PROPOSED DRAINAGE CONDITIONS

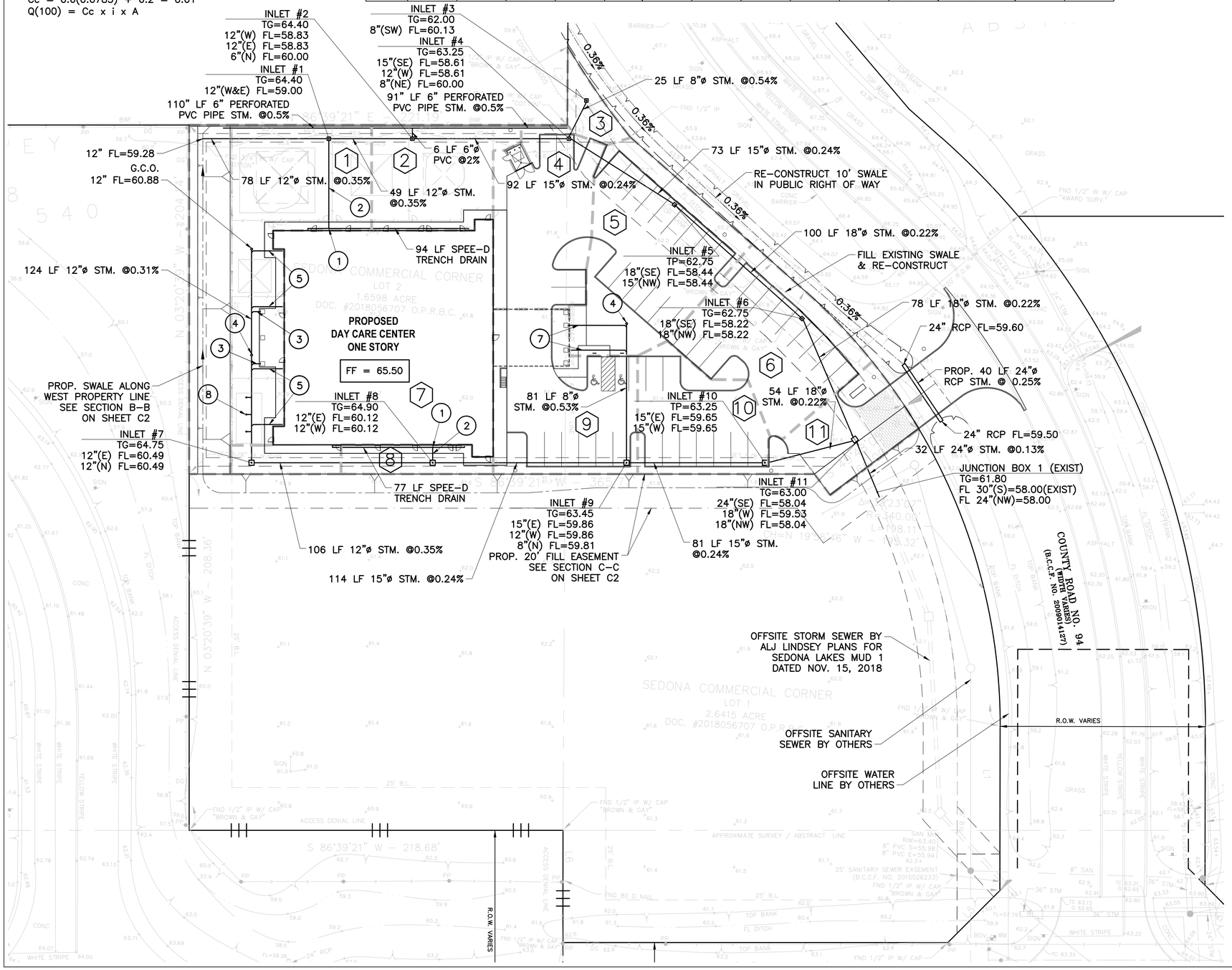
BASED ON CITY OF MANVEL 5-YEAR STORM.
A=1.6598 AC, b=71.6, d=11.08, e=0.7704
TC=200/2/60 + 80/3/60 + 10 = 12.11 MIN.
i(5)=71.6/(11.08+12.11)^0.7704 =6.35 IN/HR

BASED ON CITY OF MANVEL 100-YEAR STORM.
A=1.6598 AC, b=128.6, d=14.67, e=0.7562
TC=200/2/60 + 80/3/60 + 10 = 12.11 MIN.
i(5)=128.6/(14.67+12.11)^0.7562 =10.70 IN/HR

