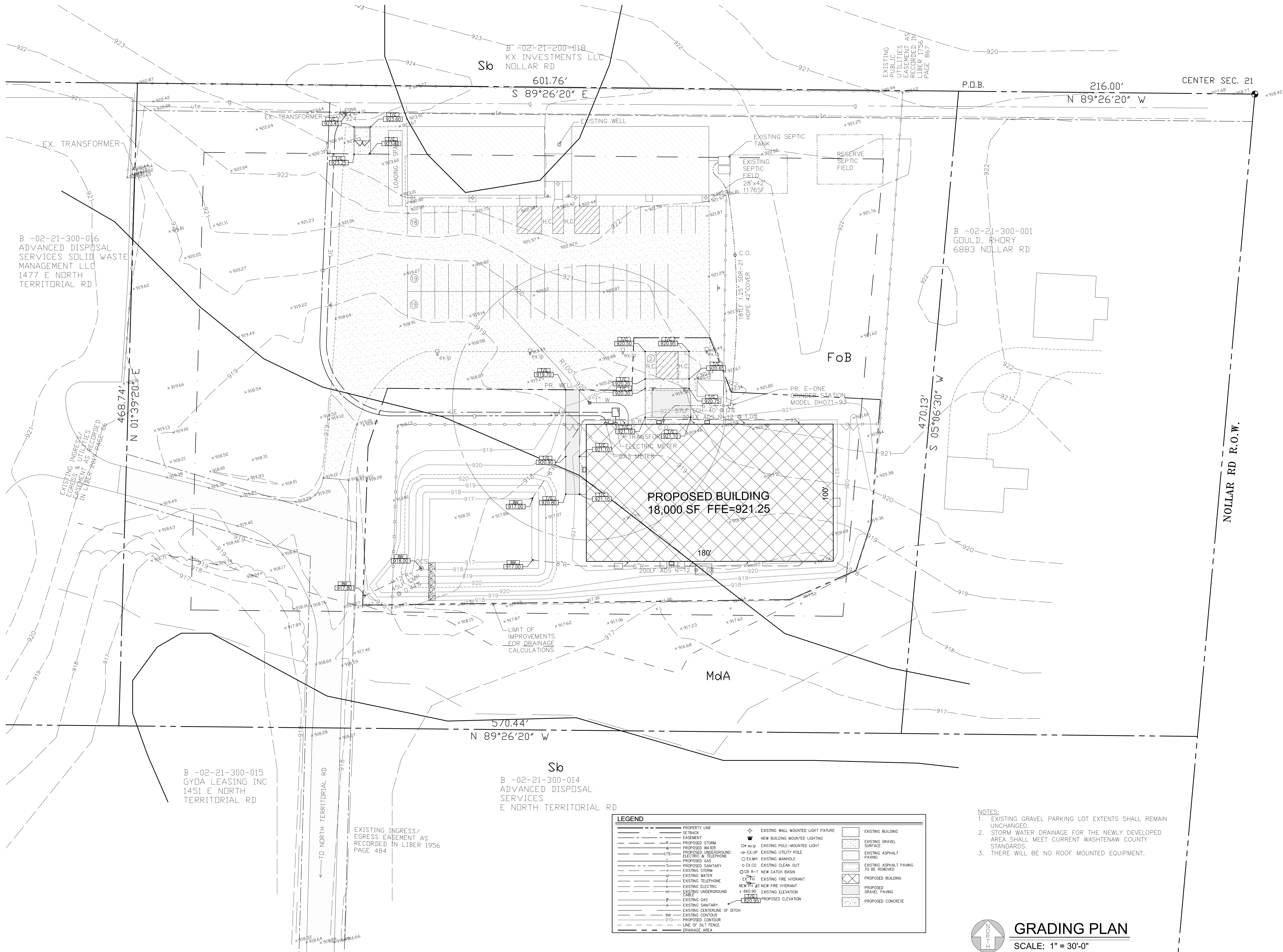


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ANN ARBOR DOG TRAINING

DESIGNERS

BUILDERS

Vanston/O'Brien, Inc.

2375 Bishop Circle West
Dexter, MI 48130
Tel: (734) 424-0661
Fax: (734) 424-0677
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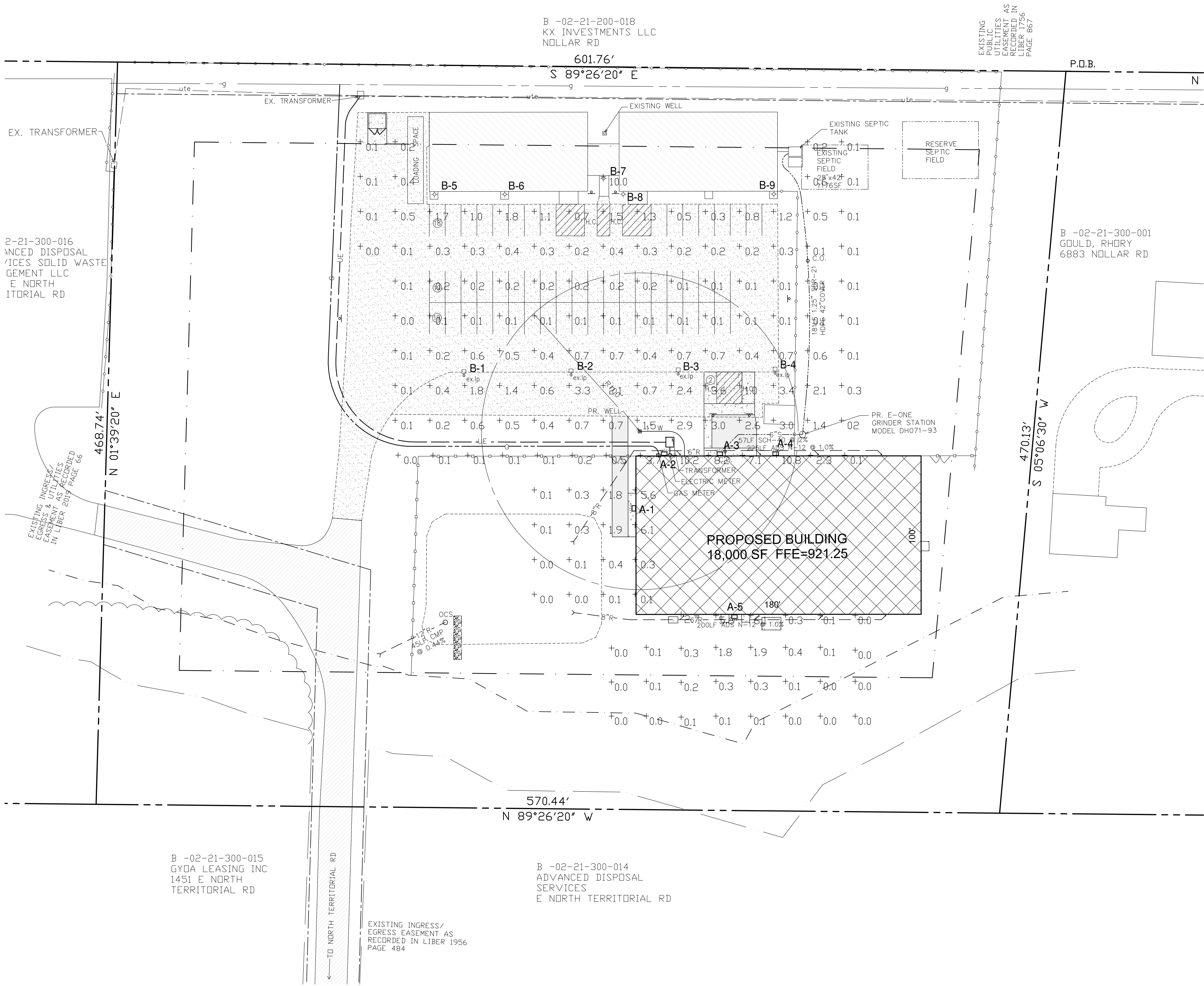
ISSUED FOR:	DATE:
CONDITIONAL USE	3-9-17
SITE PLAN	5-9-17
REVISED	6-5-17
REVISED	7-28-17
REVISED	10-12-17

DRAWN BY:	GAH/CLN
JOB NO.:	

GRADING PLAN

SHEET NO.

C-2



LIGHTING PLAN
SCALE: 1" = 40'-0"

Arrangement

Single
Arm : 0 ft
Offset : -- ft

Layout

Cols (X) Rows (Y)
Layout : Varies Varies
Spacing : Varies Varies ft
Mounting Height : 16 ft
Orient : Varies deg
Tilt : 0 deg

Statistical Analysis

Illuminance Values
Average : 1.14 fc
Maximum : 14.98 fc
Minimum : 0.00 fc
Avg/Min Ratio : N.A. fc
Max/Min Ratio : N.A. fc
Max/Avg Ratio : 13.17 fc

Arrangement

Single
Arm : 1 ft
Offset : -- ft

Layout

Cols (X) Rows (Y)
Layout : Varies Varies
Spacing : Varies Varies ft
Mounting Height : 16 ft
Orient : 90 deg
Tilt : 0 deg

Statistical Analysis

Illuminance Values
Average : 0.55 fc
Maximum : 5.69 fc
Minimum : 0.02 fc
Avg/Min Ratio : 26.98 fc
Max/Min Ratio : 280.63 fc
Max/Avg Ratio : 10.40 fc

Arrangement

Single
Arm : 1 ft
Offset : -- ft

Layout

Cols (X) Rows (Y)
Layout : Varies Varies
Spacing : Varies Varies ft
Mounting Height : Varies ft
Orient : 270 deg
Tilt : 0 deg

