TO STOCKPILING. ALL EROSION CONTROL FOR STOCKPILES SHALL BE PER BMP'S AND SWPPP. SOIL STOCKPILES MUST BE STABILIZED WITHIN 7 DAYS OF ROUGH GRADING OR INACTIVITY.



800-252-1166 651-454-0002
PLOT DATE: 4/23/2021 12:30

UTILITIES:

CENTURYLINK	(763) 712-5017
CENTERPOINT ENERGY	(763) 323-2760
COMCAST	(952) 607-4078
CONNEXUS ENERGY	(763) 323-4268
XCEL ENERGY	(612) 526-4508

DATE	REVISION HISTORY

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DATE _____ REG. NO. _____

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Consulting Engineers

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Ham Lake, MN 55304
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Fax 763-862-8042

HAM LAKE IMPROVEMENT PROJECT 1907
LUND'S LAKEVIEW FOREST RECONSTRUCTION
159TH AVE NE, 160TH LN NE, AND OTHERS

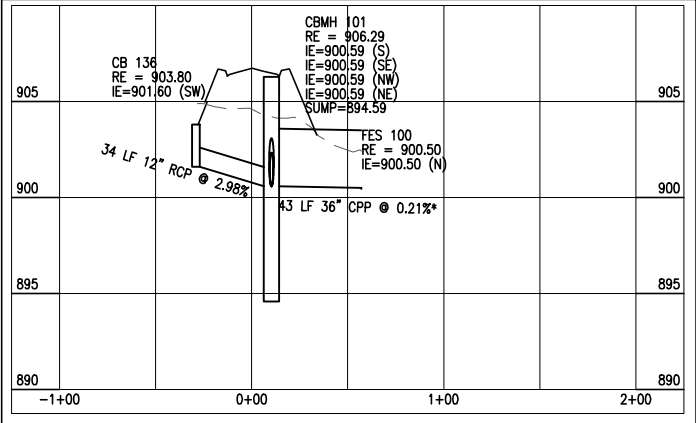
160TH AVENUE PLAN AND PROFILE

DWG: RCP01005
DATE: 04/23/21
JOB NUMBER: 1907
SHEET: 22 OF 44
FILE: 35-1-151

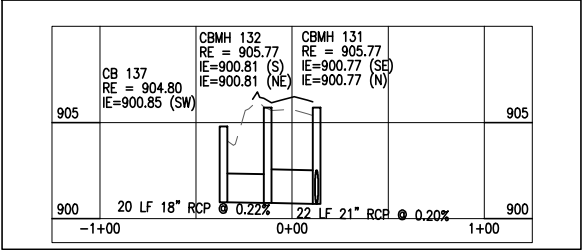
DESIGN BY: GJM DRAWN BY: GJM CHECKED BY: TPC

STORM DRAIN																				
STRUCTURE	STATION	LOCATION	SIZE OF STRUCTURE	DESIGN	TOP OF CASTING OR INLET	INVERT	CASTING ASSEMBLY (NEENAH, EJ, DL)*	TYPE GRATE (NEENAH CASTINGS)	12" R.C.P.	15" R.C.P.	18" R.C.P.	21" R.C.P.	30" R.C.P.	36" C.P.P	PIPE APRON	TRASH GUARD	APRON	FLOWS TO	INLET	% GRADE
									LIN FT	LIN FT	LIN FT	LIN FT	LIN FT	LIN FT	EACH	EACH				
CB 137	12+76.1	LT.	48" ø	RFC-465C1	904.8	900.85	R-2577	c												
											20							CBMH 132	900.81	0.22
CBMH 132	12+70.8	LT.	48" ø	RFC-465A1	905.77	900.81	R-3246	L												
												22						CBMH 131	900.77	0.2
CBMH 131	12+70.8	RT.	48" ø	RFC-465A1	905.77	900.77	R-3246	L												
												87						CBMH 101	900.59	0.2
CB 108	19+71.9	LT.	2' x 3'	RFC-459B	905.36	901.76	R-3246	L												
										244								CBMH 106	901.27	0.2
CBMH 106	17+28.9	LT.	48" ø	RFC-465A1	905.52	901.27	R-3246	L												
										132								CBMH 105	901.00	0.2
CB 107	15+85.3	RT.	2' x 3'	RFC-459B	904.84	901.05	R-3246	L												
									23									CBMH 105	901	0.20
CBMH 105	15+85.3	LT.	48" ø	RFC-465A1	904.84	901	R-3246	L												
												88						CBMH 104	900.83	0.2
CB 136	13+64.8	LT.	48" ø	RFC-465C1	903.8	901.6	R-2577	c												
									34									CBMH 101	900.59	2.98
CBMH 104	14+88.7	LT.	48" ø	RFC-465A1	905.3	900.83	R-3246	L												
												34						CBMH 103	900.75	0.21
CBMH 103	14+48.5	LT.	96" ø	RFC-465A2	905.57	900.75	R-3246	L												
													79					CBMH 101	900.59	0.21
CBMH 101	13+68	RT.	96" ø	RFC-465A2	906.29	900.59	R-3246	L												
														38	5		1	FES 100	900.5	0.21
RG 102	61+07.7	RT	5' x 2.5'	BUNKER	907.19	906.19														
TOTAL									57	376	20	231	79	38	5	4	1			

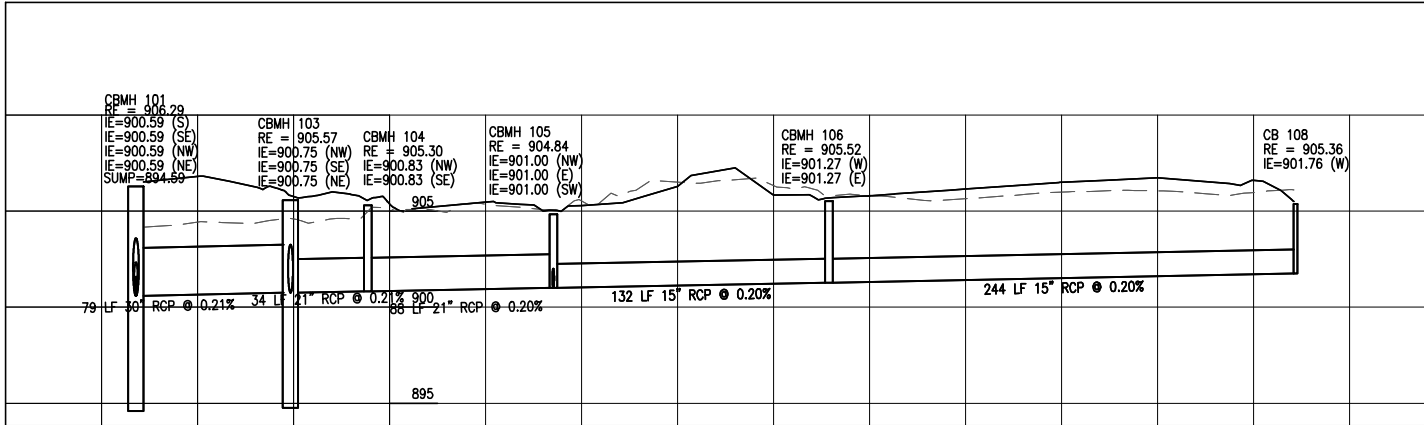
*NEENAH FOUNDRY R-3246; EAST JORDAN IRON WORKS V-4520; D&L FOUNDRY I-1804.



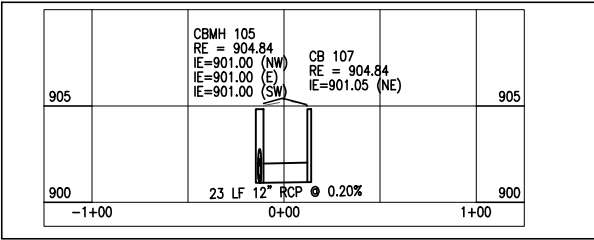
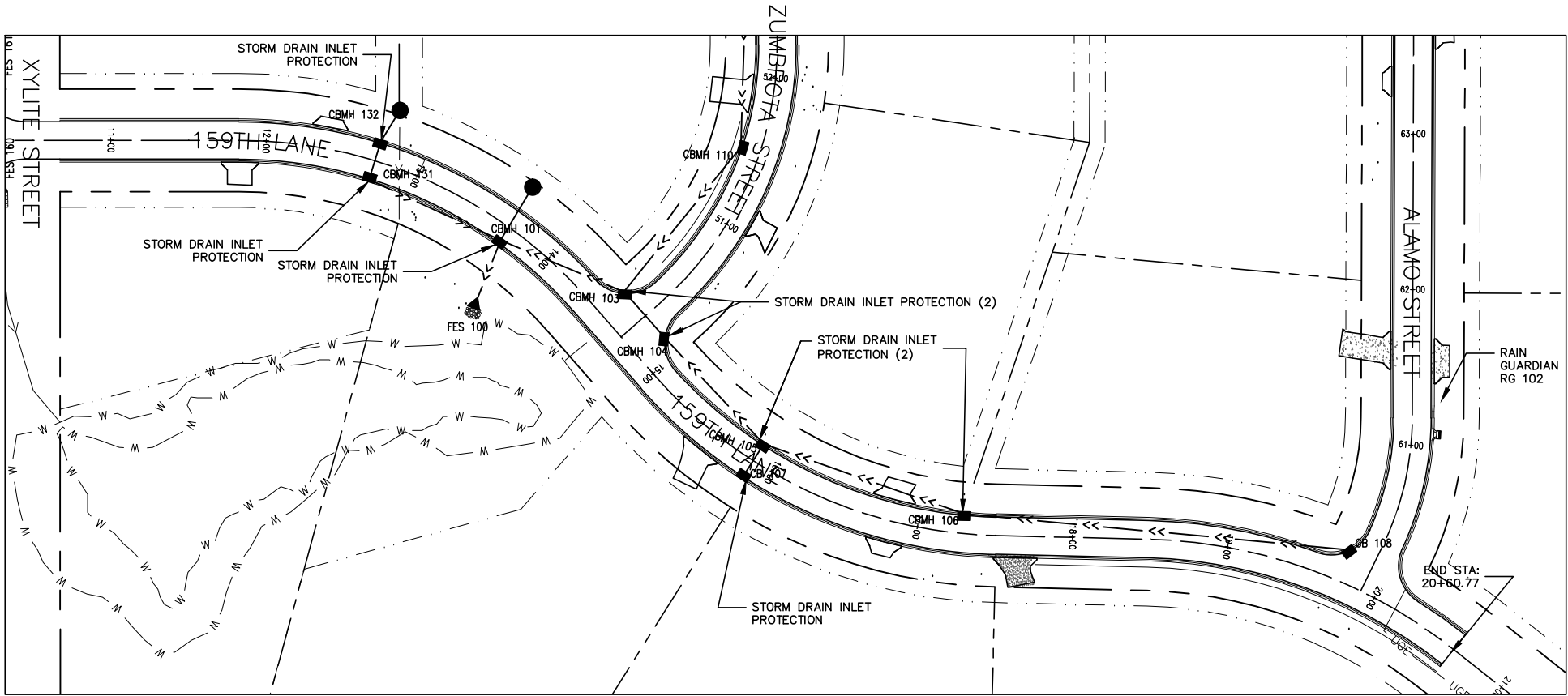
CB 136 TO CBMH 101 TO FES 100



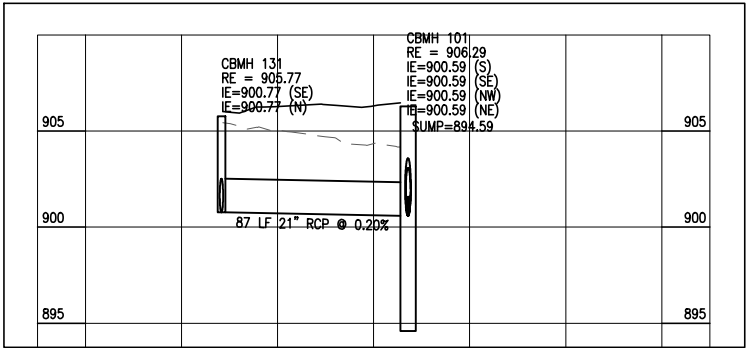
CBMH 137 TO CBMH 132 TO CBMH 131



CBMH 108 TO CBMH 106 TO CBMH 105 TO CBMH 104 TO CBMH 103 TO CBMH 101



CB 107 TO CBMH 105



CBMH 131 TO CBMH 101

NOTES:

1. ALL GRADING OPERATIONS SHALL BE CONDUCTED IN A MANNER TO MINIMIZE THE POTENTIAL FOR SITE EROSION.
2. ALL EXPOSED SOIL AREAS MUST BE STABILIZED AS SOON AS POSSIBLE TO LIMIT SOIL EROSION BUT IN NO CASE MORE THAN 7 DAYS.
3. SLOPES SHOWN ARE FROM CENTER OF STRUCTURE TO CENTER OF STRUCTURE

*PIPE LENGTHS IN PROFILE VIEW INCLUDE PIPE AND APRON



UTILITIES: CENTURYLINK (763) 712-5017
CENTERPOINT ENERGY (763) 323-2760
COMCAST (952) 607-4078
CONNEXUS ENERGY (763) 323-4268
XCEL ENERGY (612) 526-4508