COMPOSITE C VALUE Cc = 0.6Ia + 0.2
WHERE Ia = PROP IMP COVER (SHT C1)/TOTAL ON-SITE AREA
Ia = 1.1258 AC/1.6598 AC = 0.6783
Cc = 0.6(0.6783) + 0.2 = 0.61
Q(100) = Cc x i x A

100-Year Storm Sewer Calculation Table

AREA	FROM	TO	AREA	TOTAL	C	TC	I	FLOW Q	PIPE	LENGTH	GRADE	MANNINGS	VELOCITY	CAPACITY
No.	INLET No.	INLET No.	Ac	AREA		Min	In/Hr	cfs	SIZE	Feet	%	n'	ft/s	Q
1	1	2	0.3169	0.3169	0.61	12.11	10.70	2.07	12	49	0.35	0.011	3.18	2.50
2	2	4	0.1043	0.4212	0.61	12.38	10.62	2.73	15	92	0.24	0.011	3.06	3.75
3	3	4	0.0221	0.0221	0.61	12.89	10.47	0.14	8	25	0.54	0.011	3.01	1.05
4	4	5	0.1337	0.5770	0.61	12.89	10.47	3.69	15	73	0.24	0.011	3.06	3.75
5	5	6	0.2029	0.7799	0.61	13.30	10.36	4.93	18	100	0.22	0.011	3.30	5.84
6	6	11	0.1491	0.9290	0.61	13.86	10.20	5.78	18	78	0.22	0.011	3.30	5.84
7	7	8	0.3844	0.3844	0.61	12.33	10.64	2.49	12	106	0.35	0.011	3.18	2.50
8	8	9	0.0330	0.4174	0.61	12.92	10.47	2.66	15	114	0.24	0.011	3.06	3.75
9	9	10	0.1598	0.5772	0.61	13.55	10.29	3.62	15	81	0.24	0.011	3.06	3.75
10	10	11	0.1106	0.6878	0.61	14.00	10.17	4.27	18	54	0.22	0.011	3.30	5.84
11	11	JB1	0.0783	1.5460	0.61	14.30	10.09	9.51	24	32	0.13	0.011	3.08	9.67



0' 30' 60'
SCALE IN FEET
1" = 30'

LEGEND

- EXISTING STORM SEWER BY OTHERS
- EXISTING INLET BY OTHERS
- PROPOSED STORM SEWER
- PROPOSED STORM INLET/JUNCTION BOX RE: SHT C7
- DIRECTION OF FLOW OR SWALE
- DRAINAGE AREA BOUNDARY
- DIRECTION OF EXTREME EVENT FLOW
- (1) DRAINAGE AREA NUMBER

STORM DETENTION AND FLOOD MITIGATION

THIS PROJECT SITE IS LOCATED IN NORTHWEST END OF 197.6 ACRES DRAINAGE AREA "M-02A1" PER MEMORANDUM "SEDONA LAKES PHASE 2&3 ADDENDUM TO APPROVED DRAINAGE MASTER PLAN" AS PREPARED BY BROWN & GAY ENGINEERS, INC. DATED MARCH 12, 2012. ON-SITE STORM DETENTION AND FLOOD MITIGATION ARE NOT REQUIRED OF THIS DEVELOPMENT.

THIS SITE IS ALSO NORTHERN PORTION OF 4.301 ACRES TRACT AT NORTHWEST CORNER OF CR94 AND CR101 INTERSECTION. PER LETTER FROM SEDONA LAKES M.U.D. #1, ON-SITE STORM DETENTION AND FLOOD MITIGATION IS NOT REQUIRED OF THIS DEVELOPMENT.

NOTES:

1. ALL HDPE STORM SEWERS SHALL BE DOUBLE WALL WITH SMOOTH INTERIOR WALLS, WITH BELL AND SOCKET JOINTS WITH RUBBER GASKETS THAT MEET ASTM F477 (ADS N-12 STIB PIPE OR APPROVED EQUIVALENT).
2. ALL STORM SEWERS ARE HDPE PIPES.
3. COEFFICIENT OF FRICTION VALUES FOR RCP=0.013, HDPE=0.011 AND PVC=0.010
4. PLAYGROUND EQUIPMENT, AND SHADE PYRAMID INSTALLERS MUST DESIGN POSITIVE DRAINAGE SYSTEM TO DIRECT STORM SHEET FLOW AWAY FROM BUILDING, AND PADS OF STRUCTURES. INSTALLERS MUST INSTALL UNDER DRAINS AND CONNECT TO NEARBY STORM DRAIN LINES.
5. INLETS 1, 2, 3, 7 & 8 SHALL BE PARK USA MODEL CB18 OR APPROVED EQUIVALENT. INLETS 4, 5, 6, 9, & 10 SHALL BE PARK USA MODEL CB24 OR APPROVED EQUIVALENT. INLET 11 & 12 SHALL BE PARK USA MODEL CB30 OR APPROVED EQUIVALENT. JUNCTION BOX 1 SHALL BE PARK USA MODEL JB 30 OR APPROVED EQUIVALENT, RE: SHT C11.
6. STORM SEWER WILL BE CONSTRUCTED FROM INLET #12 TO EXISTING STORM SEWER AT SOUTHWEST CORNER OF CR 94 AND CR 101 INTERSECTION BY OTHERS.

