# LAKEWOOD BUSINESS CENTER **ON I-470 - PLAT S**

# STREET & STORM SEWER CONSTRUCTION PLANS

Part of Section 20, Township 48 N, Range 31 W LEE'S SUMMIT, JACKSON COUNTY, MISSOURI

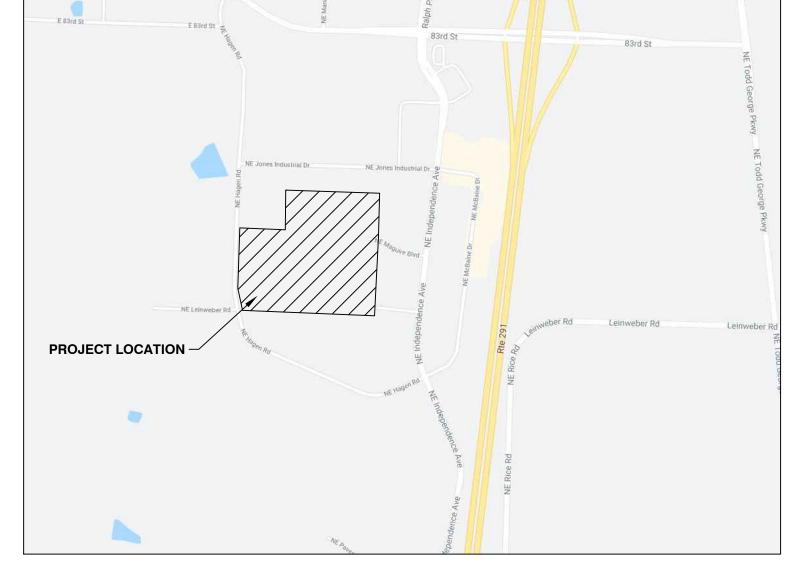
### **CONSTRUCTION AND DESIGN NOTES:**

- 1. STREET PAVEMENT SHALL CONSIST OF TYPE CG-1 CURB & GUTTER WITH PAVEMENT PER TABLE LS-2 OF THE LEE-S SUMMIT
- DESIGN AND CONSTRUCTION MANUAL. SEE SHEET C-112 FOR TYPICAL SECTION AND PAVEMENT OPTIONS.
- 2. INDUSTRIAL LOCAL STREETS SHALL BE PER APWA STANDARD FOR 60' R/W SECTION 5200 TABLE LS-1.
- 3. STORM SEWER PIPE SHALL BE HIGH DENSITY POLYETHYLENE (HDPE) AS APPROVED BY THE CITY OF LEE'S SUMMIT DESIGN AND CONSTRUCTION MANUAL 4. CURB INLETS SHALL BE PER CITY OF LEE'S SUMMIT STANDARD DRAWING NO. STM-1. JUNCTION BOXES SHALL BE PER CITY OF LEE'S SUMMIT STANDARD DRAWING NO. STM-3. FLARED END SECTIONS SHALL BE PER CITY OF LEE'S SUMMIT STANDARD DRAWING NO. STM-5.

### **GENERAL NOTES:**

ENGINEER.

- ACCORDANCE WITH ALL STATE AND LOCAL CODES.
- 13. TRAFFIC CONTROL AND MAINTENANCE OF TRAFFIC DURING CONSTRUCTION SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR AND SHALL BE IN
- PLAN SHOWS MINIMUM EROSION CONTROL MEASURES TO BE PROVIDED. ADDITIONAL SITE SPECIFIC MEASURES MAY BE NECESSARY AND SHALL BE PROVIDED BY THE DEVELOPER / OWNER, AT THE CONTRACTOR'S EXPENSE.
- 15. ANY EXISTING OR NEW STORM SEWER INLETS IN USE DURING DEMOLITION, GRADING OR CONSTRUCTION SHALL HAVE INLET PROTECTION. 16. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND QUANTITIES SHOWN ON THESE PLANS AND SHALL REPORT ANY DISCREPANCIES TO THE ENGINEER PRIOR TO COMMENCING ANY RELATED WORK.
- 17. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR DETERMINING THE LOCATION OF ALL EXISTING UTILITIES AND UNDERGROUND INSTALLATIONS, INCLUDING SERVICE CONNECTIONS, IN ADVANCE OF EXCAVATION OR TRENCHING, AND PROTECT THE SAME AS REQUIRED TO MAINTAIN
- 18. THE CONTRACTOR SHALL USE HIS OWN INFORMATION AND NOT RELY UPON ANY INFORMATION SHOWN ON THE DRAWINGS CONCERNING EXISTING UNDERGROUND INSTALLATIONS.
- 19. ANY DELAY. ADDITIONAL WORK, OR EXTRA COST TO THE CONTRACTOR CAUSED BY OR RESULTING FROM DAMAGE TO EXISTING UNDERGROUND INSTALLATIONS SHALL NOT CONSTITUTE A CLAIM FOR EXTRA WORK, ADDITIONAL PAYMENT, OR DAMAGES. ALL DAMAGE TO EXISTING UTILITIES
- INCLUDING SERVICE CONNECTIONS SHALL RE REPAIRED BY AND AT THE EXPENSE OF THE CONTRACTOR. 20. THE CONTRACTOR SHALL OBTAIN ALL NECESSARY PERMITS PRIOR TO BEGINNING CONSTRUCTION ACTIVITIES AND OBTAIN ALL NECESSARY INSPECTIONS THROUGHOUT THE CONSTRUCTION ACTIVITIES.
- 21. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL RELOCATIONS, INCLUDING BUT NOT LIMITED TO ALL UTILITIES, STORM DRAINAGE, AND SIGNS AS REQUIRED, ALL WORK SHALL BE IN ACCORDANCE WITH THE GOVERNING AUTHORITIES' SPECIFICATIONS AND SHALL BE APPROVED BY SUCH. ALL COST SHALL BE INCLUDED IN THE CONTRACTOR'S CONTRACT WITH THE OWNER.
- 22. REMOVAL OF EXISTING PAVING AND/OR BORING AT THE CONTRACTOR'S DISCRETION SHALL BE INCLUDED AS A PART OF ALL UTILITY INSTALLATIONS WHERE APPLICABLE AT THE CONTRACTOR'S EXPENSE AS WELL AS REPLACEMENT/REPAIR OF ALL DISTURBED MATERIALS IN ACCORDANCE WITH LOCAL
- 23. THE CONTRACTOR SHALL COORDINATE ALL UTILITY WORK, INCLUDING DEMOLITION AND REMOVAL, WITH THE APPROPRIATE UTILITY COMPANIES AND SERVICE PROVIDERS PRIOR TO DISCONTINUATION OF SERVICE. UTILITIES NOT NOTED FOR DEMOLITION SHALL REMAIN IN SERVICE AT ALL TIMES. 24. THE CONTRACTOR SHALL MAINTAIN EXISTING UTILITY SERVICE TO ALL ADJOINING PROPERTIES UNTIL THE RELOCATED UTILITIES ARE INSPECTED AND
- 25. ALL EXISTING UTILITIES SHALL BE REMOVED BACK TO THE CLOSEST STRUCTURE AND CAPPED AT THAT LOCATION.
- 26. REMOVE ALL TREES, GRASS, WEEDS, ROOTS, AND OTHER DEBRIS FROM THE AREA TO BE EXCAVATED, FILLED OR GRADED. 27. IF EXCAVATED MATERIAL IS UNSUITABLE FOR COMPACTION, AS DETERMINED BY THE GEOTECHNICAL ENGINEER, THE CONTRACTOR SHALL FURNISH
- 28. ALL SLOPES, CUT OR FILL, SHALL BE GRADED TO MAXIMUM FINISH SLOPE OF THREE (3) FEET HORIZONTAL TO ONE (1) FOOT VERTICAL. NO GRADED
- SLOPE SHALL EXCEED 3:1 WITHOUT SPECIFIC SLOPE PLANTING OR REINFORCEMENT.
- 29. SITE SHALL BE GRADED TO ASSURE DRAINAGE OF WATER FROM ALL SURFACES. 30. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING ALL SURFACE AND GROUNDWATER CONTROL MEASURES.
- 31. GRADES NOT OTHERWISE INDICATED ON THE PLANS SHALL BE UNIFORM LEVELS OR SLOPES BETWEEN POINTS WHERE ELEVATIONS ARE GIVEN. ABRUPT CHANGES IN SLOPES SHALL BE WELL ROUNDED.
- 32. STORM DRAINAGE SYSTEMS WITHIN THE PROJECT AREA ARE TO BE COMPLETELY CLEANED AT THE COMPLETION OF THE PROJECT.
- 33. EXISTING TREES WHERE INDICATED SHALL BE PROTECTED FROM CONSTRUCTION ACTIVITIES. ALL TREE PROTECTION FENCING TO BE INSPECTED DAILY AND ALL GRADING ACTIVITIES TO REMAIN OUTSIDE THE DRIP LINES.
- 34. ALL TREE PROTECTION MEASURES SHALL BE INSTALLED PRIOR TO GRADING. 35. ALL SOILS UNDERCUTTING, OVER EXCAVATION, UNDER DRAIN INSTALLATION, AND ROCK FILLS SHALL BE DETERMINED AND DIRECTED BY THE SOILS
- 36. FILL AREAS TO BE COMPACTED TO 95% STANDARD PROCTOR MINIMUM UNLESS OTHERWISE INDICATED BY GEOTECHNICAL ENGINEER. 37. UNLESS OTHERWISE INDICATED, ALL DISTURBED SOIL AREAS TO RECEIVE 6 INCHES OF TOPSOIL AND TO BE SEEDED AND MULCHED.



**VICINITY MAP** 



### CALL BEFORE YOU DIG 1-800-DIG-RITE

### LITH ITV CONTACTS

UTILITY CONTACTS:	
EVERGY	816-471-5275
SPIRE	800-582-1234
COMCAST	816-795-1100
AT&T	816-325-5610
SPECTRUM	816-358-5360
CITY OF LEE'S SUMMIT PUBLIC WORKS	816-969-1800
CITY OF LEE'S SUMMIT PUBLIC WORKS INSPECTIONS	816-969-1800
CITY OF LEE'S SUMMIT WATER UTILITIES	816-969-1900

### **UTILITY NOTE:**

THE UTILITIES AS SHOWN IN THESE DRAWINGS WERE DEVELOPED FROM THE INFORMATION AVAILABLE. IT IS NOT IMPLIED NOR INTENDED TO BE THE COMPLETE INVENTORY OF UTILITIES IN THIS AREA. IT IS THE CONTRACTOR'S RESPONSIBILITY TO VERIFY THE LOCATIONS OF ALL UTILITIES (WHETHER SHOWN OR NOT) AND PROTECT SAID UTILITIES FROM ANY DAMAGE.

### **SHEET INDEX:**

**OVERALL SITE PLAN** STREET PLAN & PROFILE SIGNAGE PLAN **INTERSECTION DETAILS** ADA RAMP PLAN DRAINAGE AREA MAP **OVERALL STORM SEWER LAYOUT PLAN OVERALL STORM CALCULATIONS** PHASE 1 STORM LAYOUT PLAN PHASE 1 STORM PLAN & PROFILE PHASE 1 GRADING PLAN

**COVER SHEET** 

LEGAL DESCRIPTIONS

A TRACT OF LAND BEING PART OF THE TRACT DESCRIBED BY THE WARRANTY DEED RECORDED LINDER DOCUMENT NUMBER 2015E0090550. OF THE JACKSON COUNTY MISSOURI RECORDS AND BEING LOCATED THENCE NORTH 10°02'51" FAST, 17.07 FEET: THENCE ALONG A CURVE TO THE LEFT, HAVING A RADIUS O 30.00 FEET, A CURVE LENGTH OF 51.14 FEET, A CHORD BEARING OF NORTH 38°47'01" WEST, AND A CHORD LENGTH OF 45.17 FEET: THENCE ALONG A COMPOUND CURVE TO THE LEFT. HAVING A RADIUS OF 480.00 FEET, A CURVE LENGTH OF 6.44 FEET, A CHORD BEARING OF NORTH 87°59'57" WEST, AND A CHORD LENGTH OF 6.44 FEET; THENCE NORTH 88°23'00" WEST, 934.92 FEET; THENCE ALONG A CURVE TO THE LEFT HAVING A RADIUS OF 25.00 FEET, A CURVE LENGTH OF 39.07 FEET, A CHORD BEARING OF SOUTH 46°50'51' WEST, AND A CHORD LENGTH OF 35.21 FEET. TO A POINT ON THE EAST RIGHT-OF-WAY LINE OF NE HAGEN ROAD, AS NOW ESTABLISHED: THENCE ALONG SAID EAST RIGHT-OF-WAY LINE, NORTH 02°04'42" EAST, 84.80 FEET, TO THE SOUTHWEST CORNER OF LOT 27, LAKEWOOD BUSINESS CENTER ON I-470 PLAT K, A SUBDIVISION IN SAID CITY OF LEE'S SUMMIT; THENCE ALONG THE SOUTH LINE OF SAID LOT 27, SOUTH 88°23'00" EAST, 404.01 FEET, TO THE SOUTHEAST CORNER THEREOF; THENCE ALONG THE EAST LINE OF SAID LOT 27, NORTH 01°38'44" EAST, 370.07 FEET, TO THE SOUTHWEST CORNER OF TRACT C, LAKEWOOD BUSINESS CENTER ON I-470 - PLAT R. A SUBDIVISION IN SAID CITY OF LEE'S SUMMIT: THENCE ALONG THE SOUTH LINE OF SAID TRACT C. SOUTH 88°21'07" EAST, 889.46 FEET, TO THE SOUTHEAST CORNER THEREOF AND BEING A POINT ON THE WEST LINE OF SAID LAKEWOOD BUSINESS CENTER ON 1-470, LOTS 23A AND 23B; THENCE ALONG SAID WEST LINE, SOUTH 01°47'11" WEST, 415.53 FEET, TO THE POINT OF BEGINNING AND CONTAINS 9.49 ACRES, MORE OR LESS.

### **BENCHMARK:**

SE CORNER OF AREA INLET LOCATED IN THE SE CORNER OF LOT 1 NORTH OF NE MAGUIRE BLVD.

ELEVATION=967.99

### **ENGINEER'S CERTIFICATION:**

I HEREBY CERTIFY THAT THIS PROJECT HAS BEEN **DESIGNED AND THESE PLANS PREPARED IN ACCORDANCE WITH THE CURRENT DESIGN** CRITERIA OF THE CITY OF LEE'S SUMMIT. MISSOURI AND THE STATE OF MISSOURI. I **FURTHER CERTIFY THAT THESE PLANS WERE IN** ACCORDANCE TO AASHTO STANDARDS.

SIGNATURE	DATE

CITY OF LEE'S SUMMIT, MISSOURI

APPROVED	DATE:
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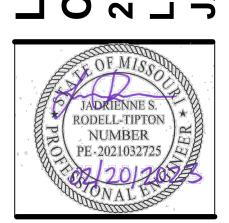
3Y:_		
	CITY ENGINEER	

Engineering: MO 4 / KS 241

ORTH OAK SAFETY STORAGE

GRAIN VALLEY, MO 64029

316) 229-8115



JADRIENNE S RODELL-TIPTON, PE PE-2021032725 (MISSOURI #)

