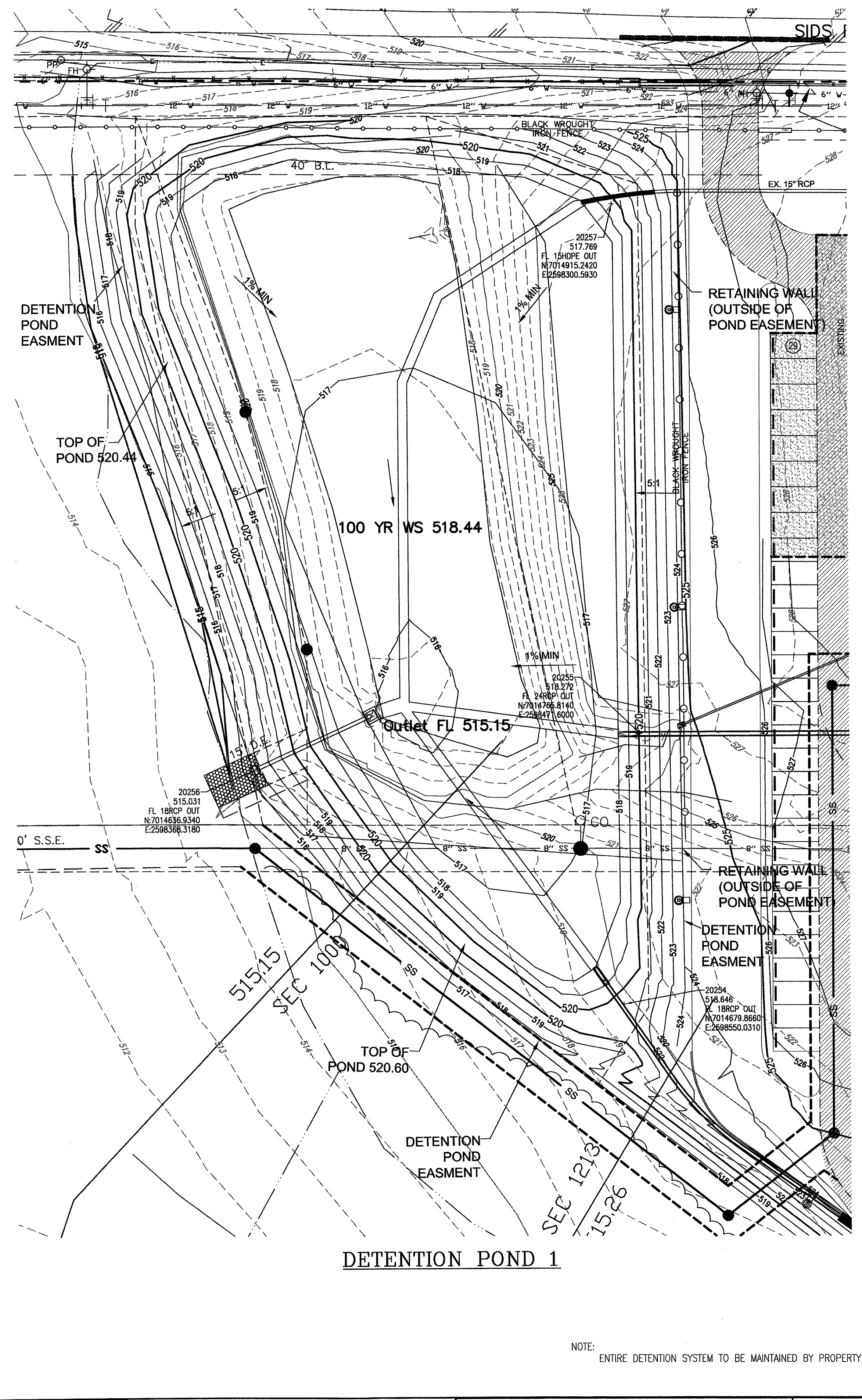


| DETENTION POND VOLUME CALCULATOR | | | | |
|----------------------------------|--------|---------------------|--------------|-----------|
| MODIFIED RATIONAL METHOD | | | | |
| 100 YEAR FREQUENCY | | | | |
| DETENTION REQUIRED | | | | |
| site total | Acre | Q | | |
| ByPass | 7.39 | 21.47 | | |
| | 1.24 | 10.94 | | |
| Area, acre | 6.15 | | | |
| Present Conditions | | Proposed Conditions | | |
| C | 0.35 | C | 0.30 | |
| Tc | 20.00 | Tc | 10.00 | |
| I (100) | 8.30 | I (100) | 9.80 | |
| Q (100) | 10.53 | Q (100) | 65.18 | |
| Proposed Intensities | | | | |
| Time | Inflow | Outflow | Storage (cf) | Intensity |
| 5 | 24741 | 4739 | 20002 | 5 |
| 10 | 32546 | 6319 | 26227 | 10 |
| 15 | 44834 | 7898 | 36935 | 15 |
| 20 | 55129 | 9478 | 45651 | 20 |
| 30 | 68745 | 12637 | 56107 | 30 |
| 40 | 77047 | 15797 | 61250 | 40 |
| 50 | 83025 | 18956 | 64089 | 50 |
| 60 | 89867 | 22115 | 67552 | 60 |
| 70 | 92988 | 25275 | 67713 | 70 |
| 80 | 96973 | 28434 | 68539 | 80 |
| 90 | 104612 | 31593 | 73018 | 90 |
| 100 | 112914 | 34752 | 78151 | 100 |
| 110 | 115438 | 37912 | 77526 | 110 |