PLAN KEY NOTES:

(1) PROVIDE AND INSTALL SPEE-D CHANNEL DRAIN WITH BOTTOM OUTLET.

(2) CONNECT TO OUTLET WITH WATER TIGHT CONNECTION AND CONSTRUCT 4" LATERAL @ 2.00% MIN. SLOPE TO ADJACENT INLET OR STORM SEWER.

(3) CONNECT TO 6" ROOF DRAIN BELOW GRADE WITH WATER TIGHT CONNECTION. CONSTRUCT 6" PVC STORM @ 1.00% MIN. CONNECT TO 12" STORM WITH 1-12"x6" WYE AND 1-6"x45° BEND

(4) CONSTRUCT CLEANOUT.

(5) CONNECT TO 8"x8" DOWNSPOUT BELOW GRADE WITH WATER TIGHT CONNECTION. CONSTRUCT 8"ø PVC LATERAL @ 0.5% MIN. SLOPE AND CONNECT TO ADJACENT STORM WITH WYE CONNECTION AND 45° BEND.

(6) PROVIDE AND INSTALL 4" LATERAL WITH WYE CONNECTION AND 45° BEND AND 4" CAP. SEE NOTE 5 THIS SHT.

(7) CONNECT TO 6" ROOF DRAIN BELOW GRADE WITH WATER TIGHT CONNECTION. CONSTRUCT 6" PVC STORM @ 1.00% MIN. CONNECT TO 8" STORM WITH 1-8"x6" WYE AND 1-6"x45° BEND

(8) 1½" P-TRAP FLOOR DRAIN WITH BRONZE COVER. CONSTRUCT LATERAL PIPE @2% SLOPE AND CONNECT TO 12" STM. DRAIN. TYPICAL OF 3

BENCHMARK

MONUMENT NAME 10 GPS MONU 1995 IS A BRASS CAP SET IN CONCRETE STAMPED "CITY OF PEARLAND 10 GPS MONU, 1995" LOCATED ON THE SOUTH BOUND HIGHWAY 288 APPROXIMATELY 2,400 FEET SOUTH OF F.M. 518 AND 21 FEET WEST FROM THE WEST EDGE OF ASPHALT. ELEV.=59.29' (NGVD 1929, 1987 ADJUSTMENT).

TBM A: BOX CUT ON H2-INLET LOCATED ON THE NORTH SIDE OF COUNTY ROAD 101 SOUTH OF THE SOUTHWEST CORNER OF THE PROPERTY, AS SHOWN. ELEVATION = 64.44'

TBM B: BOX CUT ON RCP LOCATED ON THE EAST SIDE OF COUNTY ROAD 94 NEAR THE EAST PORTION OF THE PROPERTY, AS SHOWN. ELEVATION = 61.48'

FLOOD NOTE

ACCORDING TO THE FEDERAL EMERGENCY MANAGEMENT AGENCY'S FLOOD INSURANCE RATE MAP FOR BRAZORIA COUNTY, TEXAS AND INCORPORATED AREAS, COMMUNITY PANEL NO. 48039-C-0020 H EFFECTIVELY DATED JUNE 5, 1989, THIS PROPERTY LIES IN ZONE "AE", SPECIAL FLOOD HAZARD AREAS INUNDATED BY THE 1% ANNUAL CHANCE FLOOD EVENT WITH BASE FLOOD ELEVATIONS DETERMINED.

REVISIONS AND ISSUANCE		
NO.	DATE	DESCRIPTION

IVY KIDS EARLY LEARNING CENTER

4434 CR 94
MANVEL, TEXAS 77578

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[E] dzhuang@missioneng.com
TPEF Registration No. F-11771

STATE OF TEXAS
YIFENG ZHUANG
87950
LICENSED PROFESSIONAL ENGINEER
04/23/2019

DRAWING TITLE
DRAINAGE PLAN

DRAWN BY	CHECKED BY
KN	EL
DATE	JOB NO.
04/23/2019	1806251

DRAWING NO.
C3