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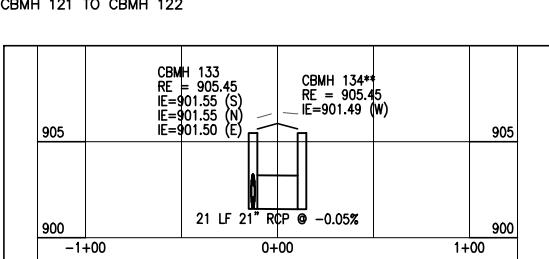
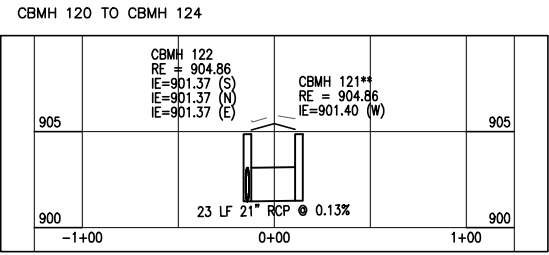
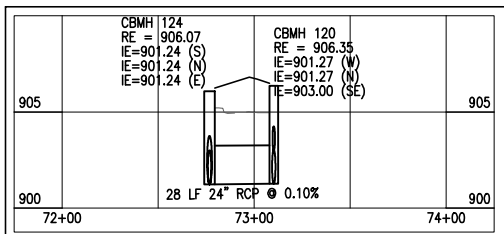
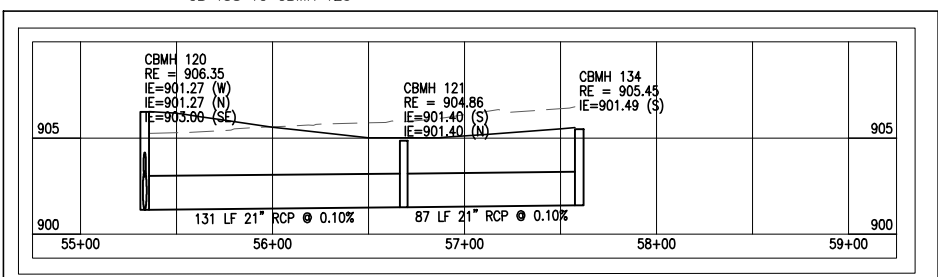
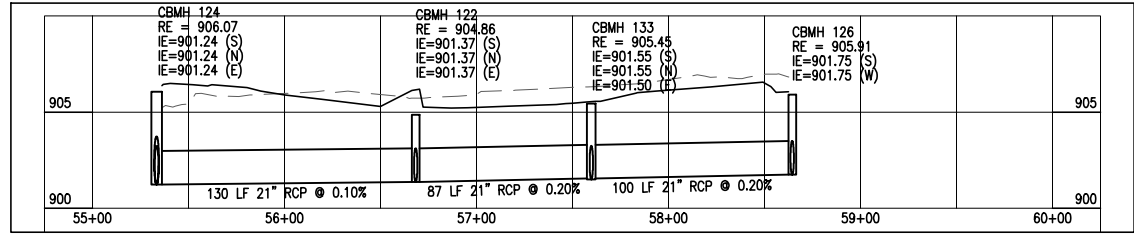
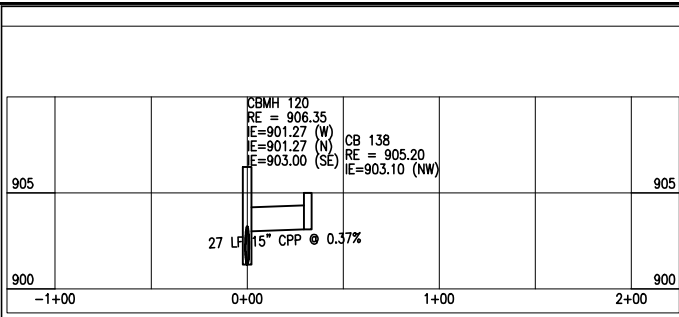
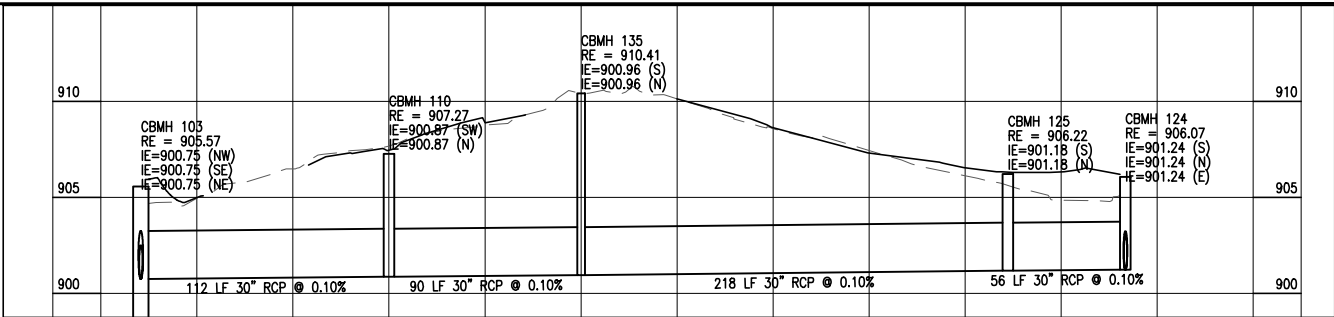
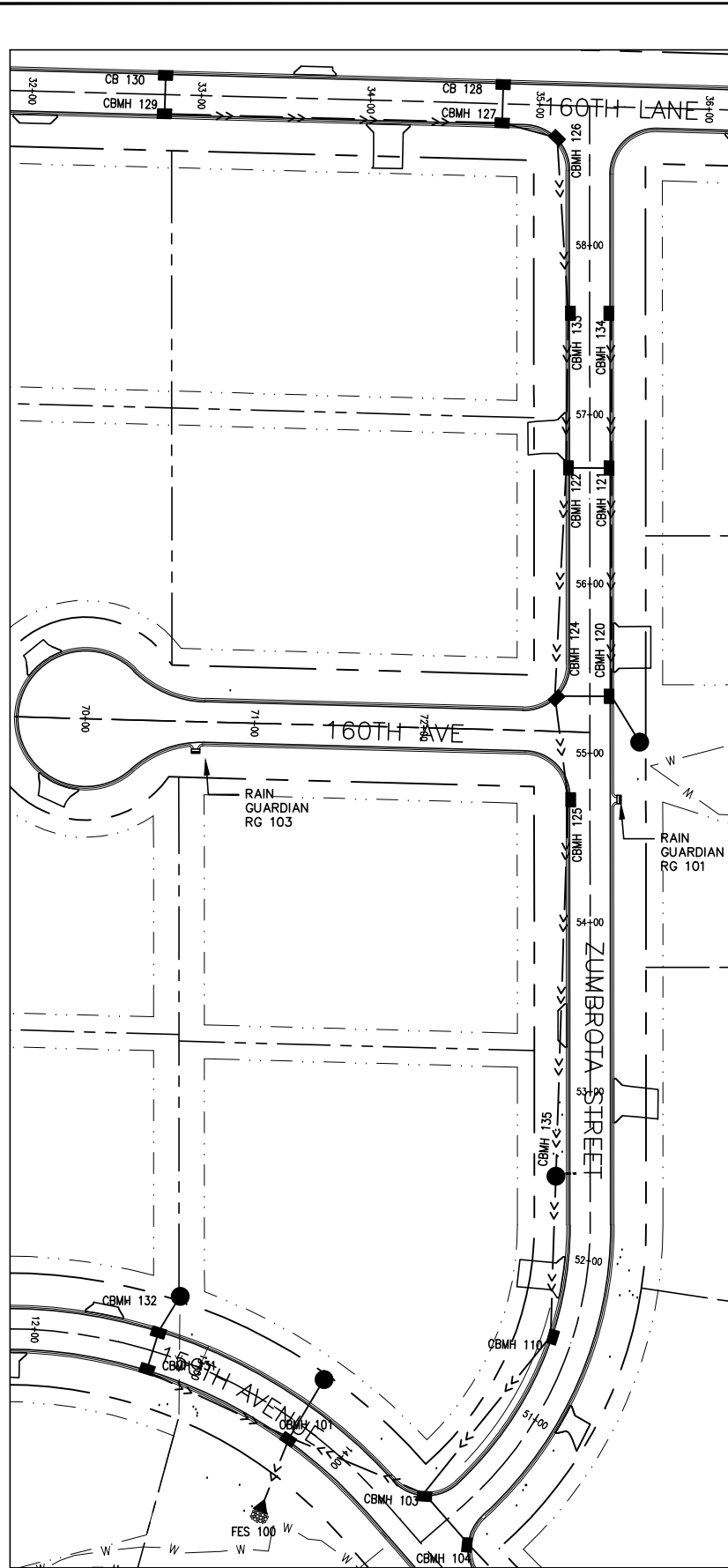
DESIGN BY: GJM

DRAWN BY: GJM

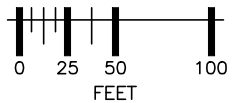
CHECKED BY: TPC

HAM LAKE IMPROVEMENT PROJECT 1907
LUND'S LAKEVIEW FOREST RECONSTRUCTION
159TH AVE NE, 160TH LN NE, AND OTHERS
STORM DRAIN TABULATIONS

DWG: 1907 STORM 1
DATE: 04/23/21
JOB NUMBER: 1907
SHEET: 23 OF 44
FILE: 35-1-152



CBMH 133 TO CBMH 134



NOTES:

1. ALL GRADING OPERATIONS SHALL BE CONDUCTED IN A MANNER TO MINIMIZE THE POTENTIAL FOR SITE EROSION.
2. ALL EXPOSED SOIL AREAS MUST BE STABILIZED AS SOON AS POSSIBLE TO LIMIT SOIL EROSION BUT IN NO CASE MORE THAN 7 DAYS.

*PIPE LENGTHS IN PROFILE VIEW INCLUDE PIPE AND APRON

STORM DRAIN

STRUCTURE	STATION	LOCATION	SIZE OF STRUCTURE	DESIGN	TOP OF CASTING OR INLET	INVERT	CASTING ASSEMBLY (NEENAH, EJ, DL)*	TYPE GRATE (NEENAH CASTINGS)	21" R.C.P.	24" R.C.P.	30" R.C.P.	15" C.P.P.	PIPE APRON	TRASH GUARD	APRON	FLOWS TO	INLET	% GRADE
									LIN FT	LIN FT	LIN FT	LIN FT						
CBMH 126	58+64.4	LT.	48" ø	RFC-465A1	905.91	901.75	R-3246	L		100						CBMH 133	901.55	0.2
CBMH 134	57+59.8	LT.	54" ø	RFC-465A1	905.45	901.49	R-3246	L		87						CBMH 121	901.40	0.1
CBMH 121	56+68.3	LT.	48" ø	RFC-465A1	904.86	901.4	R-3246	L								CBMH 120	901.27	0.1
CBMH 120	55+33.4	LT.	54" ø	RFC-465A1	906.35	901.27	R-3246	L								CBMH 124	901.24	0.1
CBMH 134**	57+59.7	LT.	54" ø	RFC-465A1	905.45	901.49	R-3246	L		28						CBMH 133	901.5	-0.05
CBMH 133	57+59.8	LT.	54" ø	RFC-465A1	905.45	901.55	R-3246	L		21						CBMH 122	901.37	0.2
CBMH 121**	56+68.3	LT.	48" ø	RFC-465A1	904.86	901.4	R-3246	L		87						CBMH 122	901.37	0.13
CBMH 122	56+68.3	LT.	54" ø	RFC-465A1	904.86	901.37	R-3246	L		23						CBMH 124	901.24	0.1
CBMH 124	55+33.4	LT.	66" ø	RFC-465A1	906.07	901.24	R-3246	L								CBMH 125	901.18	0.1
CBMH 125	54+72.3	LT.	66" ø	RFC-465A1	906.22	901.18	R-3246	L								CBMH 135	900.96	0.1
CBMH 135	52+50	LT.	48" ø	RFC-465C1	910.41	900.96	R-2577	L								CBMH 110	900.87	0.1
CBMH 110	51+50	LT.	66" ø	RFC-465A1	907.27	900.87	R-3246	L								CBMH 103	900.75	0.1
CB 138	55+06.4	RT.	48" ø	RFC-465C1	905.2	903.1	R-2577	C								CBMH 120	903	0.37
RG 101	54+72.3	RT.	5' x 2.5'	BUNKER	906.33	905.33						27						
RG 103	70+64.9	RT.	5' x 2.5'	BUNKER	905.15	904.15												
TOTAL									579	28	476	27						

* NEENAH FOUNDRY R-3246; EAST JORDAN IRON WORKS V-4520; D&L FOUNDRY I-1804.
** LISTING CONTAINS SECONDARY OUTLET/INLET PIPE



800-252-1166 651-454-0002

UTILITIES: CENTURYLINK (763) 712-5017
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COMCAST (952) 607-4078
CONNEXUS ENERGY (763) 323-4268
XCEL ENERGY (612) 526-4508