| 120 | 117962 | 41071 | 76880 | 120 |

| DETENTION POND VOLUME CALCULATOR | | | | |
|----------------------------------|--------|---------------------|--------------|-----------|
| MODIFIED RATIONAL METHOD | | | | |
| 25 YEAR FREQUENCY | | | | |
| DETENTION REQUIRED | | | | |
| site total | Acre | Q | | |
| ByPass | 7.39 | 17.33 | | |
| | 1.24 | 10.38 | | |
| Area, acre | 6.15 | | | |
| Present Conditions | | Proposed Conditions | | |
| C | 0.35 | C | 0.30 | |
| Tc | 20.00 | Tc | 10.00 | |
| I (100) | 6.70 | I (100) | 9.30 | |
| Q (100) | 6.95 | Q (100) | 61.85 | |
| Proposed Intensities | | | | |
| Time | Inflow | Outflow | Storage (cf) | Intensity |
| 5 | 19926 | 3129 | 18788 | 5 |
| 10 | 30886 | 4170 | 26715 | 10 |
| 15 | 38856 | 5213 | 33643 | 15 |
| 20 | 44501 | 6256 | 38246 | 20 |
| 30 | 52804 | 8341 | 44463 | 30 |
| 40 | 59778 | 10426 | 49352 | 40 |
| 50 | 64760 | 12511 | 52248 | 50 |
| 60 | 67740 | 14597 | 53152 | 60 |
| 70 | 72086 | 16682 | 55384 | 70 |
| 80 | 74390 | 18767 | 55823 | 80 |
| 90 | 77711 | 20852 | 56859 | 90 |
| 100 | 78044 | 22937 | 55108 | 100 |
| 110 | 78542 | 25023 | 53519 | 110 |

