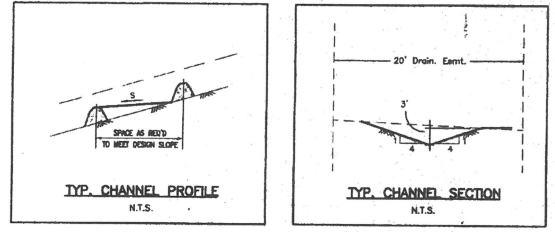
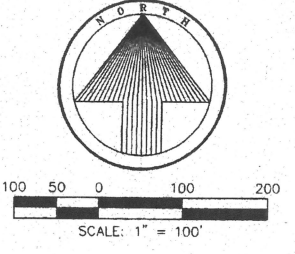
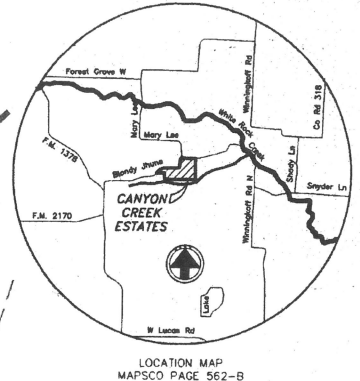


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Channel Capacity Calculation:

Channel	Q <sub>25</sub> cfs	n	s ft/ft	s' ft/ft	Depth ft	V fps	Q <sub>cap</sub> cfs
I	45.1	0.035	0.04	0.03	1.5	5.9	53.5
II	47.9	-	0.038	0.03	-	5.9	53.5
III	7.4	-	0.026	-	1.0	4.8	14.4
IV	-	-	0.055	0.05	1.0	5.9	23.4
V	45.8	-	0.074	0.03	1.5	5.9	53.5

\* Design slope required to meet velocity requirement.

Drainage Data

Area	Acres	Tc	Existing Condition			Developed Condition			Δ <sub>25</sub>	
			C'	I <sub>25</sub>	Q <sub>25</sub>	C'	I <sub>25</sub>	Q <sub>25</sub>		
1A	2.09	15	0.35	6.3	4.6	0.45	6.3	5.9	1.3	
1B	0.86	"	"	"	1.9	0.35	"	1.9	0.0	
2A	1.80	"	"	"	4.0	0.45	"	5.1	1.1	
2B	1.54	"	"	"	3.4	0.35	"	3.4	0.0	
3A	2.14	"	"	"	4.7	0.45	"	6.1	1.4	
3B	1.40	"	"	"	3.1	0.35	"	3.1	0.0	
4A	2.68	"	"	"	5.9	0.45	"	7.6	1.7	
4B	0.92	"	"	"	2.0	0.35	"	2.0	0.0	
5A	2.03	"	"	"	4.5	0.45	"	5.8	1.3	
5B	0.83	"	"	"	1.8	0.35	"	1.8	0.0	
6A	2.32	"	"	"	5.1	0.45	"	6.6	1.5	
6B	0.47	"	"	"	1.0	0.35	"	1.0	0.0	
7A	1.00	"	"	"	2.2	0.45	"	2.8	0.6	
7B	1.17	"	"	"	2.6	"	"	3.3	0.7	
7C	0.92	"	"	"	2.0	0.35	"	2.0	0.0	
8A	1.36	"	"	"	3.0	0.45	"	3.9	0.9	
8B	2.87	"	"	"	6.3	0.35	"	6.3	0.0	
9	2.13	"	"	"	4.7	0.45	"	6.0	1.3	
10	2.53	"	"	"	5.6	"	"	7.2	1.6	
11	2.61	"	"	"	5.8	"	"	7.4	1.6	
12	2.62	"	"	"	5.8	"	"	7.4	1.6	
A*	17.85	20	"	"	5.7	35.6	0.35	5.7	35.6	0.0
B*	14.70	"	"	"	"	29.3	"	"	29.3	0.0
Σ					Σ 144.9			Σ 161.5	19.6	

\* Drainage area maps are offsite of the property.