Statistical Analysis

Illuminance Values
Average : 0.67 fc
Maximum : 10.83 fc
Minimum : 0.01 fc
Avg/Min Ratio : 45.63 fc
Max/Min Ratio : 741.66 fc
Max/Avg Ratio : 16.25 fc



Luminaire Location Summary

N	Arrangement	Lum #	X	Y	Z	Orient	Tilt	Tilt Factor
1	Single	A	-44.2	-33.0	16.0	180	0	1.000
2	Single	A	-44.2	-33.0	16.0	180	0	1.000
3	Single	A	-26.0	0.0	16.0	90	0	1.000
4	Single	A	9.0	0.0	16.0	90	0	1.000
5	Single	A	44.3	0.0	16.0	90	0	1.000
		A	44.3	0.0	16.0	270	0	1.000
		A	18.0	-100.0	16.0	270	0	1.000



Luminaire Location Summary

N	Arrangement	Lum #	X	Y	Z	Orient	Tilt	Tilt Factor
1	Single	B	-101.0	0.0	16.0	90	0	1.000
2	Single	B	-101.0	1.0	16.0	90	0	1.000
3	Single	B	-34.0	0.0	16.0	90	0	1.000
4	Single	B	-34.0	1.0	16.0	90	0	1.000
		B	34.0	0.0	16.0	90	0	1.000
		B	34.0	1.0	16.0	90	0	1.000
		B	95.4	0.0	16.0	90	0	1.000
		B	95.4	1.0	16.0	90	0	1.000



Luminaire Location Summary

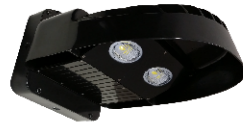
N	Arrangement	Lum #	X	Y	Z	Orient	Tilt	Tilt Factor
5	Single	B	-107.0	-5.0	16.0	270	0	1.000
6	Single	B	-107.0	-6.0	16.0	270	0	1.000
7	Single	B	-62.5	-5.0	16.0	270	0	1.000
8	Single	B	-62.5	-6.0	16.0	270	0	1.000
9	Single	B	0.0	5.0	12.0	270	0	1.000
		B	0.0	4.0	12.0	270	0	1.000
		B	12.5	-5.0	16.0	270	0	1.000
		B	107.0	-5.0	16.0	270	0	1.000
		B	107.0	-6.0	16.0	270	0	1.000



Luminaire A Proposed

IES Filename : E-AL3L315NZ.IES
Description : E-AL3L315NZ
LED wall pack. Black metal housing with integrated heat sink.
Two Cree CXA3050 LED arrays

Light Loss Factor : 0.72
Number of Lamps : 1
Lamp Lumens : ~1 lms
Luminaire Watts : 151 W



Luminaire B Existing

IES Filename : E-DD1L68C1.IES
Description : E-DD1L68C1
Gray painted metal fixture with one mounting arm on the back. One LED array.
One type CXA array

Light Loss Factor : 0.72
Number of Lamps : 1
Lamp Lumens : ~1 lms
Luminaire Watts : 66 W



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ANN ARBOR DOG TRAINING
1575 E. North Territorial Road
Northfield Township, Michigan

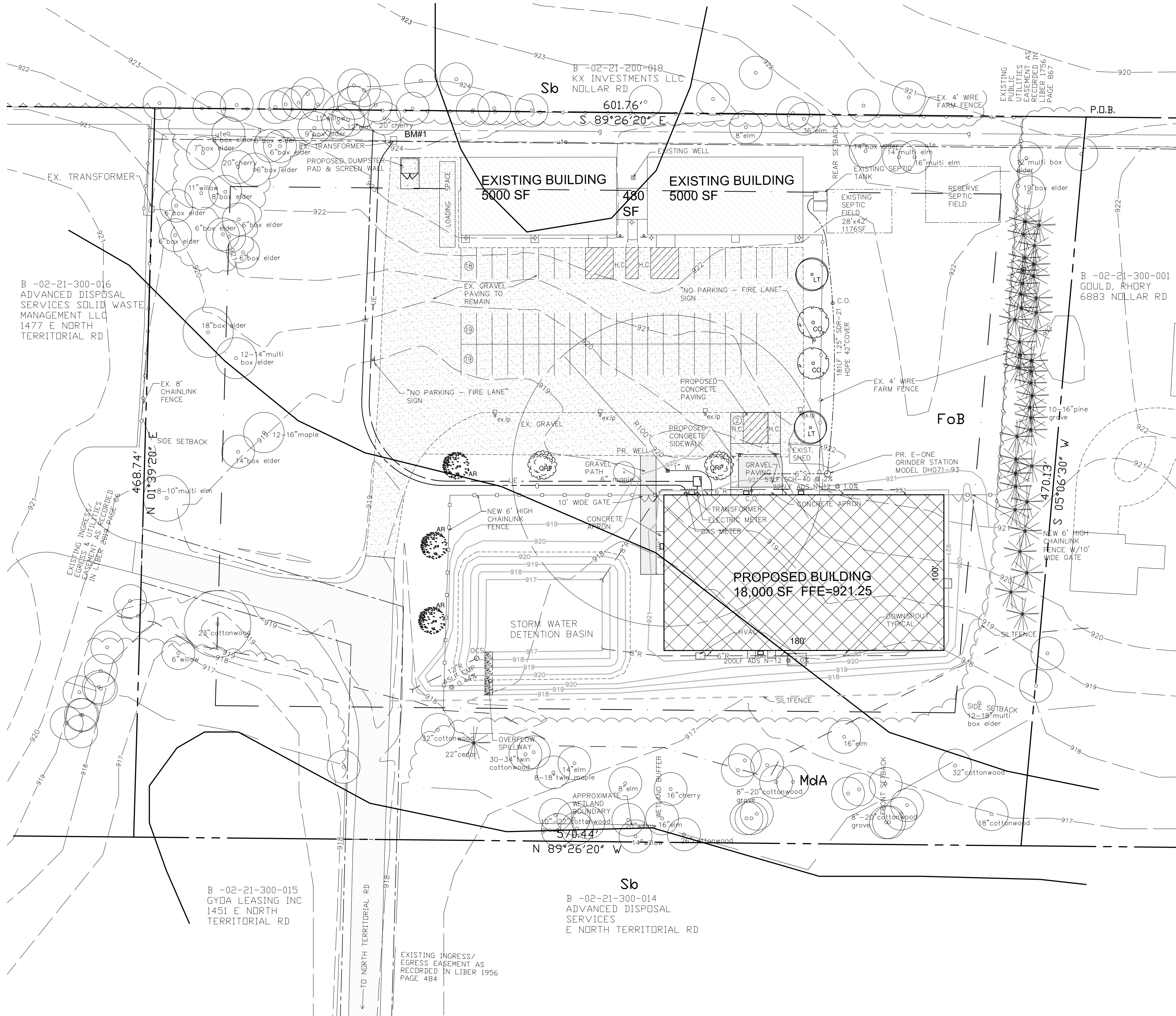
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REVISED 6-5-17
REVISED 7-25-17
REVISED 10-12-17

DRAWN BY: GAH
JOB NO.: ---

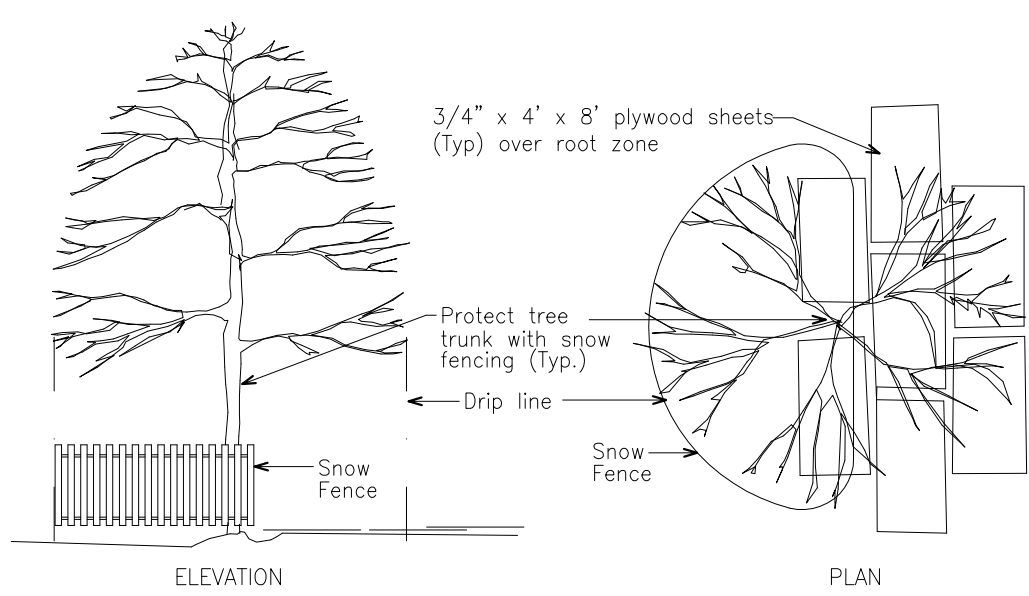
LIGHTING PLAN
SHEET NO.

