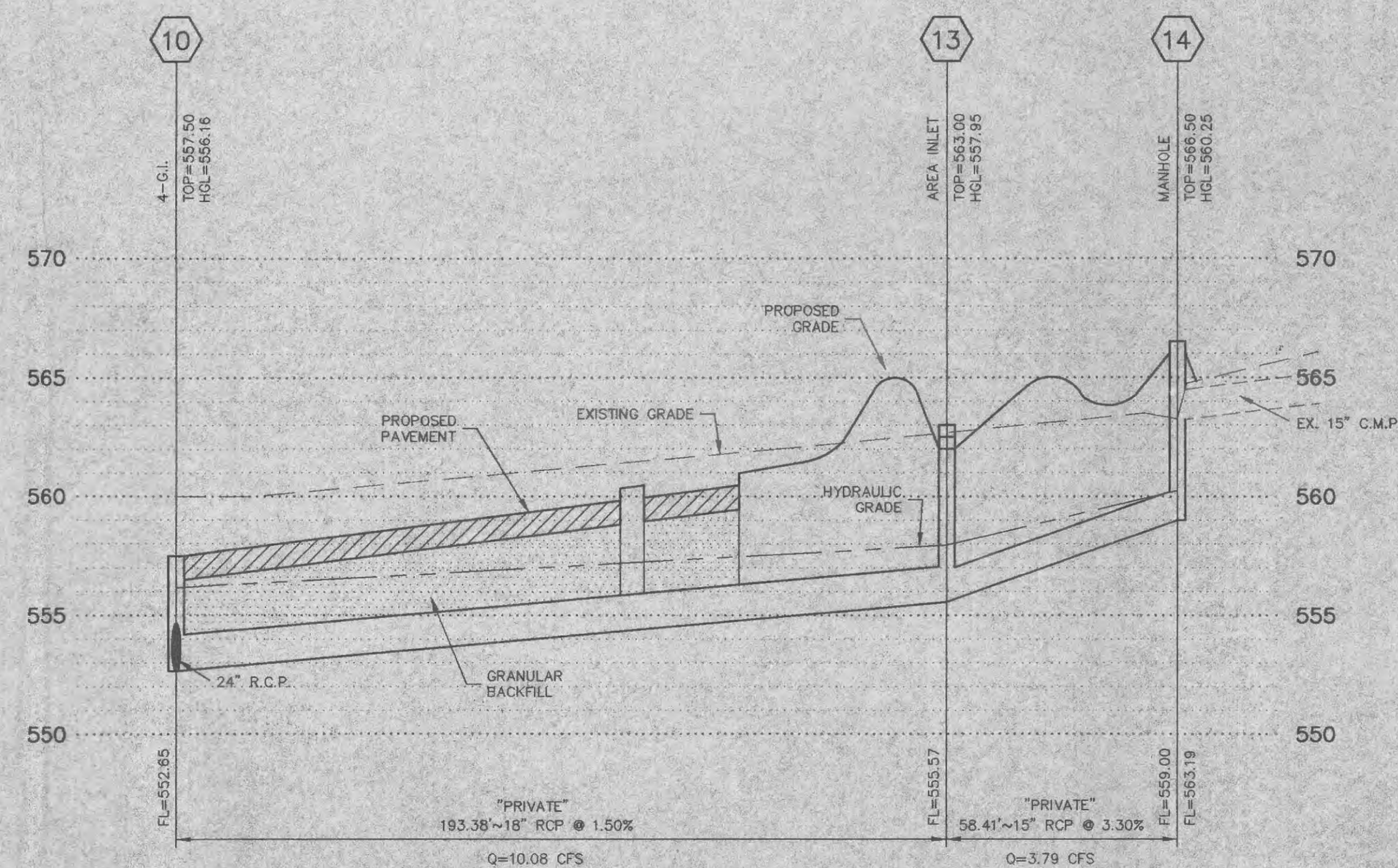