DATE	REVISION HISTORY

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DATE _____ REG. NO. _____

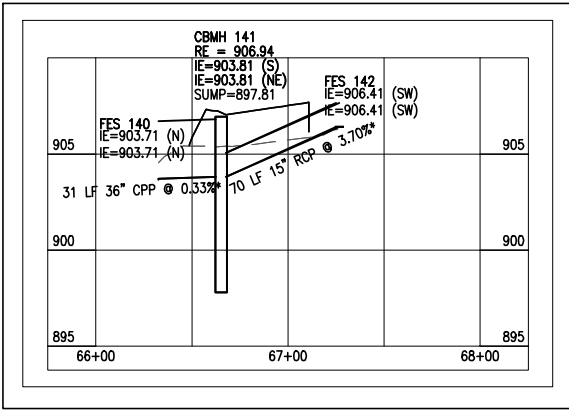
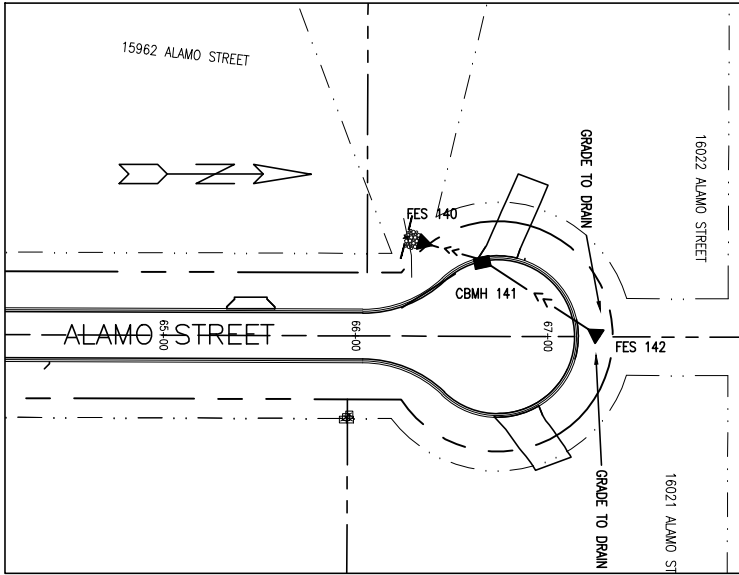
RFC ENGINEERING, INC.
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13635 Johnson Street
Ham Lake, MN 55304
Telephone 763-862-8000
Fax 763-862-8042

DESIGN BY: GJM DRAWN BY: GJM CHECKED BY: TPC

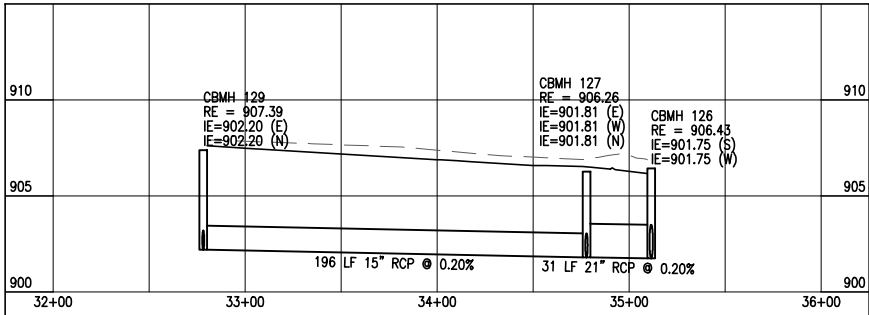
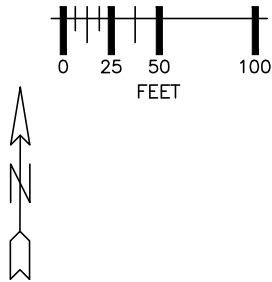
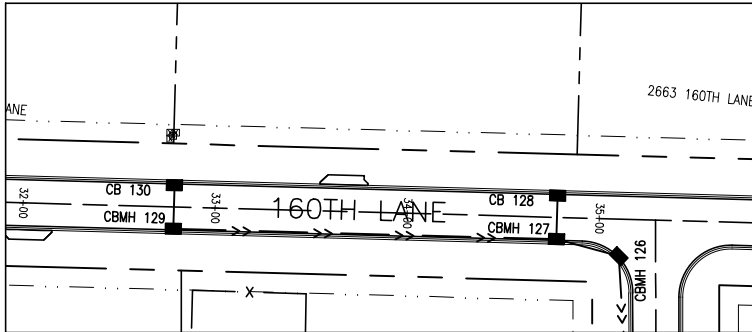
HAM LAKE IMPROVEMENT PROJECT 1907
LUND'S LAKEVIEW FOREST RECONSTRUCTION
159TH AVE NE, 160TH LN NE, AND OTHERS
STORM DRAIN TABULATIONS

DWG: 1907 STORM 2
DATE: 04/23/21
JOB NUMBER: 1907
SHEET: 24 OF 44
FILE: 35-1-153

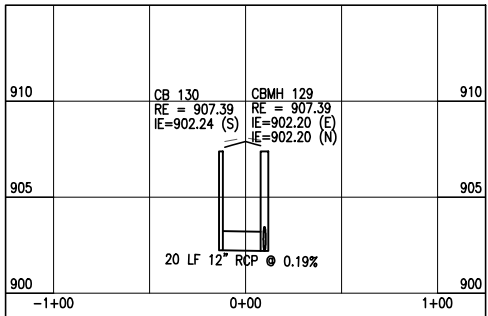


FES 142 TO FES 140

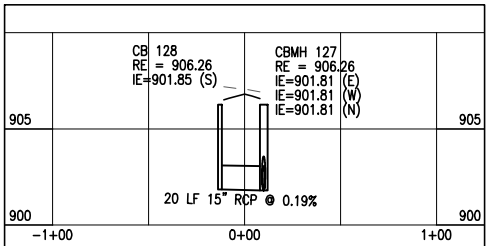
STORM DRAIN																		
STRUCTURE	STATION	LOCATION	SIZE OF STRUCTURE	DESIGN	TOP OF CASTING OR INLET	INVERT	CASTING ASSEMBLY (NEENAH, EJ, DL)*	TYPE GRATE (NEENAH CASTINGS)	12" R.C.P.	15" R.C.P.	21" R.C.P.	36" C.P.P.	PIPE APRON	TRASH GUARD	APRON	FLOWS TO	INLET	% GRADE
									LIN FT	LIN FT	LIN FT	LIN FT						
FES 142	67+26.7	LT.		FES		906.41	-	-										
CBMH 141	66+65.3	LT.	72" ø	RFC-465B3	906.94	903.81	R-3501-TB	C		64			6.1	1	1	CBMH 141	903.81	3.7
CB 130	32+78.2	LT.	2' x 3'	RFC-459B	907.39	902.24	R-3246	C				26	5	1	1	FES 140	903.71	0.33
CBMH 129	32+78.2	RT.	48" ø	RFC-465A1	907.39	902.2	R-3246	C	20							CBMH 129	902.20	0.19
CB 128	34+77.8	LT.	2' x 3'	RFC-459B	906.26	901.85	R-3246	C		196						CBMH 127	901.81	0.2
CBMH 127	34+77.8	RT.	48" ø	RFC-465A1	906.26	901.81	R-3246	C		20						CBMH 127	901.81	0.19
FES 161	10+28.7	LT.		FES		908.62	-	-			31					CBMH 126	901.75	0.2
FES 171	30+28	LT.		FES		907.24	-	-	38				12.1		2	FES 160	908.19	0.87
									38				12.1		2	FES 170	907	0.48
TOTAL									96	280	31	26		2	6			



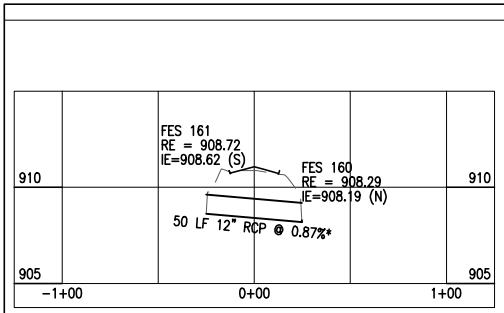
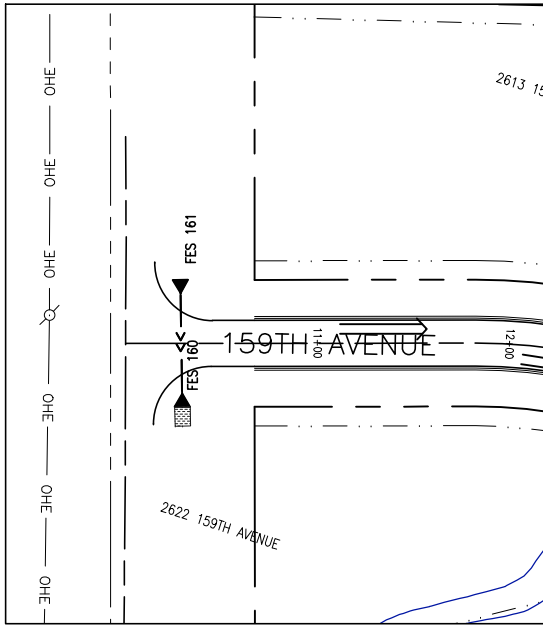
CBMH 129 TO CBMH 126



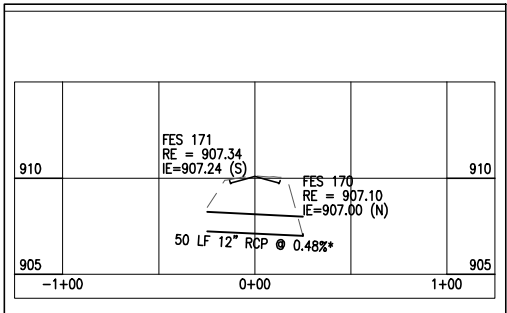
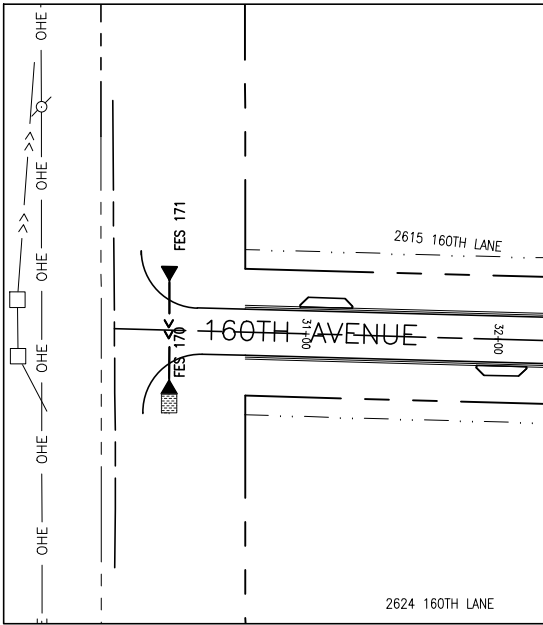
CB 130 TO CBMH 129



CB 128 TO CBMH 127



FES 161 TO FES 160



FES 171 TO FES 170

NOTES:

- ALL GRADING OPERATIONS SHALL BE CONDUCTED IN A MANNER TO MINIMIZE THE POTENTIAL FOR SITE EROSION.
- ALL EXPOSED SOIL AREAS MUST BE STABILIZED AS SOON AS POSSIBLE TO LIMIT SOIL EROSION BUT IN NO CASE MORE THAN 7 DAYS.
- SLOPES SHOWN ARE FROM CENTER OF STRUCTURE TO CENTER OF STRUCTURE

*PIPE LENGTHS IN PROFILE VIEW INCLUDE PIPE AND APRON



800-252-1166 651-454-0002

UTILITIES: CENTURYLINK (763) 712-5017
CENTERPOINT ENERGY (763) 323-2760
COMCAST (952) 607-4078
CONNEXUS ENERGY (763) 323-4268
XCEL ENERGY (612) 526-4508

DATE REVISION HISTORY

I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION, THAT I AM A DULY REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

DATE REG. NO.

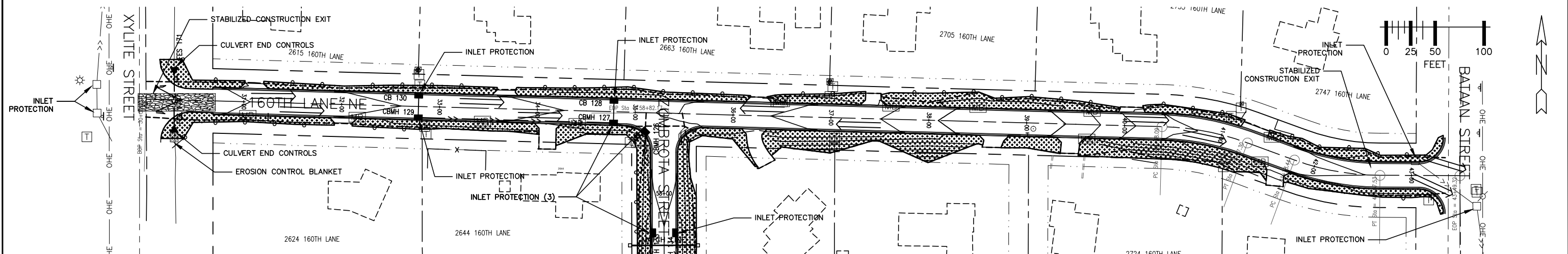
RFC ENGINEERING, INC.
Consulting Engineers

13635 Johnson Street
Ham Lake, MN 55304
Telephone 763-862-8000
Fax 763-862-8042

DESIGN BY: GJM DRAWN BY: GJM CHECKED BY: TPC

HAM LAKE IMPROVEMENT PROJECT 1907
LUND'S LAKEVIEW FOREST RECONSTRUCTION
159TH AVE NE, 160TH LN NE, AND OTHERS
STORM DRAIN TABULATIONS

DWG: 1907 STORM 3
DATE: 04/23/21
JOB NUMBER: 1907
SHEET: 25 OF 44
FILE: 35-1-154



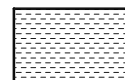
NOTES:

1. ALL GRADING OPERATIONS SHALL BE CONDUCTED IN A MANNER TO MINIMIZE THE POTENTIAL FOR SITE EROSION.
2. ALL EXPOSED SOIL AREAS MUST BE STABILIZED AS SOON AS POSSIBLE TO LIMIT SOIL EROSION BUT IN NO CASE MORE THAN 7 DAYS.

