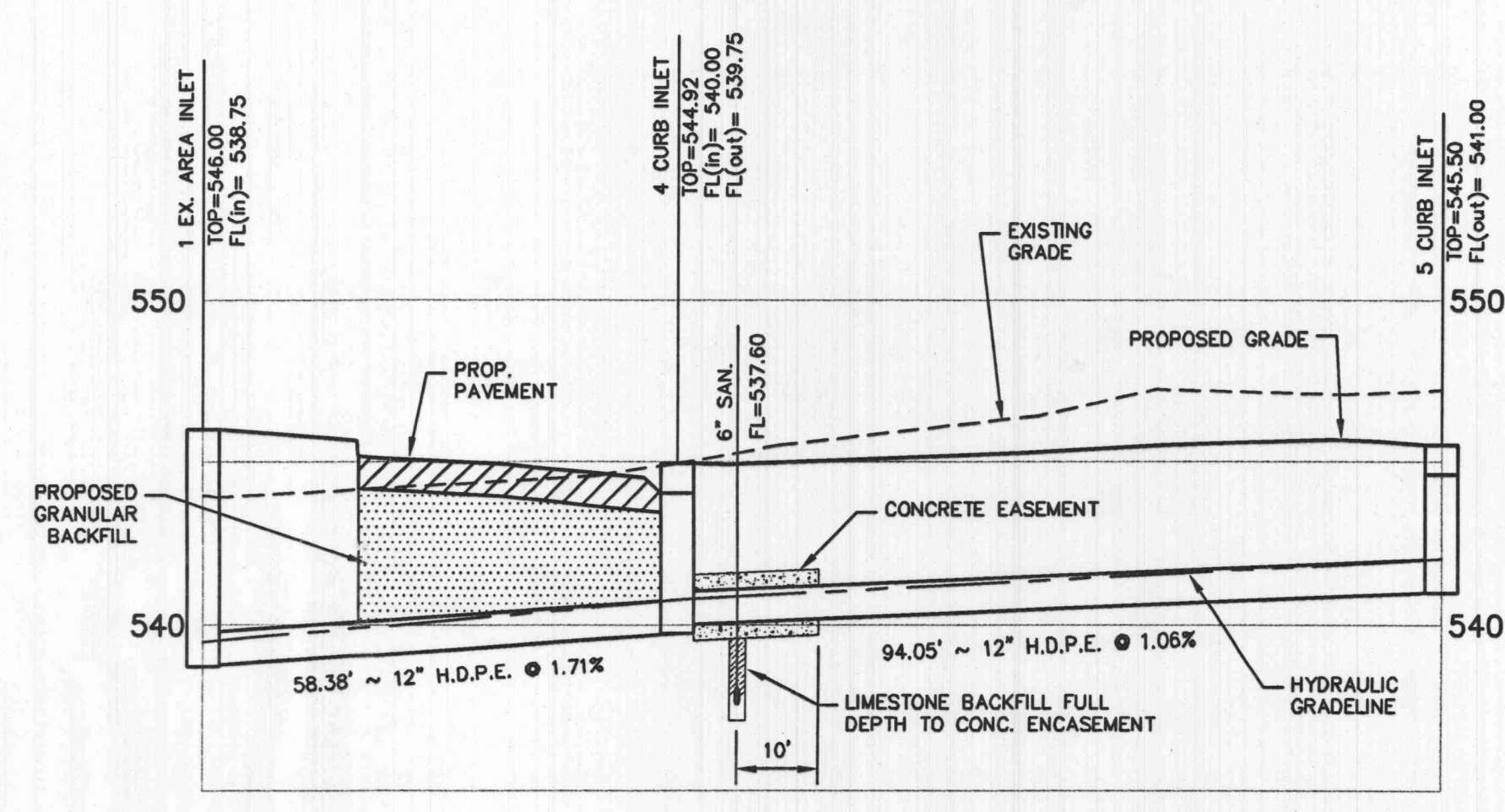


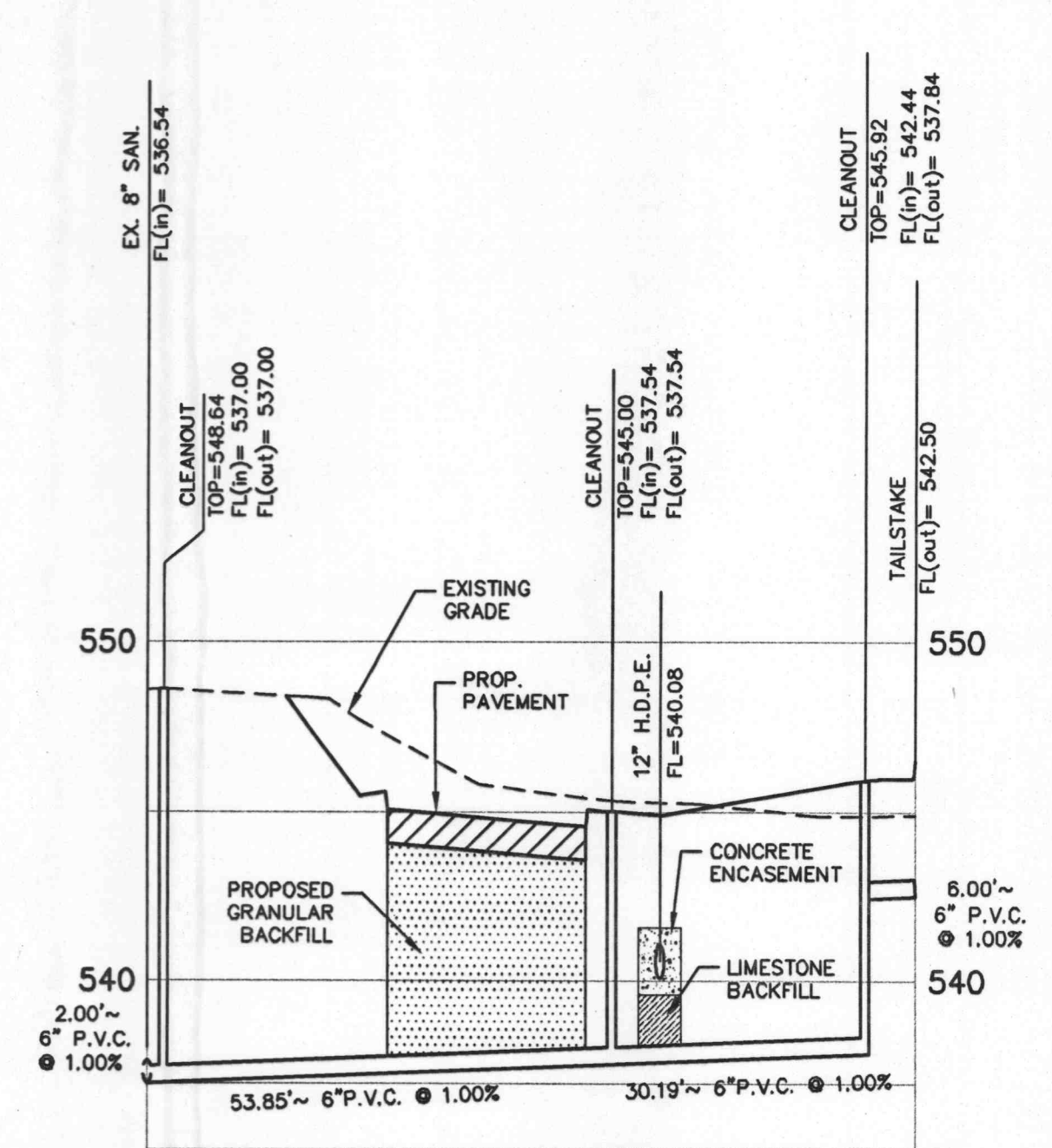
**STORM DRAIN PROFILE**

SCALE: 1"=20' HORIZ.  
1"=5' VERT.



