Detention Calculations from approved H.C.F.D. Unit #500-02-00 Detention Pond Improvements for Champions Centre Development (Approved 5/2/96)

DETENTION POND CALCULATIONS

1. SERVICE AREA:

CHAMPIONS CENTRE ESTATES SECTION TWO	=	15.8563 ACRES
CHAMPIONS CENTRE MIRAGE	=	20.6813 ACRES
PINNACLE AT CHAMPION CENTRE	=	8.0370 ACRES
AREA EXEMPT FROM DETENTION	=	5.2384 ACRES
AREA SUBJECT TO DETENTION		39.3182 ACRES

2. DETENTION STORAGE RATE:
   GS= 0.79 ACRE-FT / ACRE
3. DETENTION STORAGE VOLUME REQUIRED: 31.05 ACRE-FT
   39.3182 ACRES x 0.79 ACRE-FT/ACRE x 43560 SQ.FT./ACRE = 1,352,965 CU.FT.
4. DETENTION STORAGE VOLUME PROVIDED:

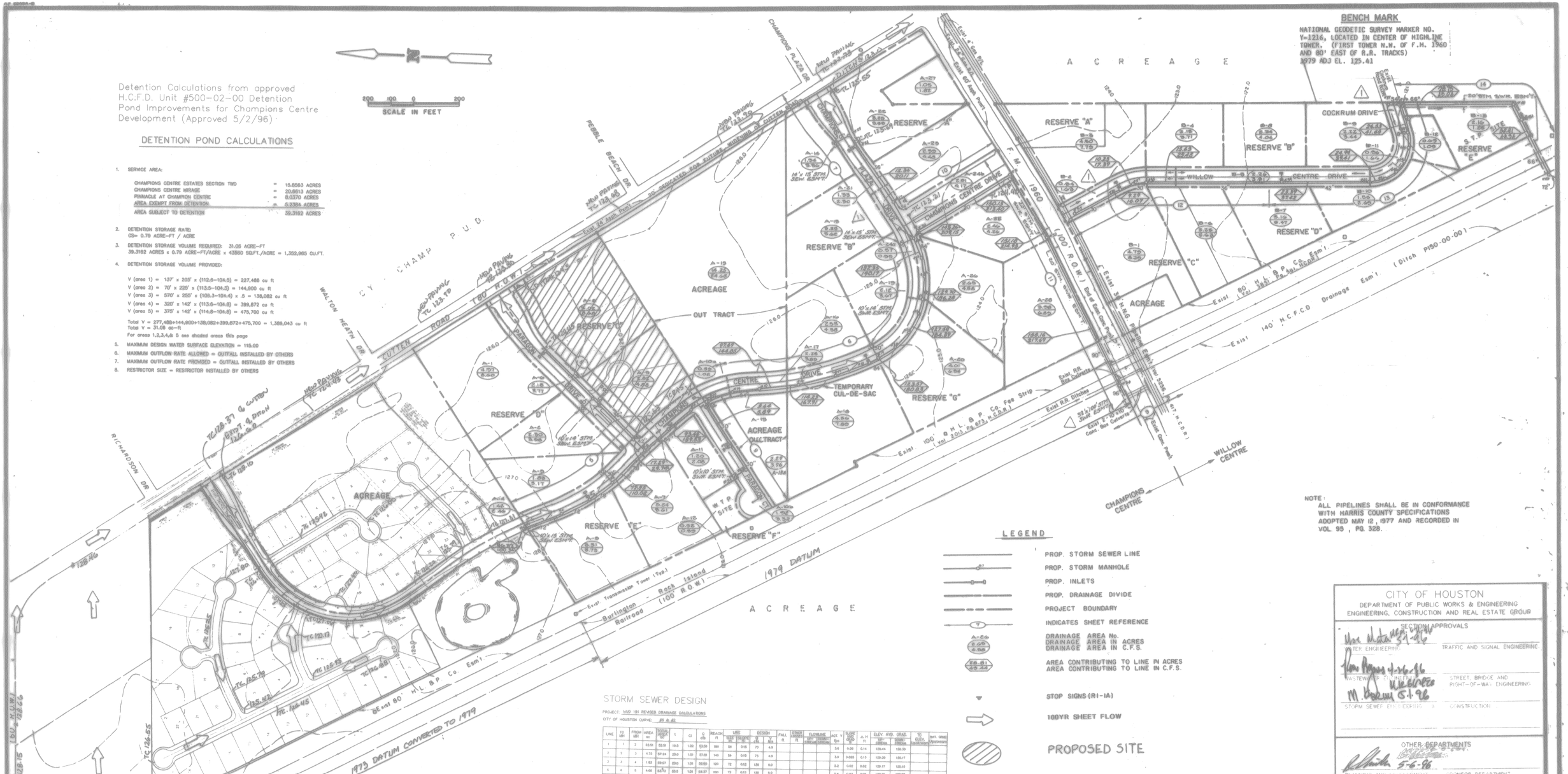
   V (area 1) = 137' x 205' x (112.6-104.5) = 227,488 cu ft
   V (area 2) = 70' x 225' x (113.5-104.3) = 144,900 cu ft
   V (area 3) = 570' x 255' x (105.3-104.4) x .5 = 138,082 cu ft
   V (area 4) = 320' x 142' x (113.6-104.6) = 399,872 cu ft
   V (area 5) = 375' x 142' x (114.8-104.8) = 475,700 cu ft