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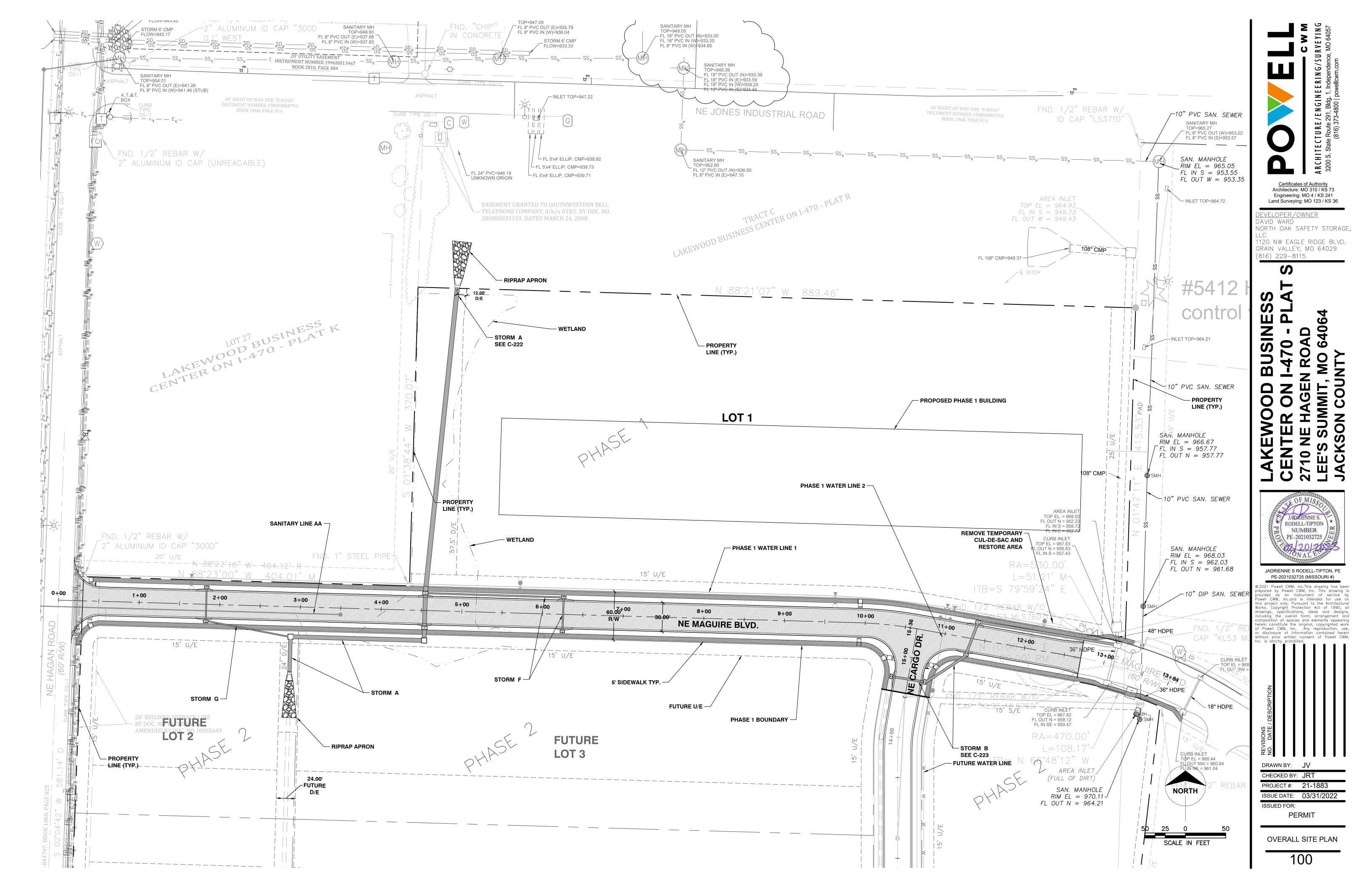
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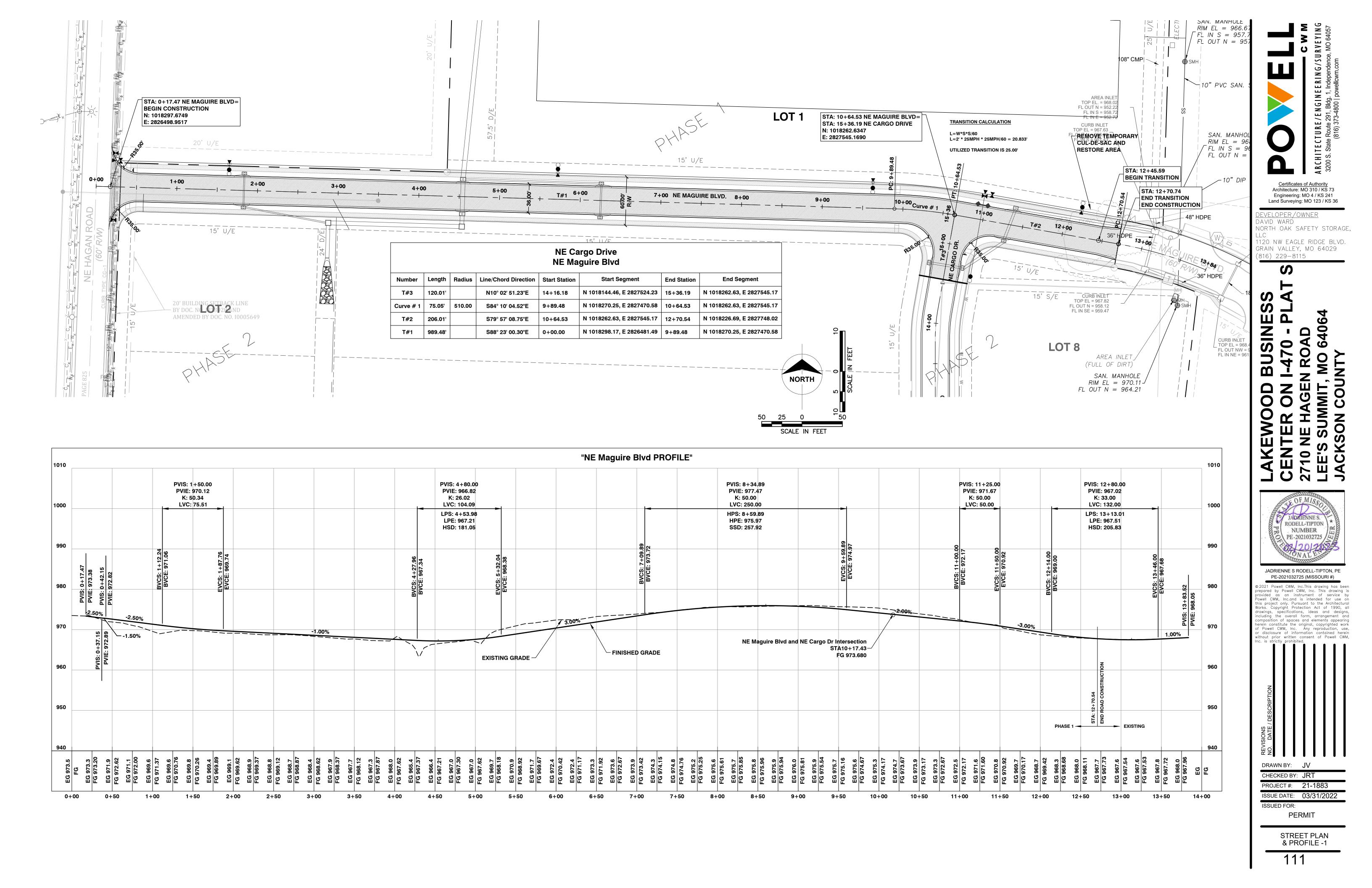
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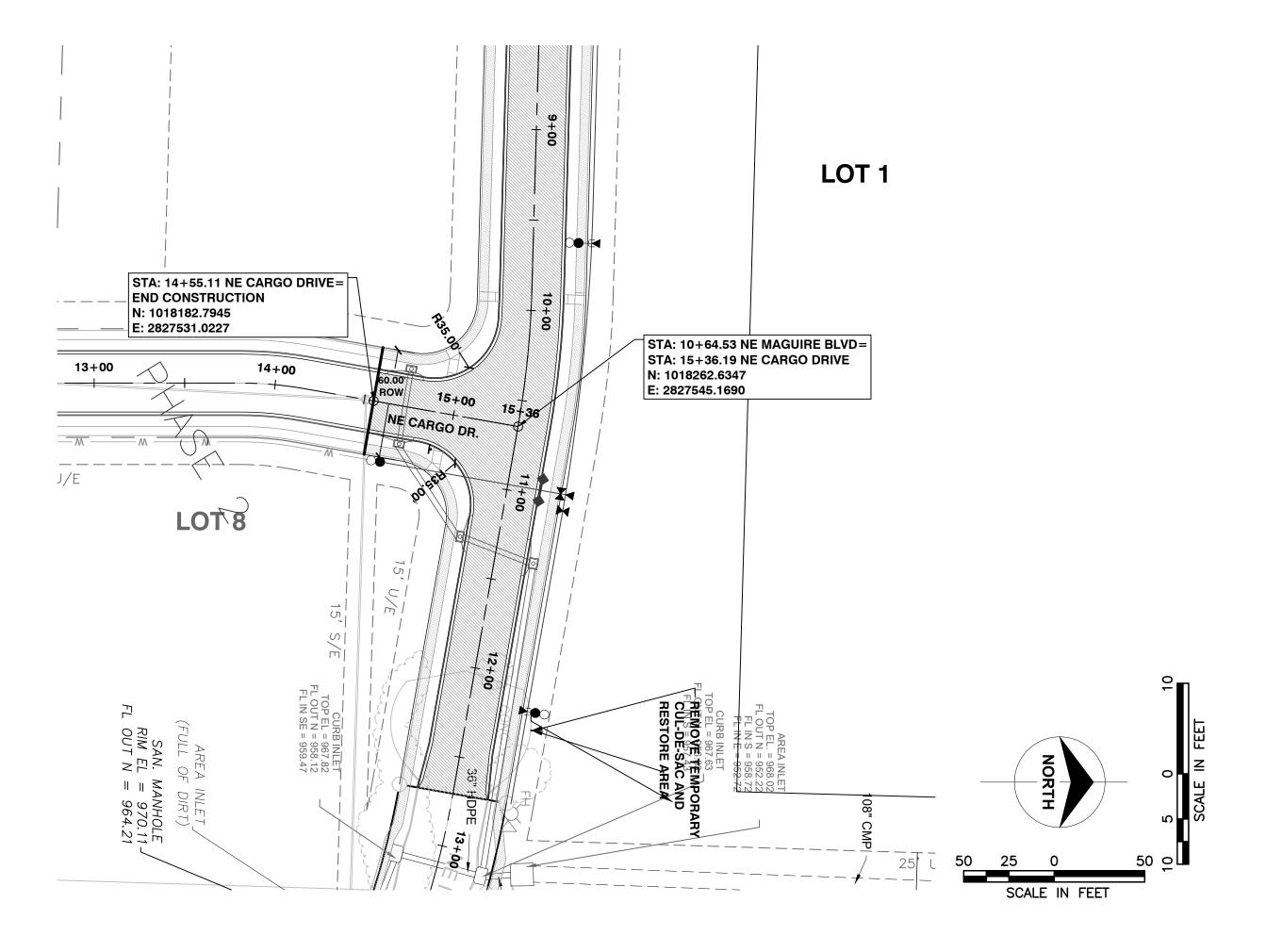
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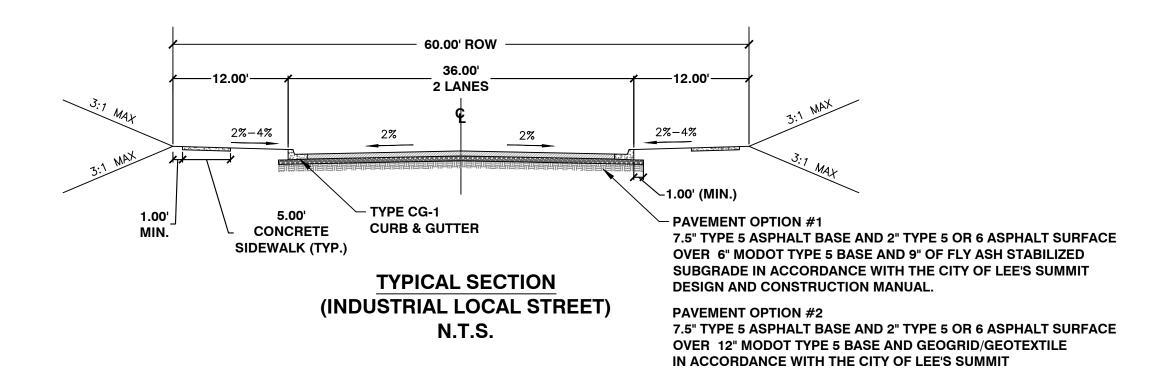
PROJECT #: 21-1883 ISSUE DATE: 03/31/2022

**COVER SHEET** 

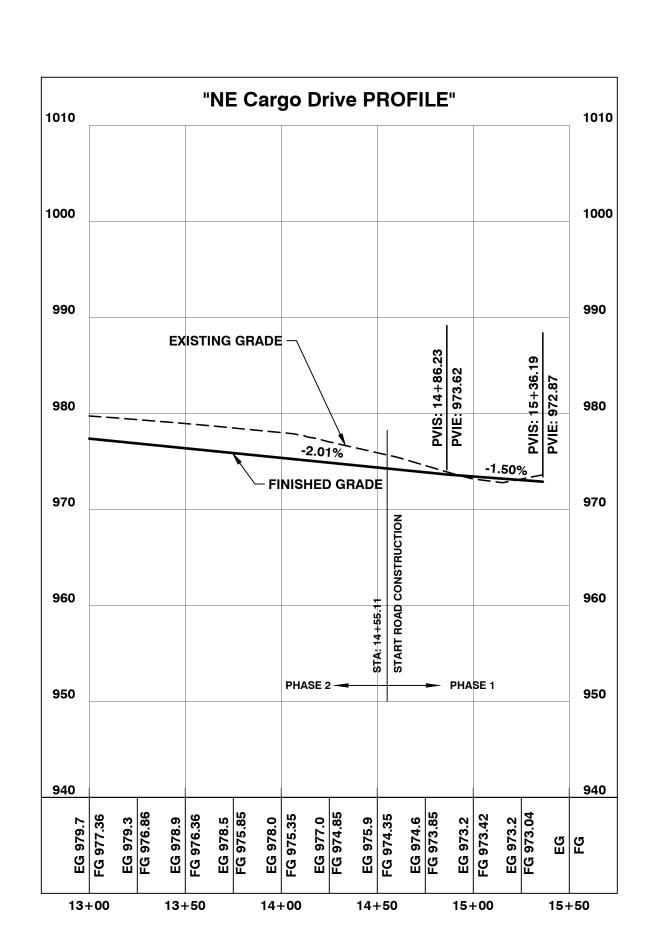








DESIGN AND CONSTRUCTION MANUAL.

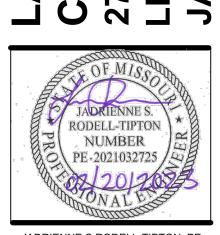




Certificates of Authority
Architecture: MO 310 / KS 73
Engineering: MO 4 / KS 241
Land Surveying: MO 123 / KS 36

IORTH OAK SAFETY STORAGE,

<u>DEVELOPER/OWNER</u> DAVID WARD



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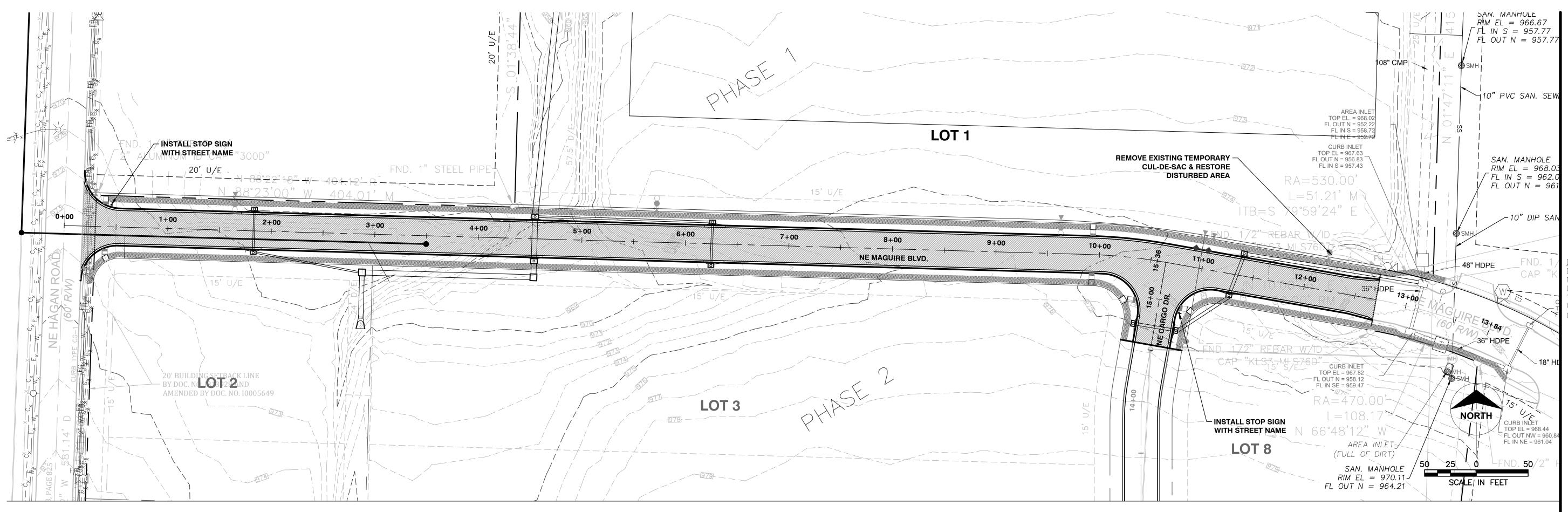
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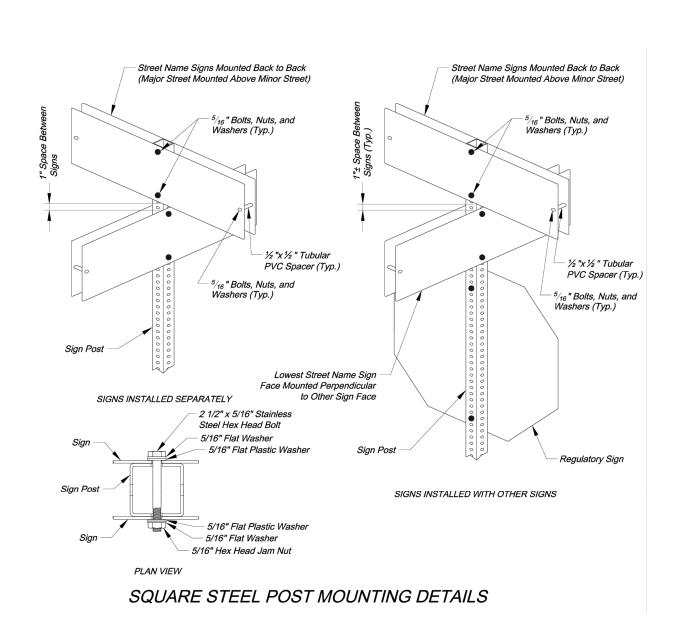
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> STREET PLAN & PROFILE - 2

PERMIT





### SQUARE STEEL POST DETAILS

SQUARE STEEL POST NOTES:

1. Square steel sign posts and break-away anchor shall consist of the following materials:
Sign Post - 14 Ga. 2" x 2" Square Steel Post
Post Anchor - 12 Ga. 2 ½ "x 2 ½" x 36" Square Steel Post

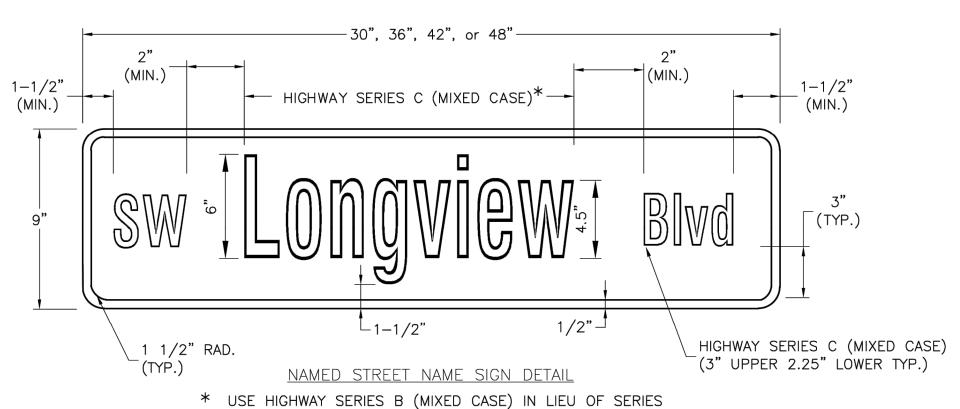
Anchor Sleeve - 12 Ga. 2 ½ x 2 ½ x 18" Square Steel Post

2. 14 Gauge posts must meet a certified minimum yield strength of 60,000 psi.

3. In all installations the first hole above the finished grade line on the sign post, anchor,

and anchor sleeve must be in line for the insertion of the corner bolt.

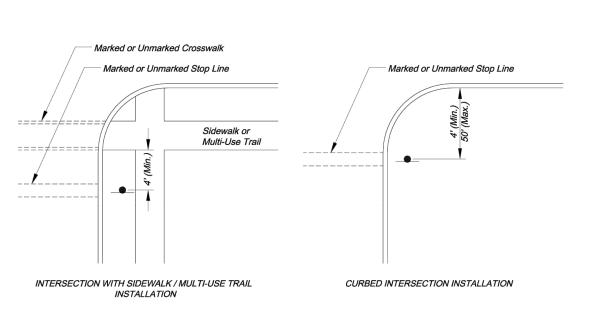
4. The maximum area for one sign post is 9.0 square feet. A sign or combination of signs with an area greater than 9.0 square feet will require two posts. Also, signs with a width greater than 36" (not including 36" x 36" diamond shaped signs) will require two posts.



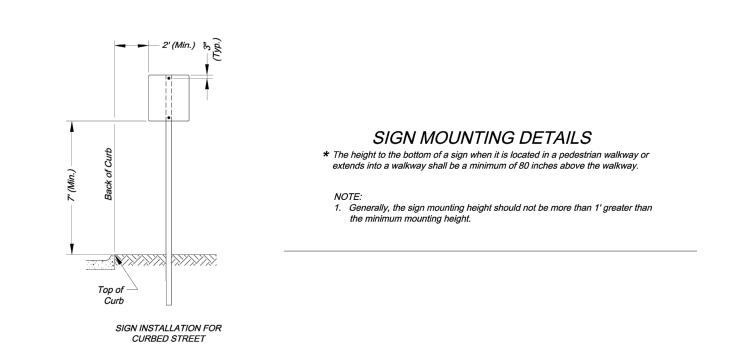
## STREET NAME SIGN FACE DETAILS

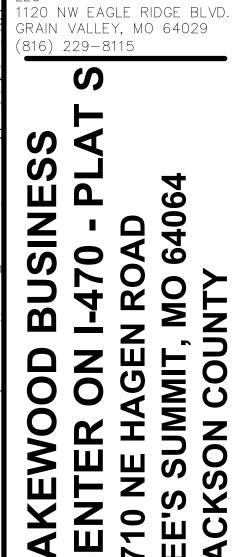
### 1. For all street name signs, the legend shall be white and the background shall

- 2. Arrows shall be added to street name signs where the name of a street changes at an intersection. Street name signs with arrows are to be installed on each
- side of the intersection to indicate the change in names. Arrows shall be white. 3. The "PRIVATE STREET" tag should be added to the end of street name signs to indicate where a street that is outside the right-of-way intersects a public street. The background for the "PRIVATE STREET" tag shall be yellow.



### CONTROL SIGN LOCATION





COUNTY

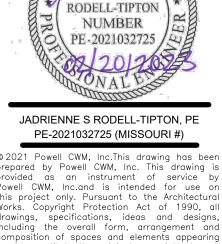
<u>Certificates of Authority</u> Architecture: MO 310 / KS 73

Engineering: MO 4 / KS 241 Land Surveying: MO 123 / KS 36

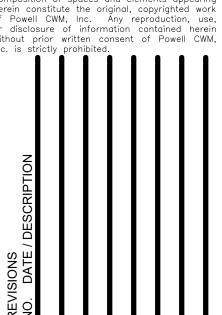
ORTH OAK SAFETY STORAGE,

EVELOPER/OWNER

AVID WARD



JADRIENNE S.

