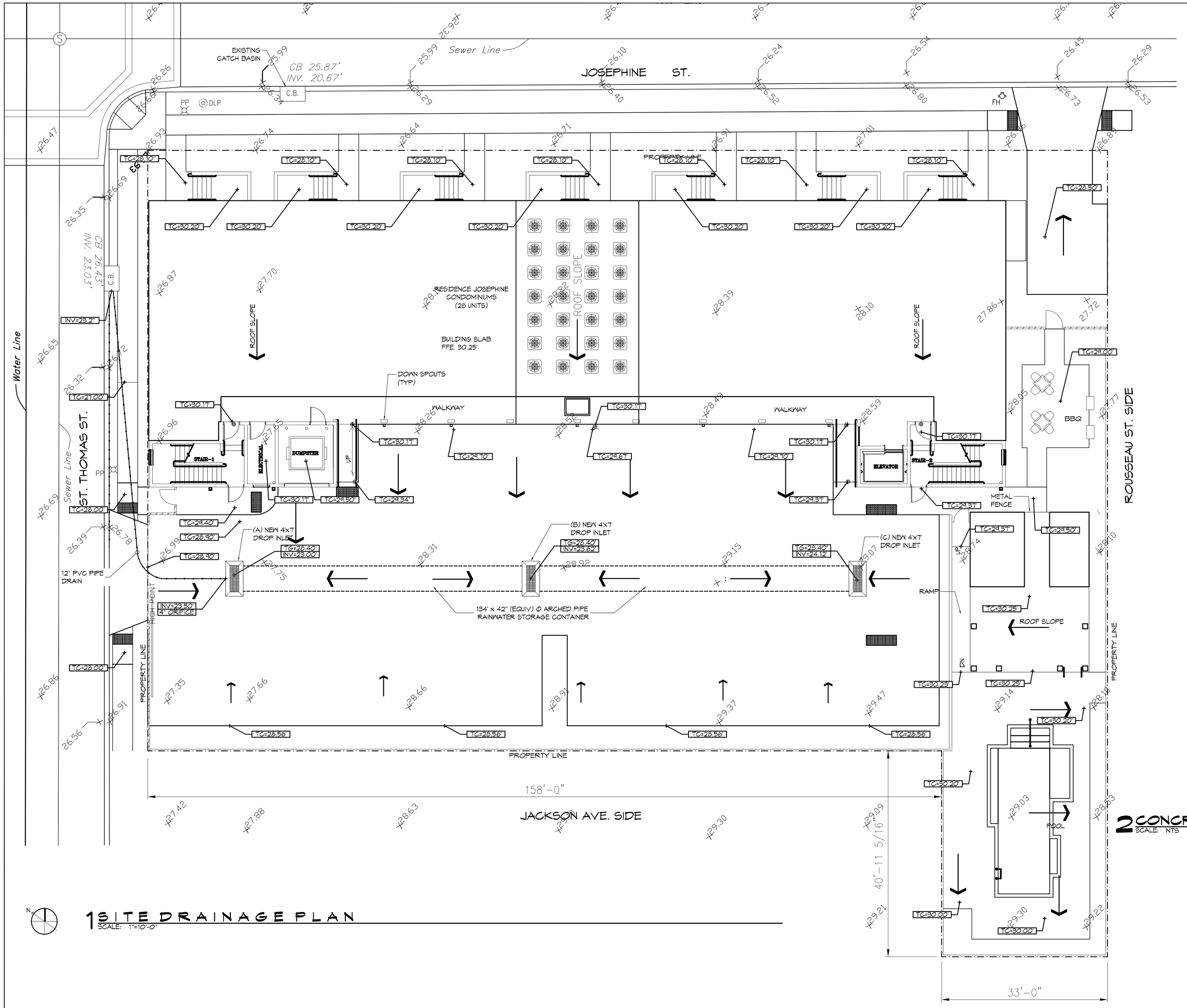


1 SITE DRAINAGE PLAN
SCALE: 1"=10'-0"

GENERAL SITE DRAINAGE NOTES

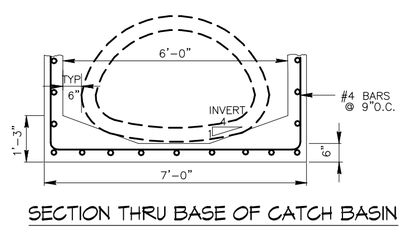
1. DRAIN PIPE(S) MUST BE THE BELL AND SPIGOT TYPE WITH "O" RING RUBBER GASKETS. THE BELLS OF THE PIPES SHALL BE LAID UPSTREAM. ALL JOINTS SHALL BE WRAPPED WITH GEOTEXTILE FABRIC. ALL PIPES SHALL REQUIRE A 3" COMPACTED SAND OR LIMESTONE BASE.
2. REMOVE DEBRIS AND CLEAN BOTTOM OF DITCHES DOWN 6" IN DEPTH - REPLACE ANY BROKEN/CRUSHED PIPES OR CULVERTS WITH SAME SIZE AND TYPE.
3. DRAIN PIPE AND FITTINGS WITHIN PROPERTY LINE SHALL BE POLYVINYL CHLORIDE PLASTIC PIPE, MEETING CLASS 100 C-900 PVC.
4. ELEVATIONS SHOWN ARE MSL.
5. FIELD VERIFY ALL ELEVATIONS AND AND DRAINAGE SYSTEM PLACEMENT PRIOR TO START OF WORK.
6. PROVIDE VERTICAL ELBOW AT DOWNSPOUTS FOR CONNECTION TO SUBSURFACE DRAINAGE WHERE INDICATED. ELBOW ID SHALL BE SIZED SUCH THAT THE DOWNSPOUT CAN BE INSERTED INTO THE PIPE OPENING WITHOUT DEFORMATION TO THE DOWNSPOUT.

SITE DRAINAGE LEGEND

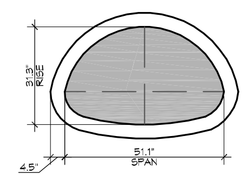
TG=100.0' — TOP OF CONCRETE