C-3



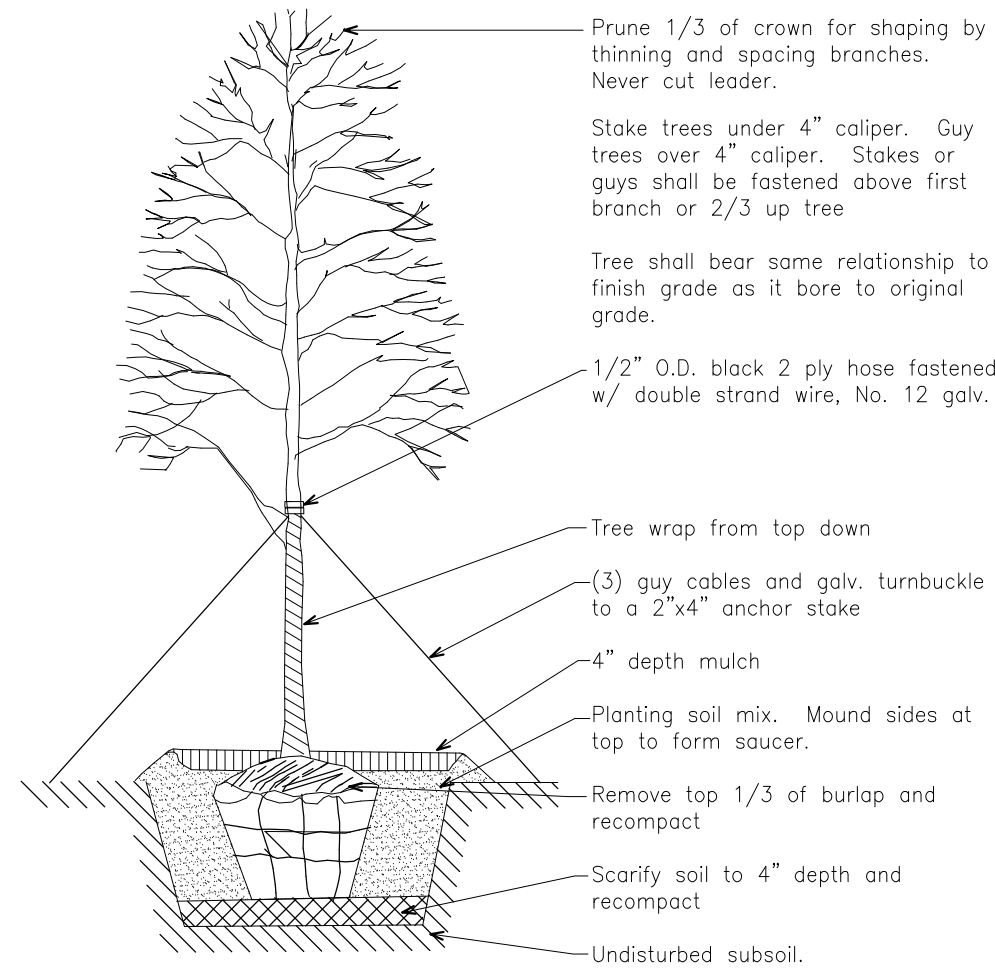
LANDSCAPE PLAN

SCALE: 1" = 40'-0"



STANDARD TREE PROTECTION

NOTE: Pull back fencing to install plywood when access in root zone is necessary.



DECIDUOUS TREE PLANTING DETAIL

Landscape Notes

- All plant material shall meet current American Association of Nurserymen, Inc. (AAN) standard for nursery stock. (ANSI Z60.1 - 1973)
- Landscape installation shall be in accordance with the American Association of Nursery standards and with the Township/City's landscape requirements.
- Planting schedules: 1) Deciduous material shall be planted from March 15 for spring planting and from October 1 until the ground freezes for fall planting. 2) Evergreen material shall be planted from March 1 through May 31 for Spring plantings and from August 1 through September 30 for all fall planting.
- Mulch plant beds, individual tree and shrub planting pits uniform depth of 4 inches.
- Provide weed mat for greenbelt and foundation plantings.
- All planting beds are to be edged. Recommended either "Permaloc Aluminum" edging or "Black Diamond" plastic edging.
- All areas with stone cover shall have weed mat.
- All landscaping to be continuously maintained.
- All site improvements detailed on this plan are to be completed prior to issuance of final certificate of occupancy.
- All construction to conform to the latest applicable Township/City regulations.
- R.O.W. areas to be seeded or sod.
- Tree protection consists of:
 - A. Yellow ribbon barriers for large areas not disturbed by construction.
 - B. Stakes 10' on center and wood snow fence around individual and groups of individual trees.
 - C. Trees to be removed will be tagged with red ribbon.
- The barrier or fence surrounding the tree or group of trees shall be located no closer to the tree than the tree's drip line. If this is not possible, the barrier shall be no closer than 6 feet from the trunk of the tree or group of trees.
- There will be no outside storage on site.
- Seed Mix
 - * Temporary planting mixture for erosion control.
 - Seed Oats 30 pounds per acre
 - Annual Rye 10 pounds per acre
 - * Permanent planting mixture on all disturbed areas, excluding BMPs.
 - Scalds Hard Fescue 12 pounds per acre
 - Danson's Creeping Red Fescue 6 pounds per acre
 - Perennial Rye 20 pounds per acre
 - Buffalo Grass 20 pounds per acre
 - Creeping Bent 0.5 pounds per acre
 - Little Blue Stem 20 pounds per acre
 - Sheep Fescue 15 pounds per acre

Existing soil nutrient levels shall be tested by an independent soil testing laboratory before fertilizers are applied.

- Rain Water Garden / Infiltration Basin Plantings

- Within areas above the first flush elevation of the infiltration basins, seeding and/or live plantings are allowed. Only native seeds (as defined by Michigan Flora, www.michiganflora.net) are allowed for permanent soil stabilization. Annual seeds are allowed in an amount necessary to temporarily stabilize the limits of disturbance.
- Within areas below the first flush elevation of the infiltration basins, only live plantings are allowed in a storm water system of any kind. Native plants are preferred. Cultivars and non-native perennials are allowable if approved by WWCRC. Plants listed on the WWCRC Rain Garden Plant List are acceptable. Invasive species are not allowed (see the City of Ann Arbor's invasive species list).

- Large trees shall not be planted directly on top of utility pipes or service leads.
- No existing trees shall be removed for this project. All existing trees labeled on the plan are in fair condition.

PLANT LIST

TREES

KEY	QTY	SPECIES	SIZE	SPECS
AR	3	Acer rubrum 'Autumn Blaze'	2.5" cal	B&B
CO	2	Autumn Blaze Red Maple	2.5" cal	B&B
		Celtis occidentalis		
LT	2	Hackberry	2.5" cal	B&B
		Liriodendron tulipifera		
QRP	2	Tulip Poplar	2.5" cal	B&B
		Quercus x warei 'Long'		
		Regal Prince Oak	2.5" cal	B&B



