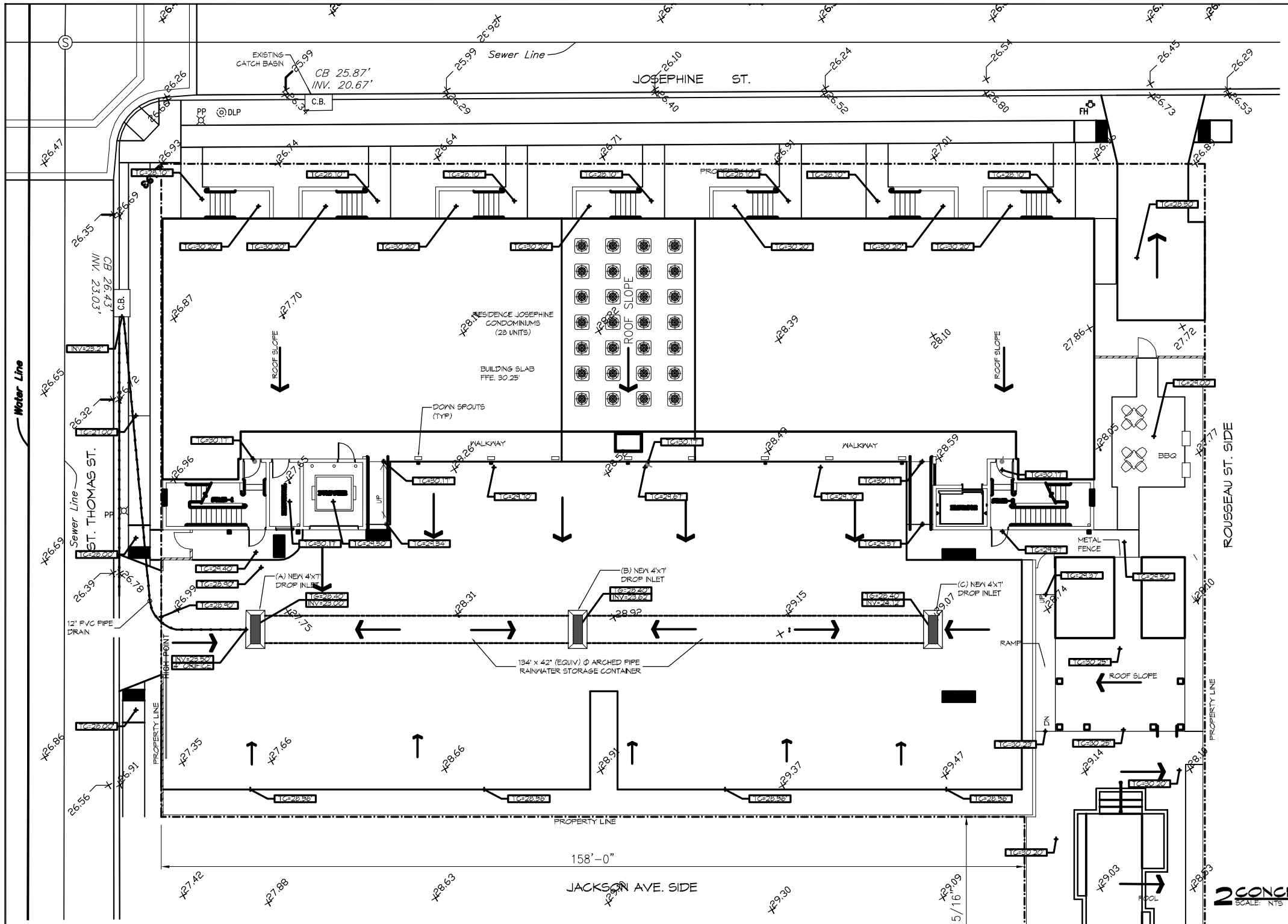


1 SITE DRAINAGE PLAN
SCALE: 1"=10'-0"

GENERAL SITE DRAINAGE NOTES

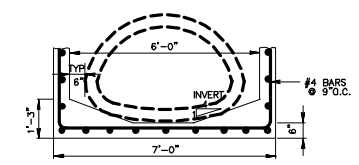
1. DRAIN PIPE(S) MUST BE THE BELL AND SPIGOT TYPE WITH "O" RING RUBBER GASKETS. THE BELLS OF THE PIPES SHALL BE LAID UPSTREAM. ALL JOINTS SHALL BE WRAPPED WITH GEOTEXTILE FABRIC. ALL PIPES SHALL REQUIRE A 9" COMPACTED SAND OR LIMESTONE BASE.
2. REMOVE DEBRIS AND CLEAN BOTTOM OF DITCHES DOWN 6" IN DEPTH - 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