TG=100.0' — TOP OF GRATE
INV=100.0' — INVERT OF PIPE
DRAINAGE FLOW DIRECTION ARROW

DROP INLET

A. 4' X T X 5'-6" DEPTH CONCRETE DROP INLET.
B. 4' X T X 5'-6" DEPTH CONCRETE DROP INLET.
C. 4' X T X 5'-6" DEPTH CONCRETE DROP INLET.



SECTION THRU BASE OF CATCH BASIN



EQUIVALENT SIZE = 42" Ø
CROSS SECTION = 8.3 s.f.

CONCRETE ARCH PIPE

2 CONCRETE ARCH PIPE & BOTTOM OF CATCH BASIN
SCALE: NTS

STORM WATER RUN-OFF CALCULATIONS

PROJECT: Josephine Condos
STORMWATER RUN-OFF CALCULATIONS

Formula used:

[1] RATIONAL METHOD: Q=AciI

where:
- Q= Peak discharge of watershed in cubic feet per second (cfs) due to maximum storm assumed.
- A= Area of watershed in acres.
- c= Coefficient of run-off [2].
- I= Intensity of rainfall in inches per hour based on concentration time.[3]

[4] $TC = \frac{\left(L^{0.8}\left(\frac{1000}{i} - 9\right)^{0.7}\right)}{(1140(s^{0.5}))}$

where:
- TC= Time of concentration= time required for rain falling at most remote point to reach discharge point.
- c= Site run-off coefficients based on conditions shown.
- s= Percent slope of overland flow.