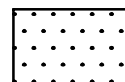
CONSTRUCTION EXIT



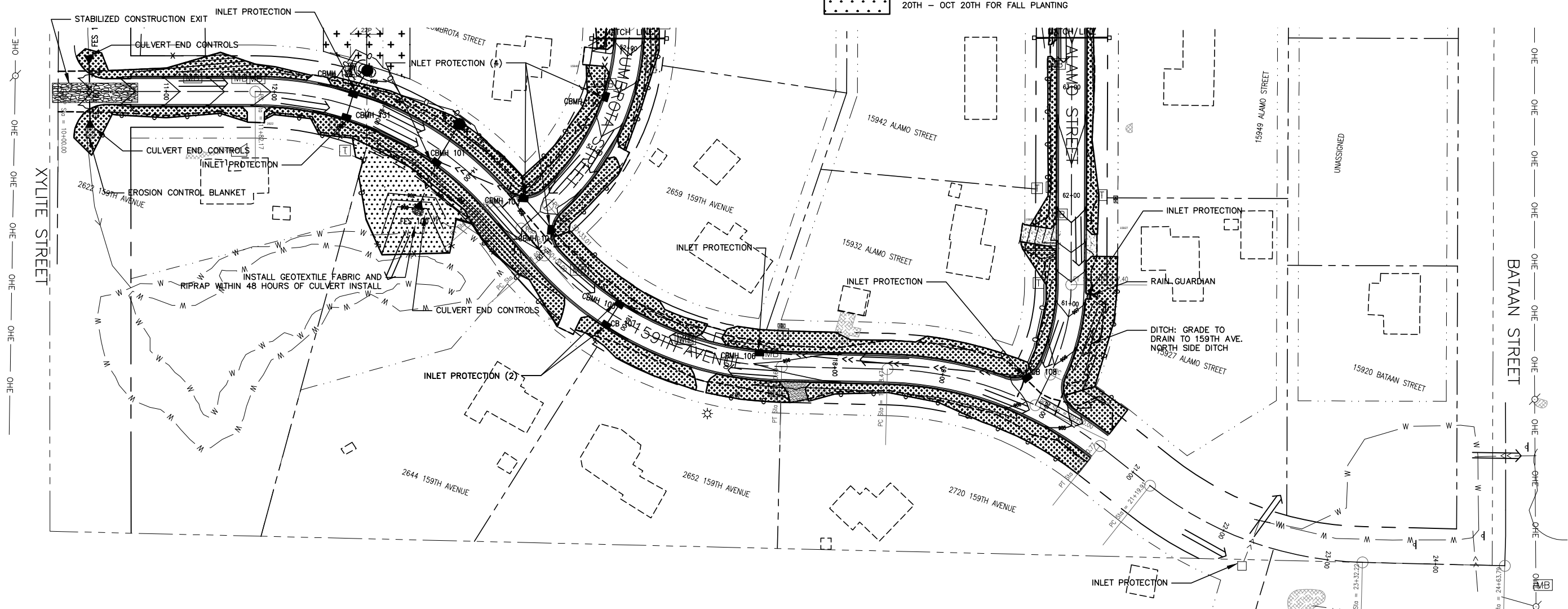
SEED MIX 25-151: RESIDENTIAL TURF
MULCH TYPE 1
PLANT APRIL 1ST - JUNE 1ST FOR SPRING PLANTING OR JULY 20TH - SEPTEMBER 20TH FOR FALL PLANTING



EROSION CONTROL BLANKET



SEED MIX 34-181: EMERGENT WETLAND
MULCH TYPE 3
PLANT APR 15TH - JUL 20TH FOR SPRING PLANTING OR SEPT 20TH - OCT 20TH FOR FALL PLANTING



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UTILITIES: CENTURYLINK (763) 712-5017
CENTERPOINT ENERGY (763) 323-2760
COMCAST (952) 607-4078
CONNEXUS ENERGY (763) 323-4268
XCEL ENERGY (612) 526-4508

DATE REVISION HISTORY

I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION, AND THAT I AM A DULY REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

DATE REG. NO.

RFC ENGINEERING, INC.
Consulting Engineers

13635 Johnson Street
Ham Lake, MN 55304
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Fax 763-862-8042

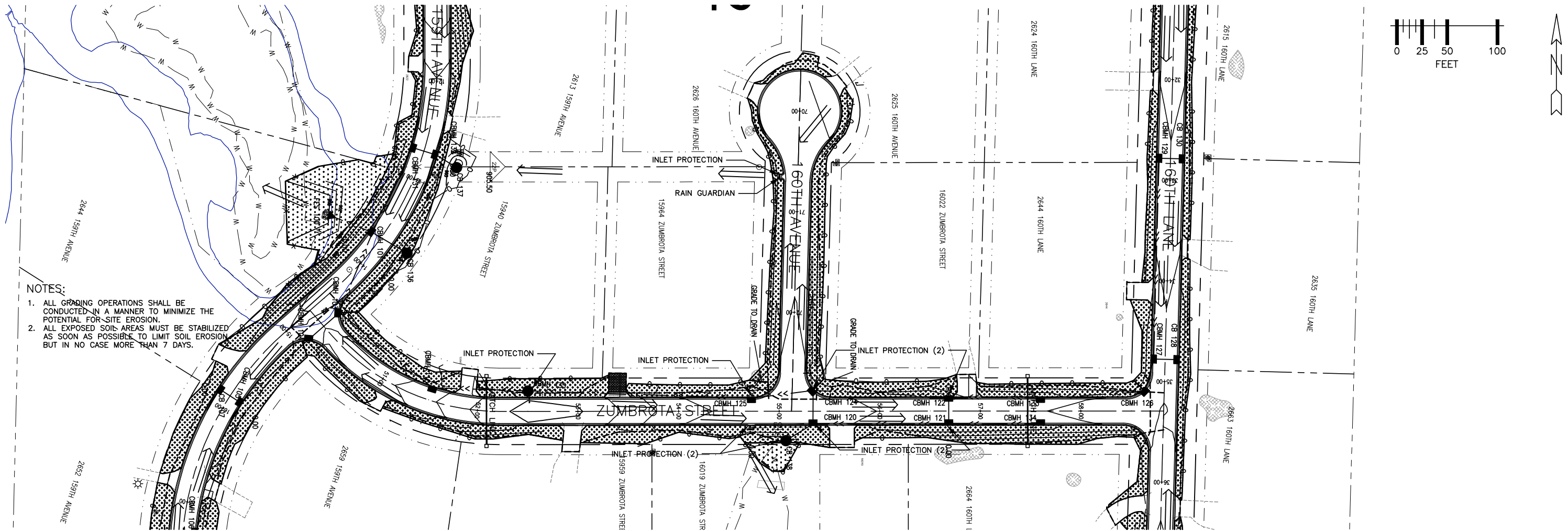
DESIGN BY: GJM

DRAWN BY: GJM

CHECKED BY: TPC

HAM LAKE IMPROVEMENT PROJECT 1907
LUND'S LAKEVIEW FOREST RECONSTRUCTION
159TH AVE NE, 160TH LN NE, AND OTHERS
STORMWATER POLLUTION PREVENTION PLAN

DWG: 1907 SWPPP 1
DATE: 04/23/21
JOB NUMBER: 1907
SHEET: 26 OF 44
FILE: 35-1-155



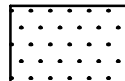
- NOTES:
1. ALL GRADING OPERATIONS SHALL BE CONDUCTED IN A MANNER TO MINIMIZE THE POTENTIAL FOR SITE EROSION.
 2. ALL EXPOSED SOIL AREAS MUST BE STABILIZED AS SOON AS POSSIBLE TO LIMIT SOIL EROSION BUT IN NO CASE MORE THAN 7 DAYS.



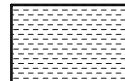
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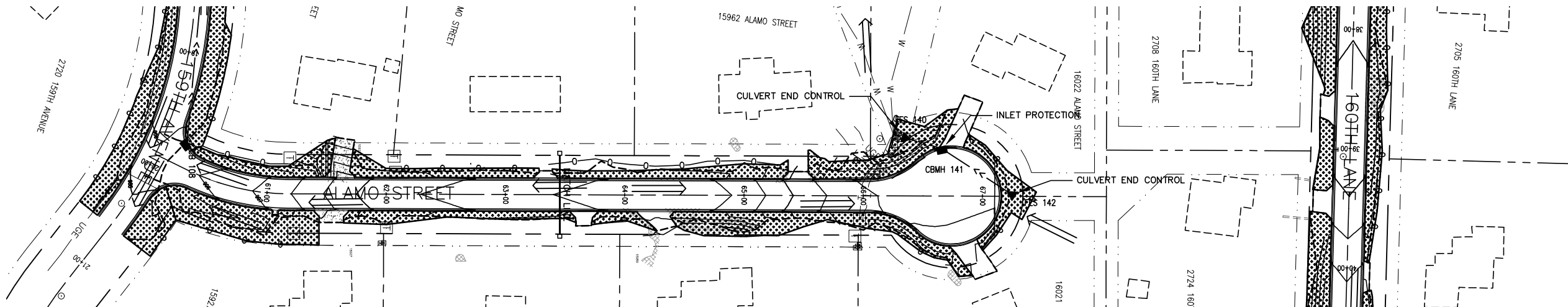
SEED MIX 25-151: RESIDENTIAL TURF
MULCH TYPE 1
PLANT APRIL 1ST - JUNE 1ST FOR SPRING PLANTING OR JULY 20TH - SEPTEMBER 20TH FOR FALL PLANTING



SEED MIX 34-181: EMERGENT WETLAND
MULCH TYPE 3
PLANT APR 15TH - JUL 20TH FOR SPRING PLANTING OR SEPT 20TH - OCT 20TH FOR FALL PLANTING



EROSION CONTROL BLANKET



UTILITIES: CENTURYLINK (763) 712-5017
CENTERPOINT ENERGY (763) 323-2760
COMCAST (952) 607-4078
CONNEXUS ENERGY (763) 323-4268
XCEL ENERGY (612) 526-4508

DATE REVISION HISTORY

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DATE REG. NO.

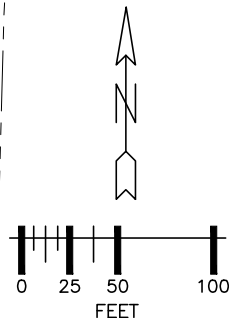
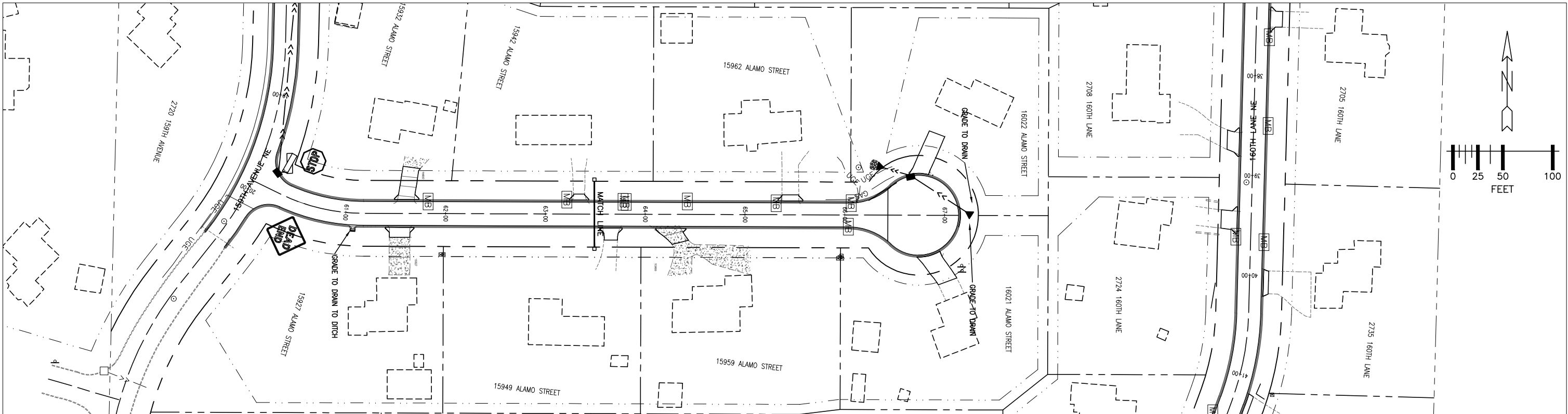
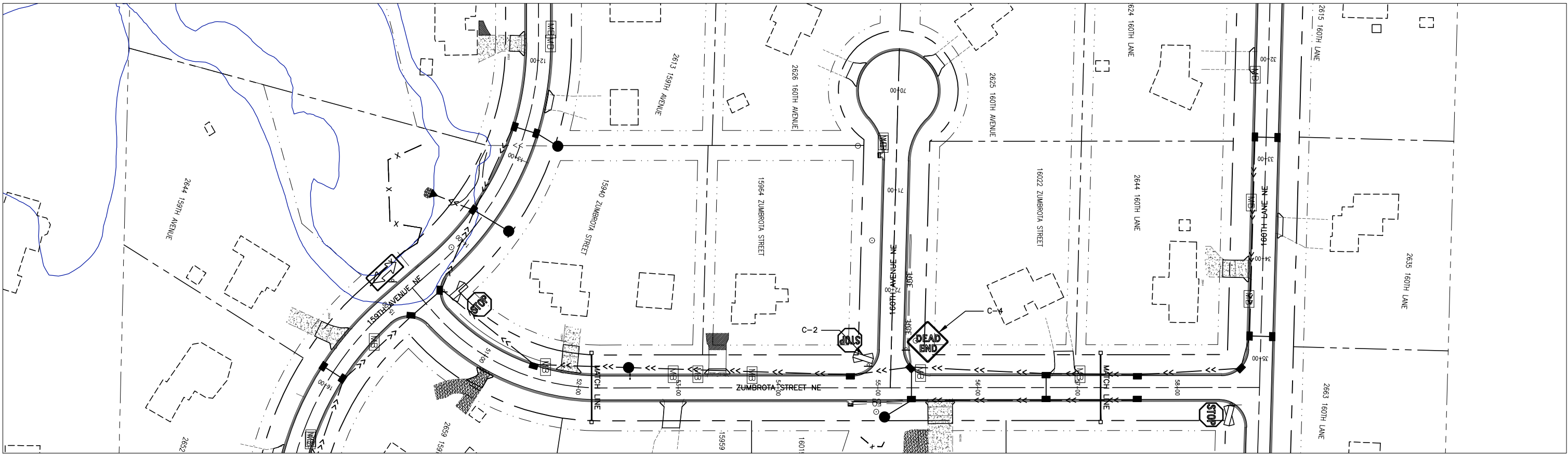
RFC ENGINEERING, INC.
Consulting Engineers

