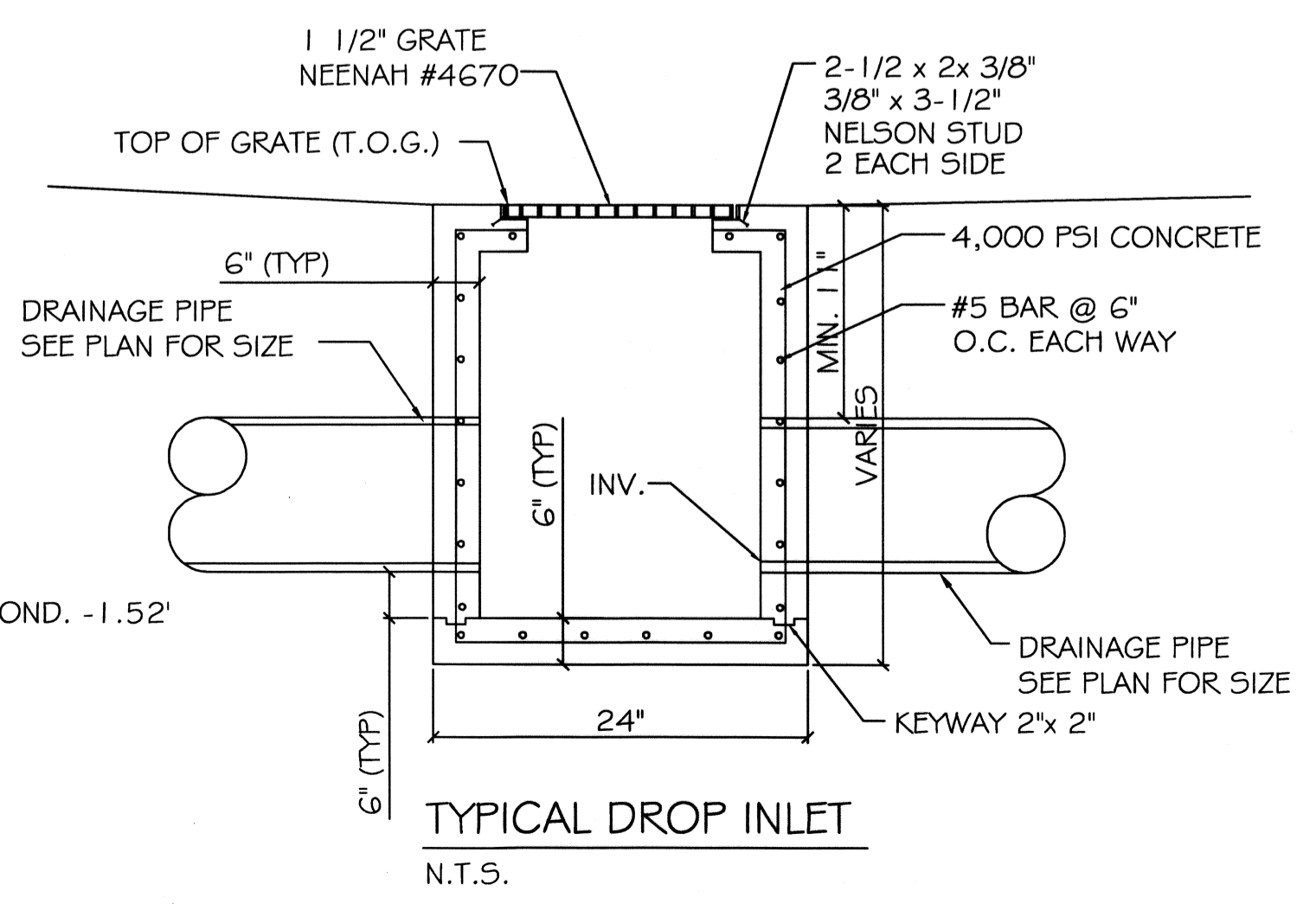