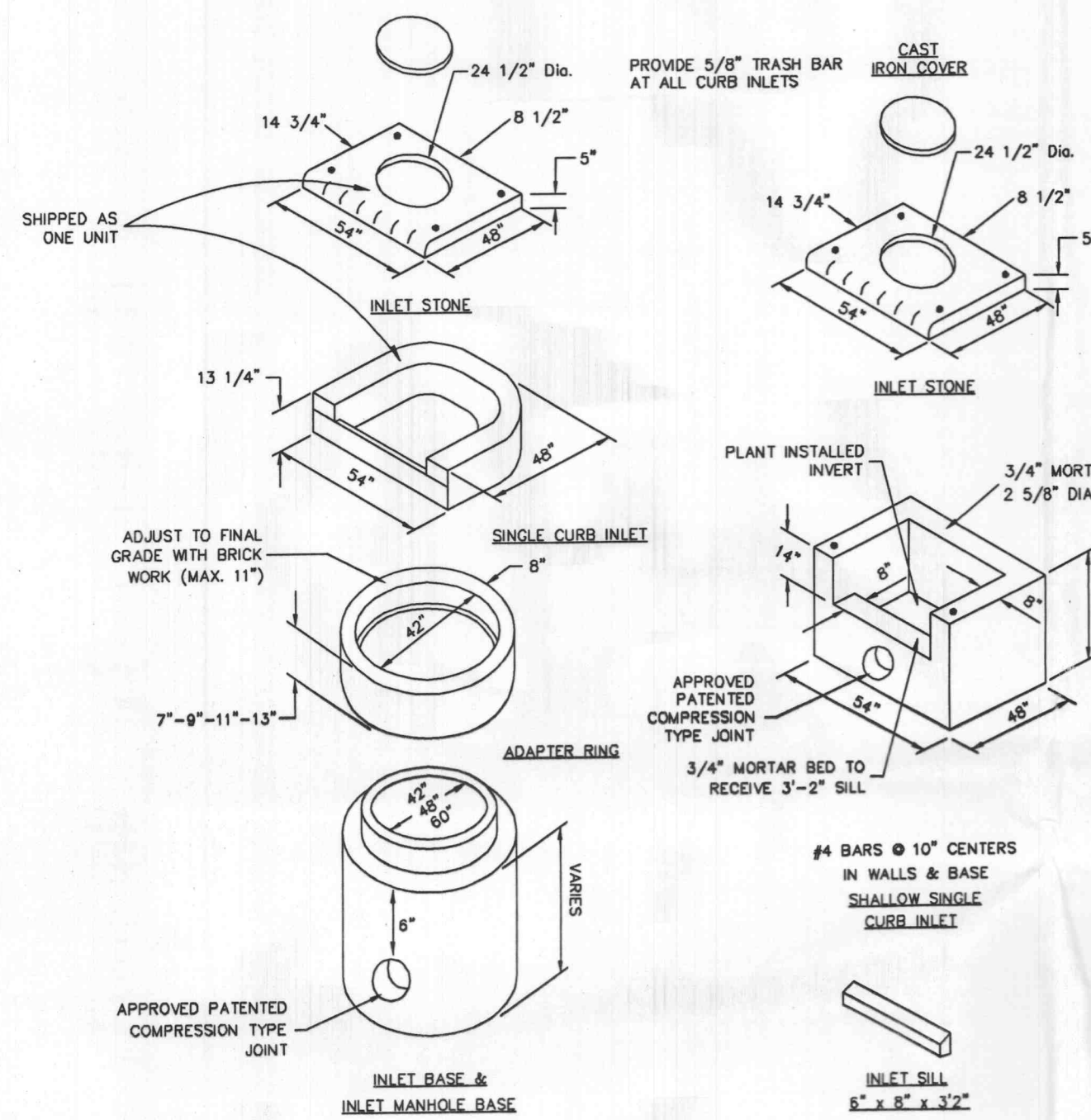
**STORM DRAIN PROFILE**

SCALE: 1"=20' HORIZ.  