   Total V = 277,488+144,900+138,082+399,872+475,700 = 1,389,043 cu ft
   Total V = 31.05 ac-ft
   For areas 1,2,3,4,& 5 see shaded areas this page
5. MAXIMUM DESIGN WATER SURFACE ELEVATION = 115.00
6. MAXIMUM OUTFLOW RATE ALLOWED = OUTFALL INSTALLED BY OTHERS
7. MAXIMUM OUTFLOW RATE PROVIDED = OUTFALL INSTALLED BY OTHERS
8. RESTRICTOR SIZE = RESTRICTOR INSTALLED BY OTHERS

200 100 0 200
SCALE IN FEET

BENCH MARK

NATIONAL GEODETIC SURVEY MARKER NO. Y-1216, LOCATED IN CENTER OF HIGHLINE TOWER. (FIRST TOWER N.W. OF F.M. 1960 AND 80' EAST OF R.R. TRACKS)
1979 ADJ EL. 125.41



NOTE:
ALL PIPELINES SHALL BE IN CONFORMANCE WITH HARRIS COUNTY SPECIFICATIONS ADOPTED MAY 12, 1977 AND RECORDED IN VOL. 93, PG. 328.

LEGEND

- PROP. STORM SEWER LINE
- PROP. STORM MANHOLE
- PROP. INLETS
- PROP. DRAINAGE DIVIDE
- PROJECT BOUNDARY
- (7) INDICATES SHEET REFERENCE
- A-E6 / 5.6 / 6.8 — DRAINAGE AREA No. / DRAINAGE AREA IN ACRES / DRAINAGE AREA IN C.F.S.
- E6-B1 / 6.8 / 6.8 — AREA CONTRIBUTING TO LINE IN ACRES / AREA CONTRIBUTING TO LINE IN C.F.S.
- STOP SIGNS (R1-1A)
- 100YR SHEET FLOW
- PROPOSED SITE