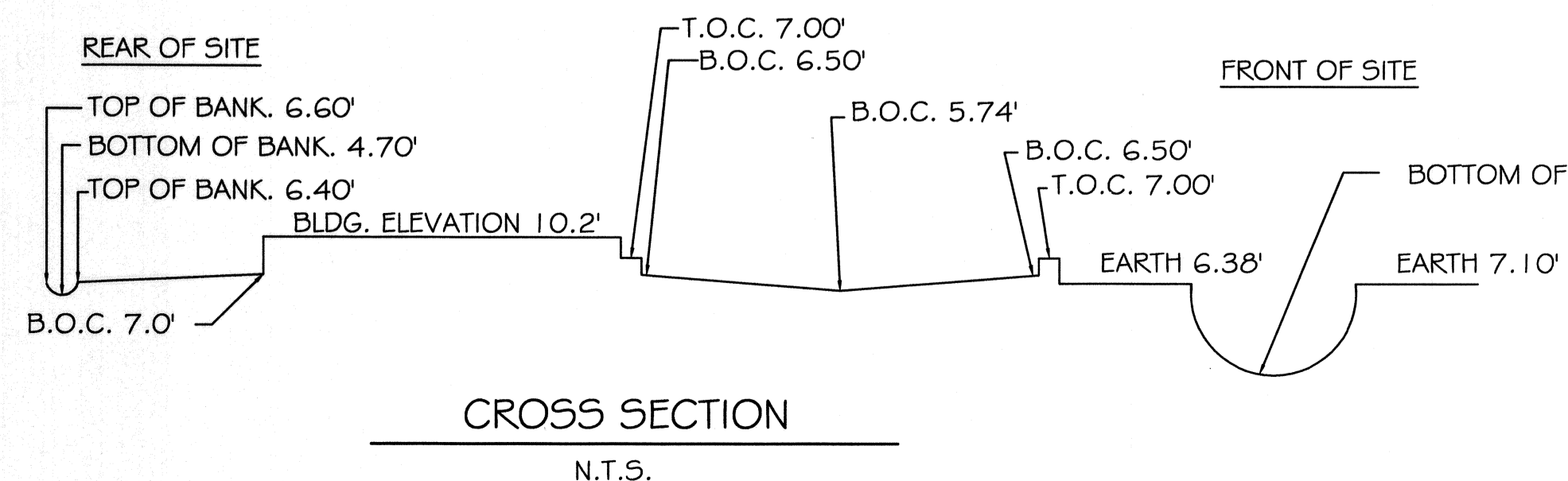
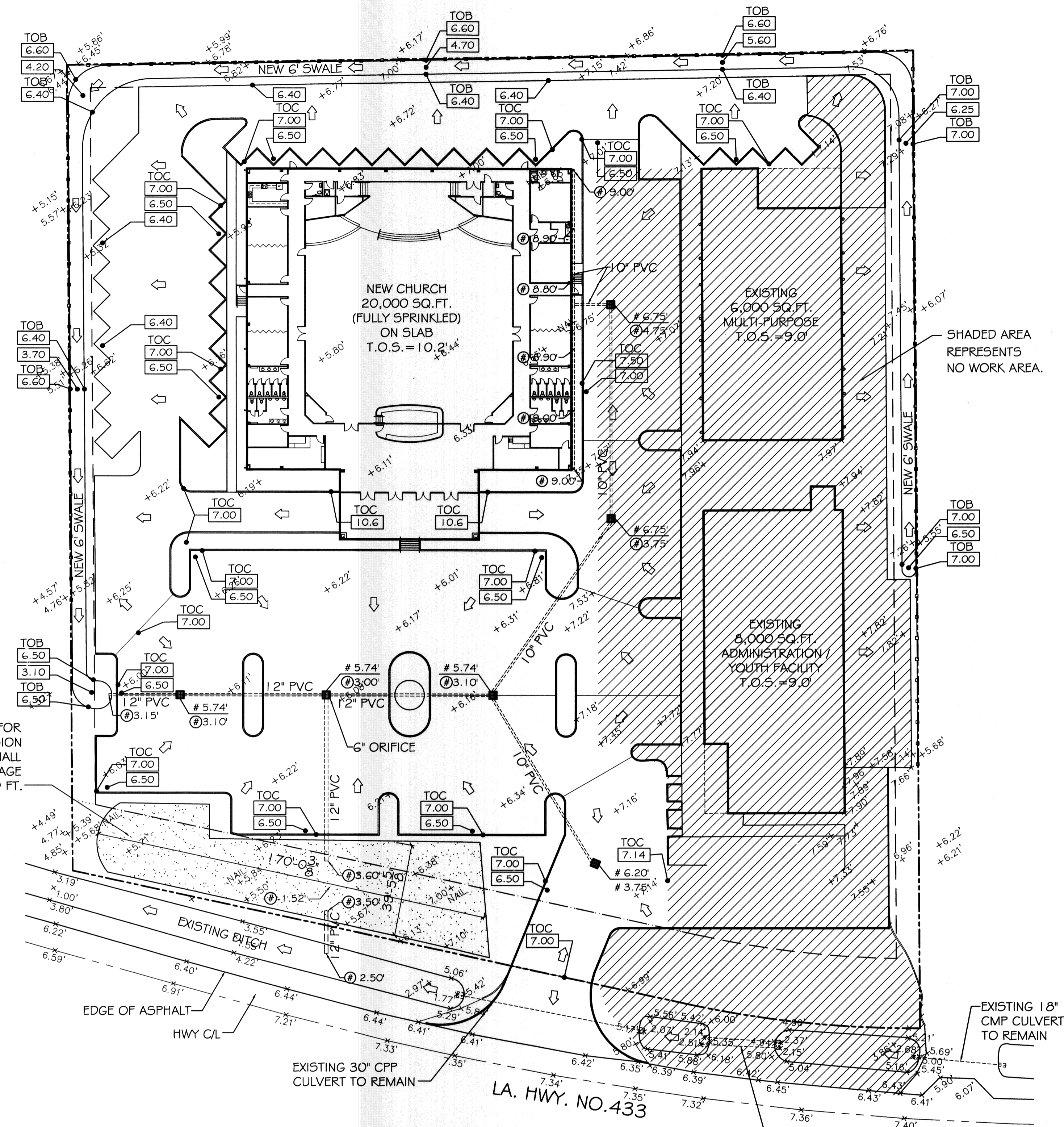
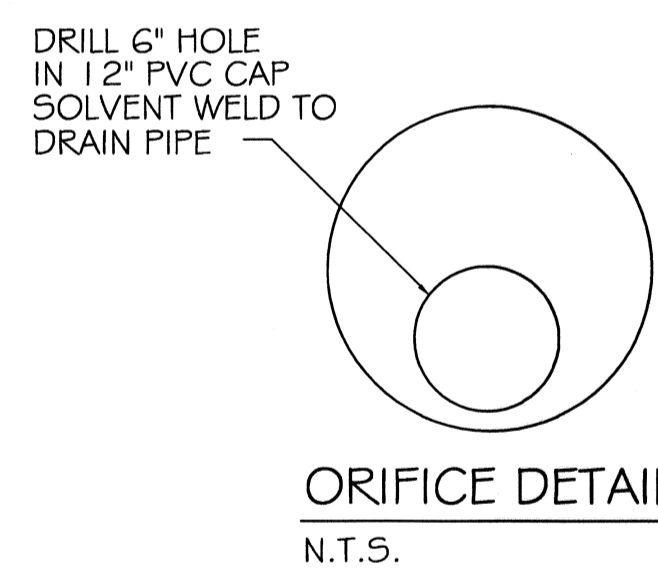