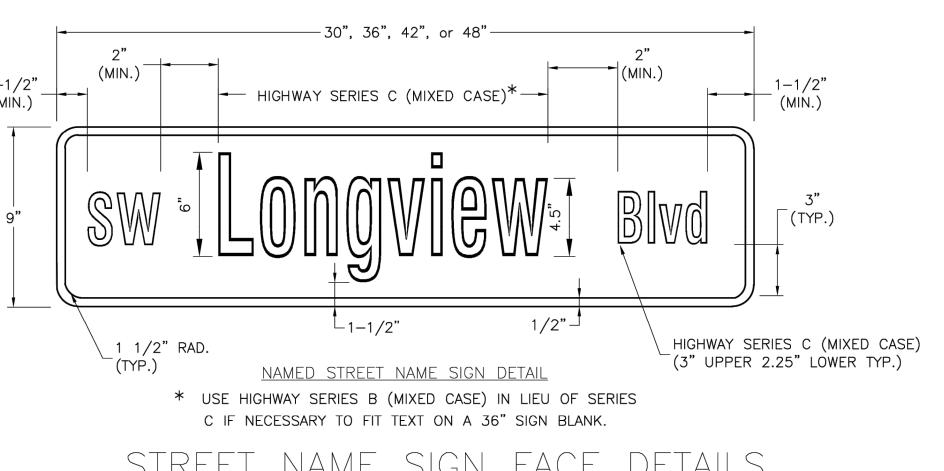


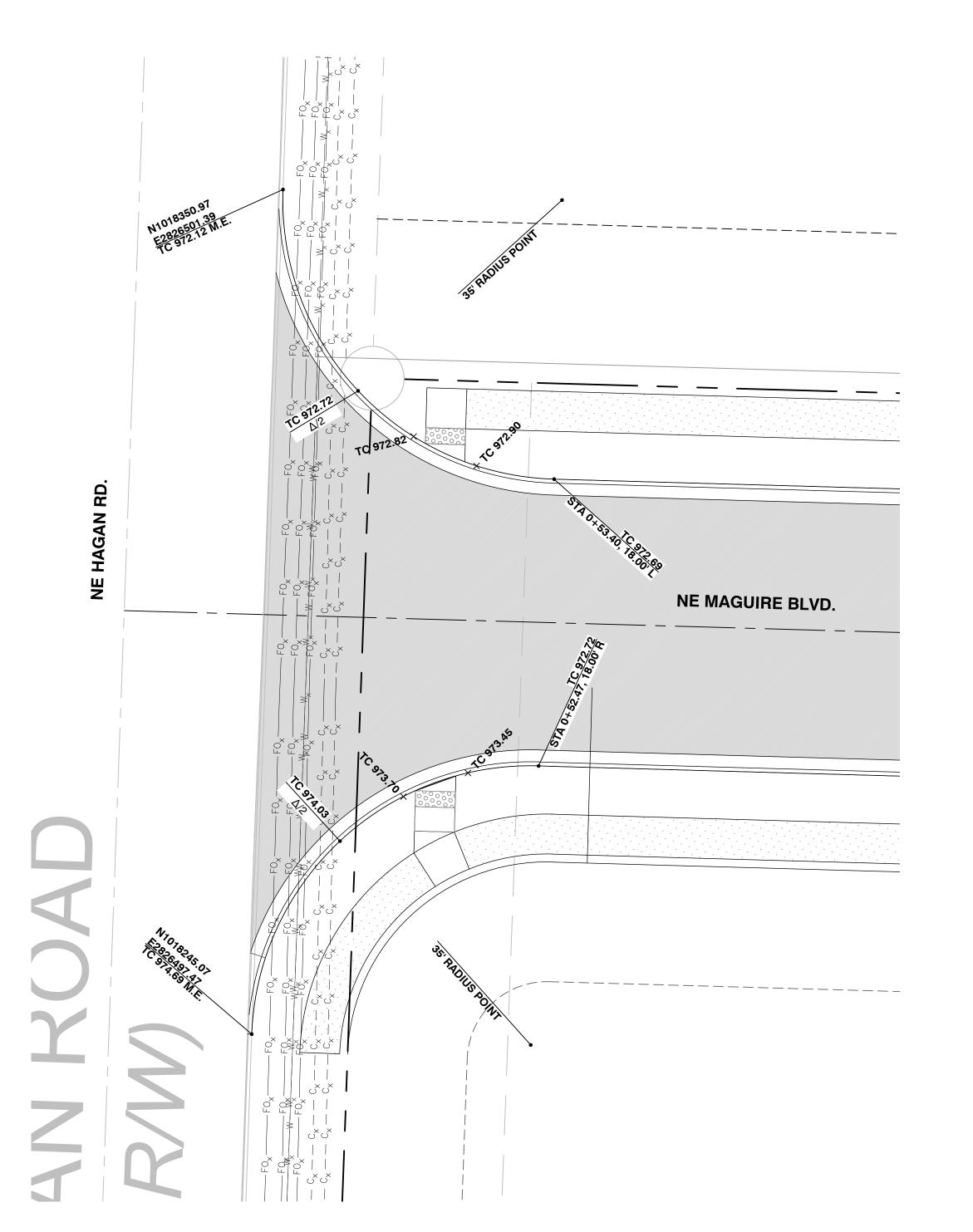
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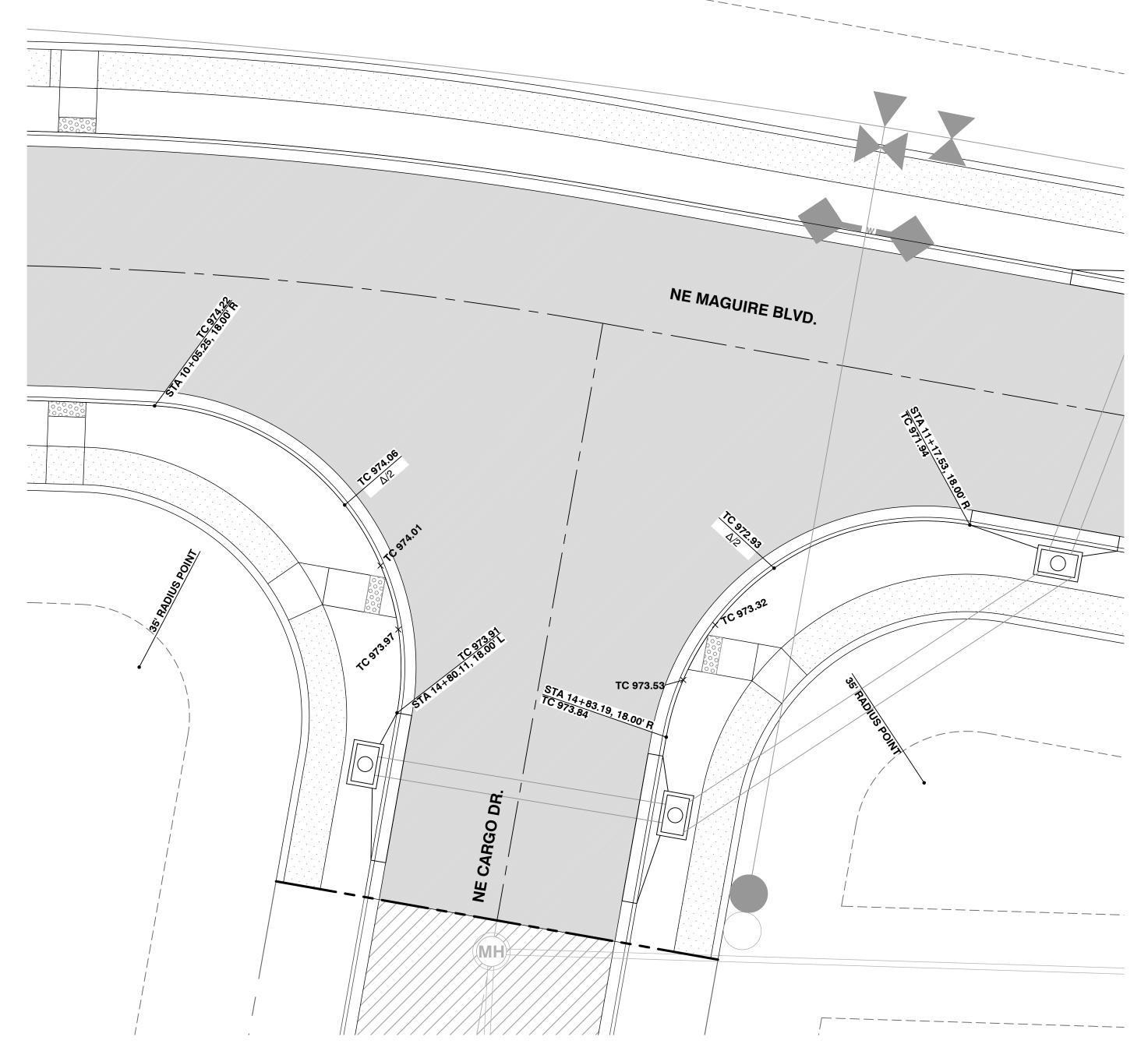
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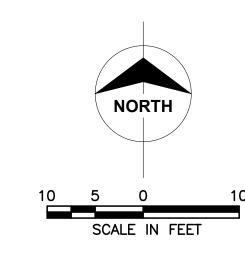
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> STREET SIGNAGE PLAN











DEVELOPER/OWNER
DAVID WARD
NORTH OAK SAFETY STORAGE,

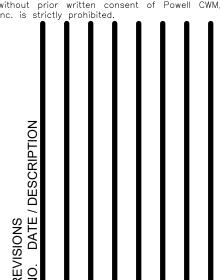
1120 NW EAGLE RIDGE BLVD. GRAIN VALLEY, MO 64029 (816) 229-8115

BUSINE 1-470 - PI 2710 NE HAGEN RO/ LEE'S SUMMIT, MO 6 JACKSON COUNTY



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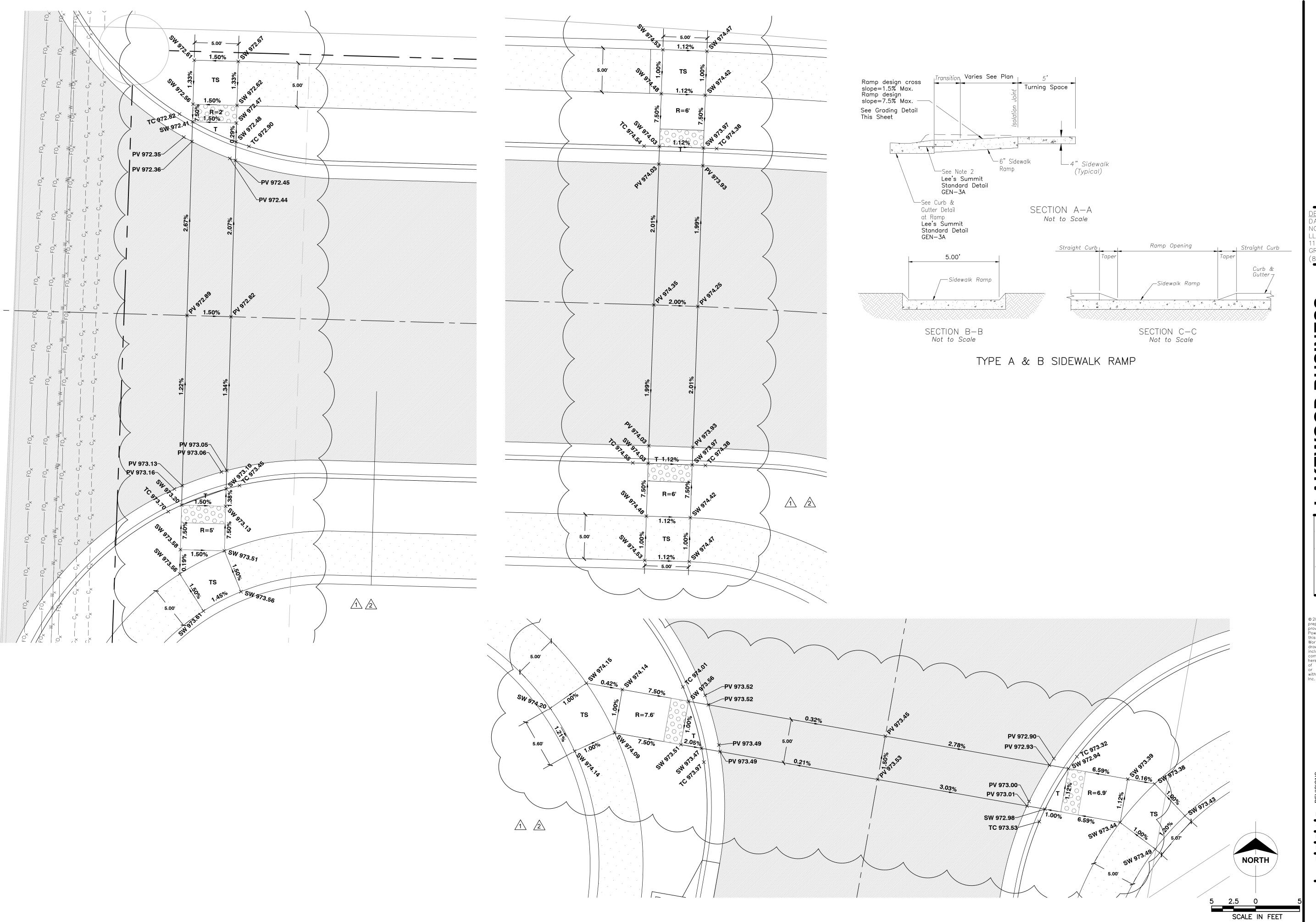


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INTERSECTION DETAILS





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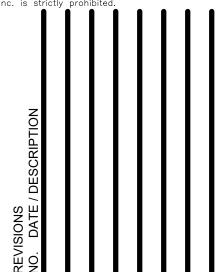
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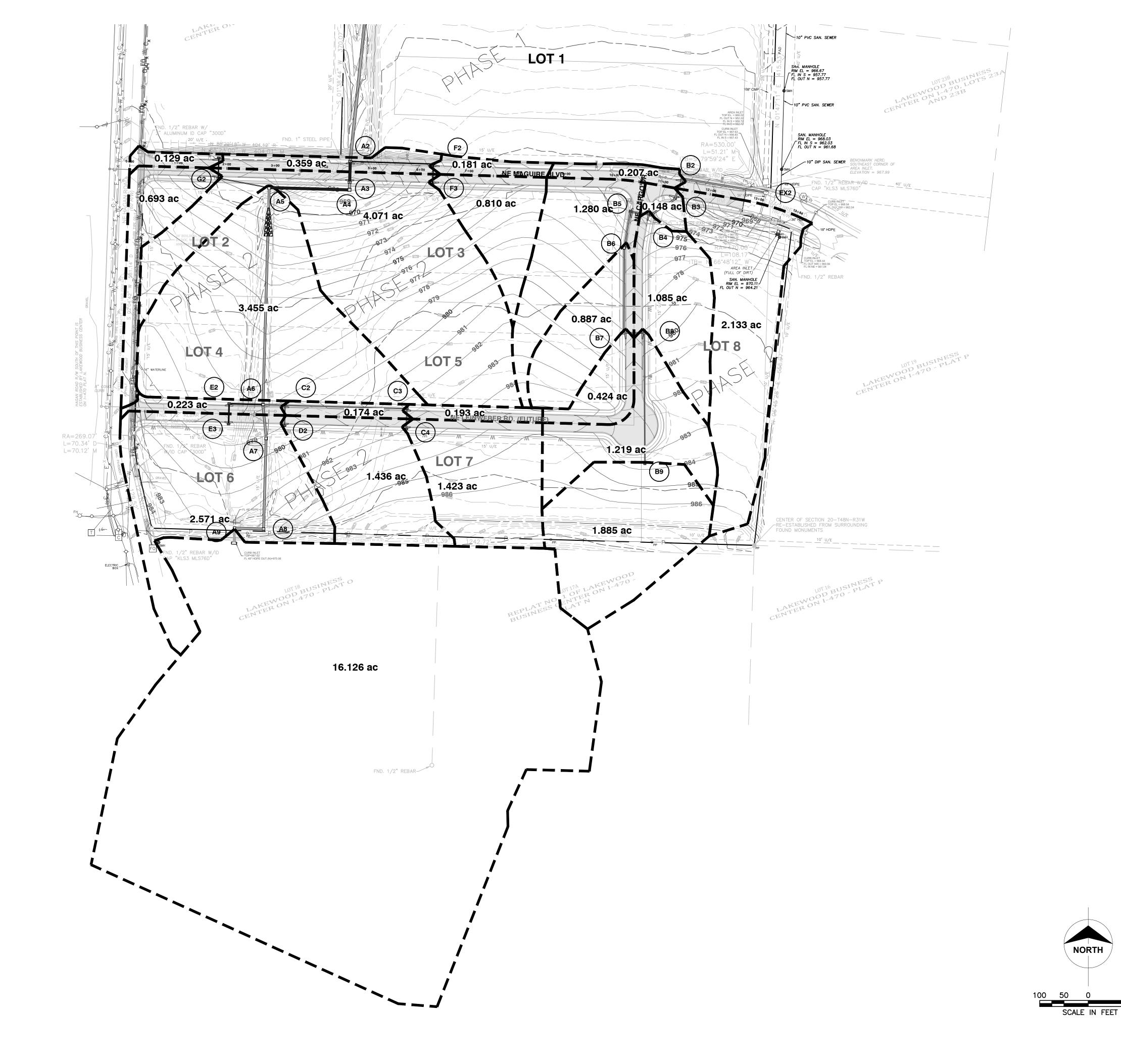


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**CURB RAMP DETAILS** 



Certificates of Authority
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Engineering: MO 4 / KS 241 Land Surveying: MO 123 / KS 36

<u>DEVELOPER/OWNER</u> DAVID WARD NORTH OAK SAFETY STORAGE,

1120 NW EAGLE RIDGE BLVD. GRAIN VALLEY, MO 64029

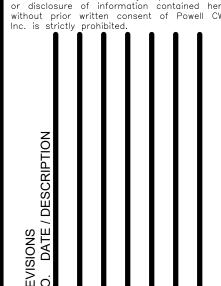
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BUSINES COUNTY