STORM SEWER DESIGN

PROJECT: MUD 191 REVISED DRAINAGE CALCULATIONS
CITY OF HOUSTON CURVE: A5 & A2

LINE	TO MH	FROM MH	AREA ac	TOTAL AREA ac	t	CI	Q cfs	REACH ft	LINE SIZE in	LINE SLOPE %	DESIGN Q cfs	DESIGN V fps	FALL ft	CONVEY VEL fps	FLOWLINE UPSTREAM	FLOWLINE DOWNSTREAM	ADJ. V fps	FLOW VEL fps	Δ H ft	ELEV. HYD. GRAD. UPSTREAM	ELEV. HYD. GRAD. DOWNSTREAM	TC ELEV. Upstream	TC ELEV. Downstream	INST. GRND Upstream
1	1	2	10.56	53.01	18.5	1.03	53.09	180	54	0.15	73	4.0					3.6	0.05	0.14	120.44	120.30			
2	2	3	4.73	57.74	20.0	1.01	57.81	140	54	0.15	73	4.0					3.9	0.005	0.13	120.30	120.17			
3	3	4	1.83	59.07	20.0	1.01	59.69	120	72	0.13	139	5.0					3.2	0.02	0.02	120.17	120.15			
4	4	5	4.65	63.72	20.0	1.01	64.37	350	72	0.13	139	5.0					4.4	0.01	0.09	120.15	120.09			
5	5	8	17.29	81.02	21.0	1.00	81.02	140	72	0.13	139	5.0					3.0	0.08	0.03	120.09	120.03			
6	8	9	1.20	82.22	21.0	1.00	82.22	130	66	0.12	200	5.5					3.2	0.02	0.02	120.03	120.01			
7	9	10	4.21	86.43	21.0	1.00	86.43	90	66	0.12	200	5.5					2.3	0.02	0.02	120.01	119.99			
8	10	14	0.59	87.02	22.0	1.01	87.89	100	66	0.12	200	5.5					3.3	0.02	0.02	119.99	119.97			
9	14	15	14.35	101.37	23.0	1.09	109.37	120	84	0.17	200	5.5					2.9	0.02	0.04	119.97	119.93			
10	15	16	0	101.37	23.0	1.09	109.37	170	84	0.12	200	5.5					2.9	0.03	0.05	119.93	119.88			
11	16	17	0	101.37	23.0	1.09	109.37	170	84	0.12	200	5.5					2.9	0.03	0.05	119.88	119.83			
12	17	18	9.34	110.71	24.0	1.10	123.75	160	84	0.12	200	5.5					3.4	0.04	0.02	119.83	119.70			
13	18	19	0	110.71	24.0	1.11	123.75	40	84	0.12	200	5.5					3.4	0.04	0.02	119.75	119.70			
14	19	20	0	110.71	24.0	1.11	123.75	90	84	0.12	200	5.5					3.4	0.04	0.04	119.73	119.69			
15	20	21	0	110.71	24.0	1.11	123.75	90	84	0.12	200	5.5					2.4	0.04	0.04	119.69	119.65			
16	21	22	4.61	114.62	25.0	1.12	128.37	90	84	0.12	200	5.5					3.5	0.045	0.05	119.65	119.60			
17	22	23	0	114.62	25.0	1.12	128.37	70	84	0.12	200	5.5					3.5	0.045	0.04	119.60	119.56			
18	23	24	2.69	117.31	26.0	1.12	131.39	100	84	0.12	200	5.5					3.5	0.045	0.05	119.56	119.51			
19	24	25	2.65	119.95	27.0	1.13	135.55	90	84	0.12	200	5.5					3.6	0.05	0.05	119.51	119.46			
20	25	26	0	119.95	27.0	1.13	135.55	100	84	0.12	200	5.5					3.6	0.05	0.05	119.46	119.41			
21	26	30	0	119.95	27.0	1.13	135.55	40	90	0.12	240	5.5					3.2	0.03	0.01	119.41	119.40			
22	30	31	13.39	133.35	28.0	1.05	134.69	470	90	0.12	240	5.5					3.6	0.045	0.21	119.40	119.19			
23	31	32	5.27	138.72	29.0	1.17	162.30	220	90	0.12	240	5.5					3.8	0.05	0.10	119.19	119.03			
24	32	33	3.98	142.70	29.0	1.17	166.98	330	90	0.12	240	5.5					4.0	0.05	0.15	119.03	118.77			
25	33	34	0	142.70	29.0	1.17	166.98	330	90	0.12	240	5.5					4.0	0.05	0.15	118.77	118.60			
26	34	EXIST. 00-00	0	142.70	29.0	1.17	166.98	500	96	0.05	270	5.5					3.2	0.03	0.15	118.65	118.50*			

*25 YR. STORM ELEVATION IN P150-00-00.

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS & ENGINEERING
ENGINEERING, CONSTRUCTION AND REAL ESTATE GROUP

SECTION APPROVALS

WATER ENGINEERING — TRAFFIC AND SIGNAL ENGINEERING
WASTEWATER ENGINEERING — STREET, BRIDGE AND RIGHT-OF-WAY ENGINEERING
STORM SEWER ENGINEERING — CONSTRUCTION

OTHER DEPARTMENTS

PLANNING AND DEVELOPMENT — SPONSOR DEPARTMENT
CITY ENGINEER — DATE 5/6/96
DIRECTOR OF PUBLIC WORKS AND ENGINEERING — DATE 5/6/96

SUBMITTED:
DATE:
APPROVED:
DATE:

DESIGNED BY: TIM
DRAWN BY: TIM
SHEET NO. 4 OF 14 SHEETS
CITY OWG. NO.

M.U.D. 191

100YR SHEET FLOW

STATE OF TEXAS — MICHAEL V. BALDWIN — 70639 — REGISTERED PROFESSIONAL ENGINEER

PEI — PROVIDENT ENGINEERS, INC.
12200 N.W. FRWY. Suite 210
Houston, Texas 77092

THIS SHEET NOT FOR CONSTRUCTION PURPOSES