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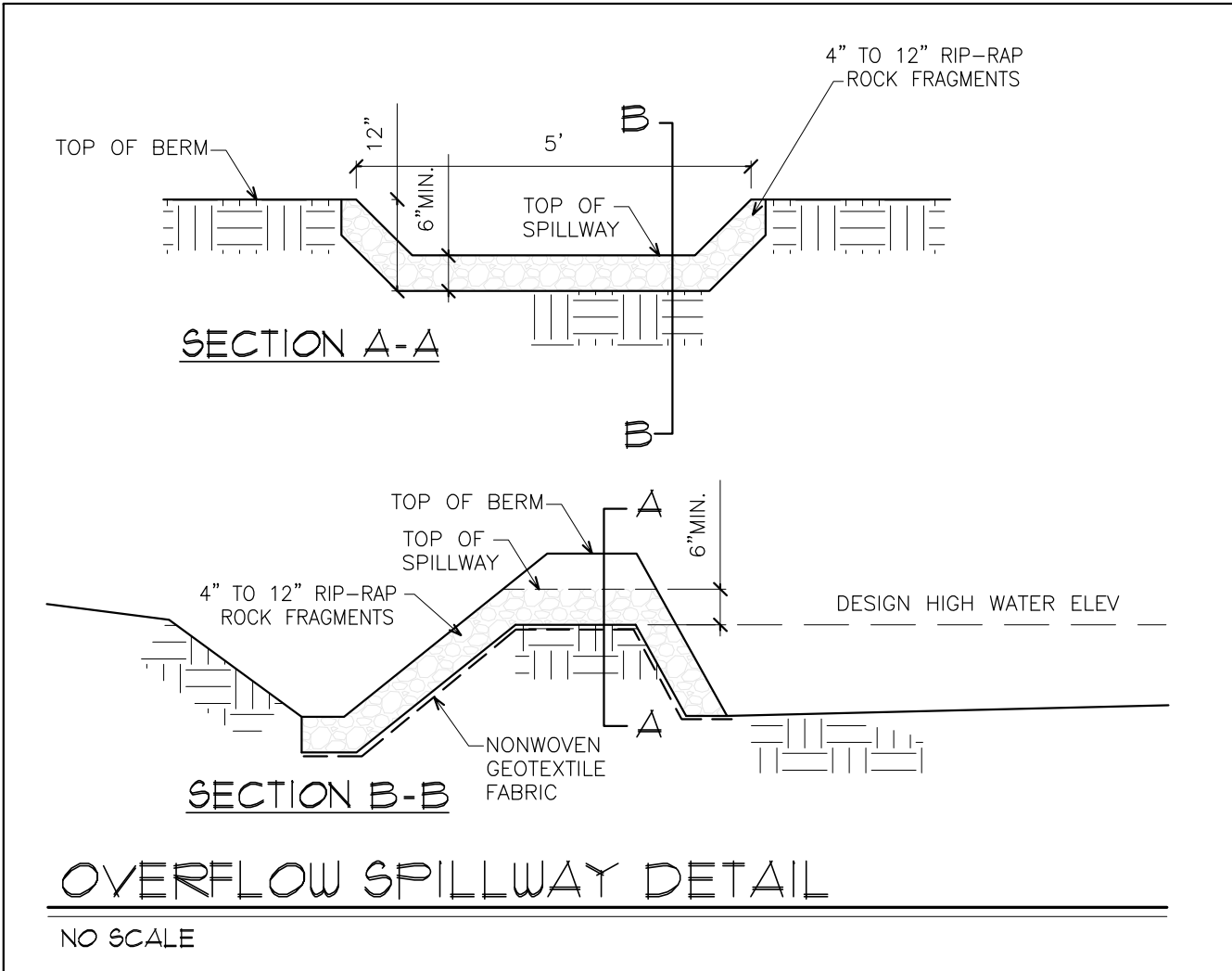
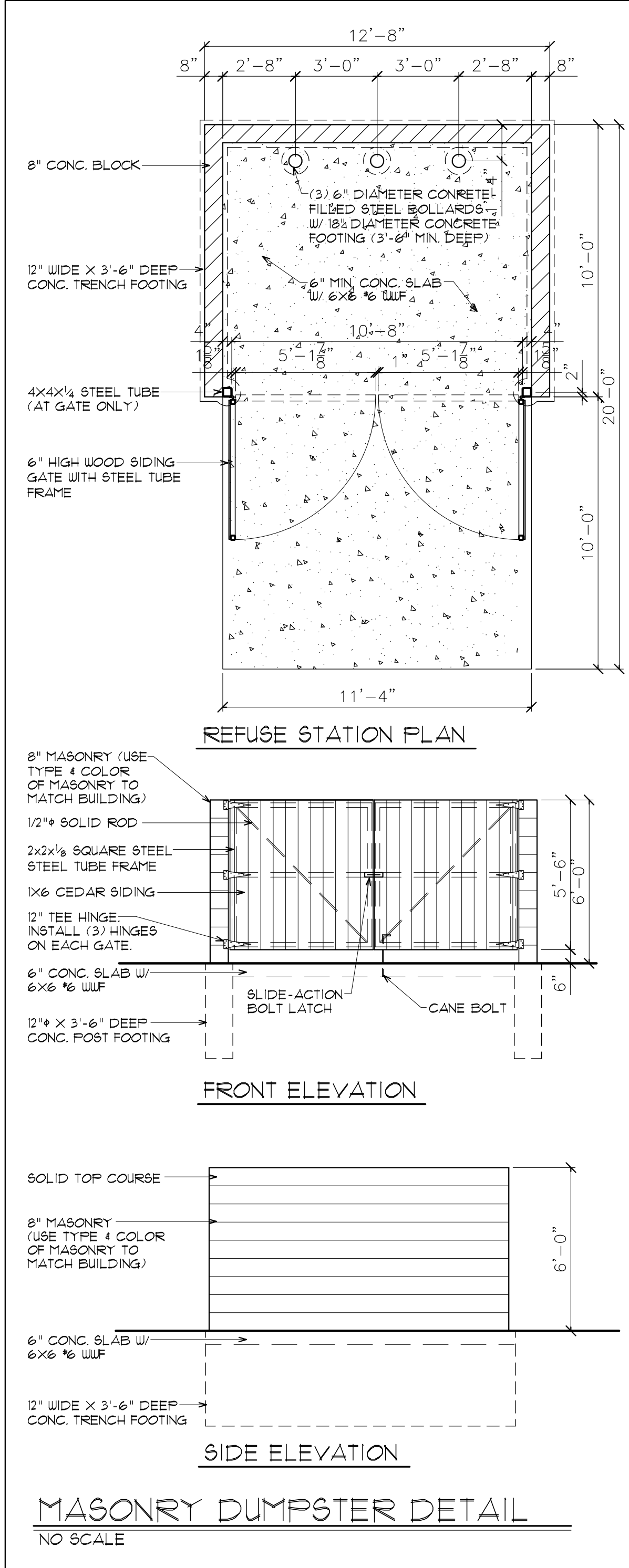
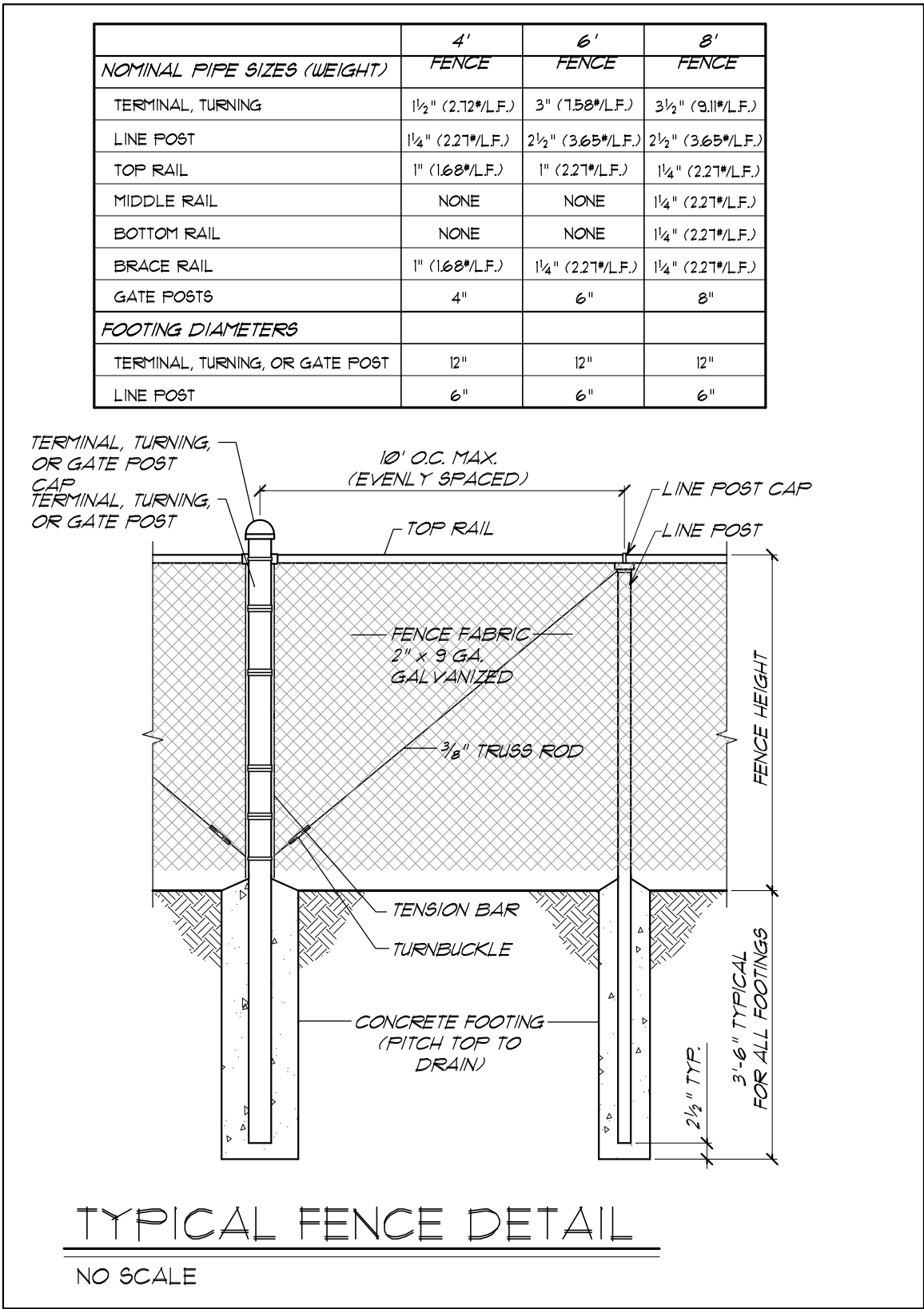
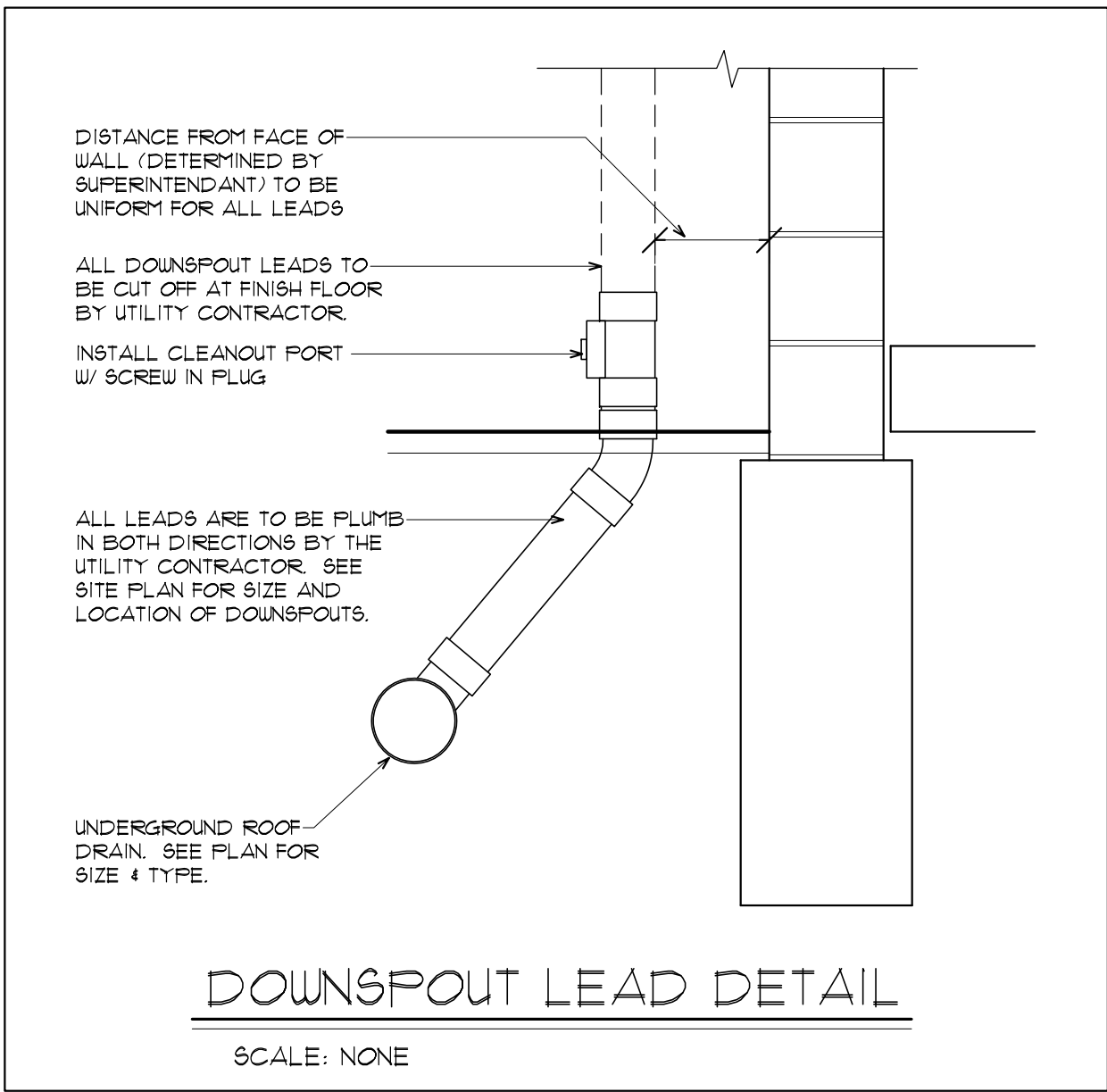
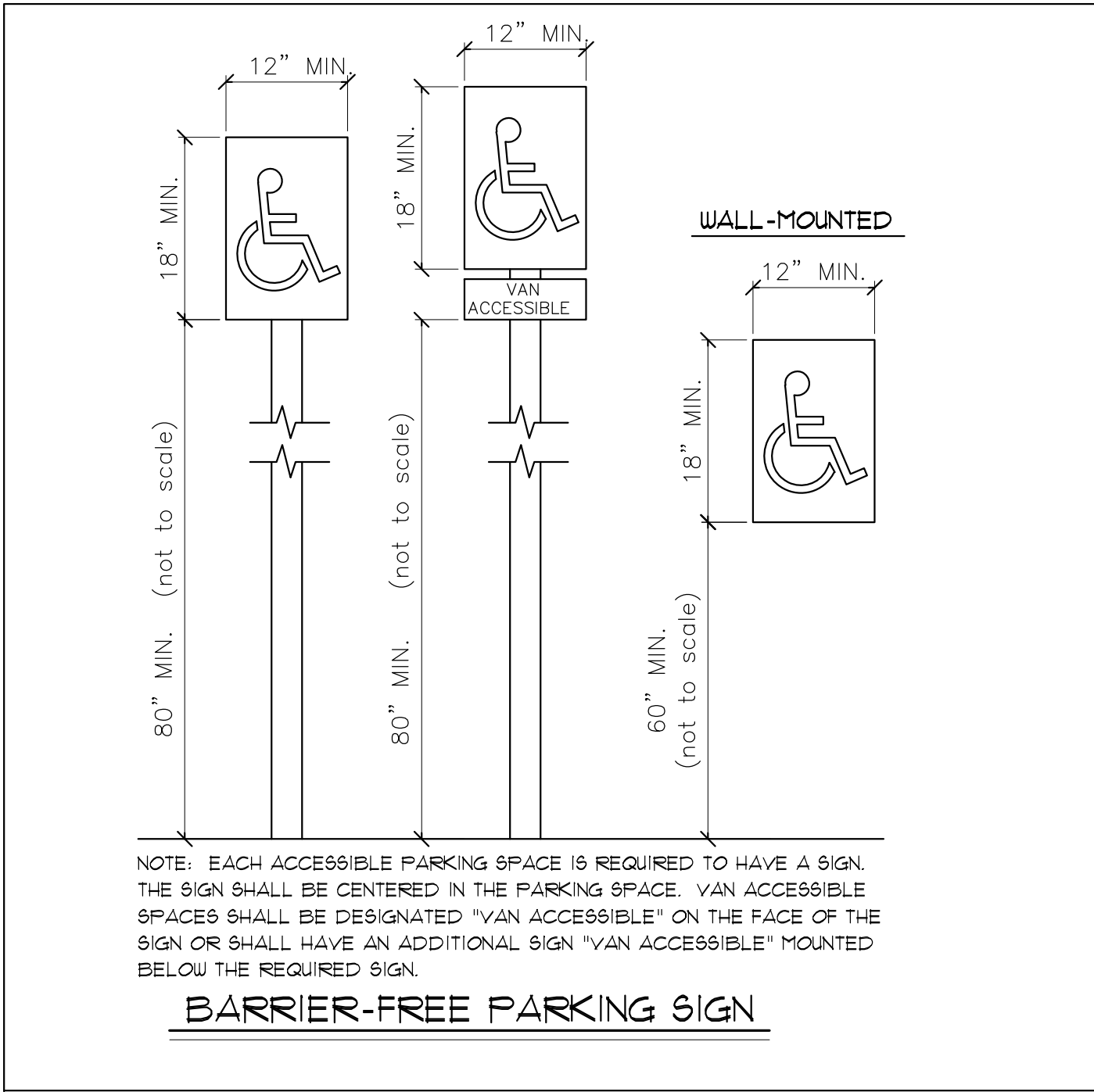
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REVISED	10-12-17