JADRIENNE S. RODELL-TIPTON NUMBER

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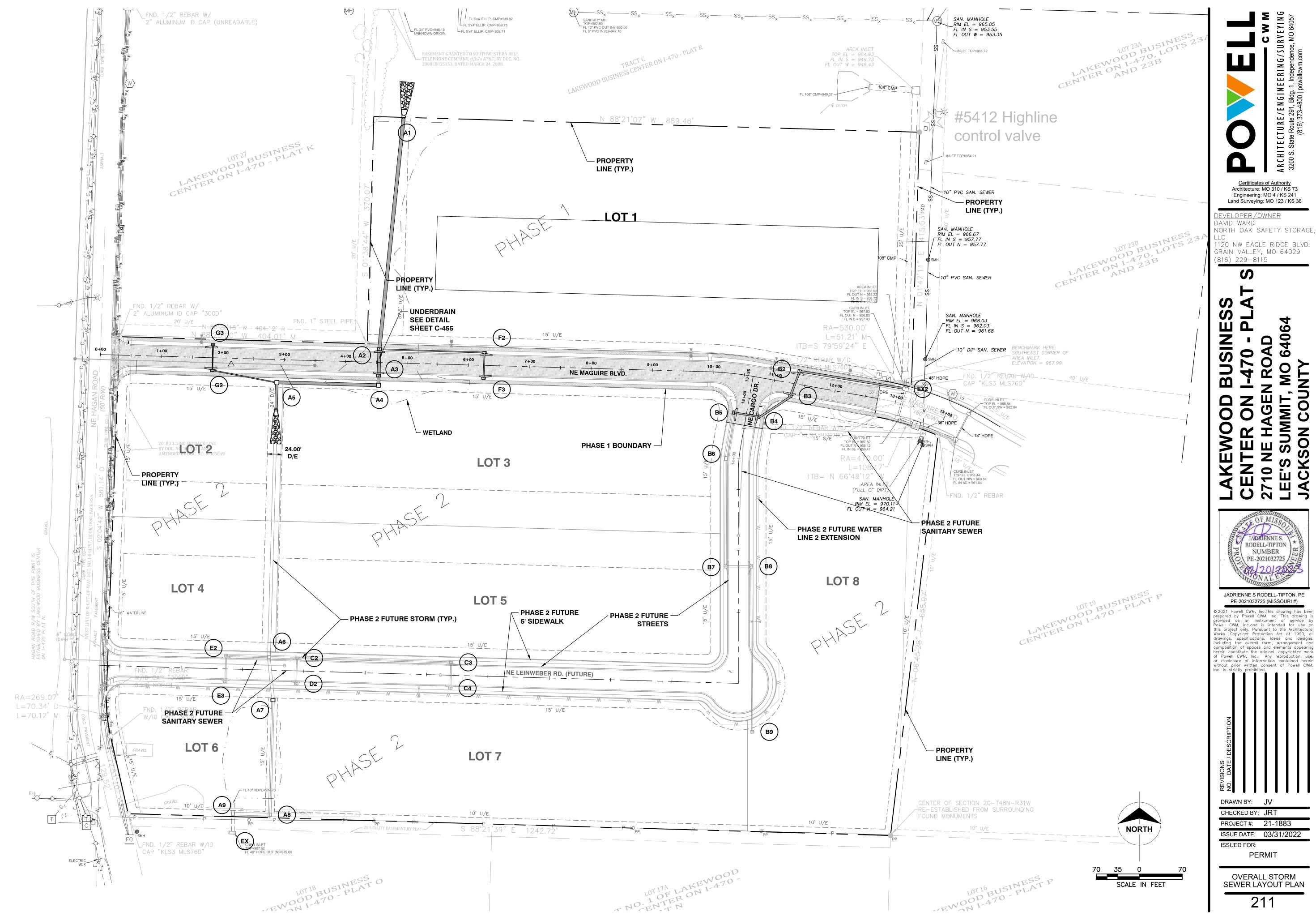


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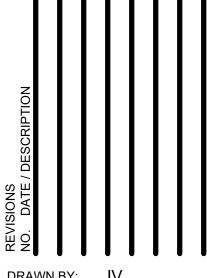
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OVERALL DRAINAGE AREA MAP



20 NW EAGLE RIDGE BLVD.

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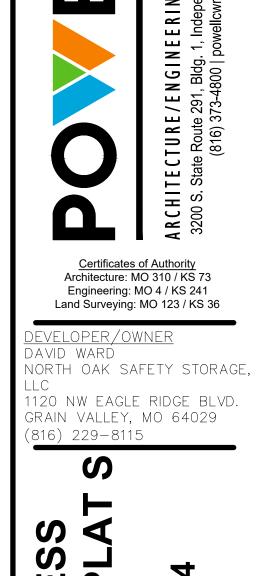


LineNo.	LineID	DrainageArea	IncrCxA	Тс	PipeTravel	iSys	IncrQ	LineLength	LineSize	LineSlope	CapacityFull	VelHd Up	VelDn	Hw	Rim-Hw	InvertUp	InvertDn	SfAve	J-LossCoeff	EnergyLoss	HGLUp	HGLDn	TotalRunoff
		(ac)		(min)	(min)	(in/hr)	(cfs)	(ft)	(in)	(%)	(cfs)	(ft)	(ft/s)	(ft)	(ft)	(ft)	(ft)	(%)		(ft)	(ft)	(ft)	(cfs)
1	A2-A1	0.47	0.31	7.7	0.98	6.61	2.28	378	60	1.22	311.28	3.69	7.93	2.34	13.5	951.6	947	0	1.00 z	0	953.94	951.19	139.26
2	A3-A2	4.07	2.69	7.6	0.09	6.63	19.75	39	54	2.13	310.81	5.49	18.79	2.06	10.13	955.25	954.42	0	0.25 z	0	957.31	956.48	133.32
3	A4-A3	0	0	7.6	0.03	6.64	0	10.678	54	2.9	363.01	6.39	20.27	1.75	10.12	956.1	955.79	0	0.40 z	0	957.85	957.54	115.63
4	A5-A4	3.46	2.28	7.2	0.39	6.74	16.79	160.079	54	0.94	206.23	2.78	13.38	2.43	9.25	957.6	956.1	0	0.80 z	0	960.03	958.53	117.37
5	A6A-A5	0	0	6.2	0.93	6.99	0	443.303	48	1	155.92	2.72	13.23	2.36	13.06	963.05	958.6	0	0.80 z	0	965.41	960.96	102.09
6	A6-A6A	0	0	5.7	0.19	7.14	0	65.255	48	1	155.31	2.35	12.29	1.98	12.88	964.3	963.65	0	0.30 z	0	966.28	965.63	76
7	A7-A6	0	0	5.2	0.49	7.29	0	180.523	48	1.58	195.87	3.35	14.67	1.75	8.66	972.86	970	0	0.40 z	0	974.61	971.75	77.56
8	A8-A7	0	0	5.1	0.15	7.33	0	53.845	48	1	155.85	2.39	12.4	2	6.51	973.9	973.36	0	0.40 z	0	975.9	975.36	78.03
9	A9-A8	16.13	10.65	5	0.07	7.35	78.28	28.014	48	0.57	108.55	1.37	9.4	2.52	10.54	974.56	974.4	0	1.00 z	0	977.08	976.92	78.28
10	C2-A6	0.17	0.11	6.1	0.15	7.03	0.83	40.644	24	5.68	58.41	3.76	15.55	0.69	4.93	973.4	971.09	0	1.00 z	0	974.09	971.78	14.93
11	C3-C2	0.19	0.13	5.2	0.94	7.3	0.92	246.228	18	1.28	12.87	0.9	7.62	0.84	4.14	977.05	973.9	0	0.60 z	0	977.89	974.74	7.76
12	C4-C3	1.42	0.94	5	0.17	7.35	6.89	39	18	1.26	12.75	0.84	7.35	0.79	3.18	978.06	977.57	0	1.00 z	0	978.85	978.36	6.89
13	D2-C2	1.44	0.95	5	0.16	7.35	6.99	39	18	0.95	11.08	0.68	6.63	0.86	3.14	975.02	974.65	0	1.00 z	0	975.88	975.51	6.99
14	E2-A6	0.22	0.15	5.2	0.25	7.3	1.07	64.856	24	1.46	29.66	1.32	9.2	0.95	4.08	973.02	972.07	0	0.40 z	0	973.97	973.02	13.45
15	E3-E2	2.57	1.7	5	0.16	7.35	12.47	39	24	1.36	28.56	1.2	8.54	0.92	3.58	973.55	973.02	0	1.00 z	0	974.47	973.97	12.47
16	F2-A3	0.18	0.12	5.3	1.03	7.26	0.87	165.974	18	2.71	18.71	1.21	8.83	0.52	9.19	961.7	957.21	0	0.40 z	0	962.22	957.73	4.75
17	F3-F2	0.81	0.53	5	0.29	7.35	3.93	39.003	18	2.54	18.13	1.04	8.19	0.47	5.84	965.09	964.1	0	1.00 z	0	965.56	964.57	3.93
18	G2-A3	0.69	0.46	6.6	0.54	6.89	3.35	101.851	15 15	1	7	0.52	5.76	0.64	6.97	962.4	961.38	0	1.00 z	0	963.04	962.02	3.64
19	G3-G2	0.11	0.07	5	1.61	7.35	0.53	42	15	1	7	0.18	3.25	0.23	6.56	963.22	962.8	0	0.00 z	0 007	963.45	963.04	0.53
20	B2-B1	0.21	0.14	7.1	0.46	6.76	1.02	168.429	30	1.76	59	0.66	6.5	3.28	5.25	962.97	960	0.515	0.4	0.867	965.6	964.73	31.88
21	B3-B2 B4-B3	0.15	0.1	/ 6.9	0.11	6.78	0.73 5.20	39.734	30	1.89	61.04	0.83	6.33	2.36	5.11	964.22	963.47	0.494	0.4	0.196	966.25	966.25	31.07
22	в <del>4</del> -вз В5-В4	1.09	0.72	6.8 6.7	0.17	6.83	5.29 6.21	59.132 38.997	30 24	1.67	57.49 44.74	2.2	7.83 14.74	1.3	7.1	965.71 067.65	964.72 966.35	0	0.30 z 0.60 z	0	967.01 968.74	966.58	30.6 25.77
23 24	B6-B5	1.28 0.89	0.84		0.08 0.19	6.85 6.9	6.21 4.32	70.796	24 24	3.33	37.41	3.38 2.28	14.74	1.09 1.05	5.38 4.75	967.65 960.8	968.15	0 0	0.80 Z 0.30 z	0	970.85	967.44 969.2	20.14
2 <del>4</del> 25	во-во В7-В6	0.69	0.59 0.28	6.6	0.19	7.06	4.32 2.04	170.68	24 24	2.33 1.76	32.48	2.26 1.67	10.37	1.05	4.73 4.78	969.8 973.3	970.3	0	0.30 Z 0.40 z	0	970.65 974.31	969.2 971.31	20.14 16.44
26	В7-В0 В8-В7	1.22	0.28	5.9	0.36	7.06 7.1	5.92	39.012	24 24	1.78	27.74	1.07	8.93	1.01	4.76 3.76	973.3 974.3	970.3 973.8	0	0.40 Z 0.60 Z	0	974.31	971.31	14.57
26 27	во-в <i>т</i> В9-В8	1.89	1.25	5.8 5	0.14	7.1 7.35	9.17	265.064	2 <del>4</del> 18	1.20 1.77	15.15	1.25	8.97	0.84	3.76	974.3 979.5	973.8 974.8	0	1.00 z	0	980.34	974.63 975.64	9.17
۷1	09-00	1.03	1.20	5	0.00	1.55	ð. 1 <i>1</i>	200.004	10	1.77	10.10	1.20	0.31	0.04	٥.٥	313.5	314.0	U	1.00 2	U	300.34	313.04	3.17

10-YR CALCS.

Linable	Linato	D : 4	L	<b>T</b> -	Dia - Taranal	:0	l	l : l	LinaCina	LinaClana	0		\	11	Dies III	, lavortila	los contDo	Of A		. <b></b>	110111-	1101.5	TatalD off
LineNo.	LineID	DrainageArea (ac)	IncrCxA	Tc (min)	PipeTravel (min)	iSys (in/hr)	IncrQ (cfs)	LineLength (ft)	LineSize (in)	LineSlope (%)	CapacityFull (cfs)	VelHd Up (ft)	VelDn (ft/s)	Hw (ft)	Rim-Hw (ft)	InvertUp (ft)	InvertDn (ft)	SfAve (%)	J-LossCoeff	EnergyLoss (ft)	HGLUp (ft)	HGLDn (ft)	TotalRunoff (cfs)
1	A2-A1	0.47	0.39	6.5	1.41	9.73	4.03	378.105	96	1.22	1090.13	4.9	8.33	2.65	13.19	951.6	947	0	1.00 z	0	954.25	951.73	257.82
2	A3-A2	4.07	3.38	6.5	0.05	9.75	34.87	39	54	2.13	310.81	7.3	21.67	3.03	9.16	955.25	954.42	0	0.25 z	0	958.28	957.45	246.48
3	A4-A3	0	0.00	6.5	0.02	9.75	0	10.678	54	2.9	363.01	8.77	23.71	2.48	9.39	956.1	955.79	0	0.40 z	0	958.58	958.28	213.68
4	A5-A4	3.46	2.87	6.2	0.22	9.83	29.64	160.079	54	0.94	206.23	3.36	14.71	3.9	7.78	957.6	956.1	0	0.80 z	0	961.5	960	215.48
5	A6A-A5	0	0	5.7	0.53	10.04	0	443.303	48	1	155.92	3.35	14.68	8.46	6.96	963.05	958.6	1.405	0.8	6.228	968.83	962.6	184.43
6	A6-A6A	0	0	5.4	0.1	10.16	0	65.255	48	1	155.31	1.82	10.82	8.25	6.61	964.3	963.65	0.764	0.3	0.498	972.01	971.51	135.99
7	A7-A6	0	0	5.1	0.28	10.27	0	180.523	48	1.58	195.87	4.43	16.23	2.47	7.94	972.86	970	0	0.40 z	0	975.33	972.55	137.51
8	A8-A7	0	0	5	0.08	10.3	0	53.845	48	1	155.85	3.05	14	2.93	5.58	973.9	973.36	0	0.40 z	0	976.83	976.29	137.96
9	A9-A8	16.13	13.39	5	0.04	10.32	138.2	28.014	48	0.57	108.55	1.88	11	5.98	7.08	974.56	974.4	0.926	1	0.259	978.66	978.4	138.2
10	C2-A7	0.17	0.14	5.6	0.08	10.07	1.46	40.644	24	5.68	58.41	5.15	18.21	0.95	4.67	973.4	971.09	0	1.00 z	0	974.35	972.04	26.91
11	C3-C2	0.19	0.16	5.1	0.53	10.28	1.63	246.228	18	1.28	12.87	1.04	8.17	1.36	3.62	977.05	973.9	0	0.60 z	0	978.41	975.26	13.74
12	C4-C3	1.42	1.18	5	0.09	10.32	12.17	39	18	1.26	12.75	1.05	8.21	1.17	2.8	978.06	977.57	0	1.00 z	0	979.23	978.74	12.17
13	D2-C2	1.44	1.2	5	0.09	10.32	12.34	39	18	0.95	11.08	0.76	6.98	2.35	1.65	975.02	974.65	1.176	1	0.459	976.61	976.15	12.34
14	E2-A7	0.22	0.18	5.1	0.14	10.28	1.88	64.856	24	1.46	29.66	1.71	10.49	1.36	3.67	973.02	972.07	0	0.40 z	0	974.38	973.43	23.81
15	E3-E2	2.57	2.13	5	0.09	10.32	22.02	39	24	1.36	28.56	1.56	9.7	1.32	3.18	973.55	973.02	0	1.00 z	0	974.87	974.38	22.02
16	F2-A3	0.18	0.15	5.2	0.58	10.25	1.54	165.974	18	2.71	18.71	1.65	10.31	0.71	9	961.7	957.21	0	0.40 z	0	962.41	957.92	8.43
17	F3-F2	0.81	0.67	5	0.17	10.32	6.94	39.003	18	2.54	18.13	1.42	9.57	0.64	5.67	965.09	964.1	0	1.00 z	0	965.73	964.74	6.94
18	G2-A3	0.69	0.57	5.9	0.31	9.96	5.91	101.851	15	1	7	0.65	6.49	0.97	6.64	962.4	961.38	0	1.00 z	0	963.37	962.35	6.61
19	G3-G2	0.11	0.09	5	0.91	10.32	0.94	42	15	1	7	0.25	1.74	0.31	6.48	963.22	962.8	0	0.00 z	0	963.53 j	963.37	0.94
20	B2-B1	0.21	0.17	6.2	0.26	9.85	1.8	168.429	30	1.76	59	2.2	11.91	7.53	1	962.97	960	1.731	1	2.916	968.3	965.38	58.45
21	B3-B2	0.15	0.12	6.1	0.06	9.87	1.29	39.734	30	1.89	61.04	2.09	11.59	7.77	-0.3	964.22	963.47	1.639	0.4	0.651	971.15	970.5	56.87
22	B4-B3	1.09	0.9	6	0.09	9.91	9.34	59.132	30	1.67	57.49	2.01	11.38	7.82	0.58	965.71	964.72	1.58	0.3	0.934	972.92	971.99	55.85
23	B5-B4	1.28	1.06	6	0.05	9.93	10.97	38.997	24	3.33	44.74	3.47	14.95	9.4	-2.93	967.65	966.35	3.675	0.6	1.433	974.96	973.53	46.97
24	B6-B5	0.89	0.74	5.9	0.11	9.97	7.63	70.796	24	2.33	37.41	2.11	11.64	9.46	-3.66	969.8	968.15	2.228	0.3	1.578	978.63	977.05	36.57
25	B7-B6	0.42	0.35	5.6	0.32	10.09	3.6	170.68	24	1.76	32.48	1.38	9.41	9	-3.21	973.3	970.3	1.457	0.4	2.487	981.74	979.26	29.57
26	B8-B7	1.22	1.01	5.5	0.08	10.13	10.45	39.012	24	1.28	27.74	1.08	8.32	9.09	-4.3	974.3	973.8	1.138	0.6	0.444	982.74	982.3	26.14
27	B9-B8	1.89	1.57	5	0.48	10.32	16.19	265.064	18	1.77	15.15	1.31	9.17	10.56	-6.42	979.5	974.8	2.027	1	5.372	988.76	983.39	16.19

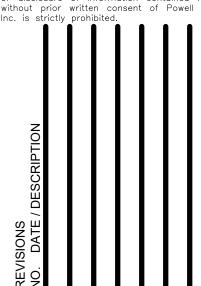
100-YR CALCS.