1"=5' VERT.

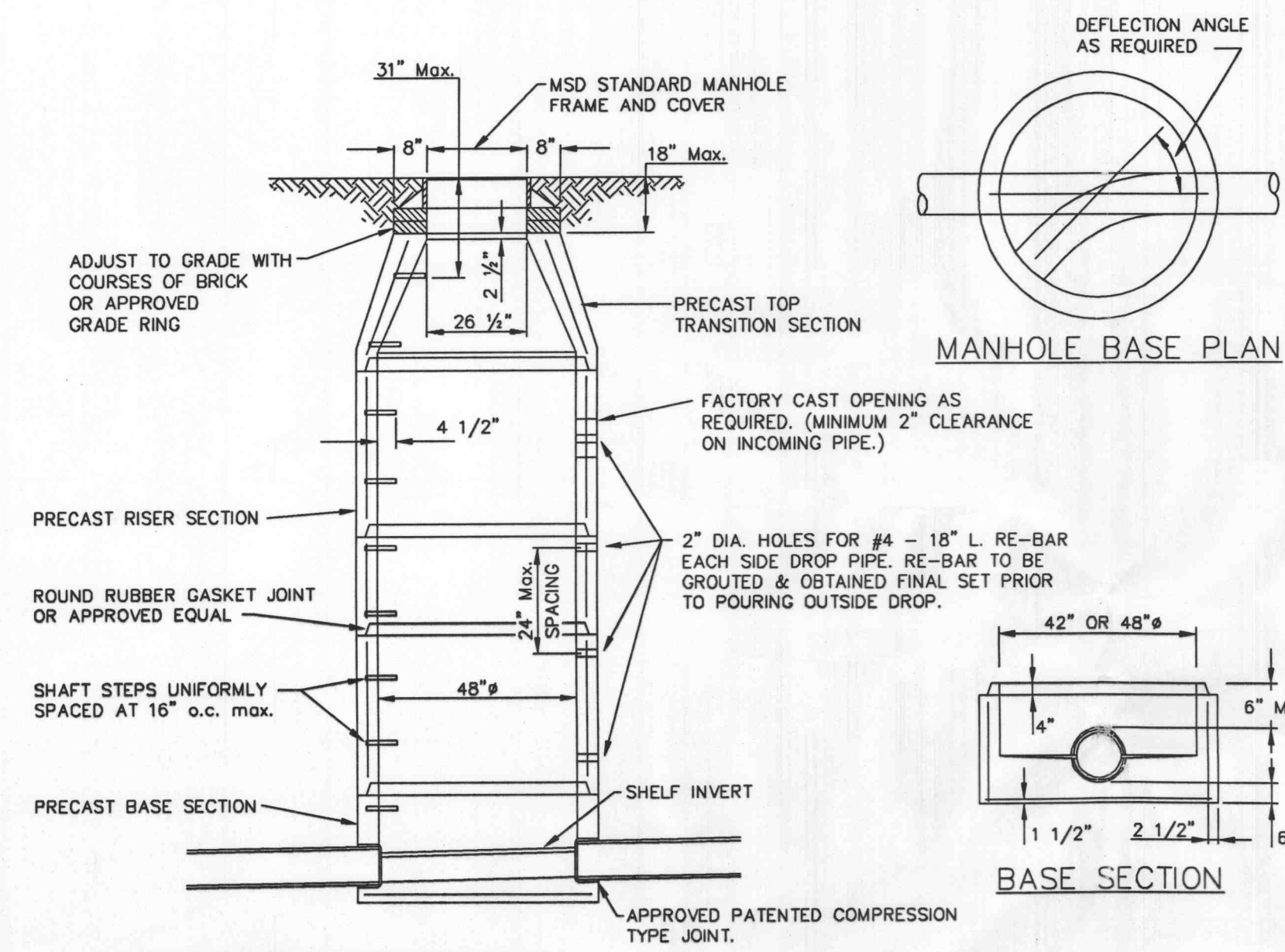


**SANITARY SEWER PROFILE**

SCALE: 1"=20' HORIZ.  