13635 Johnson Street
Ham Lake, MN 55304
Telephone 763-862-8000
Fax 763-862-8042

DESIGN BY: GJM DRAWN BY: GJM CHECKED BY: TPC

HAM LAKE IMPROVEMENT PROJECT 1907
LUND'S LAKEVIEW FOREST RECONSTRUCTION
159TH AVE NE, 160TH LN NE, AND OTHERS
STORMWATER POLLUTION PREVENTION PLAN

DWG: 1907 SWPPP 2
DATE: 04/23/21
JOB NUMBER: 1907
SHEET: 27 OF 44
FILE: 35-1-156



NOTE:
1. LOCATION OF SIGNS PER MNMUTCD SPECIFICATIONS.



800-252-1166 651-454-0002

UTILITIES: CENTURYLINK (763) 712-5017
CENTERPOINT ENERGY (763) 323-2760
COMCAST (952) 607-4078
CONNEXUS ENERGY (763) 323-4268
XCEL ENERGY (612) 526-4508

DATE REVISION HISTORY

I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION, AND THAT I AM A DULY REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

DATE REG. NO.

RFC ENGINEERING, INC.
Consulting Engineers

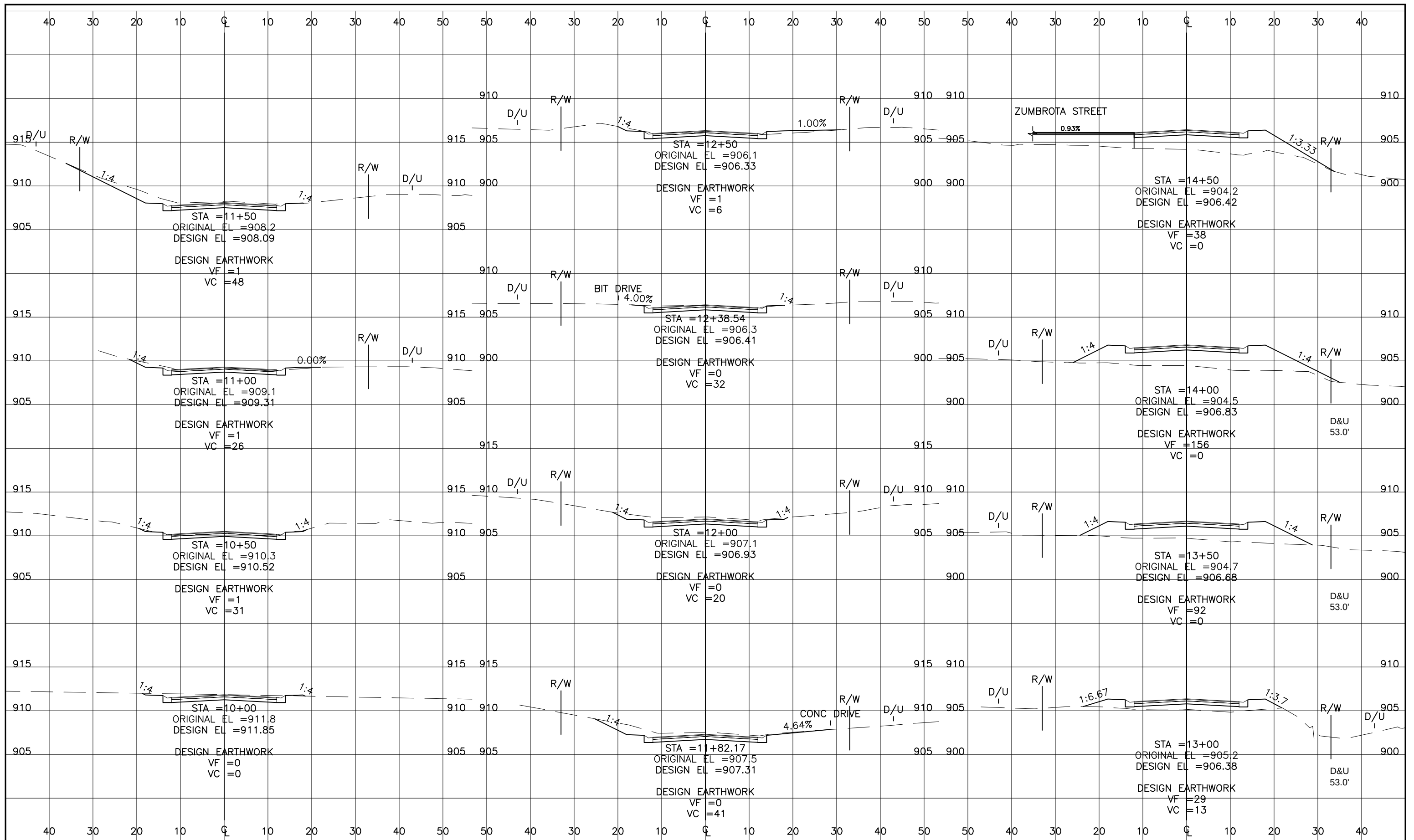
13635 Johnson Street
Ham Lake, MN 55304
Telephone 763-862-8000
Fax 763-862-8042

DESIGN BY: GJM DRAWN BY: GJM CHECKED BY: TPC

HAM LAKE IMPROVEMENT PROJECT 1907
LUND'S LAKEVIEW FOREST RECONSTRUCTION
159TH AVE NE, 160TH LN NE, AND OTHERS

SIGNING PLAN

DWG: 1907 SIGN 2
DATE: 04/23/21
JOB NUMBER: 1907
SHEET: 30 OF 44
FILE: 35-1-159





800-252-1166 651-454-0002
PLOT DATE: 4/23/2021 12:31

UTILITIES:

CENTURYLINK	(763) 712-5017
CENTERPOINT ENERGY	(763) 323-2760
COMCAST	(952) 607-4078
CONNEXUS ENERGY	(763) 323-4268
XCEL ENERGY	(612) 526-4508

DATE	REVISION HISTORY

I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION, AND THAT I AM A DULY REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

DATE _____ REG. NO. _____

RFC ENGINEERING, INC.
Consulting Engineers

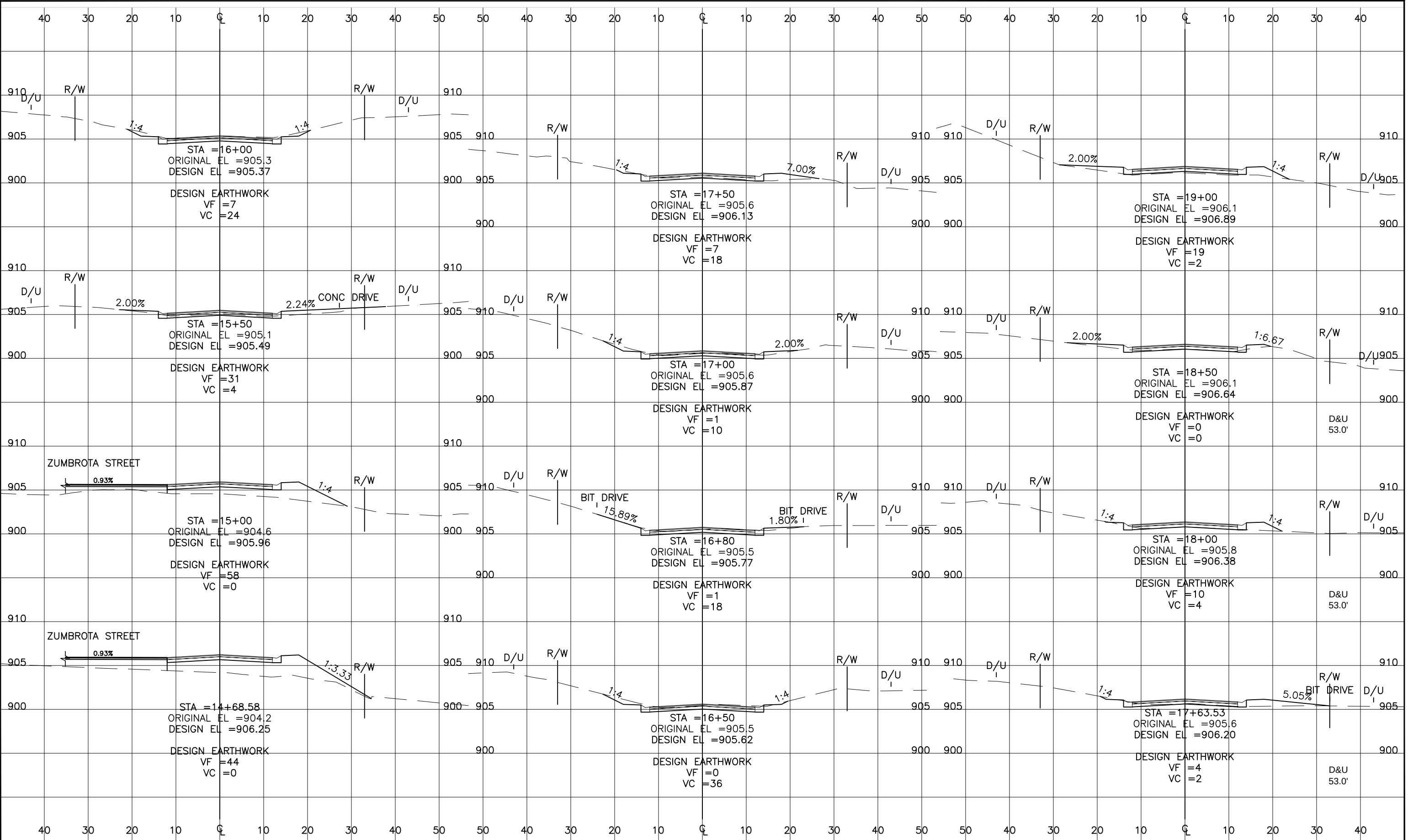
13635 Johnson Street
Ham Lake, MN 55304
Telephone 763-862-8000
Fax 763-862-8042

HAM LAKE IMPROVEMENT PROJECT 1907
LUND'S LAKEVIEW FOREST RECONSTRUCTION
159TH AVE NE, 160TH LN NE, AND OTHERS

159TH AVENUE CROSS SECTIONS

DWG:	RC001001
DATE:	04/23/21
JOB NUMBER:	1907
SHEET:	31 OF 44
FILE:	35-1-160

DESIGN BY: GJM DRAWN BY: GJM CHECKED BY: TPC





800-252-1166 651-454-0002
PLOT DATE: 4/23/2021 12:31

UTILITIES:

CENTURYLINK	(763) 712-5017
CENTERPOINT ENERGY	(763) 323-2760
COMCAST	(952) 607-4078
CONNEXUS ENERGY	(763) 323-4268
XCEL ENERGY	(612) 526-4508

DATE	REVISION HISTORY

I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION, AND THAT I AM A DULY REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