PROJECT: LIVING THE WORD INTERNATIONAL CHURCH			
STORMWATER RUN-OFF CALCULATIONS			
Formulas used			
[1] RATIONAL METHOD: $Q = Aci$			
where:	Q =	Peak discharge of watershed in cubic feet per second (cfs) due to maximum storm assumed.	
	A =	Area of watershed in acres.	
	c =	Coefficient of run-off [2].	
	i =	Intensity of rainfall in inches per hour based on concentration time [3].	
[4] $TC = \frac{(1.48(1000 - 9)^{0.77})}{(1140(s^{0.5}))}$			
where:	TC =	Time of concentration: time required for rain falling at most remote point to reach discharge point.	
	s =	Site run-off coefficient based on conditions shown.	
	S =	Percent slope of overland flow.	
PRIOR DEVELOPMENT			
100 Year Frequency			
$Q_1 = A_1c_1$			
Waterlight Surfaces	c(1) = 0.9	9457.1 sqft = 0.789 Acres	
Gravel Surface	c(2) = 0.26	99330 sqft = 2.280 Acres	
Green Space	c(3) = 0.15	8304.6 sqft = 0.191 Acres	
Summary	c = 0.40	142005.6 sqft = 3.260 Acres	
Duration (D) = Time of concentration (TC)			
where:	L = 1600	run-off length ft	Elev diff = 3.4
	c = 0.40	run-off coef	
	S = 0.0300	percent slope	
therefore:	TC = D = 24.82	minutes	
Expected rainfall intensity	i = 4.41	in/hr	
$Q_1 = 5.772$ cfs			
25% reduction 1.443 cfs			
POST DEVELOPMENT			
100 Year Frequency			
$Q_2 = A_2c_2$			
Waterlight Surfaces	c(1) = 0.9	10165.1 sqft = 2.338 Acres	
Gravel Surface	c(2) = 0.26	6025 sqft = 0.138 Acres	
Green Space	c(3) = 0.15	34129.6 sqft = 0.784 Acres	
Summary	c = 0.69	142005.6 sqft = 3.260 Acres	
Duration (D) = Time of concentration (TC)			
where:	L = 750	run-off length ft	Elev diff = 13.3
	c = 0.69	run-off coef	
	S = 0.4400	percent slope	
therefore:	TC = D = 18.83	minutes	
Expected rainfall intensity	i = 4.41	in/hr	
$Q_2 = 9.551$ cfs			
DETENTION REQUIREMENTS			
Retention required $Q_1 - Q_2 + 25Q_1 =$ cfs			
ONE HOUR DETENTION			
DETENTION DIMENSIONS	WIDTH	60 feet	
	LENGTH	240 feet	
	DEPTH	1.41 feet	
DISCHARGE END AREA REQUIREMENTS			
100 Year Frequency			
$Q = c\sqrt{2gh}$			
where:	A =	Discharge Area required	
	g =	Acceleration of gravity	
	c =	Discharge coefficient	
	h =	Hydraulic head	
Pipe Servicing Site Drainage			
Q =	5.622	cfs	h = 3.30 feet
c =	0.62	coefficient	A = 0.622 sqft
g =	32.16	ft/sec ²	D = 0.890 ft
REQUIRED CONDUIT = 16 inch inside diameter			
References:			
1. Chen, W.F. The CEM Engineering Handbook, 1995, Eq# 31.1, pg. 1036			
2. Seelye, Ewyt E. Data Book for Civil Engineers, Vol 1 1960, Tab B, pg 18-02			
3. Seelye, Ewyt E. Data Book for Civil Engineers, Vol 1 1960, Fig B, pg 18-01			
4. Chen, W.F. The CEM Engineering Handbook, 1995, Tab 31.2 Region Equation (n=0.013)			
5. Chen, W.F. The CEM Engineering Handbook, 1995, Eq# 28.32, pg. 969			