DRAWN BY: GAH
JOB NO.:

LANDSCAPE PLAN
SHEET NO.

C-4



WASHTENAW COUNTY	ACRES	ON-SITE	
PROPOSED DRAINAGE CALCULATION			
Impervious Area (0.95)	0.44	C=	0.61
Pervious Area (0.30)	0.70	A=	1.33 ACRES
Impervious Area (0.85)	0.07		
Bankfull Basin (1.0)	0.13		
ALLOWABLE RELEASE RATE=			0.15 CFS/AC
Q _{a(onsite)} = ALLOWABLE RELEASE RATE x A =			0.20 CFS
FIRST FLUSH VOLUME			
V _{ff} = (1") (1/12") (43560 SF/1ac) x A x C =		V _{ff} =	2945 cf
Pre-Development Bankfull Volume			
2-year/24 hour storm event	P=	2.35 in.	
Pre-Development CN	CN=	58	
S = 1000/CN - 10=	S=	7.241 in.	
Q = (P-0.2S)/2 / (P+0.8S)	Q=	0.100 in.	
Total Site Area (sf) excl. S-C BMPs	A=	58060 sf	
V _{bf-pre} = Q/12 x A	V _{bf-pre} =	483 cf	
Pervious Cover Post-Development Bankfull Volume			
2-year/24 hour storm event	P=	2.35 in.	
Pervious Cover CN	CN=	61	
S = 1000/CN - 10=	S=	6.393 in.	
Q = (P-0.2S)/2 / (P+0.8S)	Q=	0.154 in.	
Pervious Cover Area (sf)	Ap=	30455 sf	
V _{bf-post} = Q/12 x Ap	V _{bf-post} =	390 cf	
Impervious Cover Post-Development Bankfull Volume			
2-year/24 hour storm event	P=	2.35 in.	
Impervious Cover CN	CN=	97	
S = 1000/CN - 10=	S=	0.349 in.	
Q = (P-0.2S)/2 / (P+0.8S)	Q=	1.978 in.	
Impervious Cover Area (sf)	Ai=	27605 sf	
V _{bf-imp post} = Q/12 x Ai	V _{bf-imp post} =	4550 cf	
Pervious Cover Post-Development 100-Year Volume			
100-year storm event	P=	5.11 in.	
Pervious Cover CN	CN=	61	
S = 1000/CN - 10=	S=	6.393 in.	
Q _{100-per} = (P-0.2S) ² / (P+0.8S)	Q _{100-per} =	1.436 in.	
Pervious Cover Area (sf)	A _{100-per} =	30455 sf	
V _{100-per post} = Q/12 x Ap	V _{100-per post} =	3644 cf	
Impervious Cover Post-Development 100-Year Volume			
100-year storm event	P=	5.11 in.	
Impervious Cover CN	CN=	97	
S = 1000/CN - 10=	S=	0.349 in.	
Q _{100-imp} = (P-0.2S) ² / (P+0.8S)	Q _{100-imp} =	4.714 in.	
Impervious Cover Area (sf)	A _{100-imp} =	27605 sf	
V _{100-imp} = Q/12 x A _{100-imp}	V _{100-imp} =	10844 cf	
Runoff Summary			
V _{ff} =	2945 cf		
V _{bf-pre} =	483 cf		
V _{bf-post} =	390 cf		
V _{bf-imp post} =	4550 cf		
V _{bfpost} =	4940 cf		
V _p =	0 cf		
V _{100-per} =	3644 cf		
V _{100-imp} =	10844 cf		
V ₁₀₀ =	14488 cf		
On-Site Infiltration Requirement			
Greater of First Flush volume or Difference between pre and post development bankfull volumes			
Bankfull Volume Difference = V _{bf-post} - V _{bf-pre} =	4457 cf		
INFILTRATION DESIGN			
Required Infiltration	V _{req-inf} =	4457 cf	
Depth of basin storage	d =	1 ft	
Field Infiltration Rate	i _f =	0.5 in/hr	
Design Infiltration Rate i _d = i _f / 2	i _d =	0.25 in/hr	
Infiltration period	t _i =	6 hr	
Infiltration Interface Area	A _i =	4100 sf	
Initial Infiltration Volume			
V _i = A _i x i _d (in/hr) x 1 (ft) (12 in) x t _i (hr) =	V _i =	512 cf	
Basin Storage Volume	V _b =	4100 cf	
Total Proposed Infiltration	V _{inf} =	4612 cf	
On-Site Infiltration Proposed			
On-Site design soil infiltration rate i _d =	0.25 in/hr		
PROPOSED INFILTRAION V_{inf} =	4612 cf		
INFILTRATION PERIOD T_i =	64.0 hr		