Boundary Curve Table:

NUMBER	DELTA ANGLE	RADIUS	TANGENT	ARC LENGTH	CHORD BEARING	CHORD LENGTH
C1	47°56'52"	114.06	50.72	95.45	N 63°35'33" E	92.69
C2	87°34'08"	95.99	92.00	146.71	N 43°47'01" E	132.84
C3	91°21'19"	97.67	100.01	155.73	N 45°40'28" E	139.75

BENCHMARK:  
 RM134 Nail Set in West Edge of Pavement of Winninghoff Road Approximately 300 feet South of Blondy Jhune Road. Elev = 523.86

RECORD DRAWINGS  
 THE INFORMATION CONTAINED HEREIN WAS PROVIDED BY MORGAN CONSTRUCTION BASED ON THEIR FIELD INSTALLATION. THE UNDERSIGNED REGISTERED PROFESSIONAL ENGINEER DO NOT PROVIDE INSPECTION OF THE PROJECT, AND THEREFORE MAKES NO WARRANTY CONCERNING THE ACCURACY OR COMPLETENESS OF THE INFORMATION PROVIDED.  
 Dayton C. Macatee 5-11-99

LEGEND:  
 (SA) DRAINAGE AREA BOUNDARY  
 (IV) CHANNEL DESIGNATION

RECORD DWGS - 5-11-99  
**DRAINAGE AREA MAP**  
**TOKALAUN PARK & ESTUARY**  
**PAUL BILLINGSLEY INTERESTS, INC.**  
**CITY OF LUCAS, TEXAS**  
**MACATEE ENGINEERING, INC.**  
 6440 N. CENTRAL EXPY., SUITE 414 • DALLAS, TEXAS 75225 • 214-373-1180  
 DESIGN DRAWN DATE SCALE NOTES FILE NO. SHEET NO.  
 M.E.I. M.E.I. 06-98 1"=100' D-1

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY DAYTON C. MACATEE, P.E. #5028, ON 02/22/99  
 DAYTON C. MACATEE  
 65028  
 REGISTERED PROFESSIONAL ENGINEER  
 State of Texas  
 Dayton C. Macatee  
 2-22-99

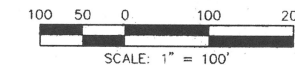
D-1  
 Tokalaun Park



JOHN W. KIRBY SURVEY - ABST. 506

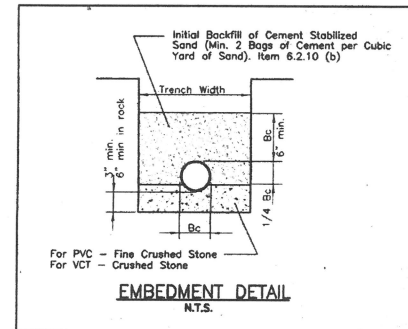
WATER LINE CURVE TABLE:

NUMBER	DELTA ANGLE	RADIUS	TANGENT	ARC LENGTH	CHORD LENGTH	CHORD BEARING
W-1	17°33'42"	150.00	23.17	45.98	45.98	S79°42'04"W
W-2	32°34'19"	437.50	127.82	248.71	245.38	S54°38'05"W
W-3	49°13'07"	362.50	168.04	311.40	301.91	S62°57'29"W
W-4	47°26'55"	437.50	194.55	366.13	355.54	S63°35'35"W
W-5	18°04'45"	150.00	25.21	48.90	48.92	S69°32'23"E
W-6	15°47'21"	361.00	50.06	99.48	99.17	S79°40'21"W
W-7	42°39'35"	382.00	148.17	284.42	277.90	S20°17'02"W



LOCATION MAP  
MAPSCO PAGE 562-B

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GENERAL NOTES:

- All construction to be in accordance with NCTCOG Standard Specifications and City Modifications thereof.
- Locations of existing underground utilities were obtained from survey works. Contractor must verify their locations prior to construction.
- Contractor shall obtain latest construction specifications and details from City of Lucas.

SPECIAL NOTES:

- Water main shall be DR14 PVC Pipe C900;
- Water mains shall have the following cover below street grades:
 

Size	Cover
6"	4.5'
8"	5.0'
10"	5.0'
12"	6.0'
- All fire hydrants shall be furnished in accordance with City of Lucas specifications, and shall be located 5' from edge of pavement.
- All residential water services shall be 1" minimum except when otherwise noted.
- The Blondy Jhune Road shall be repaired after the water main is installed.