JADRIENNE S RODELL-TIPTON, PE

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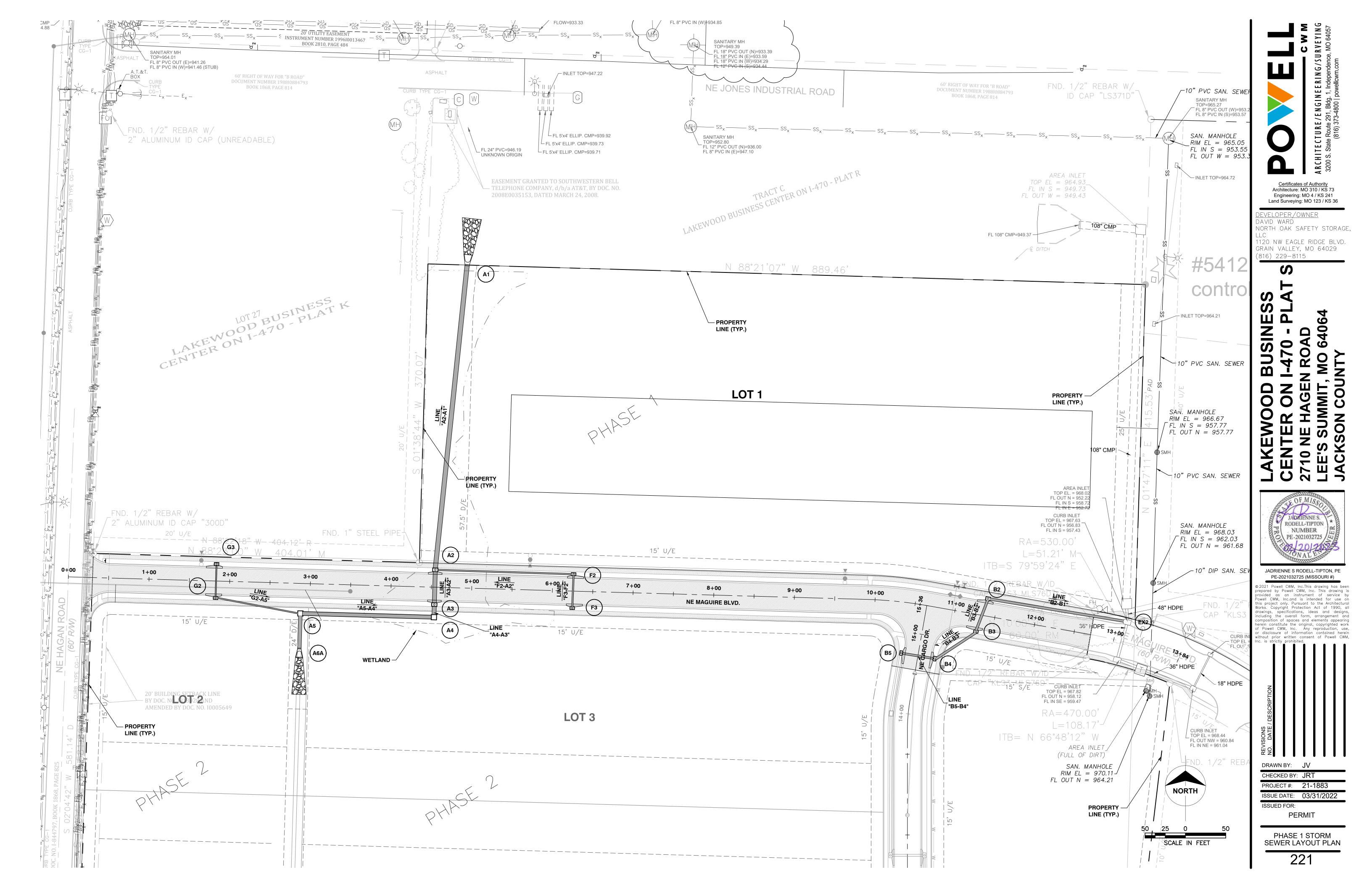
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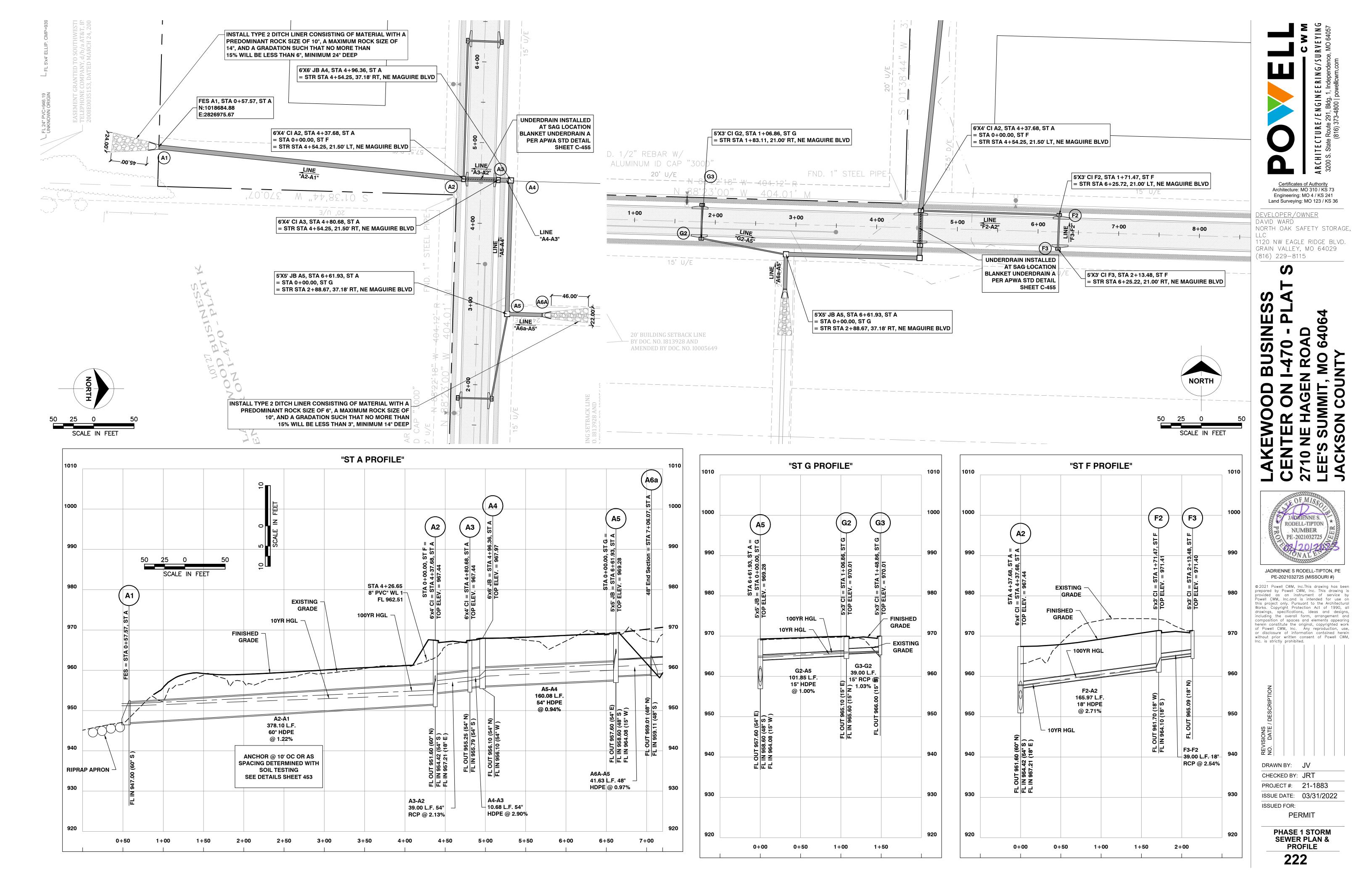
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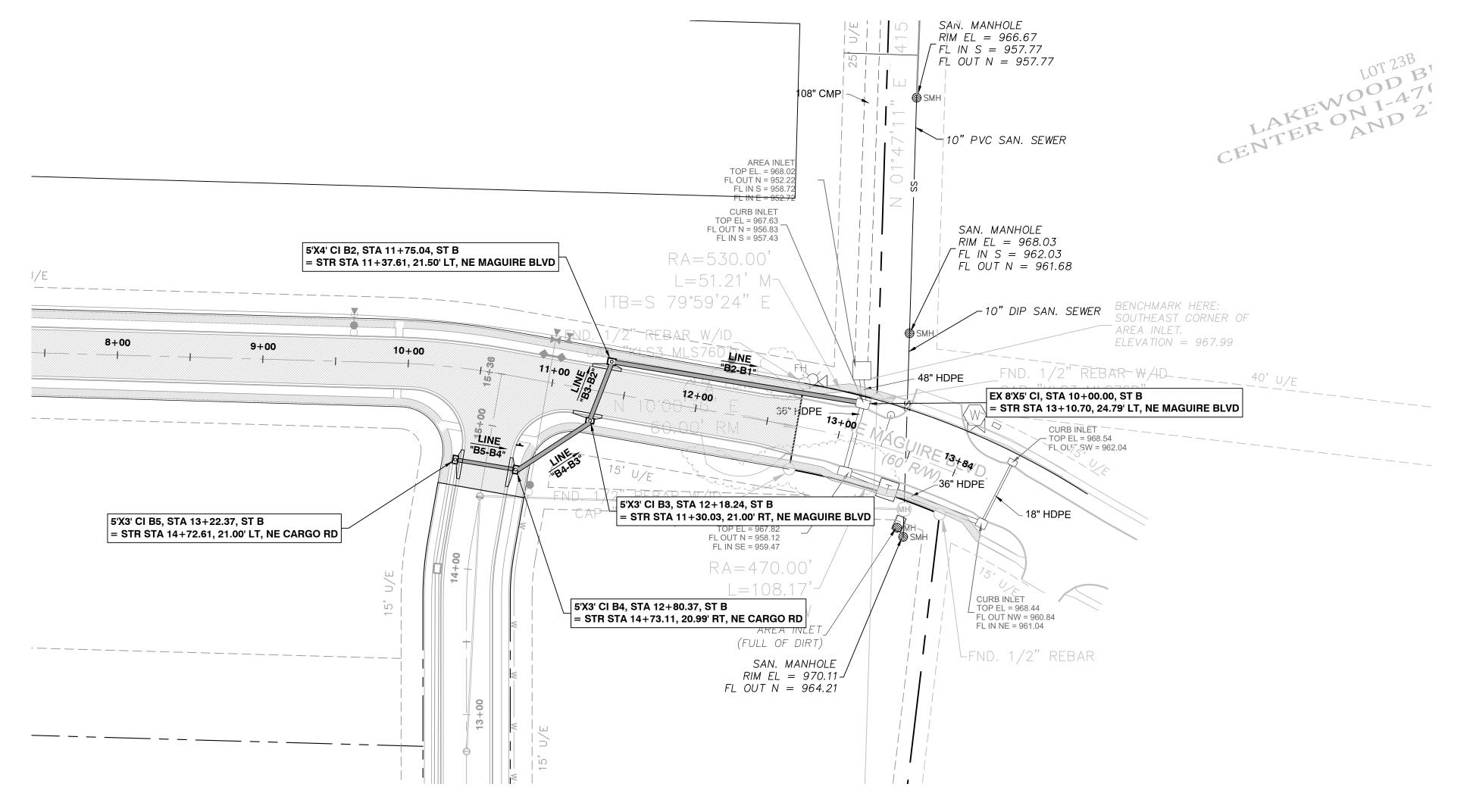
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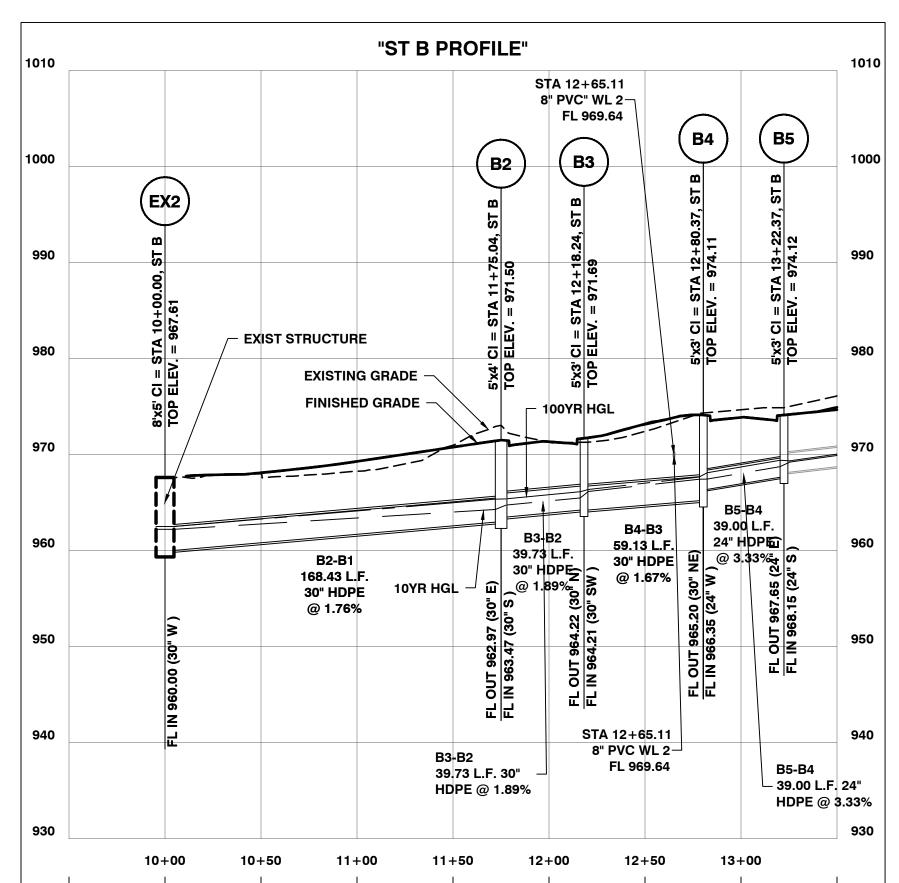
OVERALL STORM CALCULATIONS

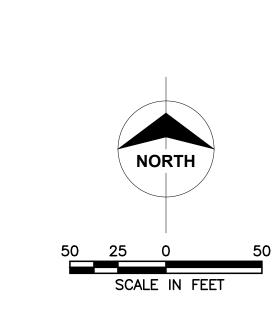
PERMIT











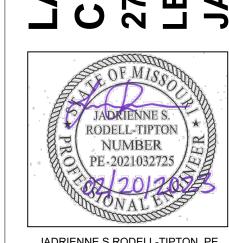
AKEWOOD BUSINESS
ENTER ON 1-470 - PLAT S
710 NE HAGEN ROAD
710 NE HAGEN ROAD
EE'S SUMMIT, MO 64064
ACKSON COUNTY

Certificates of Authority
Architecture: MO 310 / KS 73

Engineering: MO 4 / KS 241 Land Surveying: MO 123 / KS 36

NORTH OAK SAFETY STORAGE,

DEVELOPER/OWNER DAVID WARD



JADRIENNE S RODELL-TIPTON, PE PE-2021032725 (MISSOURI #)

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AO. DATE / DESCRIPTION

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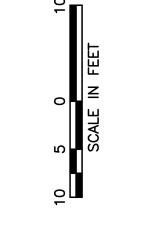
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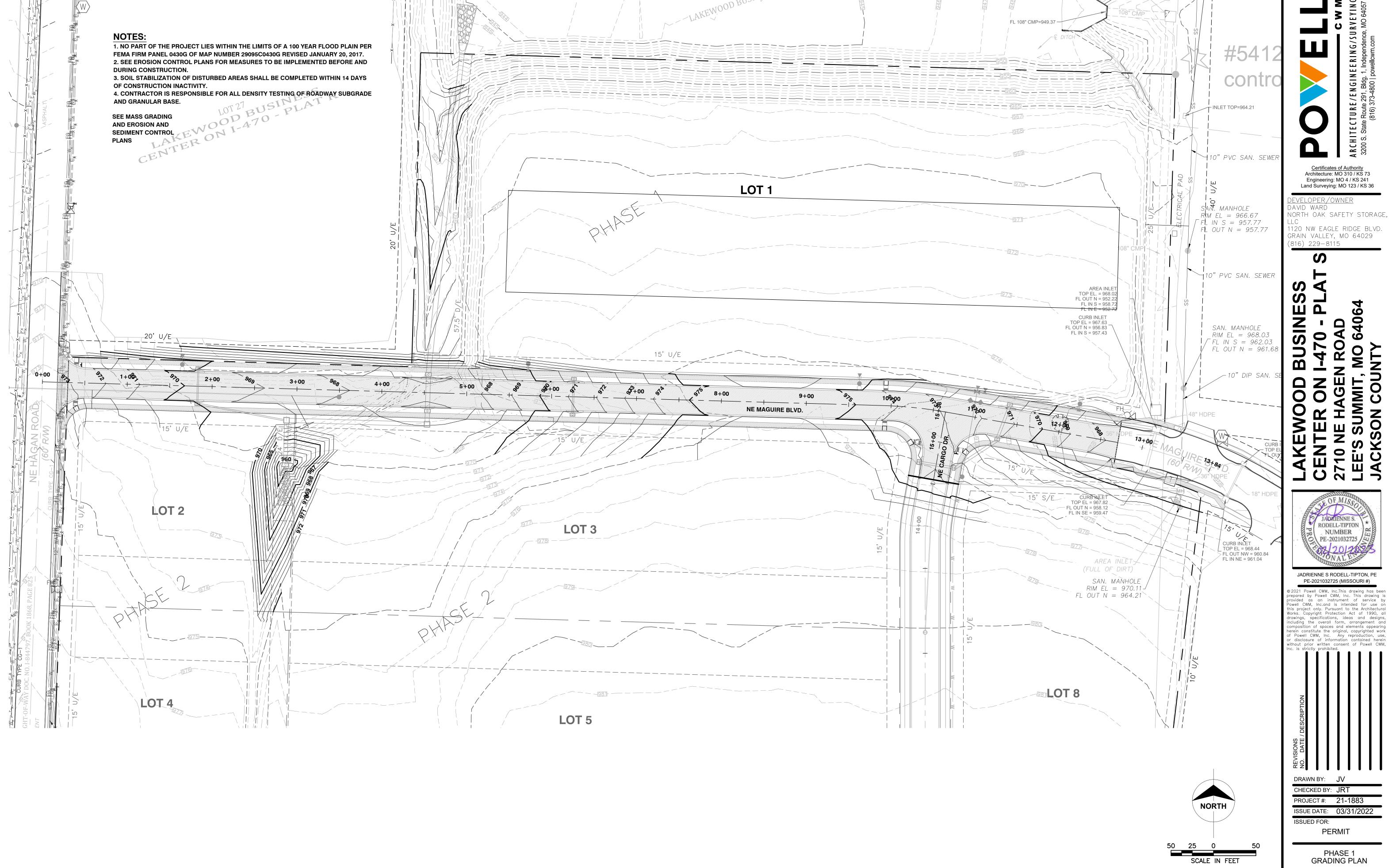
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PHASE 1 STORM SEWER PLAN & PROFILE CONT'D

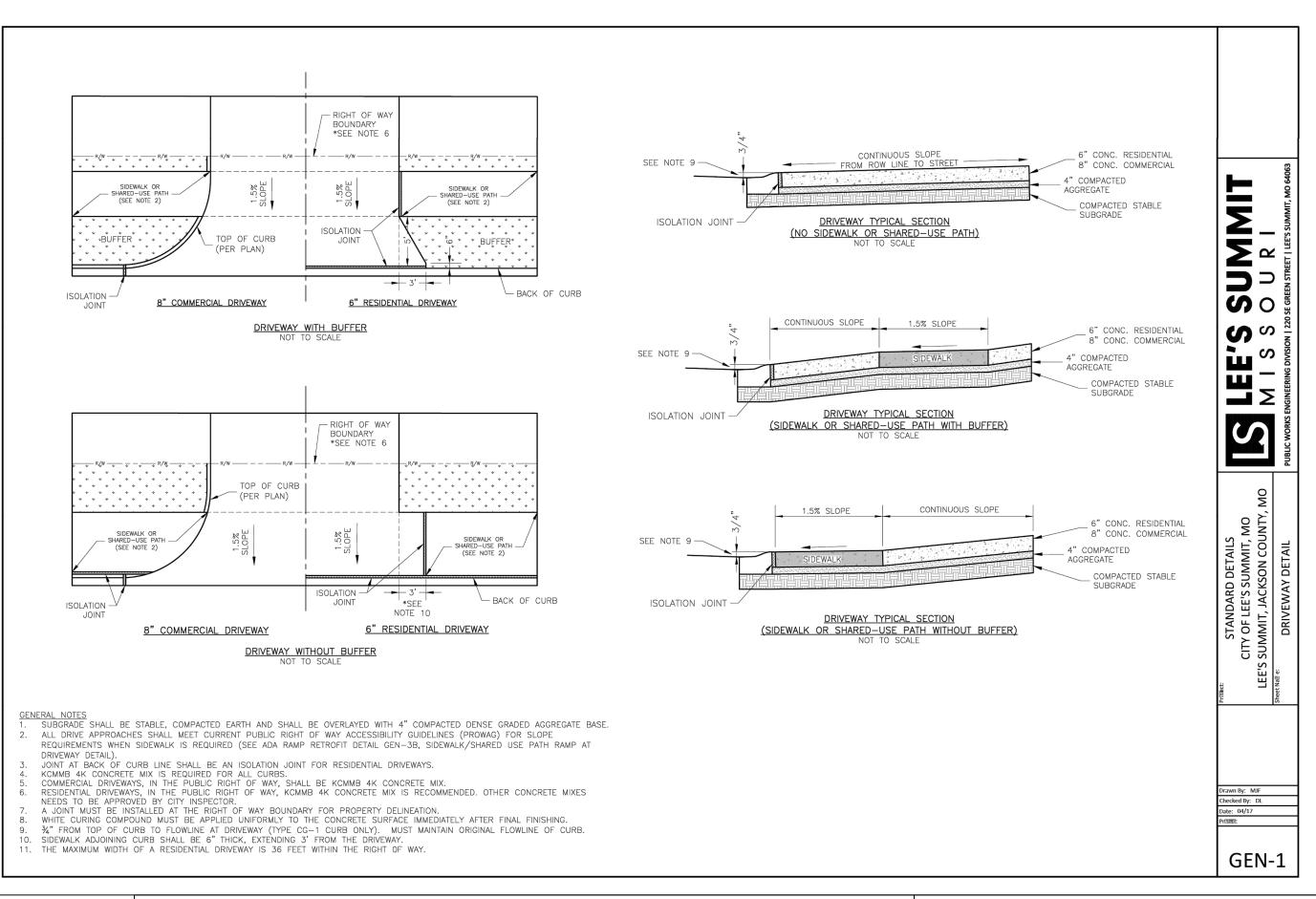
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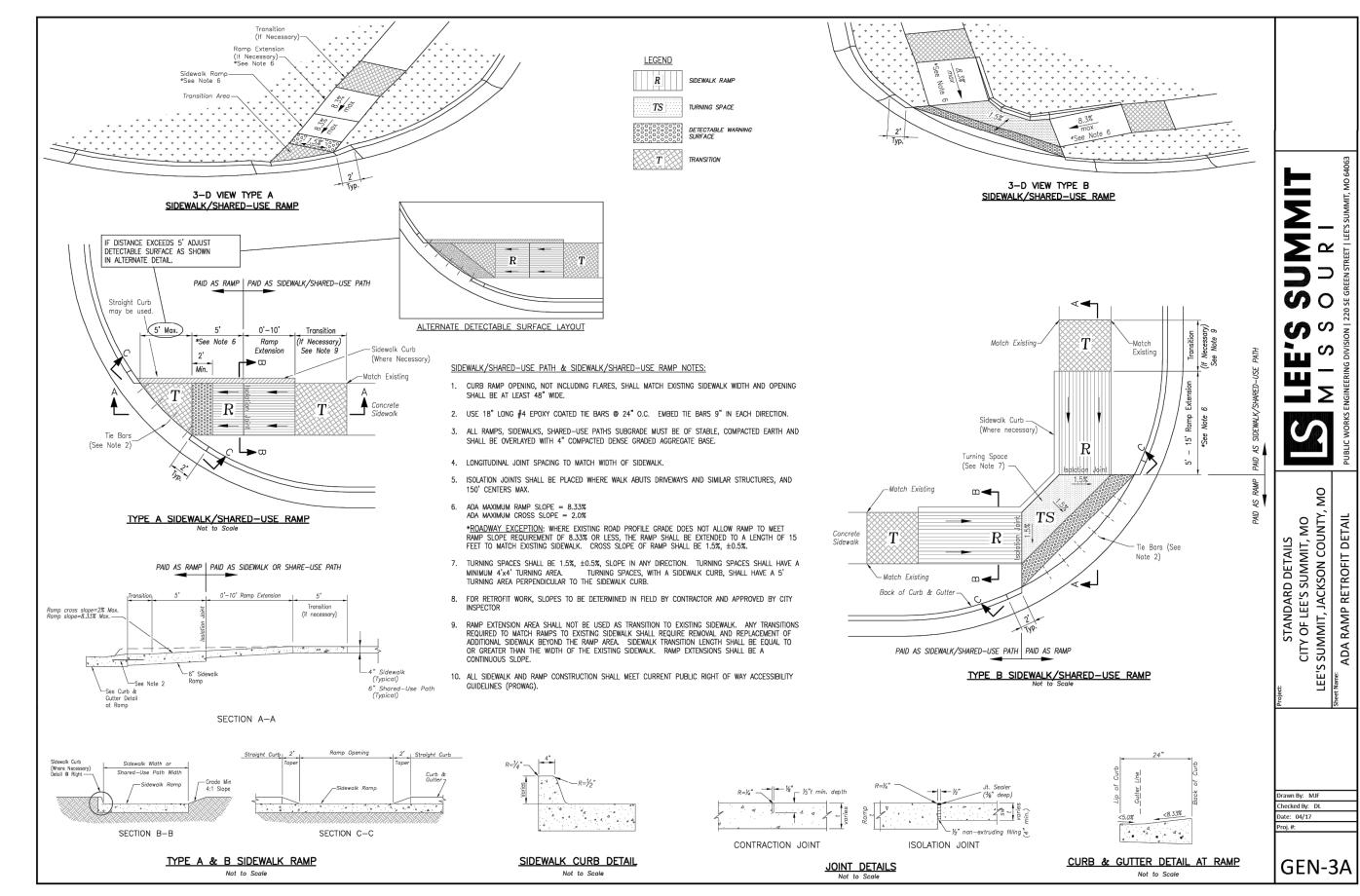