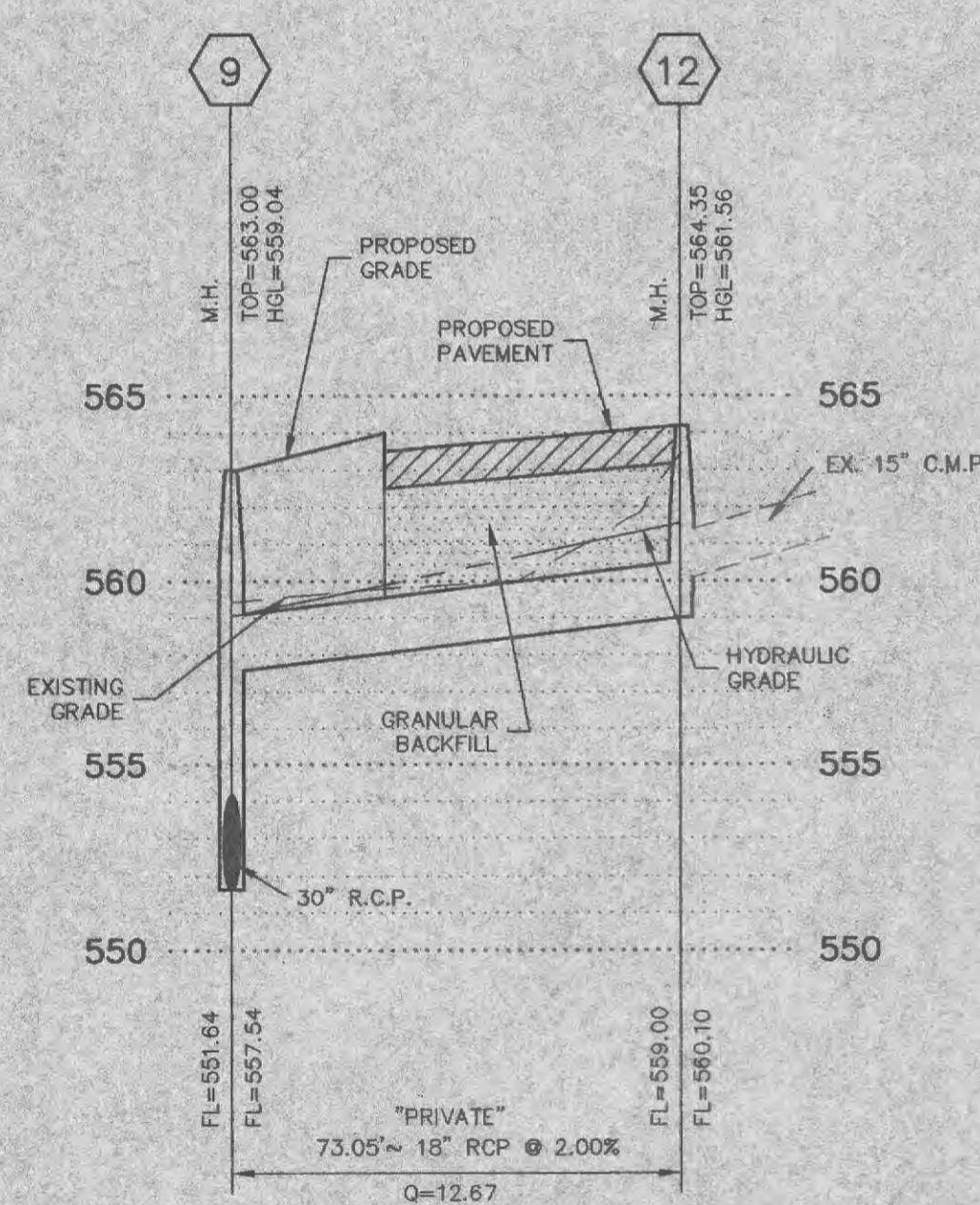