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY DAYTON C. MACATEE, P.E. 65028, ON 02/22/99



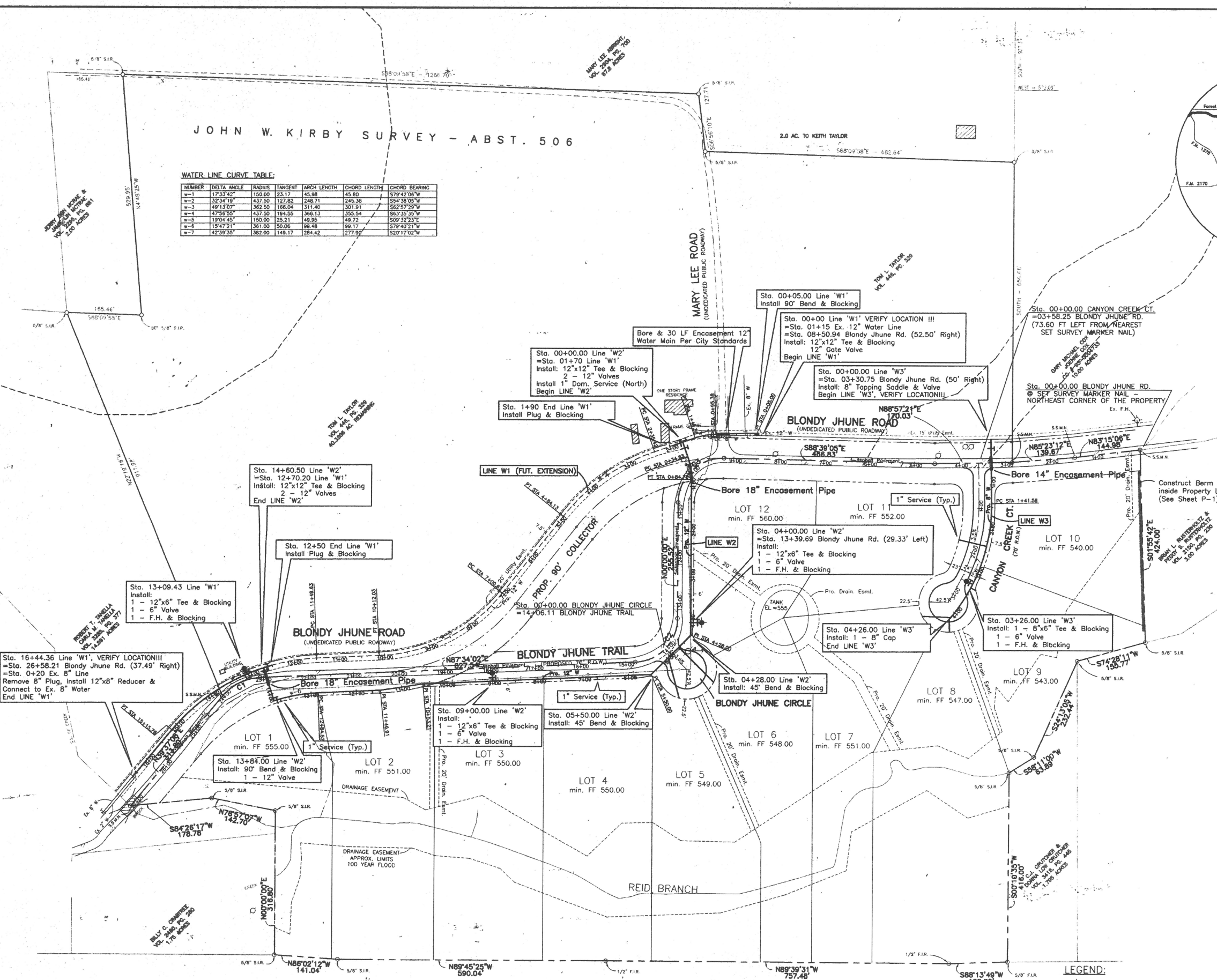
W-1

**WATER PLAN**

**TOKALAUN PARK & ESTUARY**  
**PAUL BILLINGSLEY INTERESTS, INC.**  
**CITY OF LUCAS, TEXAS**  
**MACATEE ENGINEERING, INC.**

6440 N. CENTRAL EXPY., SUITE 414 • DALLAS, TEXAS 75225 • 214-373-1180

DESIGN	DRAWN	DATE	SCALE	NOTES	FILE NO.	SHEET NO.
M.E.I.	M.E.I.	08-98	1"=100'			W-1



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P. LUCAS SURVEY - ABST. 537

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Dayton C. Macatee 5-11-99

- LEGEND:
- ⊕ F.H. FIRE HYDRANT
  - PRO. WATER LINE
  - EX. WATER LINE
  - UNDERGROUND ELECTRIC OR TELEPHONE
  - ⊙ LIGHT POLE
  - ⊙ W.V. WATER VALVE
  - ⊙ O.P.P. OVERHEAD UTILITY POLE W/ GUY
  - ⊙ S.S.M.N. SET SURVEY MARKER NAIL
  - ⊙ I.R.F. IRON ROD FOUND (SIZE AS NOTED)
  - ⊙ I.R.S. IRON ROD SET (SIZE AS NOTED)