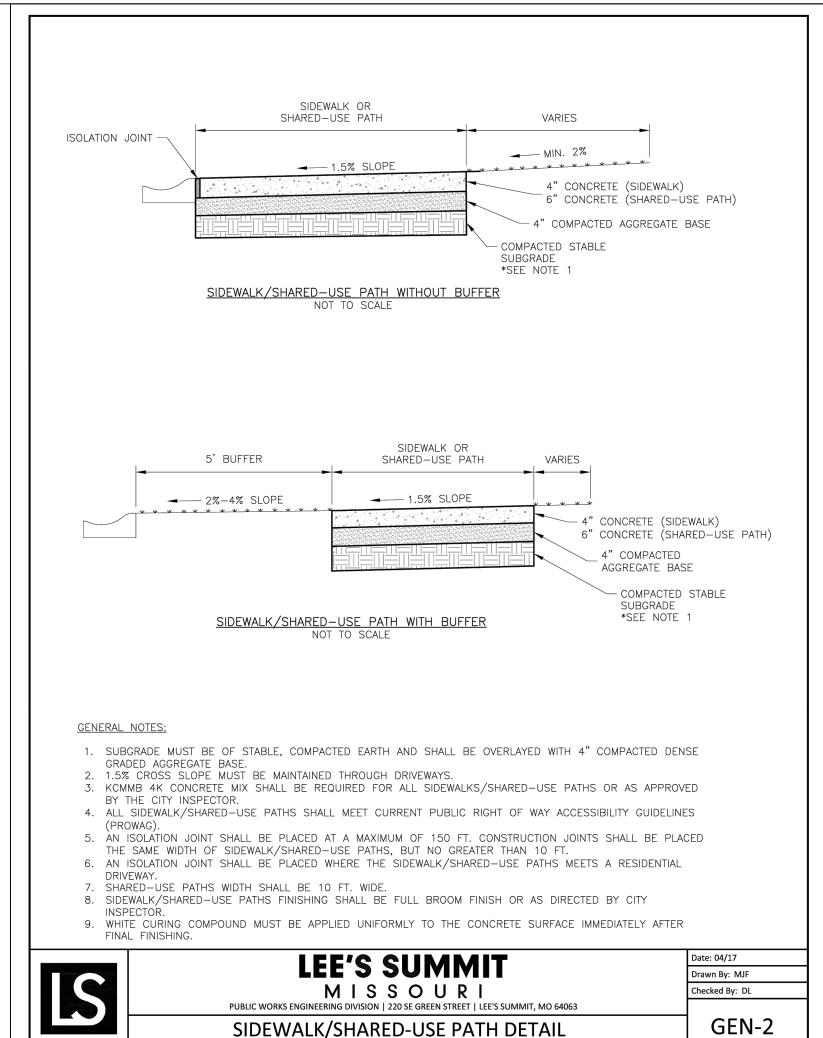
SCALE IN FEET



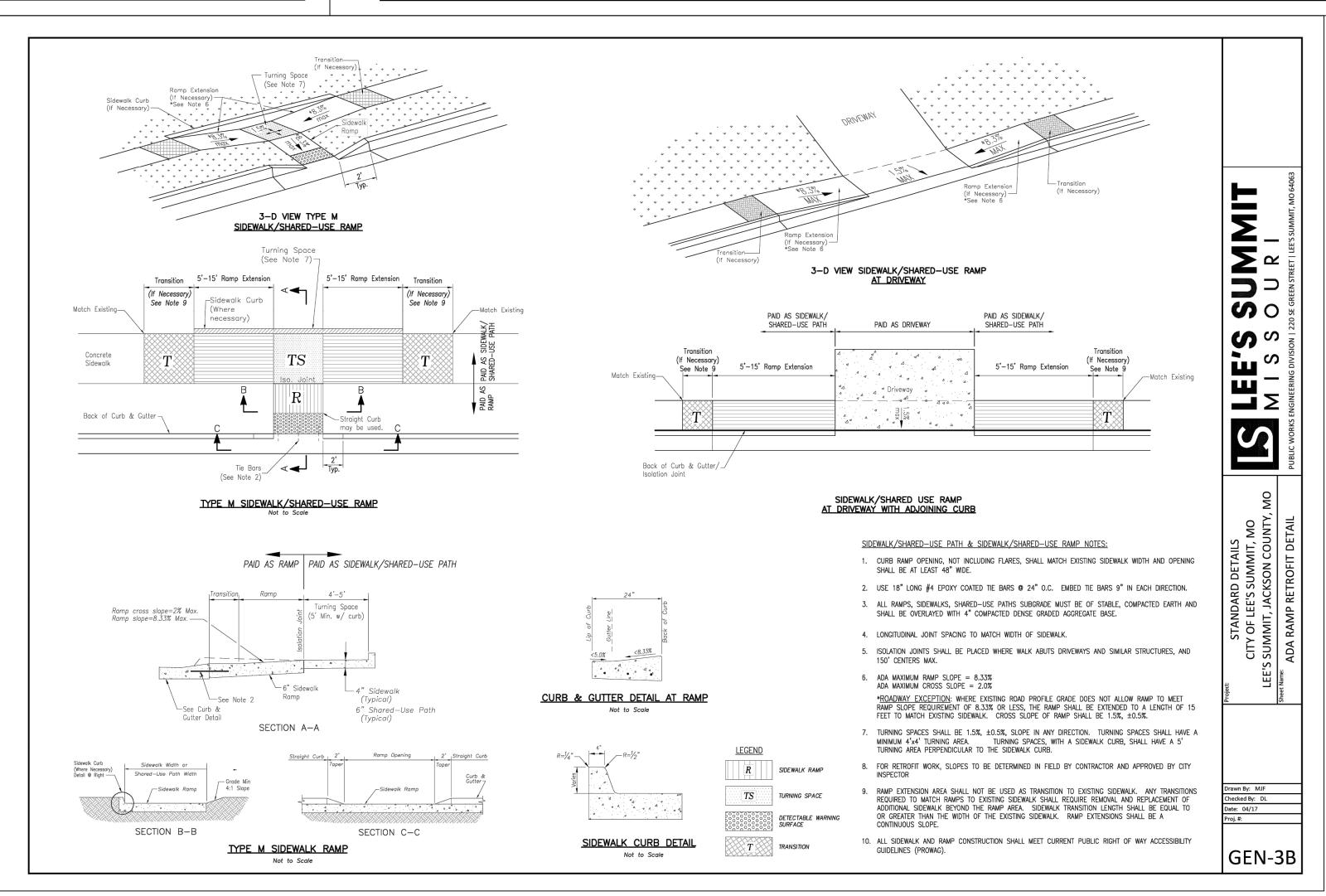
RADING PLAN







SIDEWALK/SHARED-USE PATH DETAIL





Certificates of Authority

Architecture: MO 310 / KS 73 Engineering: MO 4 / KS 241

Land Surveying: MO 123 / KS 36

ORTH OAK SAFETY STORAGE,

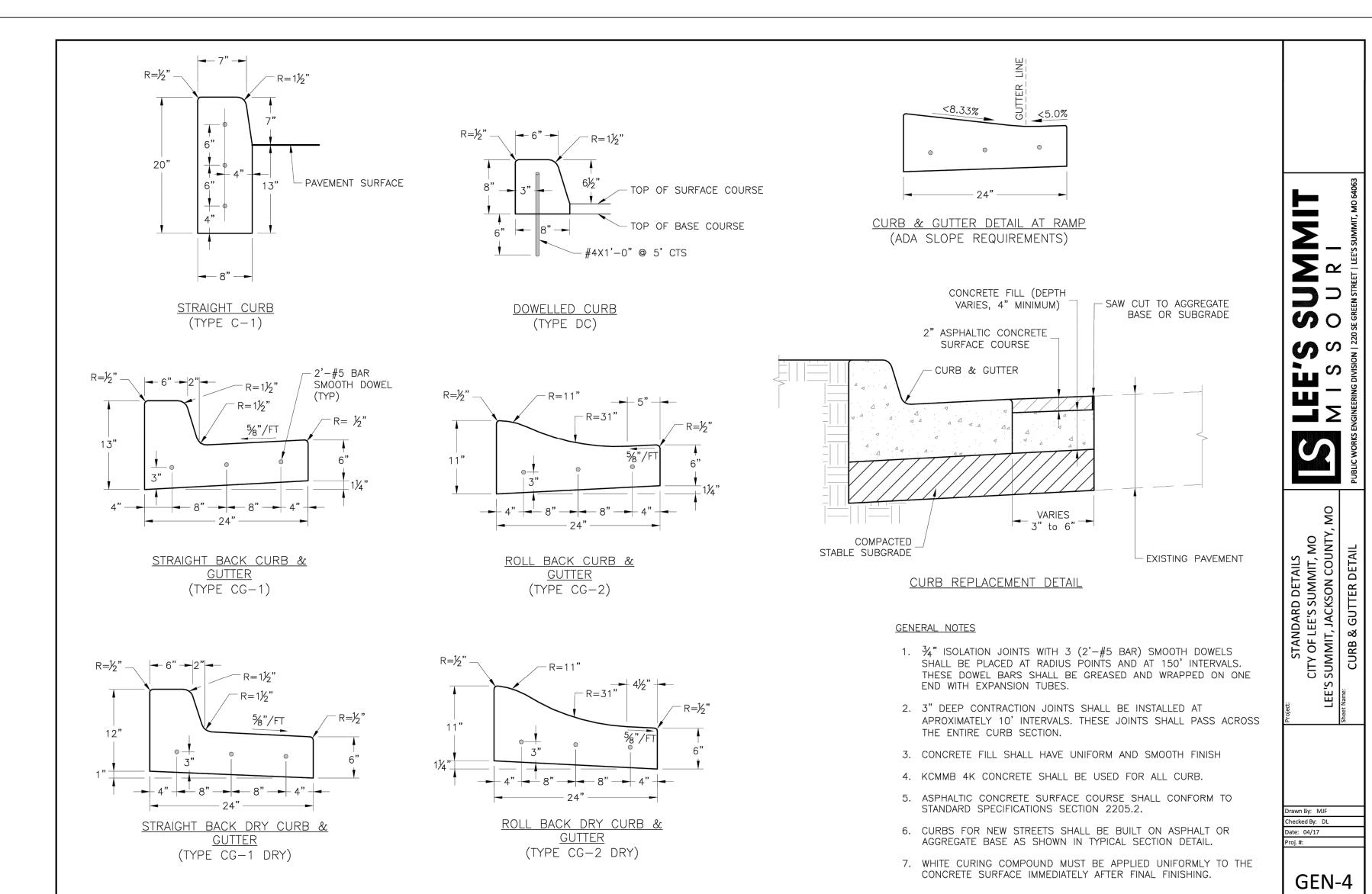
20 NW EAGLE RIDGE BLVD.

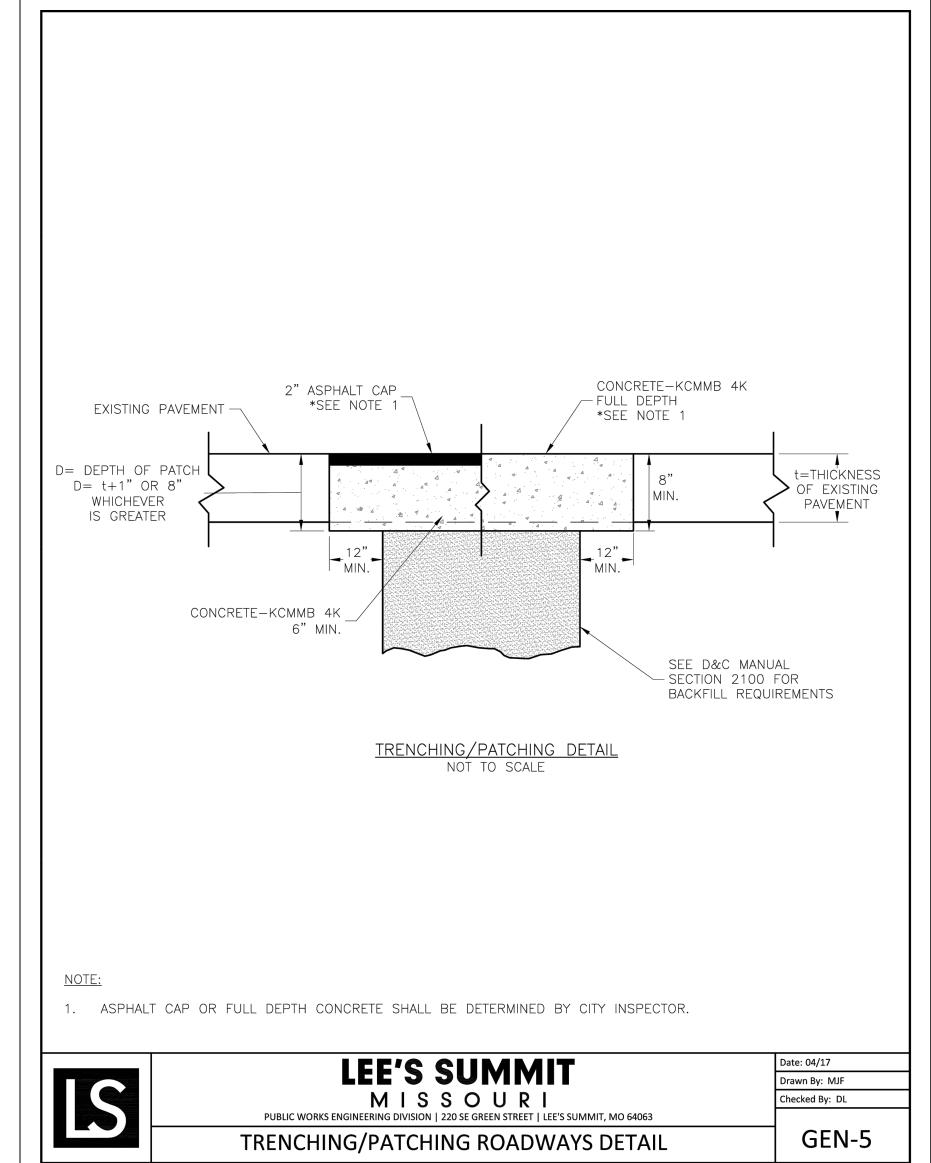
GRAIN VALLEY, MO 64029

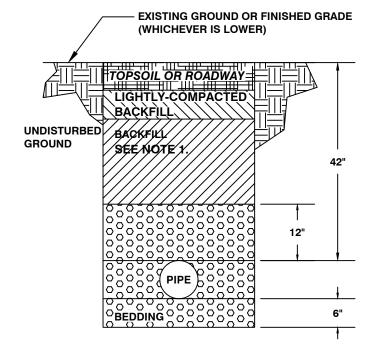
EVELOPER/OWNER

AVID WARD

816) 229-8115

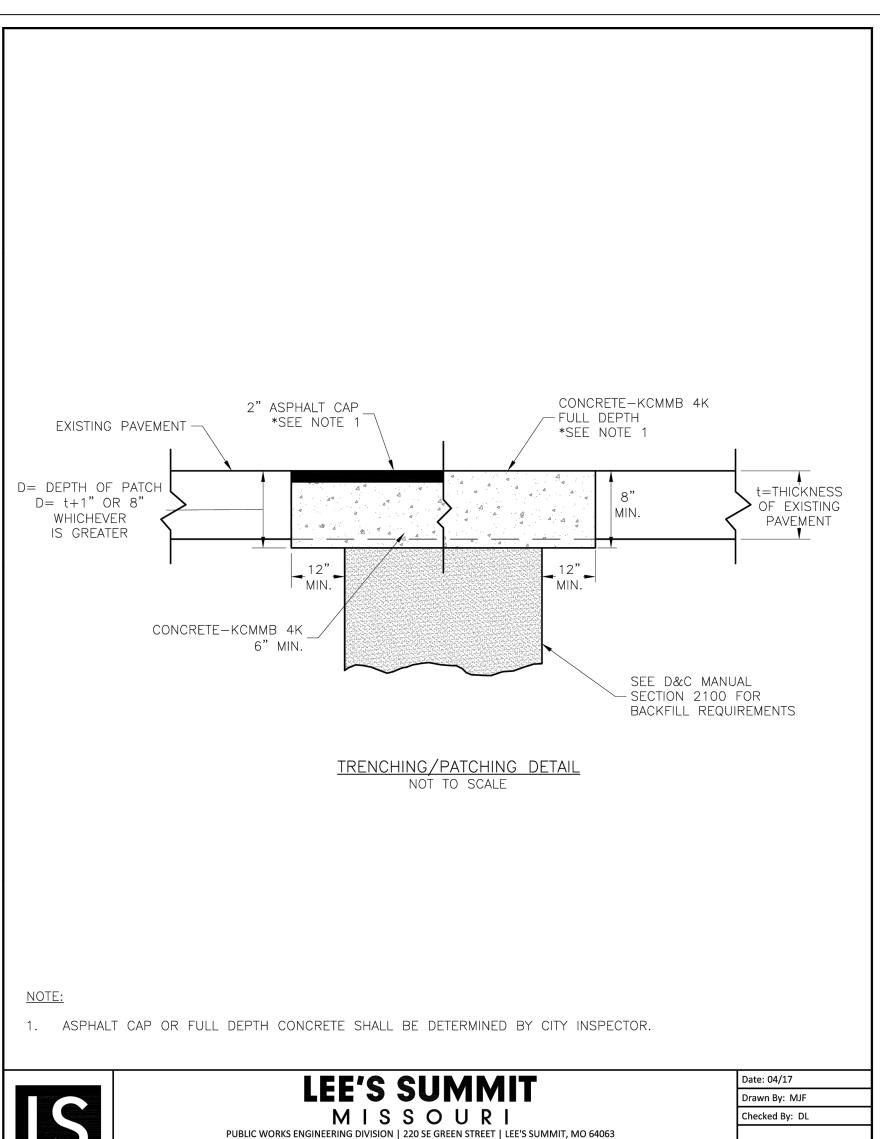


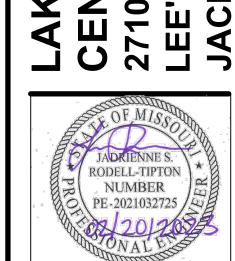




### TRENCHING AND BACKFILL DETAIL

1. Backfill of all pipes under roadways, curb and gutter and all other paved areas within the right of way shall consist of flowable backfill as specified in Section 2602.2.H Mix Design Type. A. The flowable fill shall extend to 2 feet from back of curb to 2 feet back of curb, up to 18 inches below finished grade. For existing roadways flowable shall be extend up to the base of pavement.