| DETENTION POND VOLUME CALCULATOR | | | | |
|----------------------------------|--------|---------------------|--------------|-----------|
| MODIFIED RATIONAL METHOD | | | | |
| 10 YEAR FREQUENCY | | | | |
| DETENTION REQUIRED | | | | |
| site total | Acre | Q | | |
| ByPass | 7.39 | 14.74 | | |
| | 1.24 | 8.93 | | |
| Area, acre | 6.15 | | | |
| Present Conditions | | Proposed Conditions | | |
| C | 0.35 | C | 0.30 | |
| Tc | 20.00 | Tc | 10.00 | |
| I (100) | 5.70 | I (100) | 8.00 | |
| Q (100) | 5.82 | Q (100) | 53.21 | |
| Proposed Intensities | | | | |
| Time | Inflow | Outflow | Storage (cf) | Intensity |
| 5 | 16771 | 2617 | 14154 | 5 |
| 10 | 26568 | 3489 | 23079 | 10 |
| 15 | 32878 | 4361 | 28517 | 15 |
| 20 | 37859 | 5234 | 32826 | 20 |
| 30 | 44834 | 6978 | 37855 | 30 |
| 40 | 50479 | 8723 | 41757 | 40 |
| 50 | 54797 | 10467 | 44329 | 50 |
| 60 | 57785 | 12212 | 45574 | 60 |
| 70 | 59977 | 13956 | 46021 | 70 |
| 80 | 62700 | 15701 | 47000 | 80 |
| 90 | 64281 | 17445 | 46816 | 90 |
| 100 | 66420 | 19190 | 47230 | 100 |
| 110 | 65756 | 20934 | 44822 | 110 |

| DETENTION POND VOLUME CALCULATOR | | | | |
|----------------------------------|--------|---------------------|--------------|-----------|
| MODIFIED RATIONAL METHOD | | | | |
| 5 YEAR FREQUENCY | | | | |
| DETENTION REQUIRED | | | | |
| site total | Acre | Q | | |
| ByPass | 7.39 | 12.93 | | |
| | 1.24 | 7.70 | | |
| Area, acre | 6.15 | | | |
| Present Conditions | | Proposed Conditions | | |
| C | 0.35 | C | 0.30 | |
| Tc | 20.00 | Tc | 10.00 | |
| I (100) | 5.00 | I (100) | 6.90 | |
| Q (100) | 5.23 | Q (100) | 45.89 | |
| Proposed Intensities | | | | |
| Time | Inflow | Outflow | Storage (cf) | Intensity |
| 5 | 14314 | 2354 | 11959 | 5 |
| 10 | 22915 | 3139 | 19776 | 10 |
| 15 | 28893 | 3924 | 24969 | 15 |
| 20 | 33210 | 4709 | 28501 | 20 |
| 30 | 38856 | 6279 | 32577 | 30 |
| 40 | 43837 | 7849 | 35989 | 40 |
| 50 | 48494 | 9418 | 37076 | 50 |
| 60 | 49815 | 10987 | 38828 | 60 |
| 70 | 51143 | 12557 | 38586 | 70 |
| 80 | 53136 | 14127 | 39009 | 80 |
| 90 | 56789 | 15696 | 41093 | 90 |
| 100 | 56457 | 17266 | 39181 | 100 |
| 110 | 54797 | 18836 | 35981 | 110 |



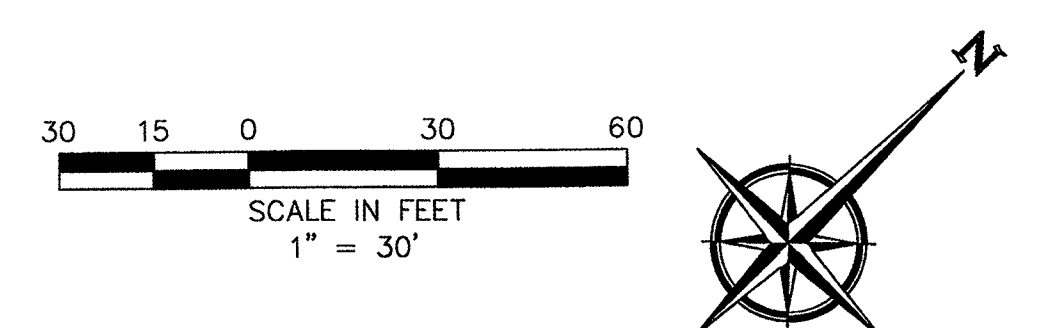
DETENTION POND
 TOTAL DRAINAGE AREA POND 1 7.39 AC.
 AREA DRAINING INTO POND 1 6.15 AC.
 AREA RELEASED UNDETAINED BELOW POND 1.24 AC.
 EXISTING C FACTOR, C=0.35
 DEVELOPED C FACTOR, C=0.90
 (7.39ac x 0.35C) - (1.24ac x 0.90C)