DATE _____ REG. NO. _____

RFC ENGINEERING, INC.
Consulting Engineers

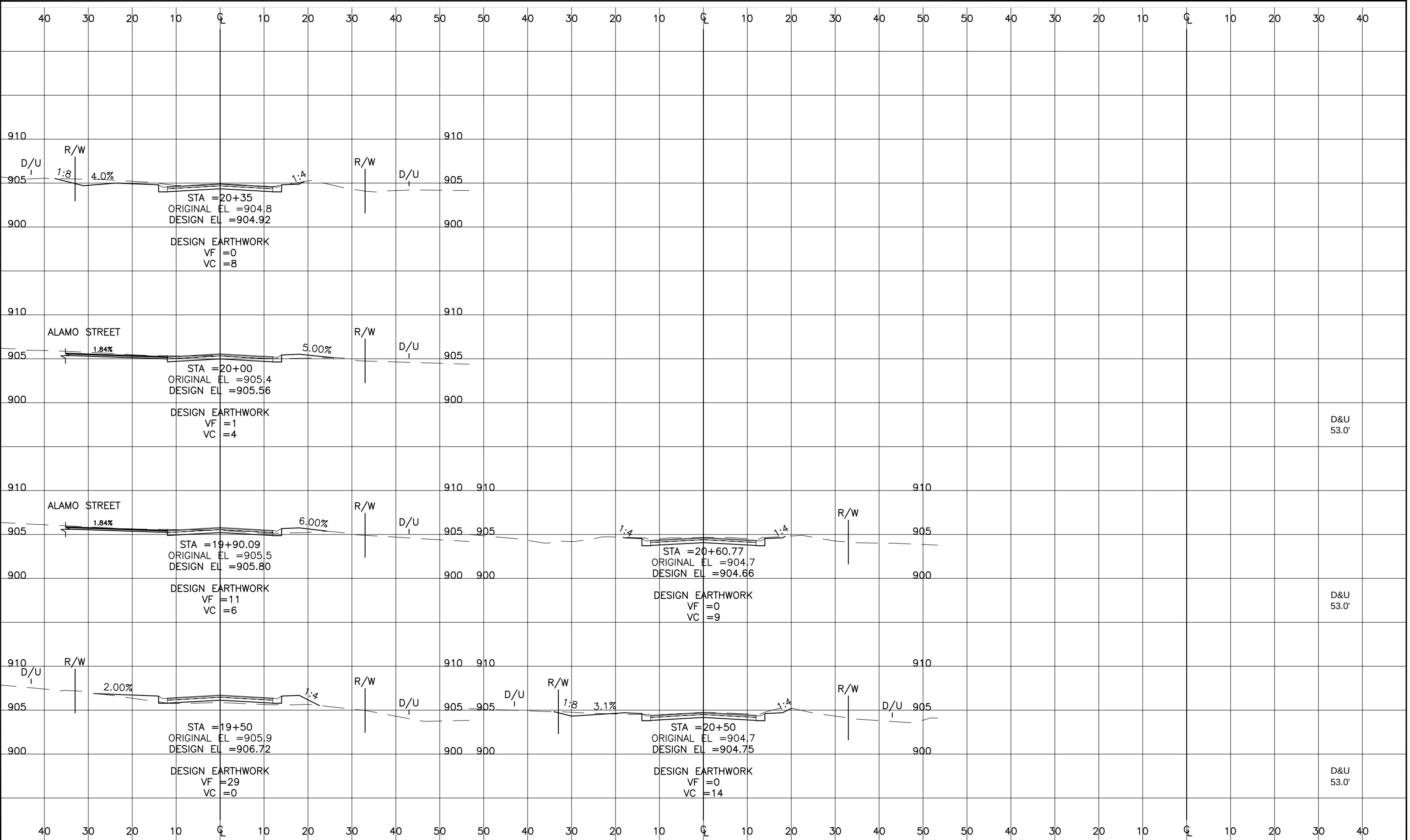
13635 Johnson Street
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Telephone 763-862-8000
Fax 763-862-8042

HAM LAKE IMPROVEMENT PROJECT 1907
LUND'S LAKEVIEW FOREST RECONSTRUCTION
159TH AVE NE, 160TH LN NE, AND OTHERS

159TH AVENUE CROSS SECTIONS

DWG:	RC002001
DATE:	04/23/21
JOB NUMBER:	1907
SHEET:	32 OF 44
FILE:	35-1-161

DESIGN BY: GJM DRAWN BY: GJM CHECKED BY: TPC





800-252-1166 651-454-0002
PLOT DATE: 4/23/2021 12:31

UTILITIES:

CENTURYLINK	(763) 712-5017
CENTERPOINT ENERGY	(763) 323-2760
COMCAST	(952) 607-4078
CONNEXUS ENERGY	(763) 323-4268
XCEL ENERGY	(612) 526-4508

DATE	REVISION HISTORY

I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION, AND THAT I AM A DULY REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

DATE _____ REG. NO. _____

RFC ENGINEERING, INC.
Consulting Engineers

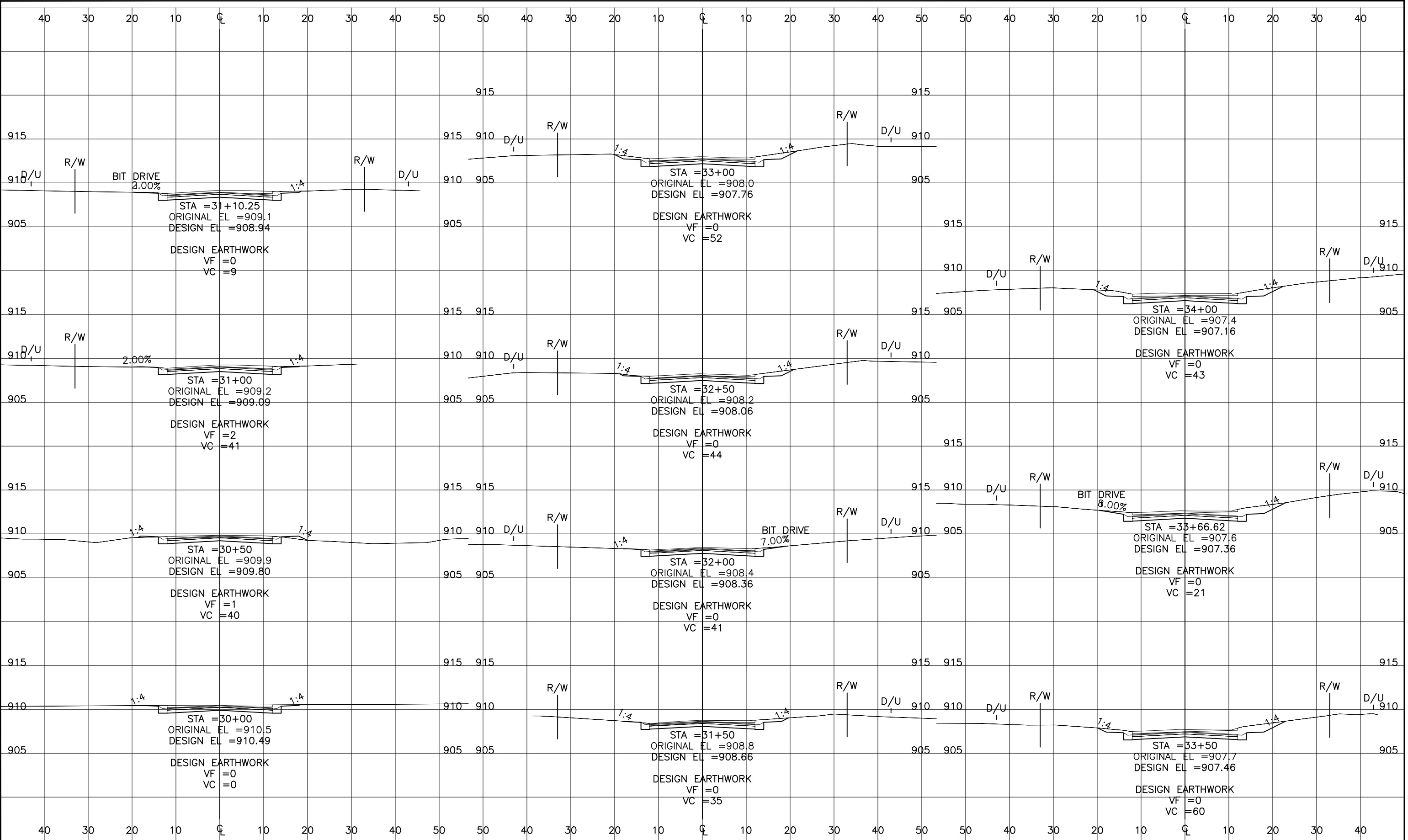
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Telephone 763-862-8000
Fax 763-862-8042

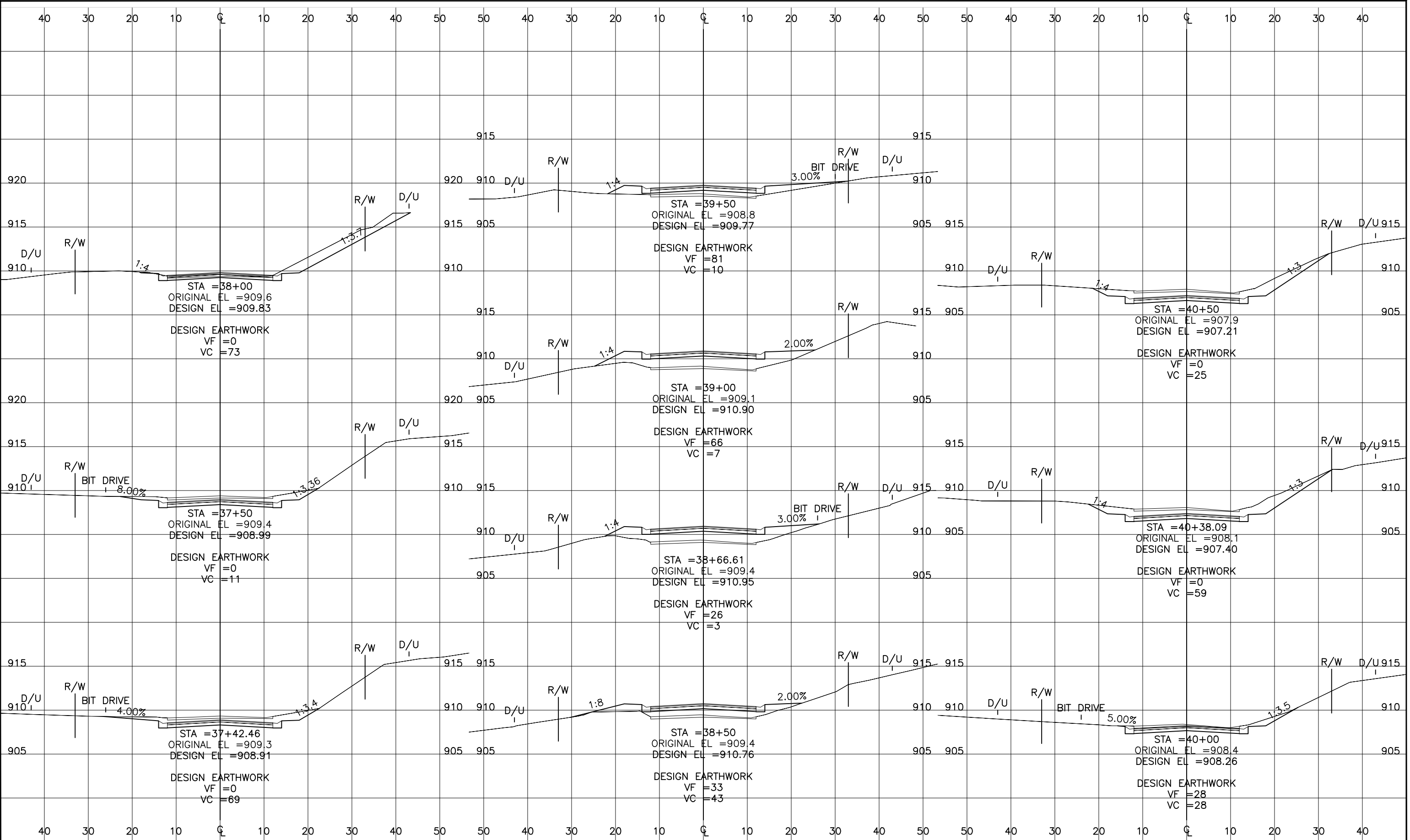
HAM LAKE IMPROVEMENT PROJECT 1907
LUND'S LAKEVIEW FOREST RECONSTRUCTION
159TH AVE NE, 160TH LN NE, AND OTHERS

159TH AVENUE CROSS SECTIONS

DWG: RC003001
DATE: 04/23/21
JOB NUMBER: 1907
SHEET: 33 OF 44
FILE: 35-1-162

DESIGN BY: GJM DRAWN BY: GJM CHECKED BY: TPC







800-252-1166 651-454-0002
PLOT DATE: 4/23/2021 12:31

UTILITIES:

CENTURYLINK	(763) 712-5017
CENTERPOINT ENERGY	(763) 323-2760
COMCAST	(952) 607-4078
CONNEXUS ENERGY	(763) 323-4268
XCEL ENERGY	(612) 526-4508

DATE	REVISION HISTORY

I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION, AND THAT I AM A DULY REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