<u>Certificates of Authority</u> Architecture: MO 310 / KS 73

Engineering: MO 4 / KS 241 Land Surveying: MO 123 / KS 36

NORTH OAK SAFETY STORAGE,

120 NW EAGLE RIDGE BLVD. GRAIN VALLEY, MO 64029

EVELOPER/OWNER

DAVID WARD

816) 229-8115

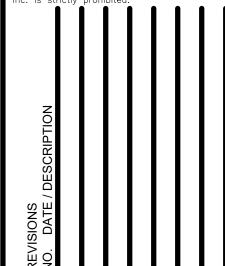
70

CON

JADRIENNE S RODELL-TIPTON, PE

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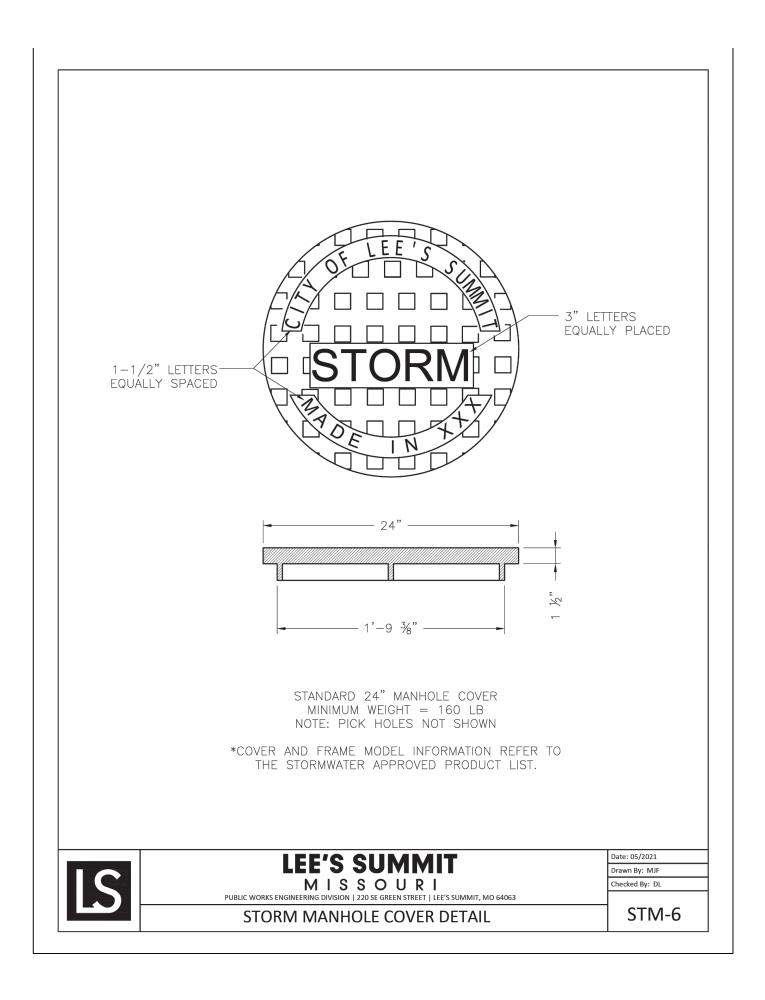
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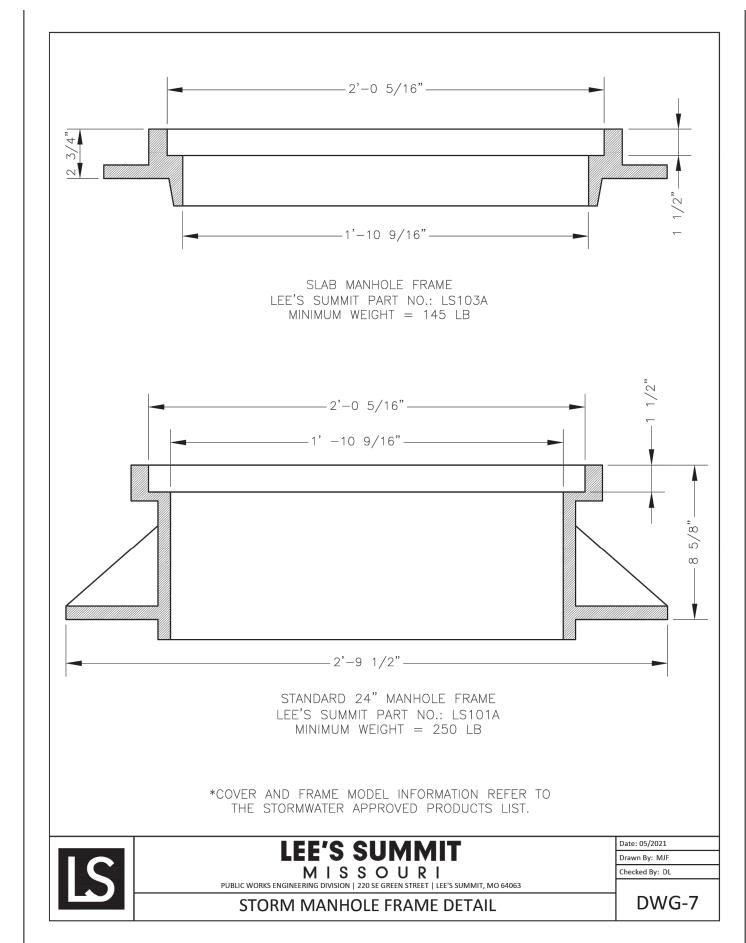
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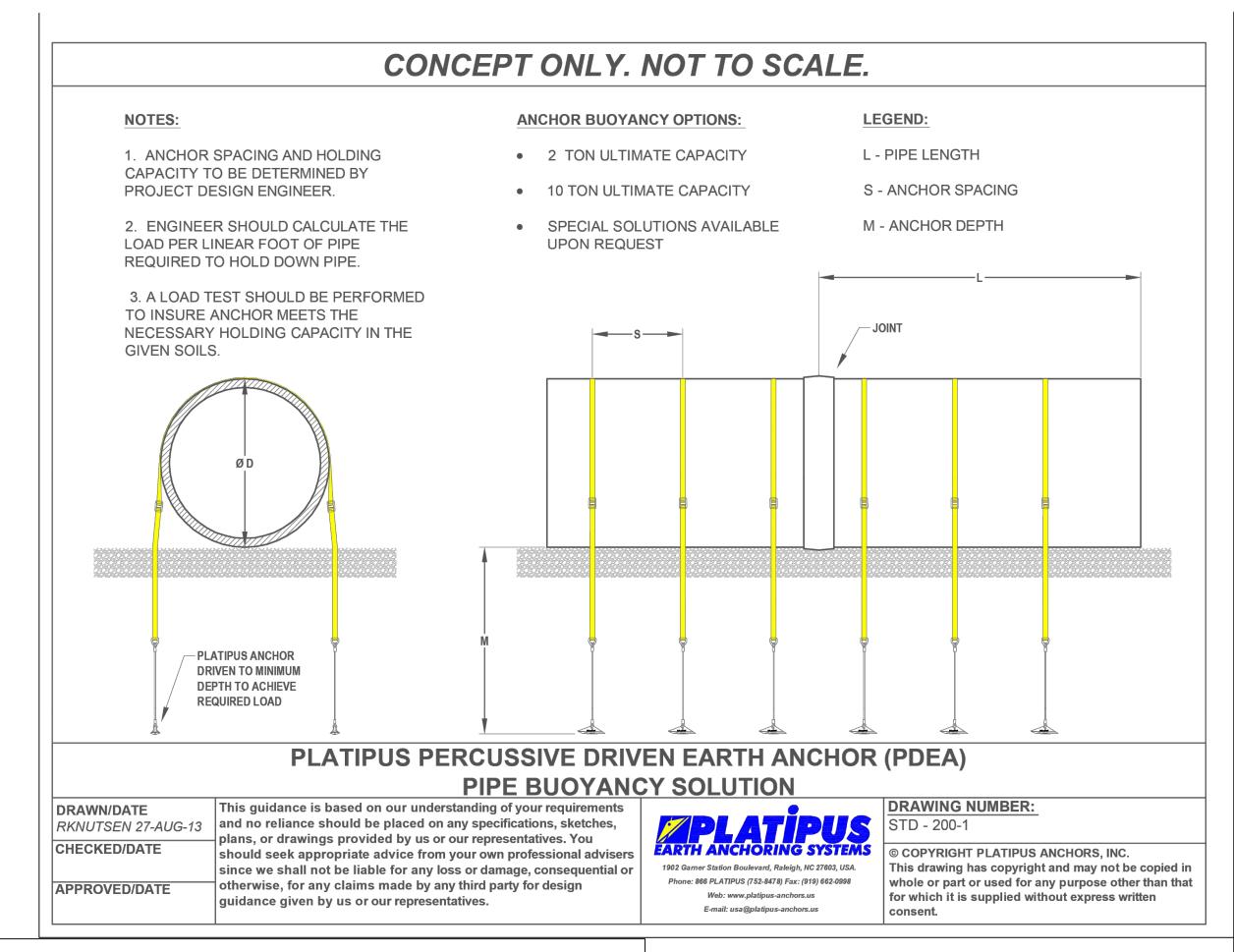
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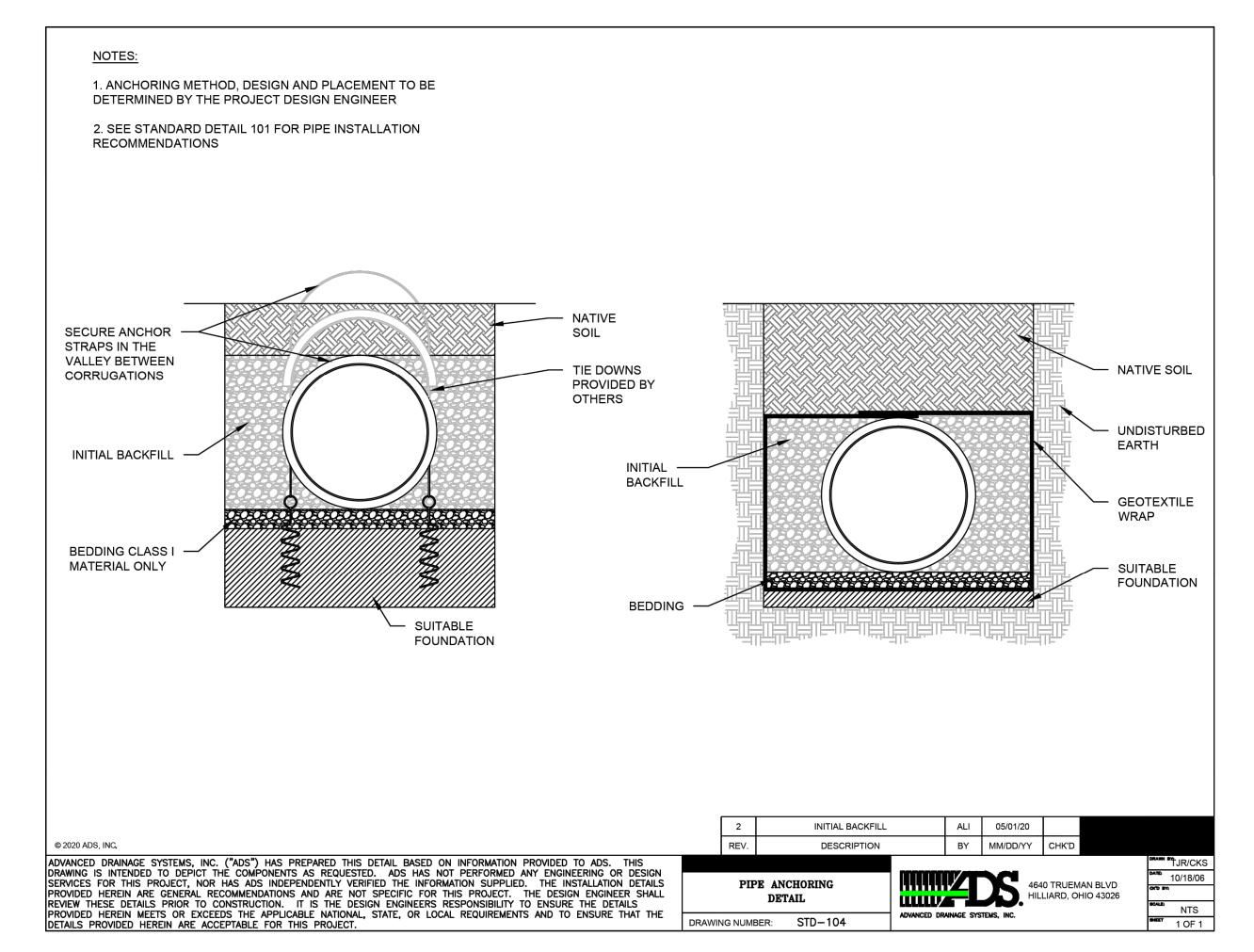
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DETAILS











Certificates of Authority
Architecture: MO 310 / KS 73
Engineering: MO 4 / KS 241
Land Surveying: MO 123 / KS 36

DEVELOPER/OWNER
DAVID WARD
NORTH OAK SAFETY STORAGE,
LC
1120 NW EAGLE RIDGE BLVD.

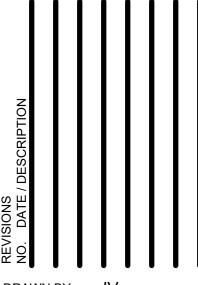
1120 NW EAGLE RIDGE BLVI GRAIN VALLEY, MO 64029 (816) 229-8115

OD BUSINESS
ON I-470 - PLAT (AGEN ROAD)
IMIT, MO 64064
COUNTY

JADRIENNE S.
RODELL-TIPTON
NUMBER
PE-2021032725
PONAL

JADRIENNE S RODELL-TIPTON, PE PE-2021032725 (MISSOURI #)

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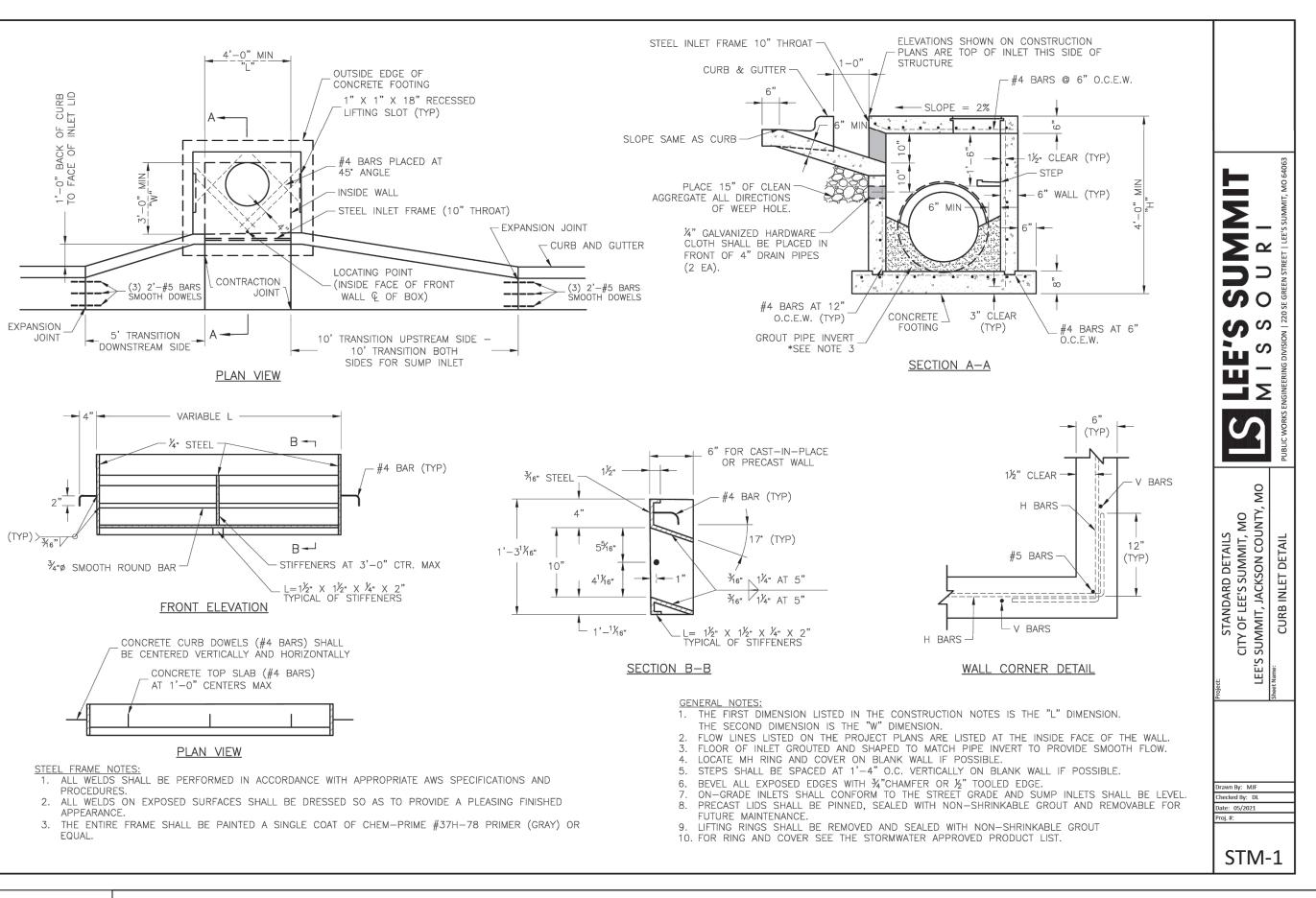
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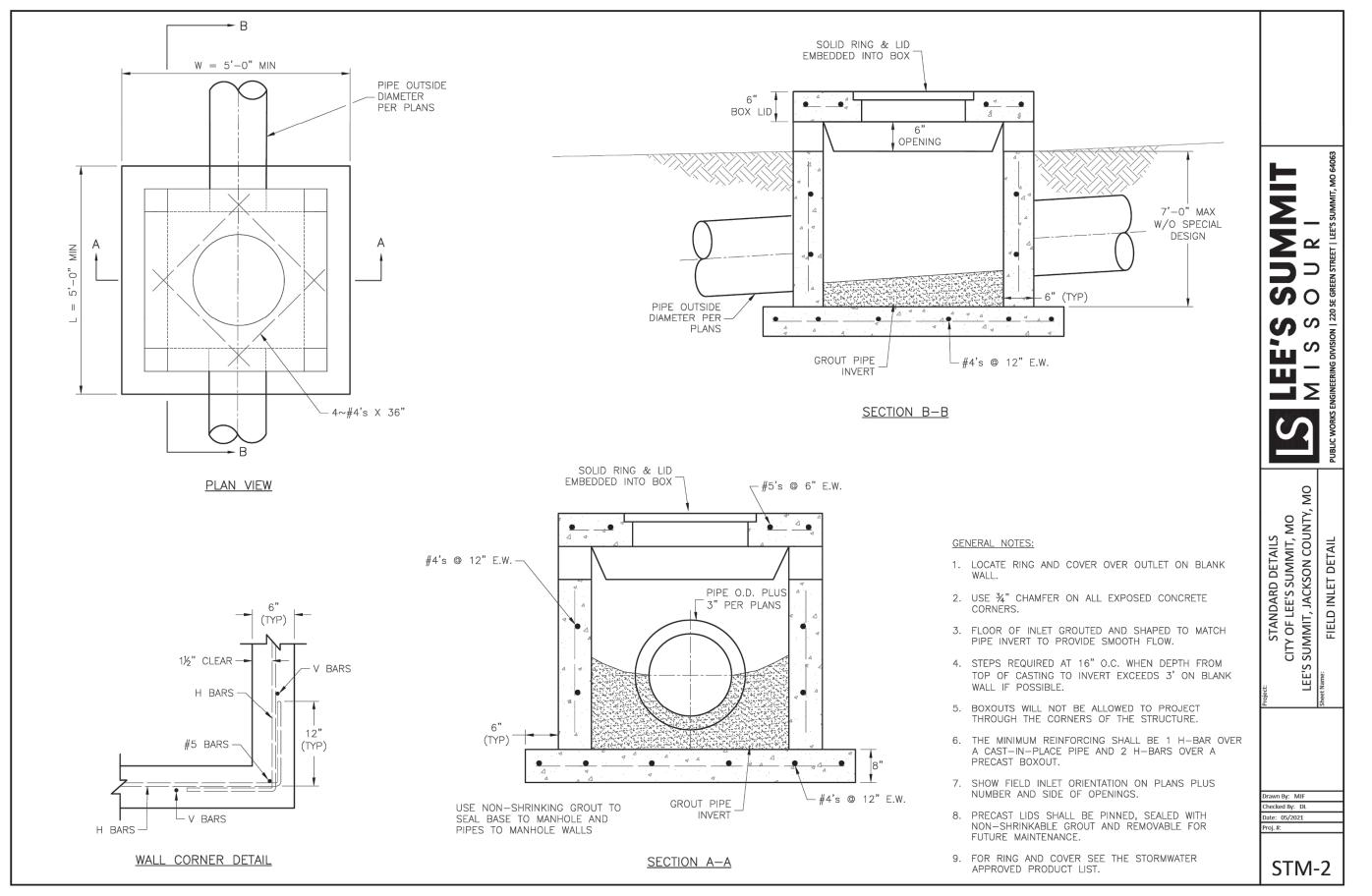
PROJECT #: 21-1883
ISSUE DATE: 03/31/2022