ALLOWABLE RELEASE, 5 YEAR (Q=CA)
 5 YEAR 20 MINUTE INTENSITY I=5.00
 12.93 cfs - 7.70 cfs (bypass)
 Q(5)= 5.2 cfs (ALLOWABLE RELEASE)

ALLOWABLE RELEASE, 10 YEAR (Q=CA)
 10 YEAR 20 MINUTE INTENSITY I=5.7
 14.74 cfs - 8.93 cfs (bypass)
 Q(10)= 5.8 cfs (ALLOWABLE RELEASE)

ALLOWABLE RELEASE, 25 YEAR (Q=CA)
 25 YEAR 20 MINUTE INTENSITY I=6.7
 17.33 cfs - 10.38 cfs (bypass)
 Q(25)= 7.0 cfs (ALLOWABLE RELEASE)

ALLOWABLE RELEASE, 100 YEAR (Q=CA)
 100 YEAR 20 MINUTE INTENSITY I=8.3
 21.47 cfs - 10.94 cfs (bypass)
 Q(100)= 10.5 cfs (ALLOWABLE RELEASE)



Detention Pond Volume Calculations

| Contour Elevation | Surface Area (sf) | Average Area | Cumulative Volume (cf) |
|-------------------|-------------------|--------------|------------------------|
| 515.15 | 0 | 154 | 54 |
| 515.50 | 308 | 2,224 | 1,166 |
| 516.00 | 4,140 | 14,920 | 16,086 |
| 517.00 | 25,700 | 38,299 | 54,385 |
| 518.00 | 50,898 | 53,704 | 108,089 |
| 519.00 | 56,510 | 58,437 | 166,526 |
| 520.00 | 60,364 | | |

5 YEAR WS 517.65
 10 YEAR WS 517.81
 25 YEAR WS 518.05
 100 YEAR WS 518.44

5-41,093
 10-47,230
 25-56,859
 100-78,161

Outlet Structure Calculations
 5 Year Discharge @ Max Water Surface

Q total = 5.2 cfs Allowed
 Storage Elevation = 517.85
 Invert Elevation = 515.15
 Width Weir (1) = .40

Q total = 5.27 cfs Provided
 Q ALLOW TO Q DESIGN, 10yr DIFFERENCE = 1.3%

WER (1)
 Q=5.27
 C=3.333
 H=2.90 [H = Storage elev. minus FL of weir]
 L=.40
 Q=5.27 cfs
 Weir opening .40 feet x 2.50' @ WS 517.85

Outlet Structure Calculations
 10 Year Discharge @ Max Water Surface

Q total = 5.8 cfs Allowed
 Storage Elevation = 517.81
 Invert Elevation = 515.15
 Width Weir (1) = .40

Q total = 5.78 cfs Provided
 Q ALLOW TO Q DESIGN, 10yr DIFFERENCE = -0.3%

WER (1)
 Q=5.78
 C=3.333
 H=2.66 [H = Storage elev. minus FL of weir]
 L=.40
 Q=5.78 cfs
 Weir opening .40 feet x 2.66' @ WS 517.81

Outlet Structure Calculations
 25 Year Discharge @ Max Water Surface

Q total = 7.0 cfs Allowed
 Storage Elevation = 518.05
 Invert Elevation = 515.15
 Width Weir (1) = .40

Q total = 6.58 cfs Provided
 Q ALLOW TO Q DESIGN, 10yr DIFFERENCE = -6.0%

WER (1)
 Q=6.58
 C=3.333
 H=2.90 [H = Storage elev. minus FL of weir]
 L=.40
 Q=6.58 cfs
 Weir opening .40 feet x 2.90' @ WS 518.05