FOR REVIEW PURPOSES ONLY

DATE: _____ REG. NO. _____

RFC ENGINEERING, INC.
Consulting Engineers

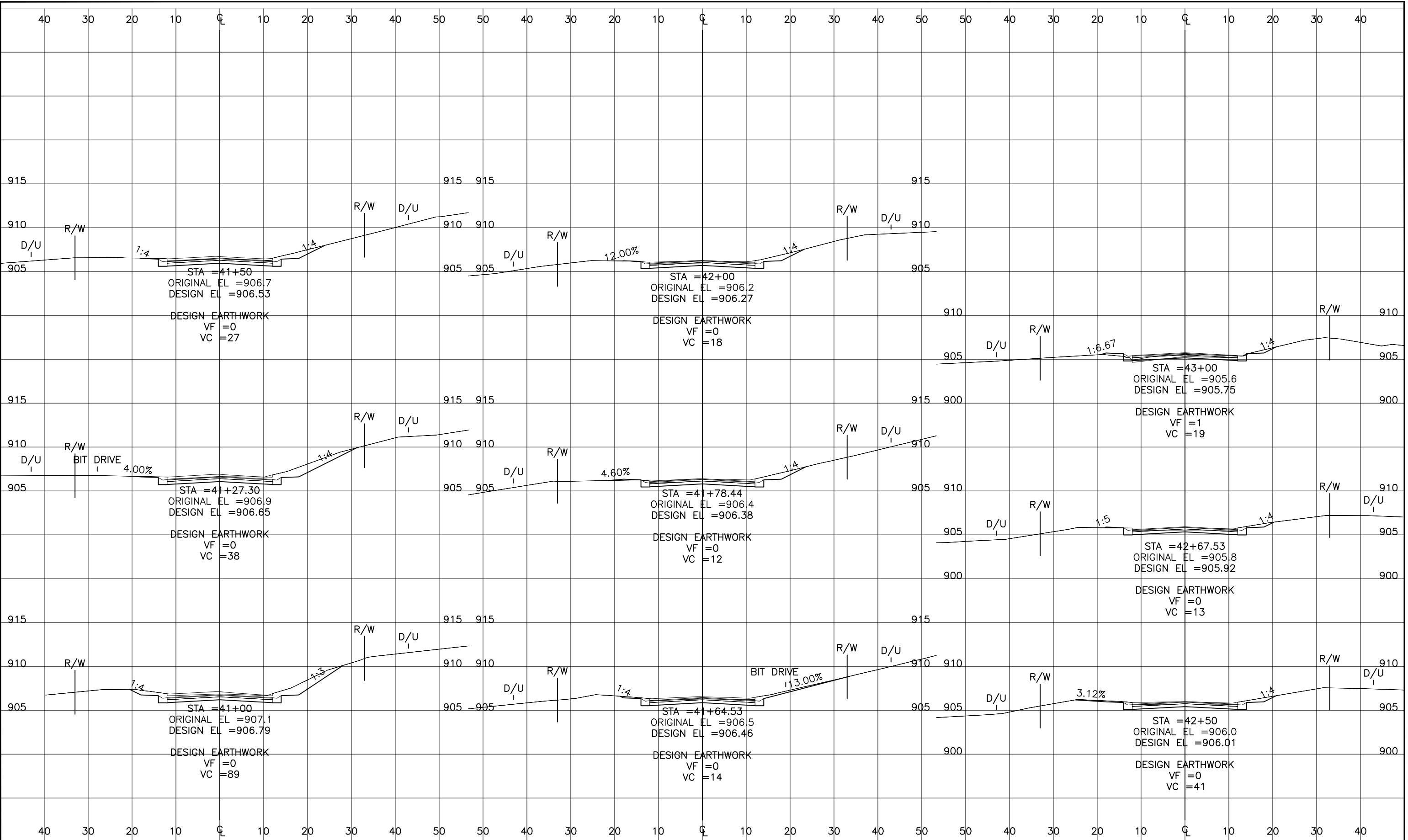
13635 Johnson Street
Ham Lake, MN 55304
Telephone 763-862-8000
Fax 763-862-8042

HAM LAKE IMPROVEMENT PROJECT 1907
LUND'S LAKEVIEW FOREST RECONSTRUCTION
159TH AVE NE, 160TH LN NE, AND OTHERS

160TH LANE CROSS SECTIONS

DESIGN BY: GJM DRAWN BY: GJM CHECKED BY: TPC

DWG: RC003002
DATE: 04/23/21
JOB NUMBER: 1907
SHEET: 36 OF 44
FILE: 35-1-165





800-252-1166 651-454-0002
PLOT DATE: 4/23/2021 12:31

UTILITIES:

CENTURYLINK	(763) 712-5017
CENTERPOINT ENERGY	(763) 323-2760
COMCAST	(952) 607-4078
CONNEXUS ENERGY	(763) 323-4268
XCEL ENERGY	(612) 526-4508

DATE	REVISION HISTORY

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DATE: _____ REG. NO. _____

RFC ENGINEERING, INC.
Consulting Engineers

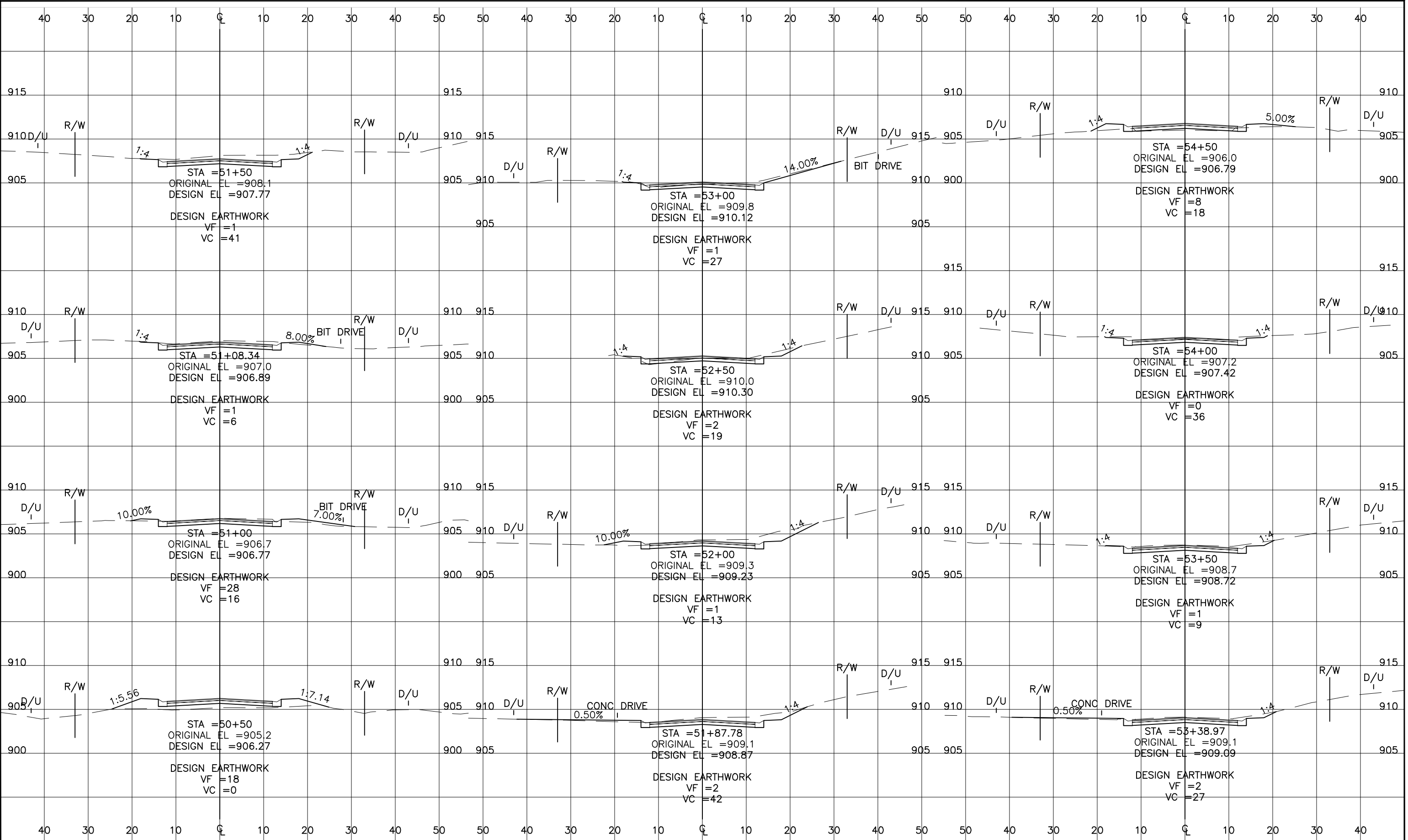
13635 Johnson Street
Ham Lake, MN 55304
Telephone 763-862-8000
Fax 763-862-8042

HAM LAKE IMPROVEMENT PROJECT 1907
LUND'S LAKEVIEW FOREST RECONSTRUCTION
159TH AVE NE, 160TH LN NE, AND OTHERS

160TH LANE CROSS SECTIONS

DWG:	RC004002
DATE:	04/23/21
JOB NUMBER:	1907
SHEET:	37 OF 44
FILE:	35-1-166

DESIGN BY: GJM DRAWN BY: GJM CHECKED BY: TPC





800-252-1166 651-454-0002
PLOT DATE: 4/23/2021 12:31

UTILITIES:

CENTURYLINK	(763) 712-5017
CENTERPOINT ENERGY	(763) 323-2760
COMCAST	(952) 607-4078
CONNEXUS ENERGY	(763) 323-4268
XCEL ENERGY	(612) 526-4508

DATE	REVISION HISTORY

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DATE _____ REG. NO. _____

RFC ENGINEERING, INC.
Consulting Engineers

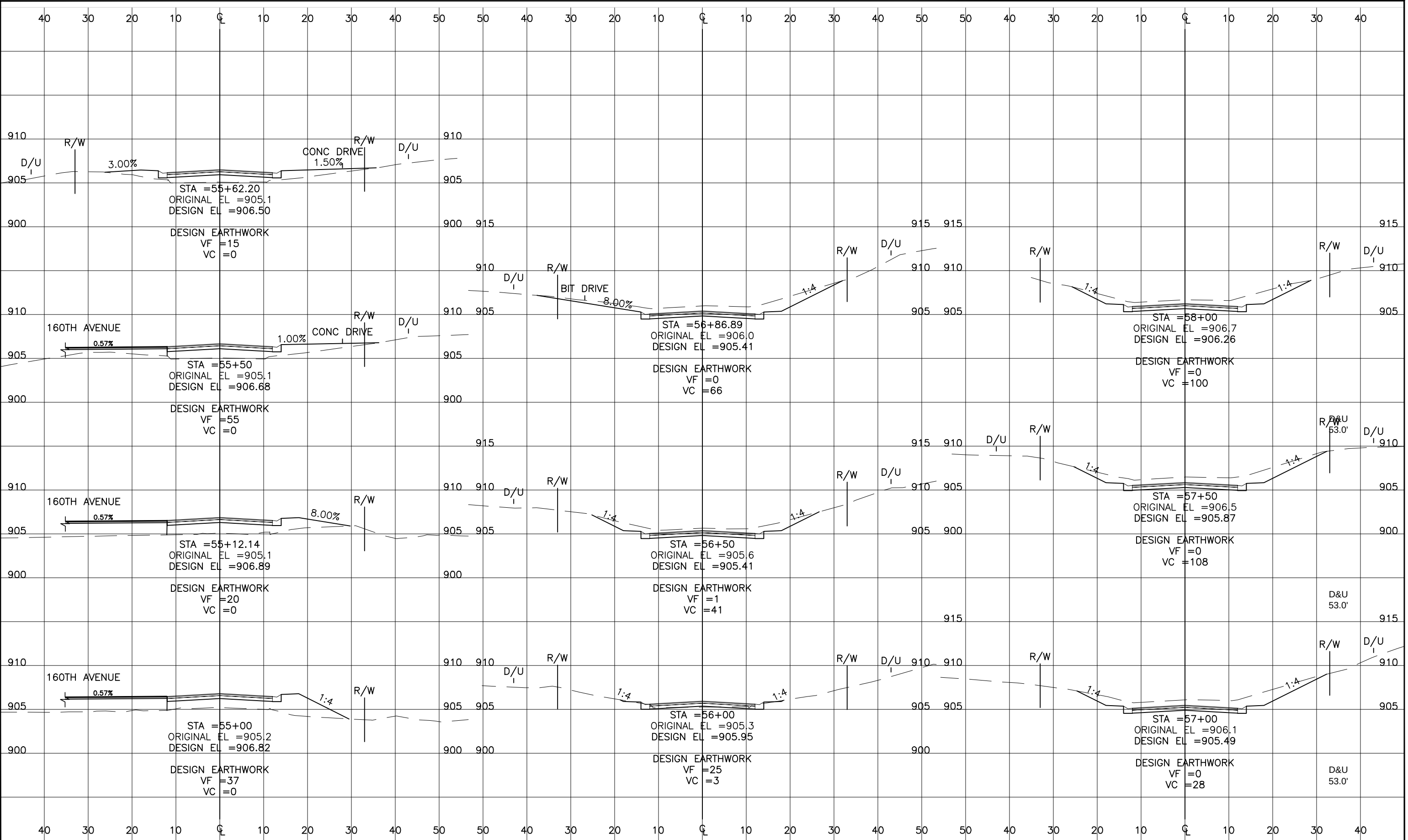
13635 Johnson Street
Ham Lake, MN 55304
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Fax 763-862-8042

HAM LAKE IMPROVEMENT PROJECT 1907
LUND'S LAKEVIEW FOREST RECONSTRUCTION
159TH AVE NE, 160TH LN NE, AND OTHERS

ZUMBROTA STREET CROSS SECTIONS

DWG:	RC001003
DATE:	04/23/21
JOB NUMBER:	1907
SHEET:	38 OF 44
FILE:	35-1-167

DESIGN BY: GJM DRAWN BY: GJM CHECKED BY: TPC



800-252-1166 651-454-0002
PLOT DATE: 4/23/2021 12:31

UTILITIES:

CENTURYLINK	(763) 712-5017
CENTERPOINT ENERGY	(763) 323-2760
COMCAST	(952) 607-4078
CONNEXUS ENERGY	(763) 323-4268
XCEL ENERGY	(612) 526-4508