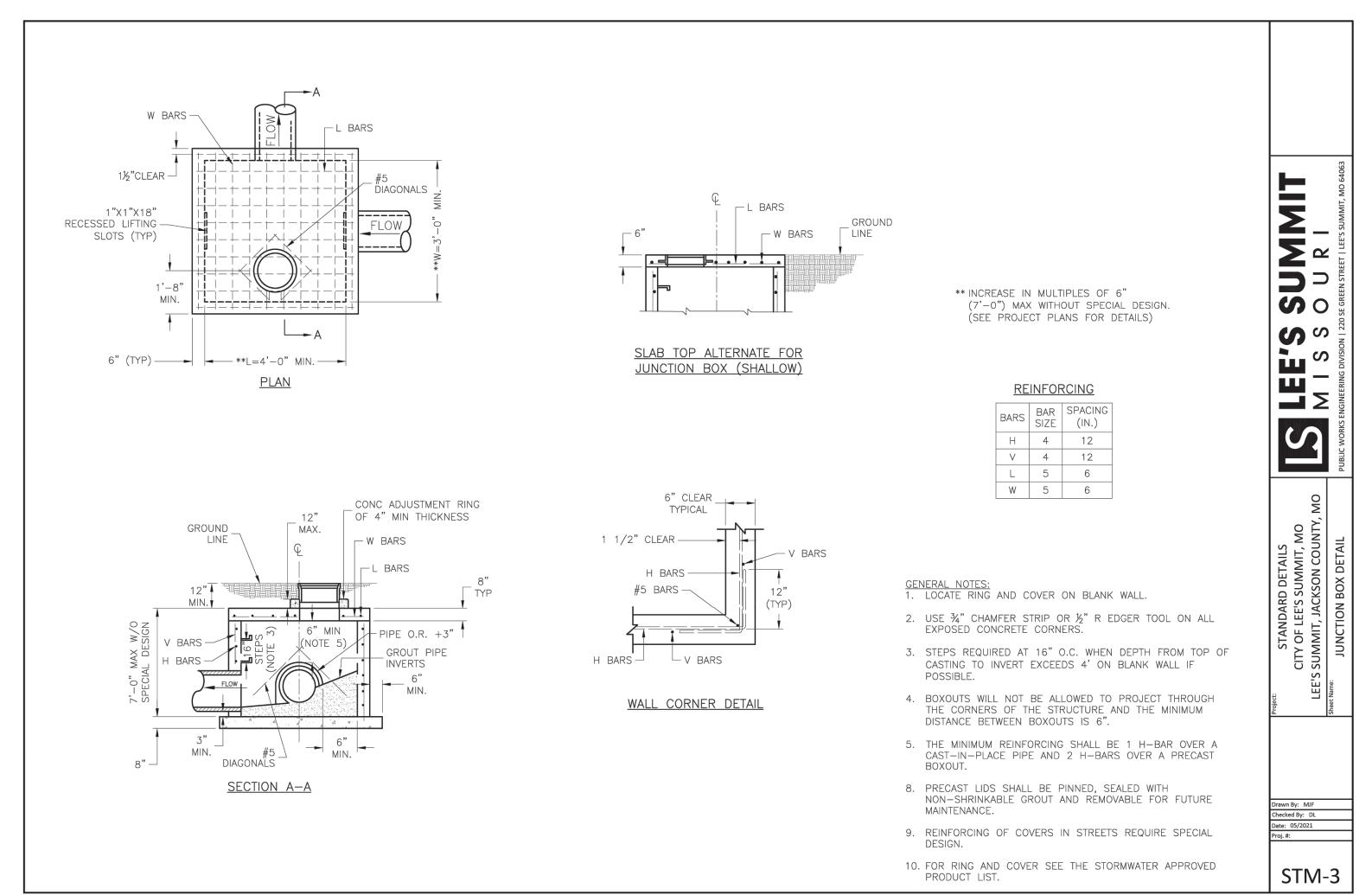
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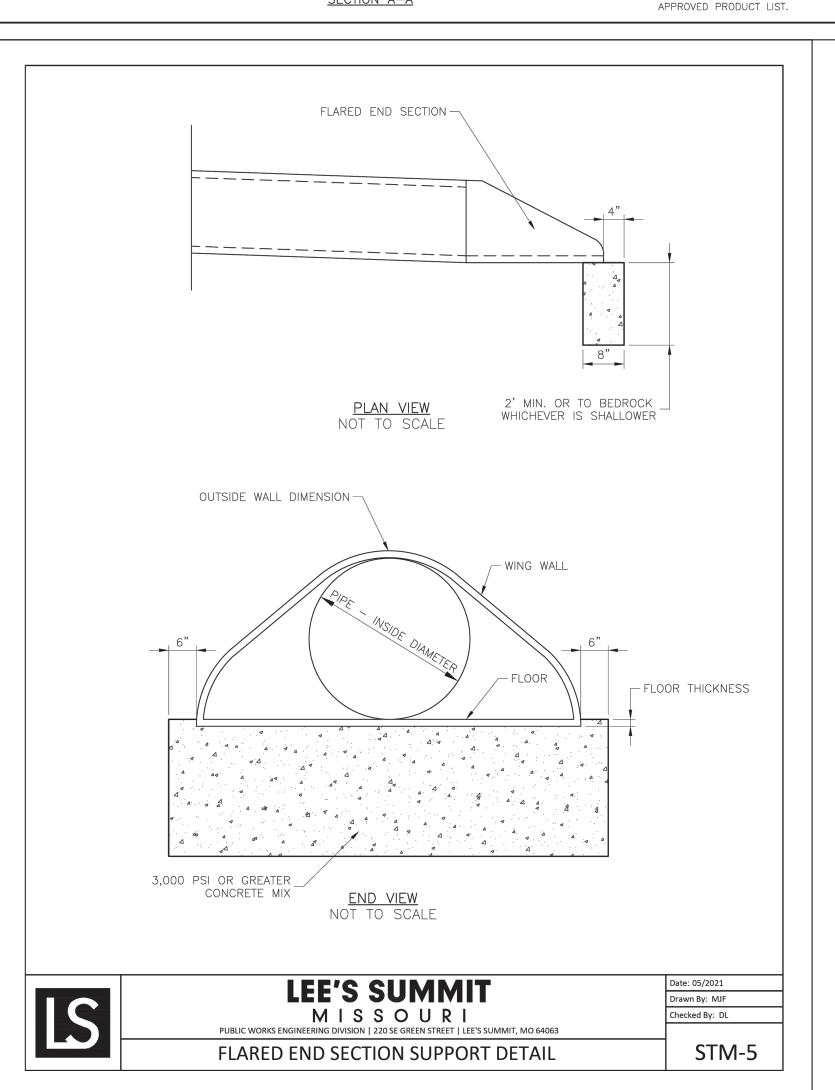
DETAILS

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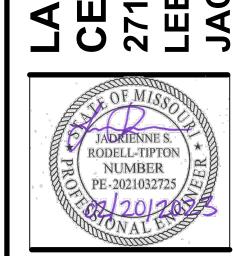


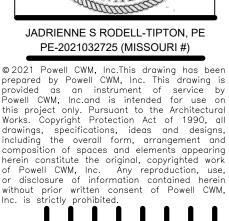


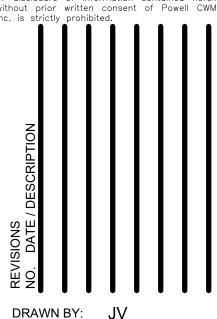
AVID WARD IORTH OAK SAFETY STORAGE,

120 NW EAGLE RIDGE BLVD. GRAIN VALLEY, MO 64029 316) 229-8115

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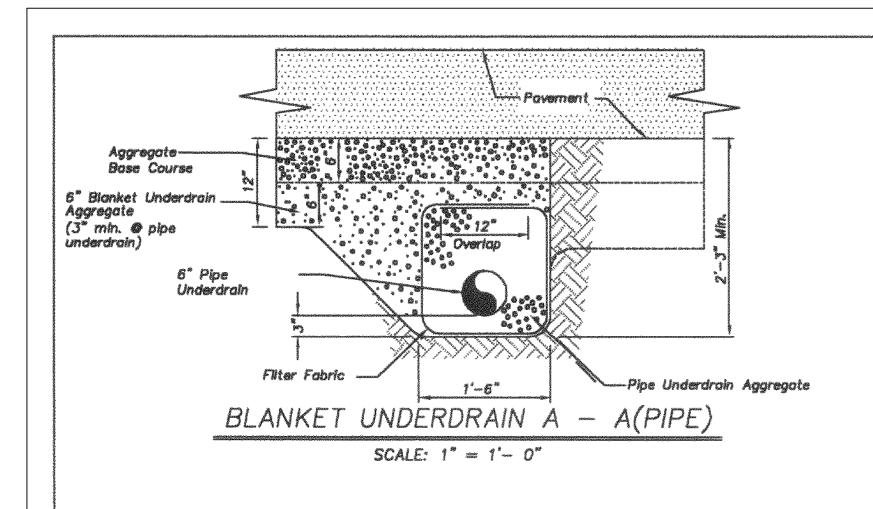


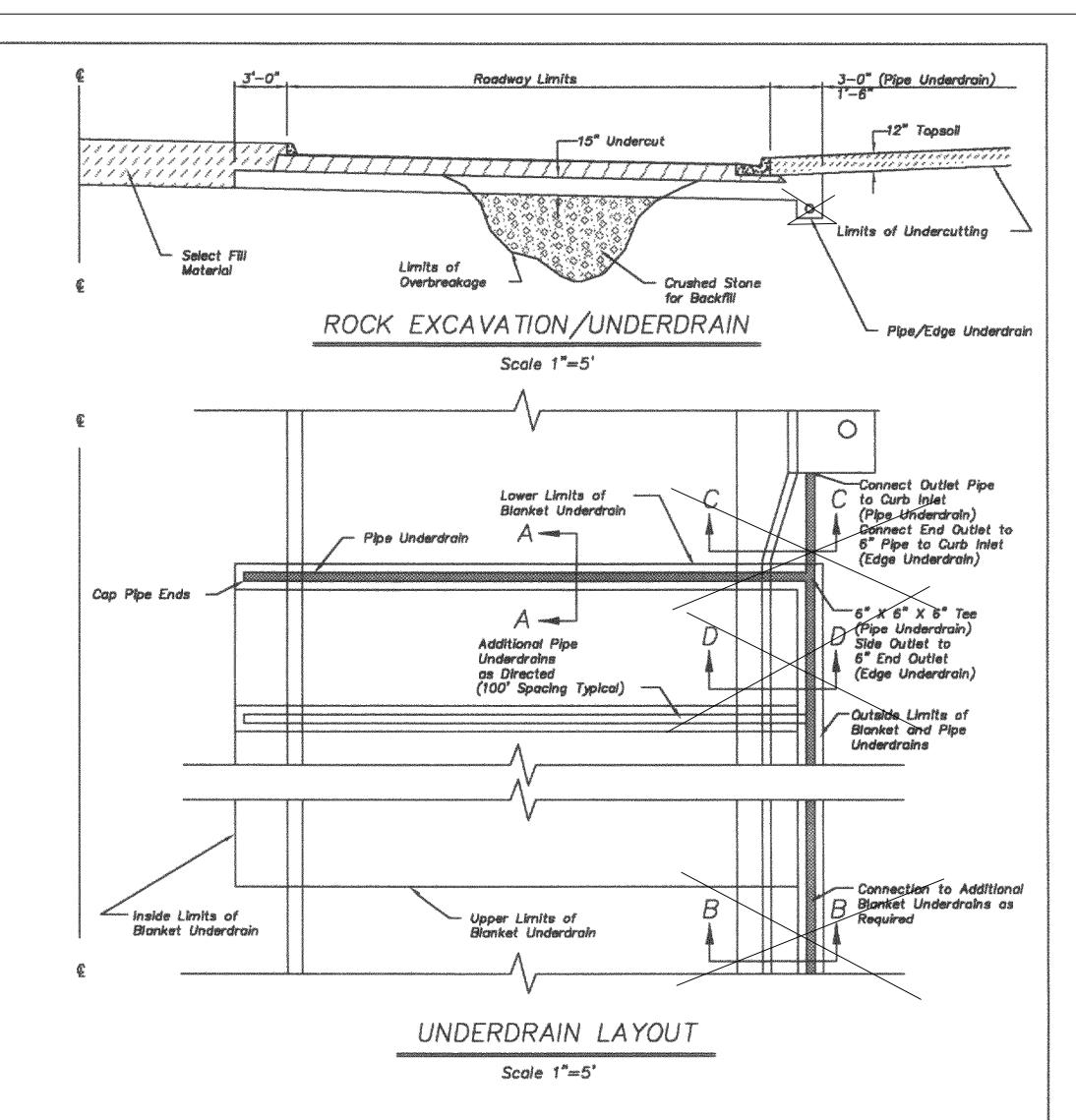
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PROJECT #: 21-1883 ISSUE DATE: 03/31/2022

DETAILS



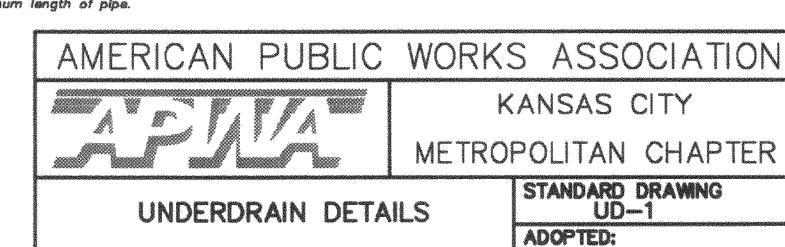


### Underdroin Notes:

- All roadway excavation in rock will be undercut no less than 15" for the full width of the roadway as shown.
- in areas where underdrains are not required, undercut and overbreakage in limestone and shale shall be brought to within 6" of the subgrade line with properly compocted crushed stone, shot rock, and/or rock rubble. The remaining 6" shall conform to Standard Specifications Section 2202.
- 3. Layers of earth or shale shall not be permitted for backfill up to the bottom of the crushed stone.
- 4. A minimum of 12" of select soil (topsoil) shall be placed on exposed rock cut or fill slopes outside the limits of the roadway. All rock and shale slopes shall be benched @ maximum 2' vertical intervals prior to placement of select soil.
- Proposed underdrain pipe layout, flowline elevations, inlet connection points, and details shall be approved prior to construction by the City Engineer.
- 6. Where pipe underdrains are used, all underdrain outlet pipes shall be solid wall with watertight joints. All outlet pipes shall be tied into the nearest storm sewer inlet as approved. Where edge underdrains are used, all underdrain outlet pipes shall be solid wall with manufacturer joints approved by the City Engineer. All connections between pipes and edge connectors or curb inlets shall be made with 2' minimum length of pipe.

- All underdrain pipes shall be installed at a minimum slope of 1%.
   Underdrain pipe shall be installed with the perforations placed down.
- 8. Blanket underdrains shall be placed on bedrock unless otherwise directed by the City Engineer. Undercut and overbreakage in limestone and shale shall be brought to within 12° of the subgrade line with properly compacted crushed stone, shot rock and/or rock rubble.
- 9. All filter fabric used for pipe underdrain construction shall conform to Standard Specifications Section 2203.6.
- The Contractor may, at his option, use either pipe underdrain or edge underdrain, but shall not mix underdrain types within any underdrain system.
- 11. All edge underdroin shall be held in the center of the trench by mechanical methods while placing granular backfill. See detail this sheet. Alternate methods may be used with prior approval by the City Engineer.
- 12. Blanket underdain aggregate, pipe underdrain aggregate, pipe underdrain, edge underdrain and outlet pipe shall conform to Standard Specifications Section 2203.6

MAY 23, 2001



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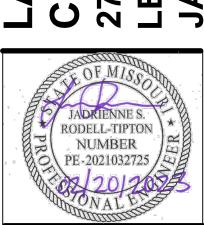
DEVELOPER/OWNER
DAVID WARD
HORTH OAK SAFETY STORAGE,
LC

1120 NW EAGLE RIDGE BLVD. GRAIN VALLEY, MO 64029

816) 229-8115

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2710 NE HAGEN ROAD
LEE'S SUMMIT, MO 64064
JACKSON COUNTY

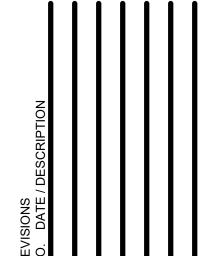


JADRIENNE S RODELL-TIPTON, PE

PE-2021032725 (MISSOURI #)

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