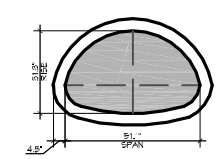
TG=100.00' — TOP OF CONCRETE
TG=100.00' — TOP OF GRATE
INV=100.00' — INVERT OF PIPE
DRAINAGE FLOW DIRECTION ARROW

DROP INLET

A. 4' X 7' X 5'-6" DEPTH CONCRETE DROP INLET.
B. 4' X 7' X 5'-6" DEPTH CONCRETE DROP INLET.
C. 4' X 7' X 5'-6" DEPTH CONCRETE DROP INLET.



SECTION THRU BASE OF CATCH BASIN



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=AGI

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

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

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

PRIOR TO DEVELOPMENT
10 Year Frequency

G_1 = AGI

Watertight Surfaces			0	sqft	0.000	Acres
c(1) =	0.8					
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 =	141	run-off length ft	Elev diff 1
	c =	0.15	run-off coef	
	S =	0.5298	percent slope	
therefore	TC = D =	20.12	minutes	
Expected rainfall intensity	I =	5.66	in/hr	

G_1 = 0.500 cfs

POST DEVELOPMENT
10 Year Frequency

G_2 = AGI

Watertight Surfaces			18,808	sqft	0.386	Acres
c(1) =	0.80					
Brick Pavers			4,902	sqft	0.044	Acres
c(2) =	0.90					
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 =	130	run-off length ft	Elev diff 1
	c =	0.70	run-off coef	
	S =	0.7692	percent slope	
therefore	TC = D =	8.81	minutes	
Expected rainfall intensity	I =	7.07	in/hr	

G_2 = 2.475 cfs

LANDSCAPE INFILTRATION

Landscaping	Area	Soil Type	Cubic Feet Infiltration / HR	Gal Infiltration / hr
	Turf	B	1,140 cu ft / hr	191 gph
Planting Area	9,445 s.f.	A	242.82 cu ft / hr	2,140 gph
		Total	910.28 cf hr (0.0882 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 1,570.8 cuft or 13,068 Gallons
Draining a volume of this size using the Pre-Development Run-Off Rate of 0.202 cfs would take = 1,570.8 cuft / 0.202 cfs = 8682 seconds or 111.4 minutes or 1.86 hrs.
Since the Landscaping infiltration can handle 910.28 cu ft/hr the storage requirement can be reduced by this amount. 1,570.8 - 1910.28 cu ft / hr x 1.86 hrs = 1,179.7 cu ft of storage

CAPTURE REQUIREMENTS

Storage = 1.25 / 12 x sqft of Watertight Surface 1,179.7 cuft or 8,779 Gallons
Storage using an Arch Conc Pipe = Equiv 42" Round Pipe with an area 9.6 Full Flow Area s.f.
Arch Pipe Length Required with 100% Storage Capacity = 123.00

CALCULATE THE SIZE ORIFICE TO RESTRICT FLOW

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

where:
A = Discharge area required
g = Acceleration 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 =	32.18	ft/sec/sec		

REQUIRED SIZE ORIFICE = 4.50 inch inside diameter

References:
1. Chen W.F., The Civil Engineering Handbook, 1985, Eq.9.31, pg.1030
2. Beeley, Blaugh E., Data Book for Civil Engineers, Vol.I 1960, Tbl.B, pg.18-02
3. Beeley, Blaugh E., Data Book for Civil Engineers, Vol.I 1960, Fig.B, pg.18-01
4. Chen W.F., The Civil Engineering Handbook, 1985, Tbl.9.1.2 Regan Equation (n=0.013)
5. Chen W.F., The Civil Engineering Handbook, 1985, Eq.7.3.9.2, pg.684

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SCALE: AS SHOWN | FILE NAME: SITE DRAINAGE PLAN
DATE: 30 Dec. 2015

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NO.	DATE	REVISIONS

C1.2