**STORM SEWER PROFILES**

HORIZONTAL SCALE: 1"=30'  
VERTICAL SCALE: 1"=5'



**STORM SEWER PROFILES**

HORIZONTAL SCALE: 1"=30'  
VERTICAL SCALE: 1"=5'

STOCK & ASSOCIATES CONSULTING ENGINEERS, INC.		DATE: 08/31/98		REVISIONS:		15 YEAR STORM		20 MINUTE DURATION																						
CALC. BY: D.P.B.		CHECKED BY: G.M.S.		PROJECT NO: 98-1633		PROJECT NAME: SUNRISE METHODIST		PHASE / PLAN:																						
STRUCTURE NUMBER	LINE	FLOWLINE ELEVATIONS		LENGTH (Feet)	PIPE SLOPE (ft./ft.)	PIPE SIZE (IN.)	TRIBUTARY (Area)	P (cfs/acre)	Q (cfs)	BYPASS (cfs)	TOTAL Q (cfs)	MEAN FULL FLOW VELOCITY (ft./sec.)	VELOCITY HEAD (ft.)	Friction Losses (ft./100')	HYDRAULIC ELEVATIONS			Struct. Upper H.E. w/ 1' dia. (ft.)	Struct. Lower H.E. (ft.)	Struct. Upper H.E. w/ 1' dia. (ft.)	Struct. Lower H.E. (ft.)	Struct. Slope (ft./ft.)	Struct. n Factor	REMARKS						
		UPPER STRUC.	LOWER STRUC.												Upper FL + Dia.	Lower H.E. (ft.)	Lower H.E. (ft.)													
EX 1	EX 1	542.02	542.02	34.29	0.019	30						42.74	8.71	1.18	50.31	0.37	0.63	0.58	1.21	545.27	544.89	544.52	546.48	X	X	0.013	STARTING HGL FOR NEW SYSTEM			
EX 2	EX 2	542.77	542.77	41.92	0.018	30						6.85	1.40	0.03	0.21	0.01													STARTING HGL FOR NEW SYSTEM	
4	4	542.93	542.77	8.08	0.020	30						35.89	7.31	0.83	29.75	0.06	0.23	0.19	0.42	545.43	546.54	546.48	546.96	549.00	2.04	0.013				
5	5	543.50	542.93	105.76	0.054	15						2.69	2.19	0.07	0.20	0.18	0.07	0.07	0.07	544.75	547.14	546.96	547.21	547.25	0.04	0.013				
4	4	542.93	542.93																											
6	6	544.61	542.93	114.24	0.047	30						33.20	6.76	0.71	23.58	0.75	0.21	0.21	0.21	547.11	547.71	546.96	547.92	549.45	1.53	0.013				
7	7	545.50	544.61	60.32	0.048	30						33.20	6.76	0.71	23.58	0.40	0.10	0.41	0.51	548.00	548.32	547.92	548.83	549.00	0.17	0.013				
8	8	551.06	545.50	139.21	0.099	30						31.93	6.50	0.66	20.88	0.84	0.04	0.12	0.16	553.56	549.67	548.83	553.72	557.88	4.16	0.013				
9	9	551.64	551.06	57.59	0.010	30						31.40	6.40	0.64	19.95	0.34	0.41	0.26	0.67	554.14	554.04	553.72	554.81	563.00	8.19	0.013				
10	10	552.65	551.64	101.25	0.010	24						18.73	5.96	0.55	10.34	0.69	0.37	0.29	0.66	554.65	555.50	554.81	556.16	557.50	1.34	0.013				
11	11	554.30	552.65	164.73	0.010	12						1.00	1.27	0.03	0.03	0.13	0.03	0.03	0.03	555.30	556.29	556.16	556.32	557.80	1.46	0.013				
9	9	557.54	557.54																										HGL @ TOP PIPE	
12	12	559.00	557.54	73.05	0.020	18						12.67	7.17	0.80	10.11	1.06	D	R	O	P	560.50	560.10	559.04	561.56	564.35	2.79	0.013			
10	10	552.65	552.65																											HGL @ STR. 11
13	13	555.57	552.65	194.38	0.050	18						10.08	5.70	0.51	5.09	1.79	D	R	O	P	557.07	557.95	556.16	557.95	563.00	4.34	0.013			
14	14	559.00	557.07	58.41	0.030	15						3.79	3.09	0.15	0.56	0.20	D	R	O	P	560.25	558.15	557.95	564.44	566.50	2.06	0.013		UPPER HGL @ TOP OF INCOMING PIPE	

FORMULAS: MEAN FULL FLOW VELOCITY  $V = Q_{ACT} / A_{PIPE}$   
 FRICTION LOSS  $N = 2.97n^2 \frac{LV^2}{d^{7/3}}$   
 VELOCITY HEAD  $h_v = V^2 / 2g$   
 JUNCTION LOSSES =  $[Q_{in}(out) - \sum Q_{in}(in)] \times 1.33 \div Q_{out}$   
 BEND LOSSES =  $h_v \times \text{ANGLE COEFFICIENT}$  ( $h_v$  for incoming line)  
 ANGLE COEFFICIENTS = 90° = 0.7  
 45° = 0.47  
 30° = 0.35  
 NOTES: 1. IF MORE THAN ONE INCOMING LINE, CALCULATE EACH BEND LOSS AND ADD TOGETHER.  
 2. NO STRUCTURE LOSSES TO BE CALCULATED AT A DROP.  
 3. IF  $Q_{in}(n) > Q_{in}(out)$ , NO JUNC. LOSS TO BE CALCULATED.

SUNRISE UNITED METHODIST CHURCH  
SEWER PROFILES, DETAILS AND HYDRAULIC DATA

**STOCK & ASSOCIATES CONSULTING ENGINEERS, INC.**

425 NORTH NEW BALLAS ROAD  
SUITE 165  
ST. LOUIS, MO. 63141  
PH. (314) 432-8100  
FAX (314) 432-8171  
e-mail: general@stockassoc.com