DRAINAGE AREA CALCULATIONS							
Pre-Development	Cover Type	Soil Type	AREA(sf)	AREA(ac)	C Value	CN	CN'A
B&B	Meadow	B	58060	1.333	0.30	58	77
		TOTAL	58060	1.333	Weighted CN	58	
Post-Development	Cover Type	Soil Type	AREA(sf)	AREA(ac)	C Value	CN	CN'A
Impervious	Pavement	B	1165	0.027	0.95	98	3
	Pond	B	5500	0.126	1	98	12
	Gravel	B	2910	0.067	0.85	85	6
	Building	B	18000	0.413	0.95	98	40
		TOTAL	27605	0.634	Weighted CN	97	
Pervious							
	Lawn	B	30455	0.699	0.30	61	43
		TOTAL	30455	0.699	Weighted CN	61	

Time of Concentration							
Flow Type	K	Elev. Change	Length (L)	Slope % (S)	S ^{0.5}	V=K * S ^{0.5}	T _c =L / (V*3600)
Sheet Flow	0.48	4.0	300	1.300	1.140	0.547	0.152
Waterway	1.20	0.5	100	1.300	1.140	1.368	0.020
Small Tributary	2.10	0.0	0	0.000	0.000	0.000	0.000

Q _p = 238.6 x T _c ^{-0.82} =	Q _p =	1007.77 cfs/in-mi ²
Total Site Area (ac) excl. SC-BMPs	A=	1.33 ac
Q ₁₀₀ = Q _{100-per} + Q _{100-imp} =	Q ₁₀₀ =	6.15 in
Peak Flow (PF) = Q _p x Q ₁₀₀ x A / 640	PF=	12.91 cfs
Δ = PF(cfs) - 0.15(cfs/ac)*A(ac)	Δ=	12.71 cfs
V ₀ = Δ / PF x V ₁₀₀	V ₀ =	14263 cf

REQUIRED DETENTION VOLUME WITH INFILTRATION		
V _{det} = V ₀ - V _{inf} =	V _{det} =	9651 cf

BASIN STORAGE PROVIDED				
ELEV.	AREA	DEPTH	VOLUME	TOTAL
	(FT ²)	(FT)	(FT ³)	VOLUME (FT3)
920.6	8935	0.6	5,041	17,592
920	7867	1	7,054	12,552
919	6240	1	5,498	5,498
918	4756	1	4,100	4,100
917	3443	0	0	0

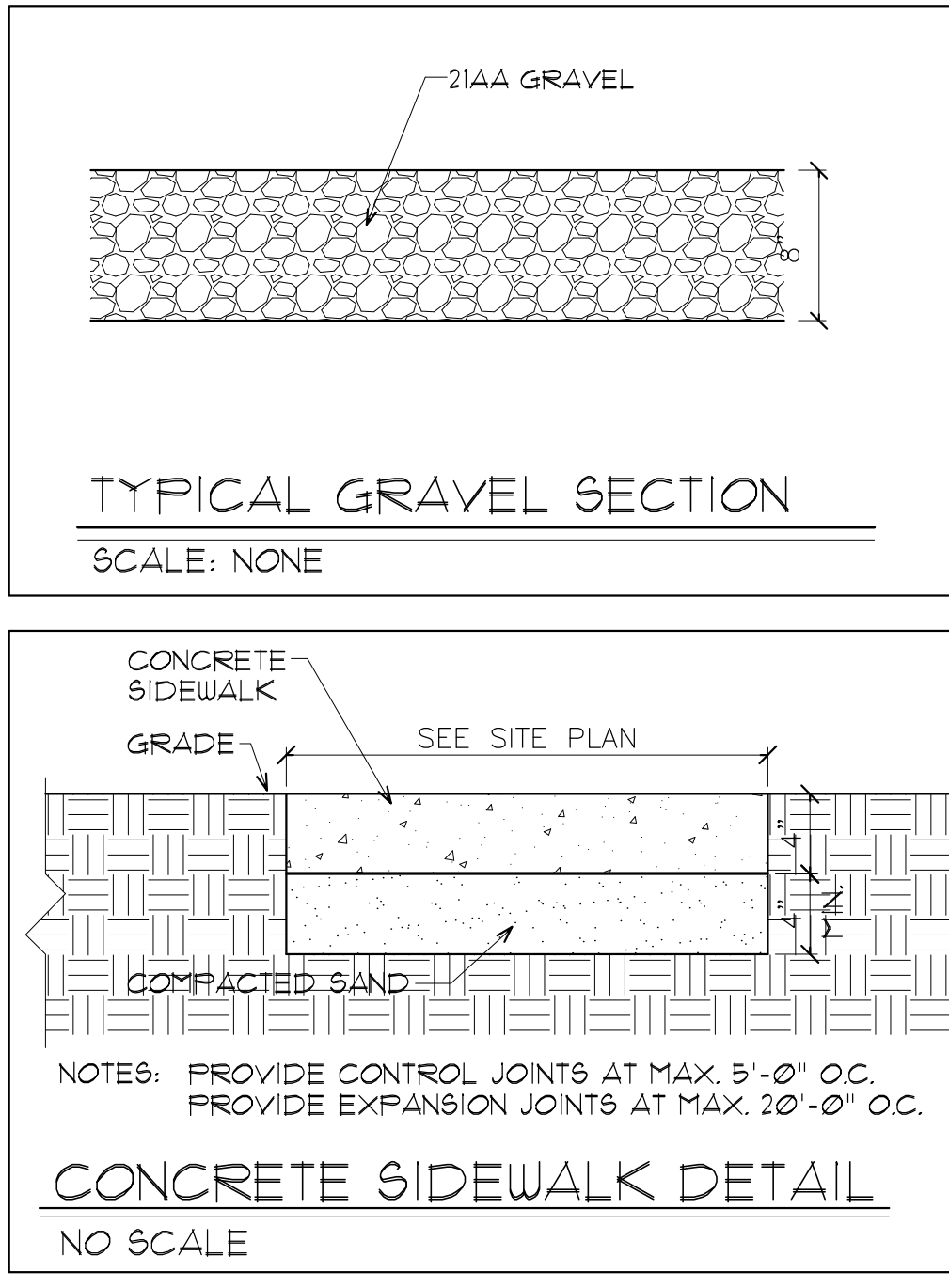
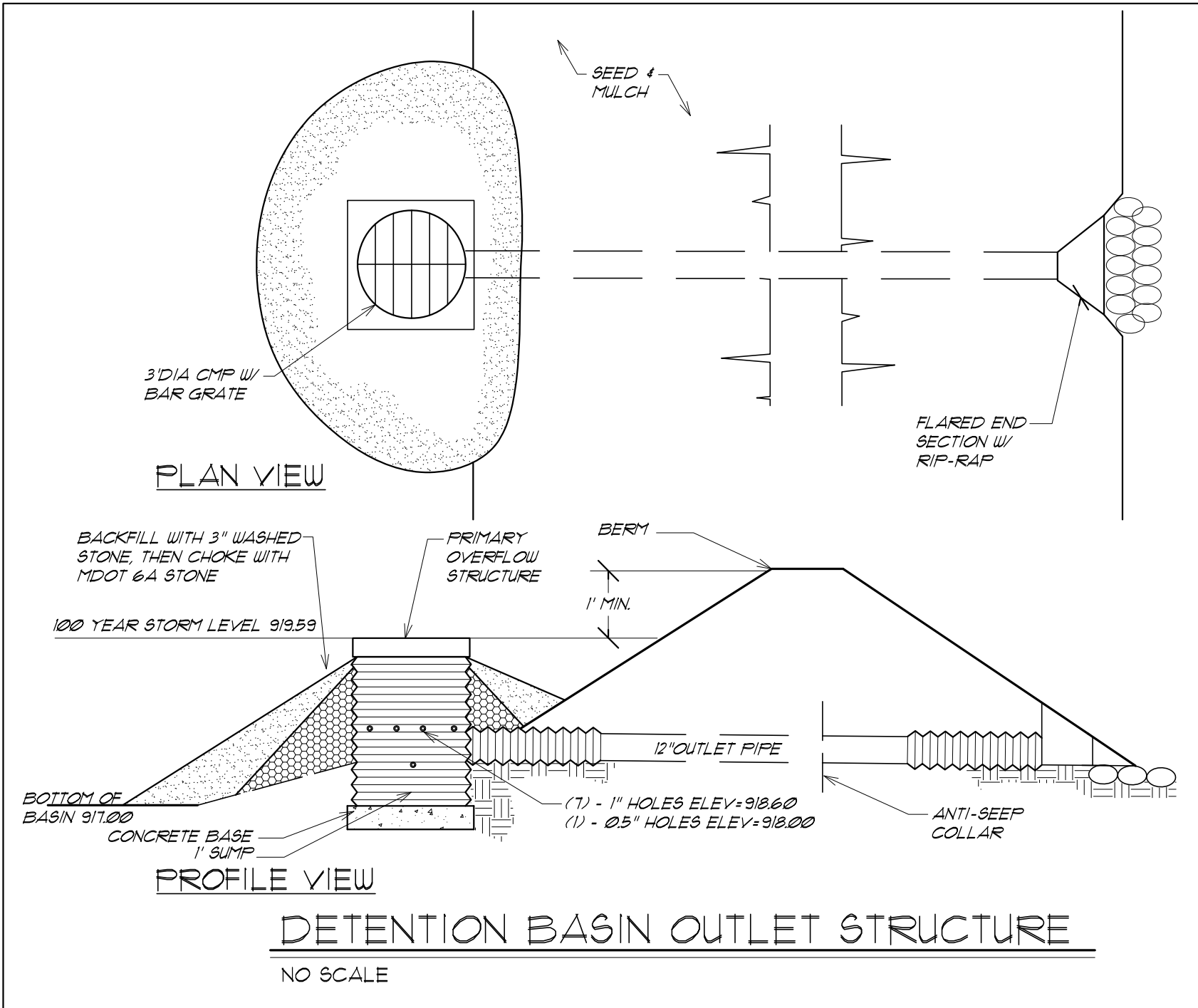
BOTTOM OF BASIN	X _b =	917.00
INFILTRATION	X _i =	918.00
FIRST FLUSH	X _{FF} =	917.72
BANKFULL	X _{BF} =	918.60
100 YEAR	X _f =	919.59