PRIOR TO DEVELOPMENT
10 Year Frequency

Q_1 = AcI

Watertight Surfaces		0	sqft	0.000	Acres
c(1) =	0.9				
Brick Pavers		0	sqft	0.000	Acres
c(2) =	0.25				
Green Space		24,255	sqft	0.557	Acres
c(3) =	0.15				
Summary		24,255	sqft	0.557	Acres
c =	0.15				

Duration (D) = Time of concentration (TC)

where	L =	181	run-off length ft	Elev diff	1
	c =	0.15	run-off coef		
	S =	0.5236	percent slope		
therefore	TC = D =	20.12	minutes		
Expected rainfall intensity	I =	5.99	in/hr		

Q_1 = 0.500 cfs

POST DEVELOPMENT
10 Year Frequency

Q_2 = AcI

Watertight Surfaces		16,808	sqft	0.386	Acres
c(1) =	0.90				
Brick Pavers		4,302	sqft	0.099	Acres
c(2) =	0.30				
Green Space		3,145	sqft	0.072	Acres
c(3) =	0.15				
Summary		24,255	sqft	0.557	Acres
c =	0.70				

Duration (D) = Time of concentration (TC)

where	L =	110	run-off length ft	Elev diff	1
	c =	0.70	run-off coef		
	S =	0.5882	percent slope		
therefore	TC = D =	6.61	minutes		
Expected rainfall intensity	I =	7.67	in/hr		

Q_2 = 2.915 cfs

LANDSCAPE INFILTRATION

Lanscaping	Area	Soil Type	Cubic Feet Infiltration / HR	gal Infiltration / Hr
Turf	776 s.f.	B	17.46 cu ft / hr	131 gph
Planting Area	9,445 s.f.	A	212.62 cu ft / hr	2,190 gph
		Total	310.26 cf/hr (0.0862 cfs)	2,321 gph

CAPTURE REQUIREMENTS

Capture the 1st 1.25" of rainfall of a 10 year storm over a 24-hr period
Storage = 1.25"/12 x sqft of Watertight Surface = 1150.8 cuft or 13,046 Gallons
Draining a volume of this size using the Pre-Development Run-Off Rate of 0.262 cfs would take = 1150.8 cuft / 0.262 cfs = 4882 seconds or 111.4 minutes or 1.86 hrs
Since the Lanscaping Infiltration can handle 310.26 cu ft/hr the storage requirement can be reduced by this amount. 1150.8 - (310.26 cu ft / hr x 1.86 hrs) = 1119.1 cu ft of storage

CAPTURE REQUIREMENTS

Storage = 1.25"/12 x sqft of Watertight Surface = 1119.1 cuft or 8,374 Gallons
Storage using an Arch Conc Pipe = Equiv 42" Round Pipe with an area = 8.3 Full Flow Area s.f.
Arch Pipe Length Required with 10.0% Storage Capacity = 119.36

CALCULATE THE SIZE ORIFICE TO RESTRICT FLOW

[5] $A = \frac{Q}{(c\sqrt{(2gh)})}$

where:
- A= Discharge Area required
- g= Accelration of gravity
- c= Discharge coefficient
- h= Hydraulic head
- Q= Flow volume from run-off

Q =	0.500	cfs	h =	1.00	feet
c =	0.62	coefficient	A =	0.101	sqft
g =	32.16	ft/sec/sec			

REQUIRED SIZE ORIFICE = 4.50 inch inside diameter

References:
1. Chen, N.F. The Civil Engineering Handbook. 1985. Eq 9.11, pg. 1036
2. Seelye, Elwyn E. Data Book for Civil Engineers, Vol1 1960. Tbl B, pg. 18-02
3. Seelye, Elwyn E. Data Book for Civil Engineers, Vol1 1960. Fig B, pg. 18-01
4. Chen, N.F. The Civil Engineering Handbook. 1985. Tbl 9.2 Kegan Equation (n=0.019)
5. Chen, N.F. The Civil Engineering Handbook. 1985. Eq 9.28.32, pg. 964

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SCALE: AS SHOWN | FILE NAME: SITE DRAINAGE PLAN
DATE: 01-11-16

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NO.	DATE	REVISIONS

C1.2

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