DATE	REVISION HISTORY

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DATE: _____ REG. NO. _____

RFC ENGINEERING, INC.
Consulting Engineers

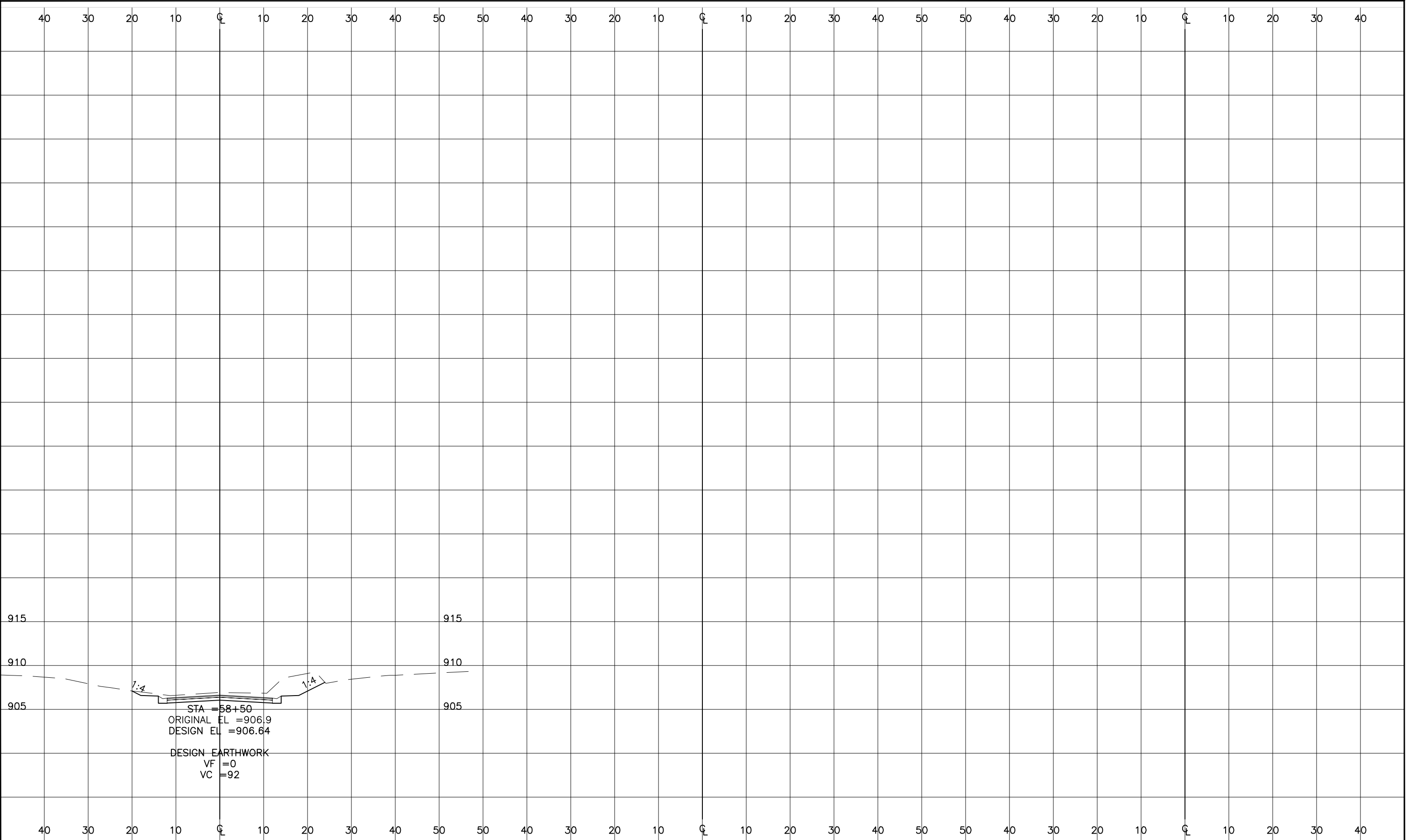
13635 Johnson Street
Ham Lake, MN 55304
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Fax 763-862-8042

HAM LAKE IMPROVEMENT PROJECT 1907
LUND'S LAKEVIEW FOREST RECONSTRUCTION
159TH AVE NE, 160TH LN NE, AND OTHERS

ZUMBROTA STREET CROSS SECTIONS

DESIGN BY: GJM DRAWN BY: GJM CHECKED BY: TPC

DWG:	RC002003
DATE:	04/23/21
JOB NUMBER:	1907
SHEET:	39 OF 44
FILE:	35-1-168





800-252-1166 651-454-0002
PLOT DATE: 4/23/2021 12:31

UTILITIES:

CENTURYLINK	(763) 712-5017
CENTERPOINT ENERGY	(763) 323-2760
COMCAST	(952) 607-4078
CONNEXUS ENERGY	(763) 323-4268
XCEL ENERGY	(612) 526-4508

DATE	REVISION HISTORY

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DATE _____ REG. NO. _____

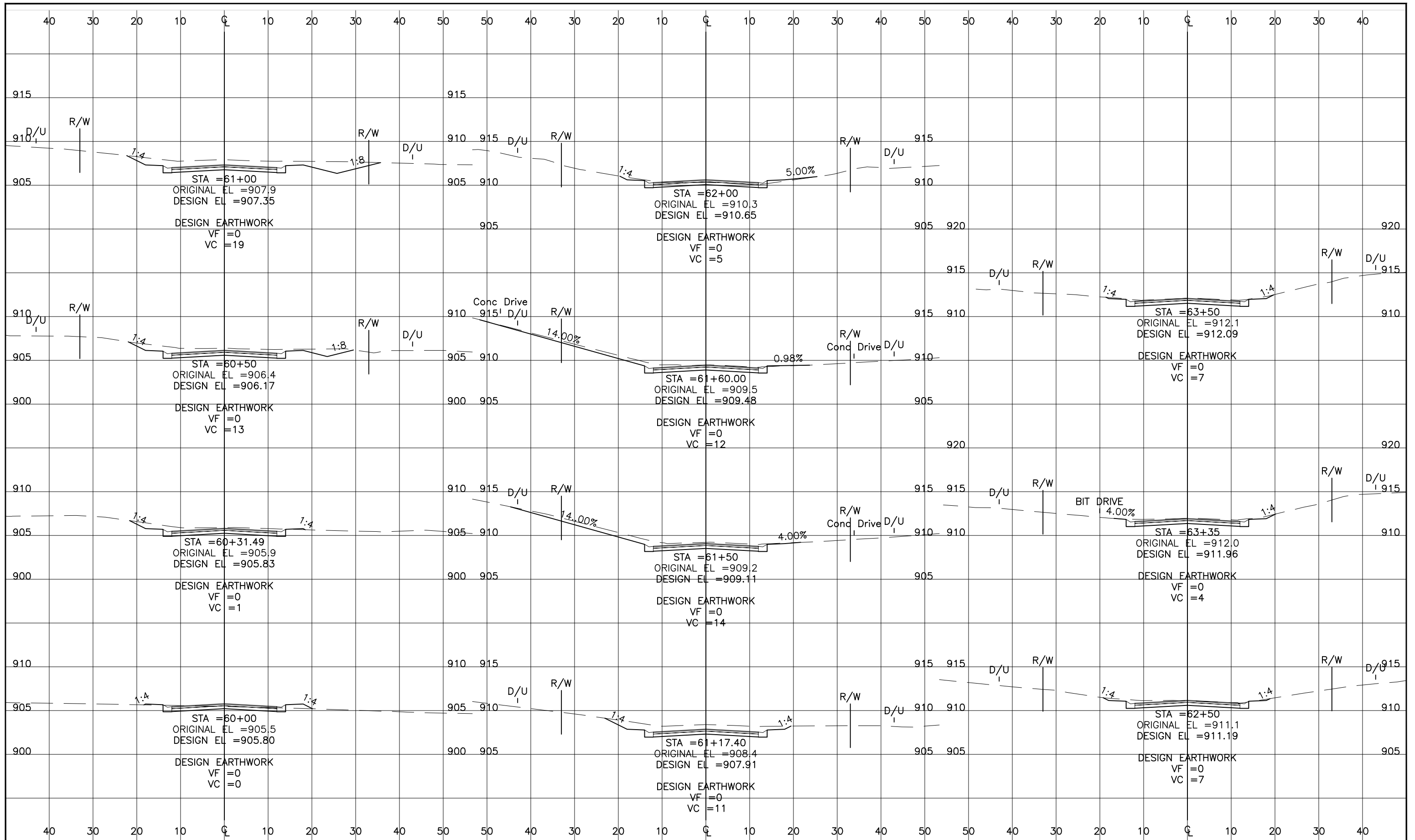
RFC ENGINEERING, INC.
Consulting Engineers

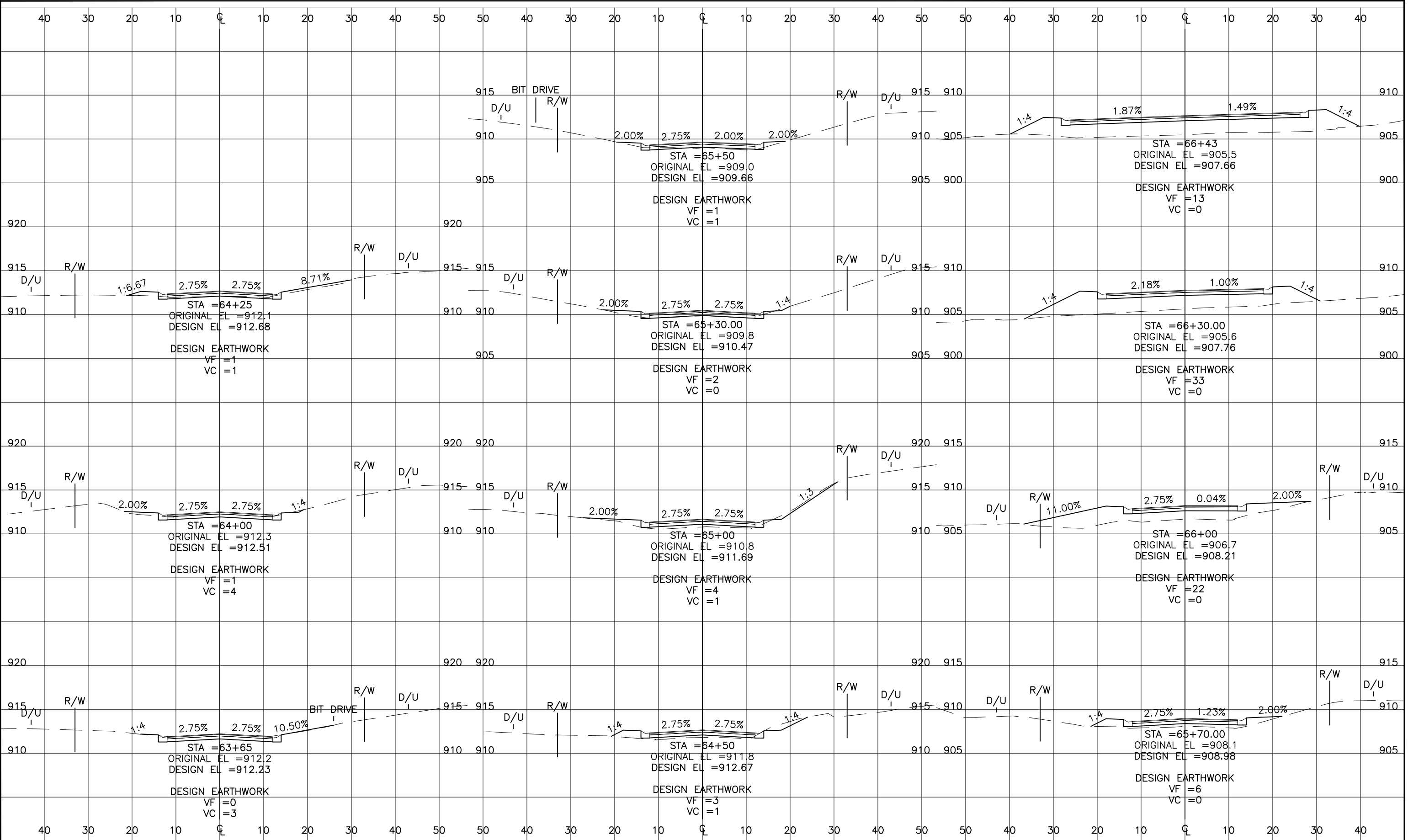
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Fax 763-862-8042

HAM LAKE IMPROVEMENT PROJECT 1907
LUND'S LAKEVIEW FOREST RECONSTRUCTION
159TH AVE NE, 160TH LN NE, AND OTHERS

ZUMBROTA STREET CROSS SECTIONS

DWG:	RC003003
DATE:	04/23/21
JOB NUMBER:	1907
SHEET:	40 OF 44
FILE:	35-1-169







800-252-1166 651-454-0002
PLOT DATE: 4/23/2021 12:31

UTILITIES:

CENTURYLINK	(763) 712-5017
CENTERPOINT ENERGY	(763) 323-2760
COMCAST	(952) 607-4078
CONNEXUS ENERGY	(763) 323-4268
XCEL ENERGY	(612) 526-4508

DATE	REVISION HISTORY

I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION, AND THAT I AM A DULY REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

DATE _____ REG. NO. _____

RFC ENGINEERING, INC.
Consulting Engineers

13635 Johnson Street
Ham Lake, MN 55304
Telephone 763-862-8000
Fax 763-862-8042

HAM LAKE IMPROVEMENT PROJECT 1907
LUND'S LAKEVIEW FOREST RECONSTRUCTION
159TH AVE NE, 160TH LN NE, AND OTHERS

ALAMO STREET CROSS SECTIONS

DWG:	RC002004
DATE:	04/23/21
JOB NUMBER:	1907
SHEET:	42 OF 44
FILE:	35-1-171

DESIGN BY: GJM DRAWN BY: GJM CHECKED BY: TPC