PROPOSED OUTLET CONTROL		
BANKFULL FLOOD		
A PORTION OF THE BANKFULL VOLUME SHALL BE STORED FOR INFILTRATION		
THE REMAINING VOLUME SHALL DISCHARGE THROUGH HOLES AT THE TOP OF THE INFILTRATION STORAGE X		
REMAINING VOLUME =	328 CF	
Q _{BF} = REMAINING VOLUME x (1 / 24HRS) x (1 / 3600SEC) =	0.004 CFS	
PLACE OPENINGS AT INFILTRATION STORAGE ELEVATION =	918.00	
have = 2/3 x (X _{BF} - X _i) =	0.40 FT	
A = Q _{BF} / { (0.62 * SORT(2*32.2*have)) } =	0.001 SF	
A	0.5	
A/ 0.001	=	0.88
	1	0.5 INCH DIAMETER HOLES AT ELEV. =
		918.00

100 YEAR FLOOD		
Q _a = ALLOWABLE RELEASE RATE x AREA SITE IN ACRES=		0.20 CFS
Q _a IS A PEAK OR MAXIMUM FLOW. CALCULATE THE MAXIMUM FLOW PASSING THROUGH		
BANKFULL ORIFICES. USING THE TOTAL HEAD, AND SUBTRACT FROM Q _a TO DETERMINE		
THE ORIFICE SIZE TO RELEASE THE 100 YEAR STORM VOLUME:		
Q _{BF} = 0.62x#HOLES _{FF} xAREA EACH HOLE _{FF} x(2*32.2*(X ₁₀₀ -X _i)) ^{0.5}		
Q _{BF} =	0.01 CFS	
Q _a - (Q _{BF}) =	0.19 CFS	
A = Q _a / (0.62 * (2 *32.2 * (X ₁₀₀ -X _{BF})) ^{0.5}) =	0.039 SF	
A	1	
A/ 0.005	=	7.10
	1	INCH DIAMETER ORIFICE HAS AN AREA OF
		0.005 SF

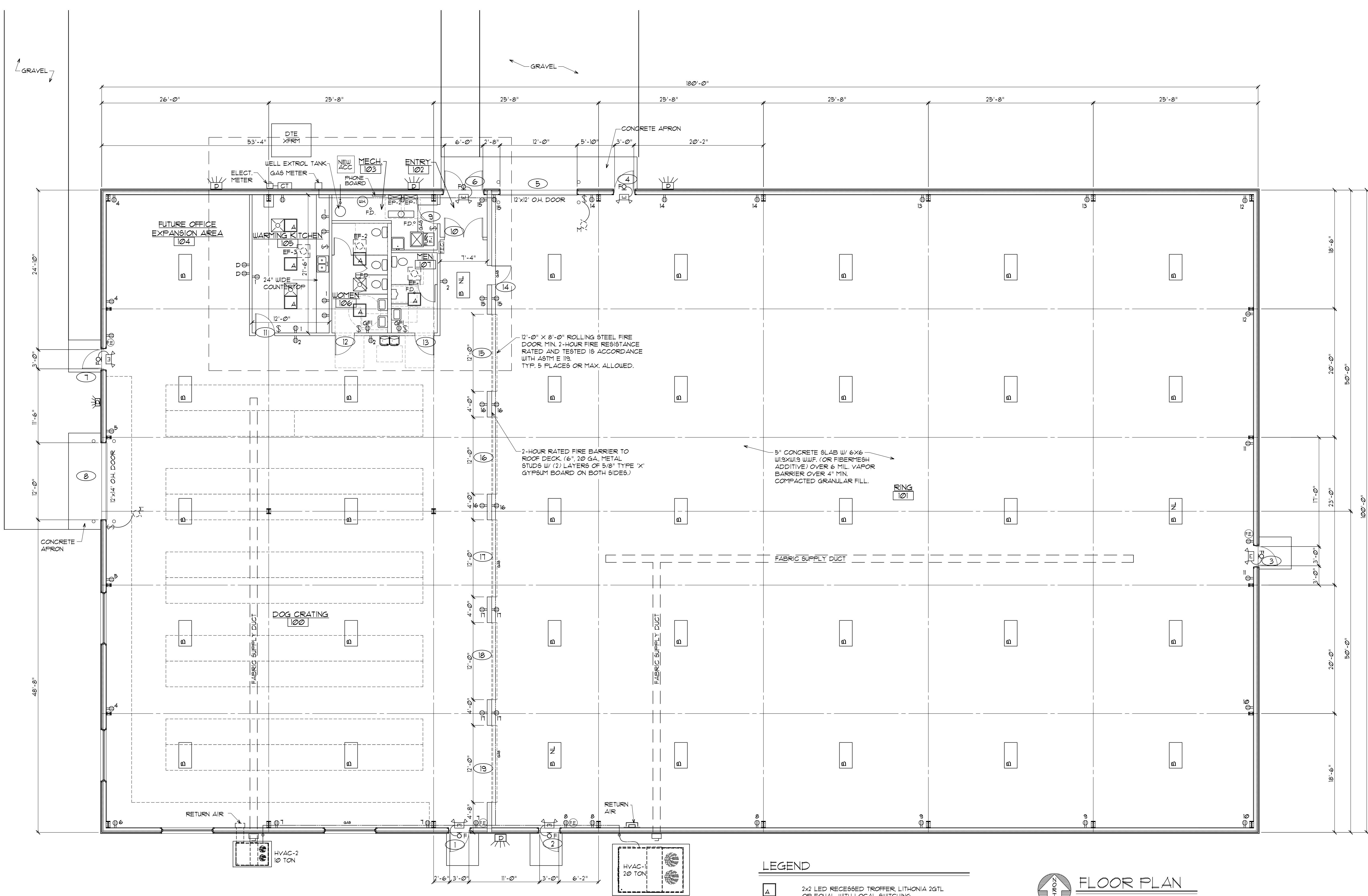
THEREFORE, USE THE FOLLOWING NUMBER OF 1" DIAMETER HOLES:		
7 HOLES AT ELEV. =	918.60	

SUMMARY OF REQUIRED STANDPIPE HOLES:		
ELEVATION	# OF HOLES	DIAMETER OF HOLES
918.60	7	1 in.
918.00	1	0.5 in.



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HVAC EQUIPMENT SCHEDULE					
	NAME	MODEL	CAPACITY	ELE.	NOTES
HVAC-1	PAD MOUNTED PACKAGE HVAC UNIT W/ ECONOMIZER	TRANE	20 TON COOLING 400,000 BTU HEATING	208V, 3PH, 125A	EER RATING 11.00, W/ 7-DAY PROGRAMMABLE THERMOSTAT
HVAC-2	PAD MOUNTED PACKAGE HVAC UNIT W/ ECONOMIZER	TRANE	10 TON COOLING 250,000 BTU HEATING	208V, 3PH, 60A	EER RATING 11.00, W/ 7-DAY PROGRAMMABLE THERMOSTAT
F-1	FURNACE WITH A/C COIL, TOP DISCHARGE		2 TON COOLING 15,000 BTU HEATING	110V, 1 PH, 20A	EER RATING 11.00, W/ 7-DAY PROGRAMMABLE THERMOSTAT
ACC-1	PAD MOUNTED A/C CONDENSER			208V, 3 PH, 20A	
EF-1	CEILING EXHAUST FAN, LOW SONE	DAYTON 5AE69	150 CFM	110V, 17A	SWITCH WITH ROOM LIGHTS
EF-2	CEILING EXHAUST FAN, LOW SONE	DAYTON 5AE69	150 CFM	110V, 17A	SWITCH WITH ROOM LIGHTS
EF-3	CEILING EXHAUST FAN, LOW SONE	DAYTON 3DPE3	200 CFM	110V, 22A	SWITCH WITH ROOM LIGHTS



- LEGEND**
- A 2x2 LED RECESSED TROFFER, LITHONIA 2GTL OR EQUAL, WITH LOCAL SWITCHING
 - B 2X4 LED HIGH-BAY, LITHONIA 1BH (12,000 LUMENS) OR EQUAL, SWITCHED FROM ELECTRIC PANEL
 - B EM SAME AS B W/ BATTERY BACKUP
 - B NL SAME AS B ON A NIGHT LIGHT CIRCUIT
 - 4'-0" LONG, CHAIN HUNG, 3000 LUMENS LED LIGHT FIXTURE
 - LED, 76 WATT, WALL-MOUNTED, DOWN LIGHT, EXTERIOR FIXTURE
 - X EXIT SURFACE MOUNTED EMERGENCY EXIT SIGN SHALL BE "LED" W/ BATTERY BACK UP, LITHONIA *LQM5WSR 120/211 EL
 - X1 EXIT/COMBO SAME AS TYPE EBU AND X EXCEPT COMBINATION, LITHONIA *LHQ5WSR 120/211 H
 - FQ REMOTE EMERGENCY EGRESS UNIT VIA 'E'
 - OK BATH EXHAUST FAN
 - NEW DUPLEX ELECTRICAL RECEPTACLE, NUMBER DEFINES CIRCUIT
 - PD SAME AS ABOVE - ON DEDICATED CIRCUIT
 - \$ SWITCH
 - \$3 THREE-WAY SWITCH
 - FE FIRE EXTINGUISHER
 - FE2 FIRE EXTINGUISHER IN CABINET
 - EBH ELECTRIC BASEBOARD HEATER

FLOOR PLAN
SCALE: 1/8" = 1'-0"

HVAC, PLUMBING & ELECTRICAL GENERAL NOTES:

- These drawings are to be considered as design drawings only and are meant to establish minimum requirements for the project.
- Work not identified on the drawings, however, required by code and/or required to provide complete operable systems shall be the subcontractors responsibility.
- Subcontractor shall be responsible for final shop drawings, properly engineered and containing all information as may be required by the local Building Department for issuance of the building permit. Sealed drawings shall not be part of the subcontractors responsibility.