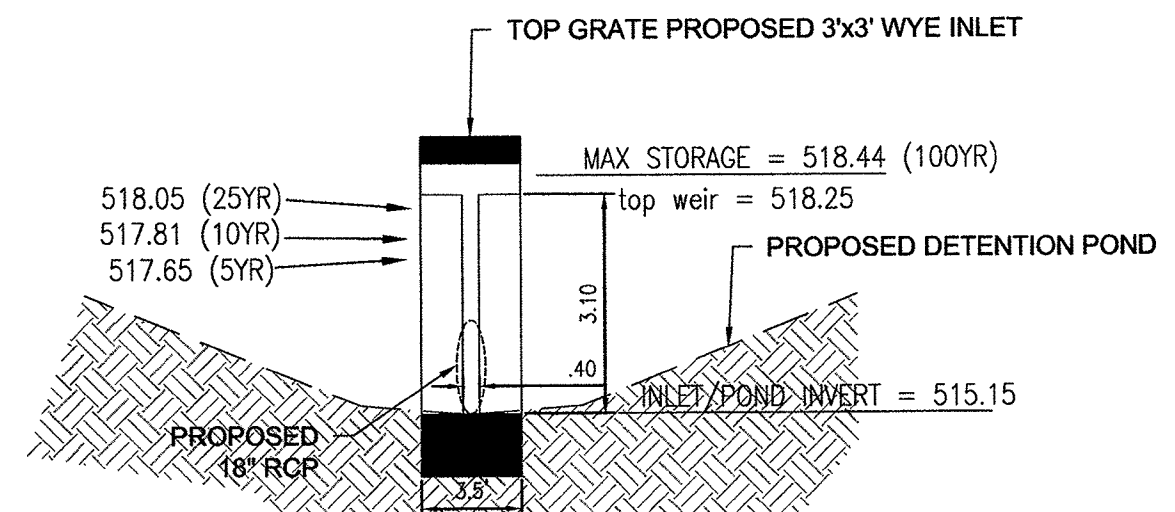
Outlet Structure Calculations
 100 Year Discharge @ Max Water Surface

Q total = 10.5 cfs Allowed
 Storage Elevation = 518.44
 Invert Elevation = 515.15
 Width Weir (2) = 12.0

Q total = 10.59 cfs Provided
 Q ALLOW TO Q DESIGN, 10yr DIFFERENCE = 0.8%

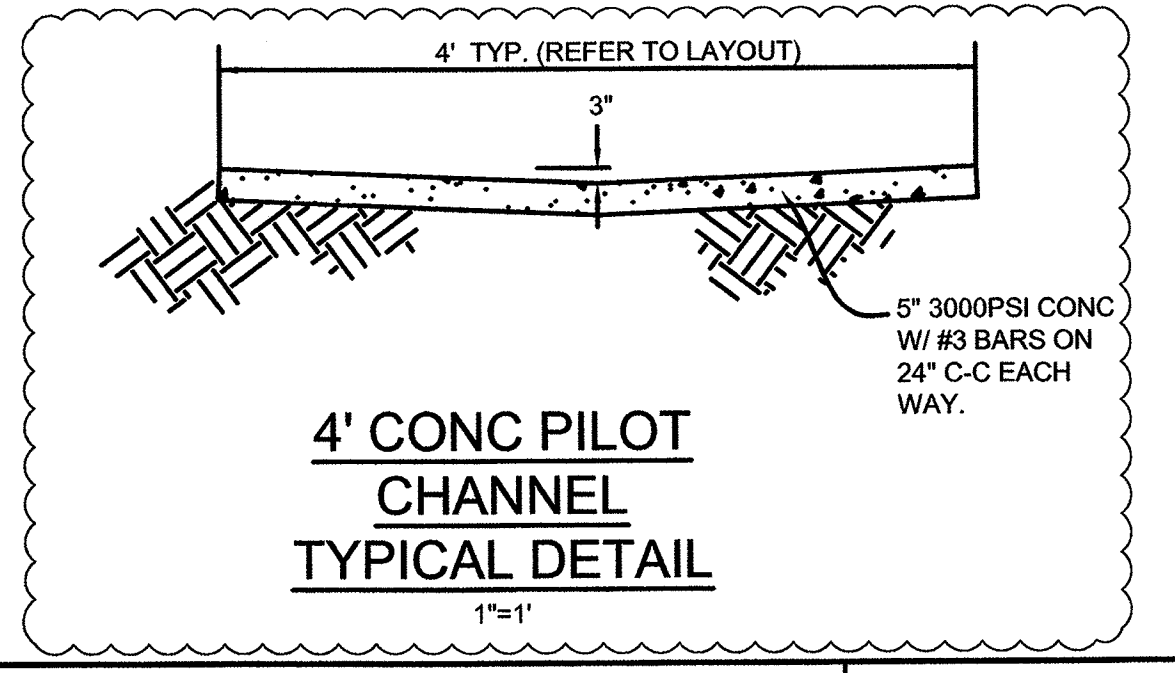
WER (1)
 Q=10.59
 C=3.333
 H=3.10 [H = Storage elev. minus FL of weir]
 L=.40
 Q=7.28 cfs
 Weir opening .40 feet x 3.10' @ FL 518.25