DRAINAGE PLAN NOTES:

1. DRAIN PIPE # FITTINGS WITHIN PROPERTY LINE SHALL BE POLYVINYL CHLORIDE PLASTIC PIPE, MEETING CLASS 100 C-900 PVC.
2. ELEVATIONS SHOWN ARE M.S.L.
3. FIELD VERIFY ALL ELEVATIONS AND DRAINAGE SYSTEM PLACEMENT PRIOR TO START OF WORK.
4. THERE IS NO EVIDENCE OF EXISTING OFF-SITE FLOW CROSSING THE PROPERTY.

RELOCATE EXISTING POND TO ALLOW FOR PARKING LOT. EXISTING POND'S DIMENSION ARE 145' X 34'. THE RELOCATED POND SHALL BE 170' X 39' AND MAINTAIN A NEW AVERAGE DEPTH OF 7.9 FT.

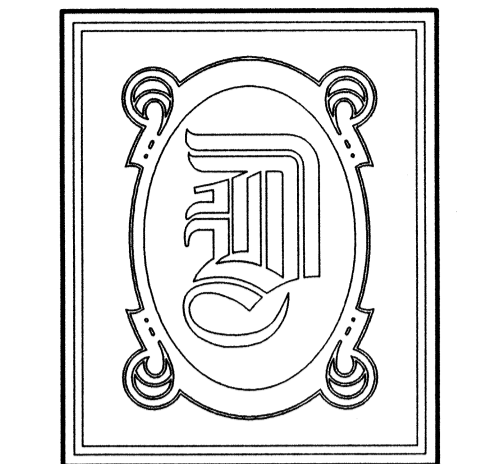
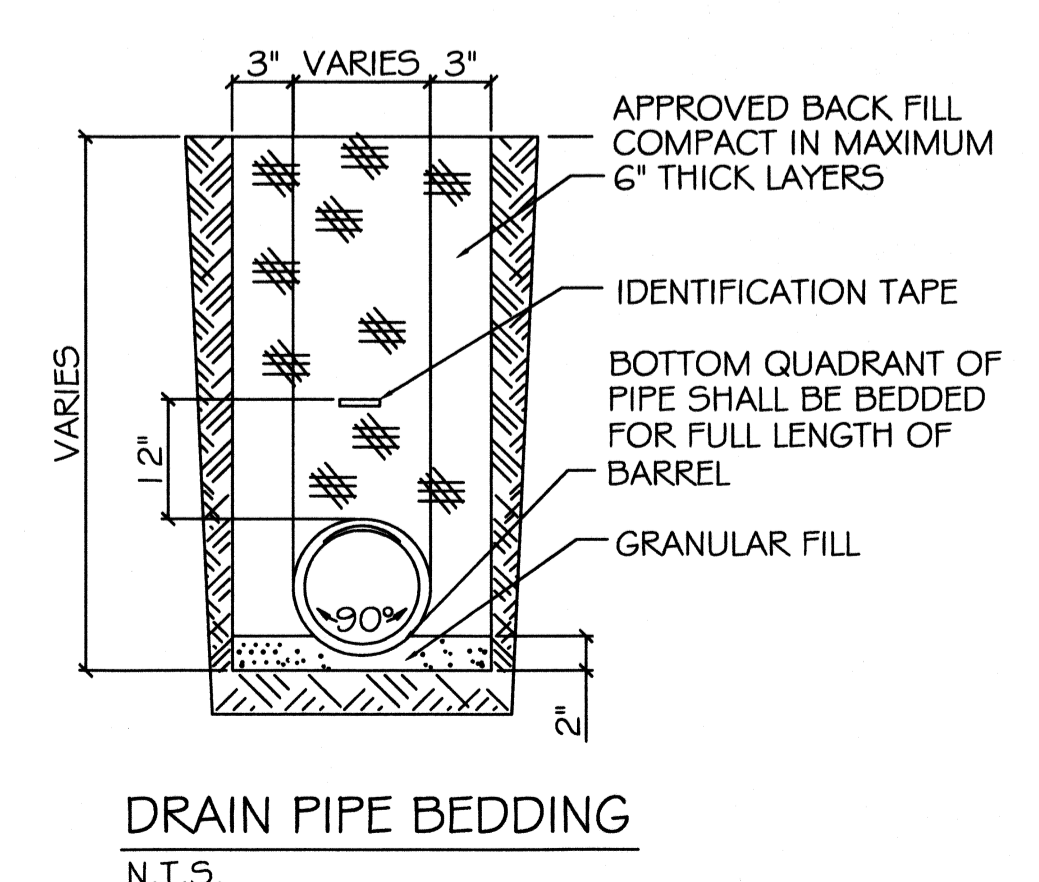


DRAINAGE PLAN

SCALE: 1" = 30'-0"

LEGEND

- - - - - PROPERTY LINE
- - - - - SETBACK LINE
- ← SHEET FLOW ARROW
- ⊕ INVERT ELEVATION
- ⊙ TOP OF GRATE ELEVATION
- NEW ELEVATION



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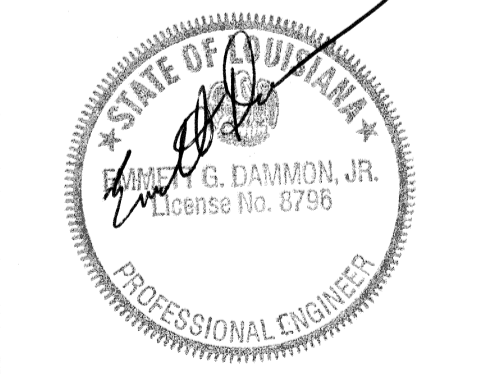
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LIVING THE WORD INTERNATIONAL

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DRAINAGE PLAN



REV: 03-12-12

SCALE: AS NOTED

JOB#: 2128

DATE: 01-27-12

SHEET 6

C-5

OF 21