MECHANICAL NOTES:

- All supply air ducts shall be wrapped with insulation.
- HVAC contractor shall be responsible for all roof curbs, wall penetrations, curbs, flashings and sealants as required.
- Supply and return air duct sizes to be determined by mechanical contractor.
- Gas piping sizes shall be determined by mechanical contractor.

PLUMBING NOTES:

- All sanitary piping shall be SCH. 40 PVC.
- All hot and cold water piping shall be type K copper.
- All cold water piping shall be insulated.

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ISSUED FOR:	DATE:
REVIEW	5-31-12
PROPOSAL	6-5-12
REVISED	4-26-16
REVISED	5-3-16
PROPOSAL	7-11-16
REVISED	5-17-17
REVISED	10-4-17

DRAWN BY: CLN/SA
JOB NO.: -

FLOOR PLAN
SHEET NO.

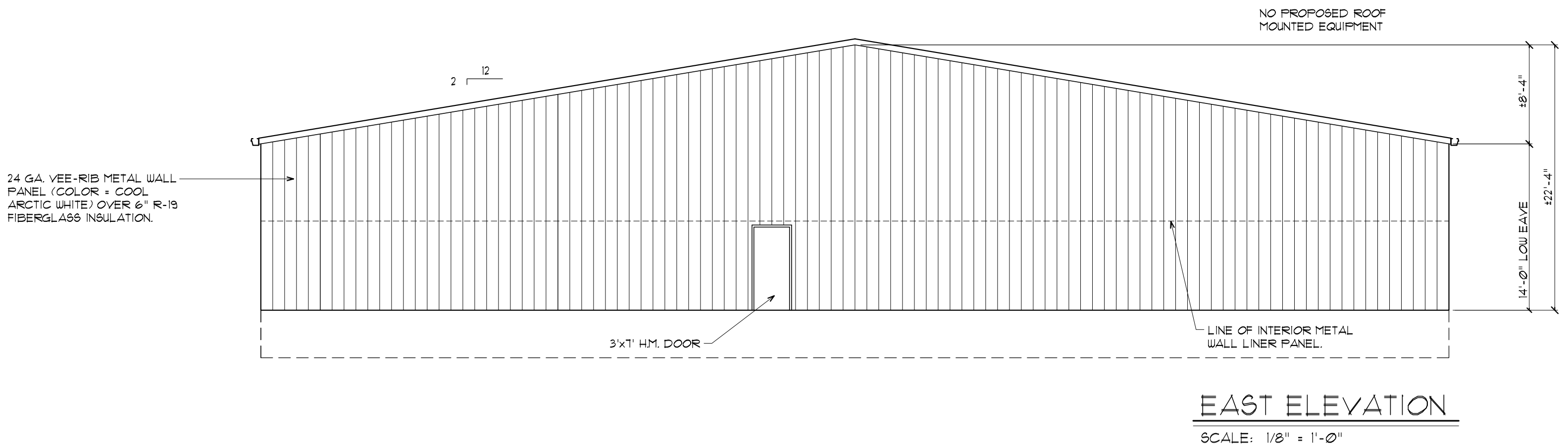
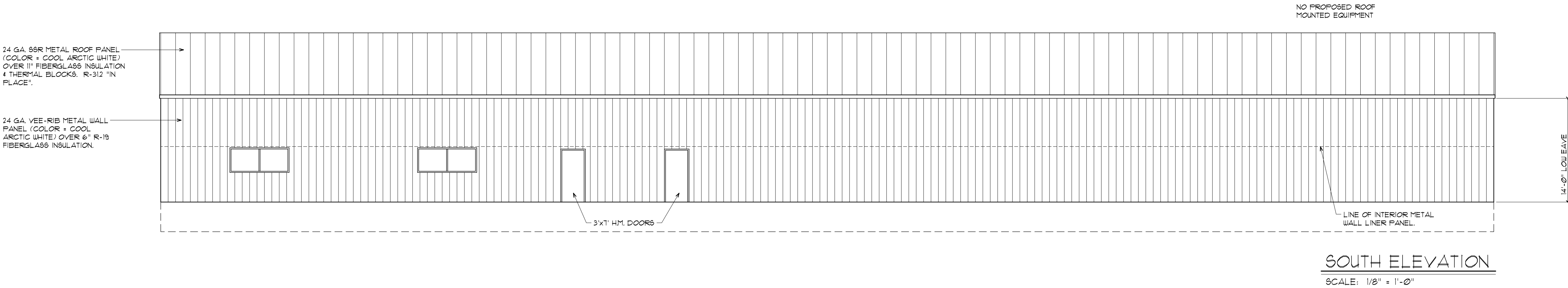
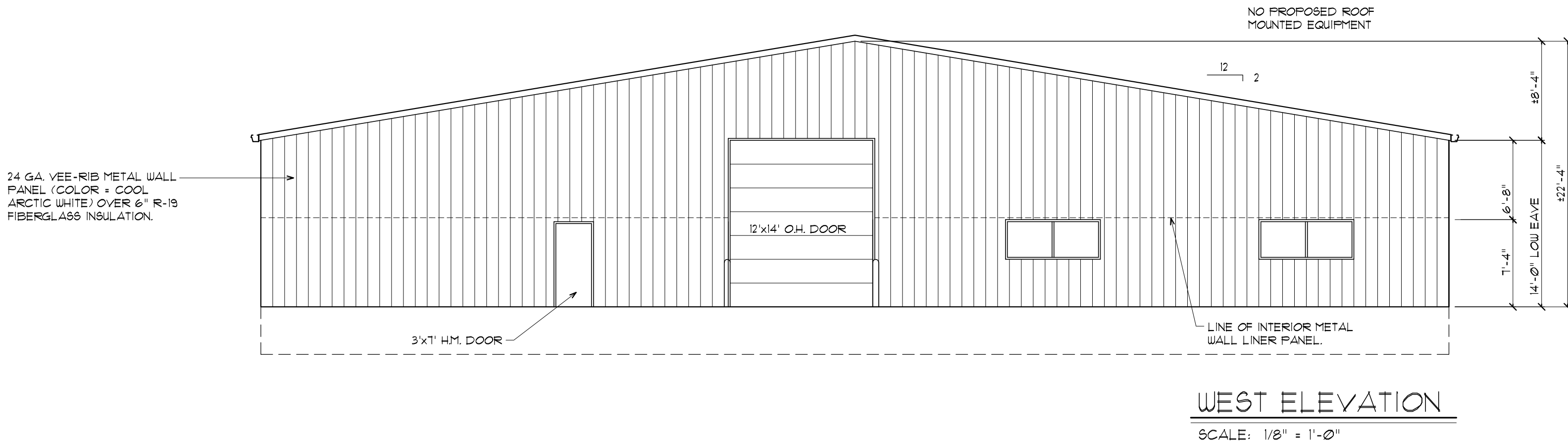
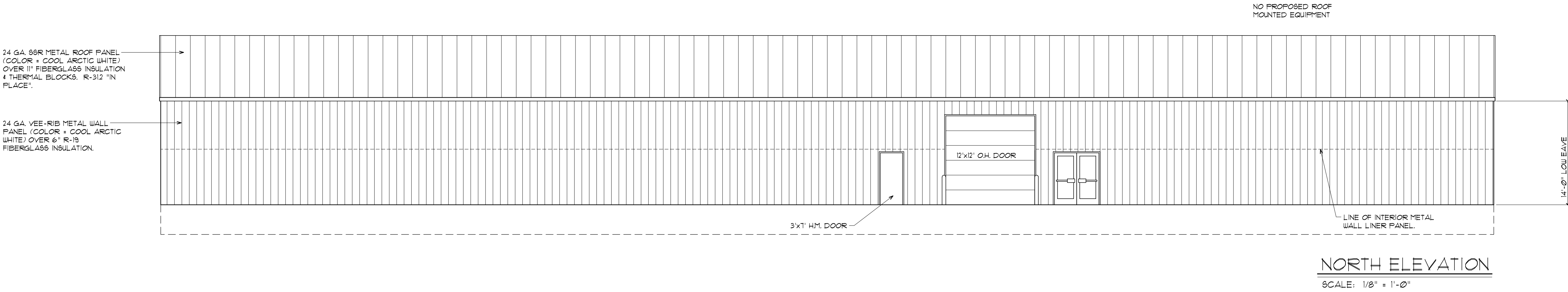
A-1

ANN ARBOR DOG TRAINING
1575 E. North Territorial Road
Northfield Township, Michigan

DESIGNERS
Vanston/O'Brien, Inc.
BUILDERS

2375 Bishop Circle West
Dexter, MI 48130
Tel: (734) 424-0661
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JOB NO.: -

ELEVATIONS

SHEET NO.

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