WER (2)
 Q=10.59
 C=3.333
 H=0.19 [H = Storage elev. minus FL of weir]
 L=12.0
 Q=3.31 cfs
 Weir opening 12.0 feet x 0.19' @ FL 518.44



3'x3' WYE INLET
 N.T.S

NOTE:
 EXISTING STRUCTURE (INSTALLED IN PHASE ONE) HAS A WEIR OPENING OF 0.35 FT. MODIFY EXISTING OPENING TO WIDTH OF 0.70 FEET TO RELEASE AT EXISTING RATES FOR 5/10/25 AND 100 YEAR STORMS FOR THE ENTIRE PHASE 1 AND PHASE 2 AREAS.



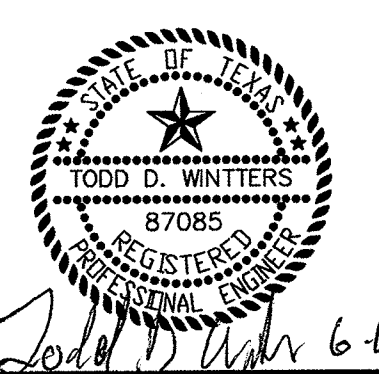
4' CONC PILOT CHANNEL
 TYPICAL DETAIL
 1"=1'

BENCHMARK:
 "X" CUT IN CURB 23'± SOUTH OF EAST DRIVE APPROACH OF EXISTING RAYBURN COUNTRY ELECTRIC BUILDING.

ENGINEERINGCONCEPTS & DESIGN, L.P.
 ENGINEERING / PROJECT MANAGEMENT / CONSTRUCTION SERVICES - FIRM REG. #F-00145
 201 WINDCO CIR, STE 200, WYLIE, TX 75098
 972-941-8400 FAX: 972-941-8401 WWW.ECDLP.COM

| REVISIONS: | |
|-------------------|--------------------|
| DRAWN: TONY | DATE: JUNE 7, 2018 |
| CHECKED: TW | DATE: MAY 23, 2018 |
| PROJECT NO.: 3560 | |
| DWG FILE NAME: | |

THIS DOCUMENT IS RELEASED FOR THE PURPOSE OF CONSTRUCTION.



DETENTION POND 1
 RAYBURN ELECTRIC COOP. PHASE 2
 LOT 5, BLK 1 RAYBURN COUNTRY ADDITION
 CITY OF ROCKWALL, ROCKWALL COUNTY, TEXAS

SHEET
 11
 OF
 20

"Case No. SP2017-041"