1"=5' VERT.



**CURB INLET DETAILS**  
(n.t.s.)

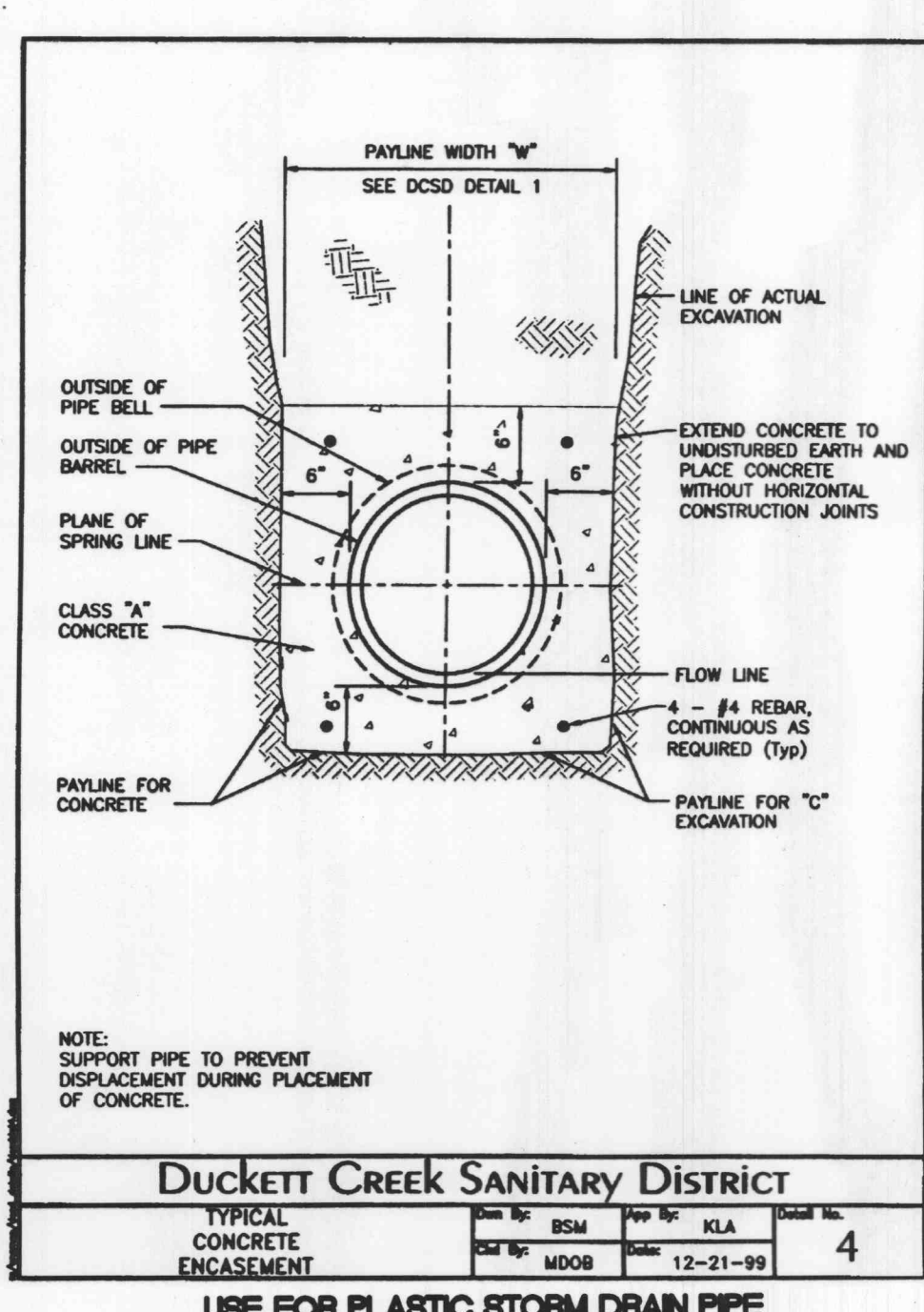
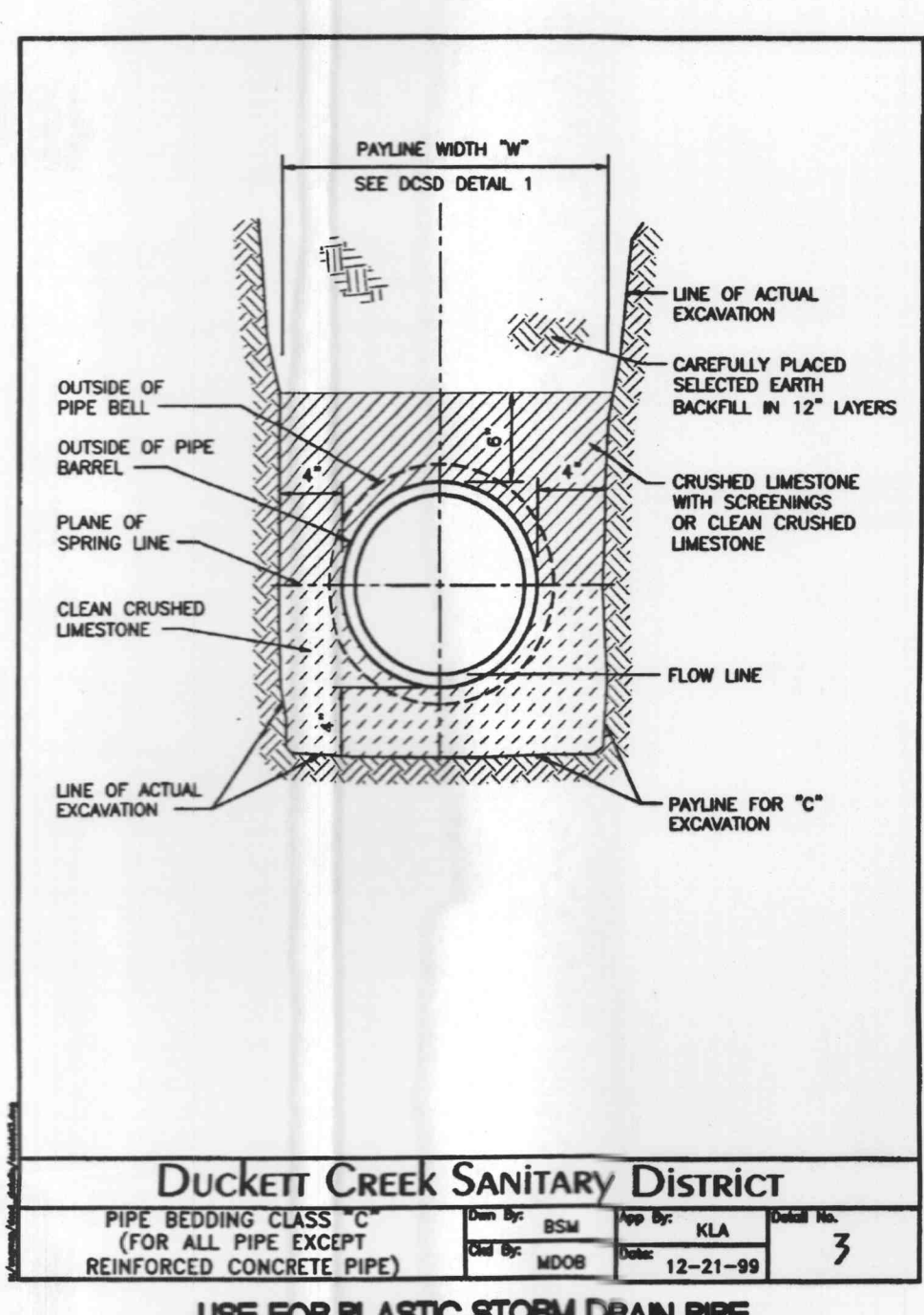
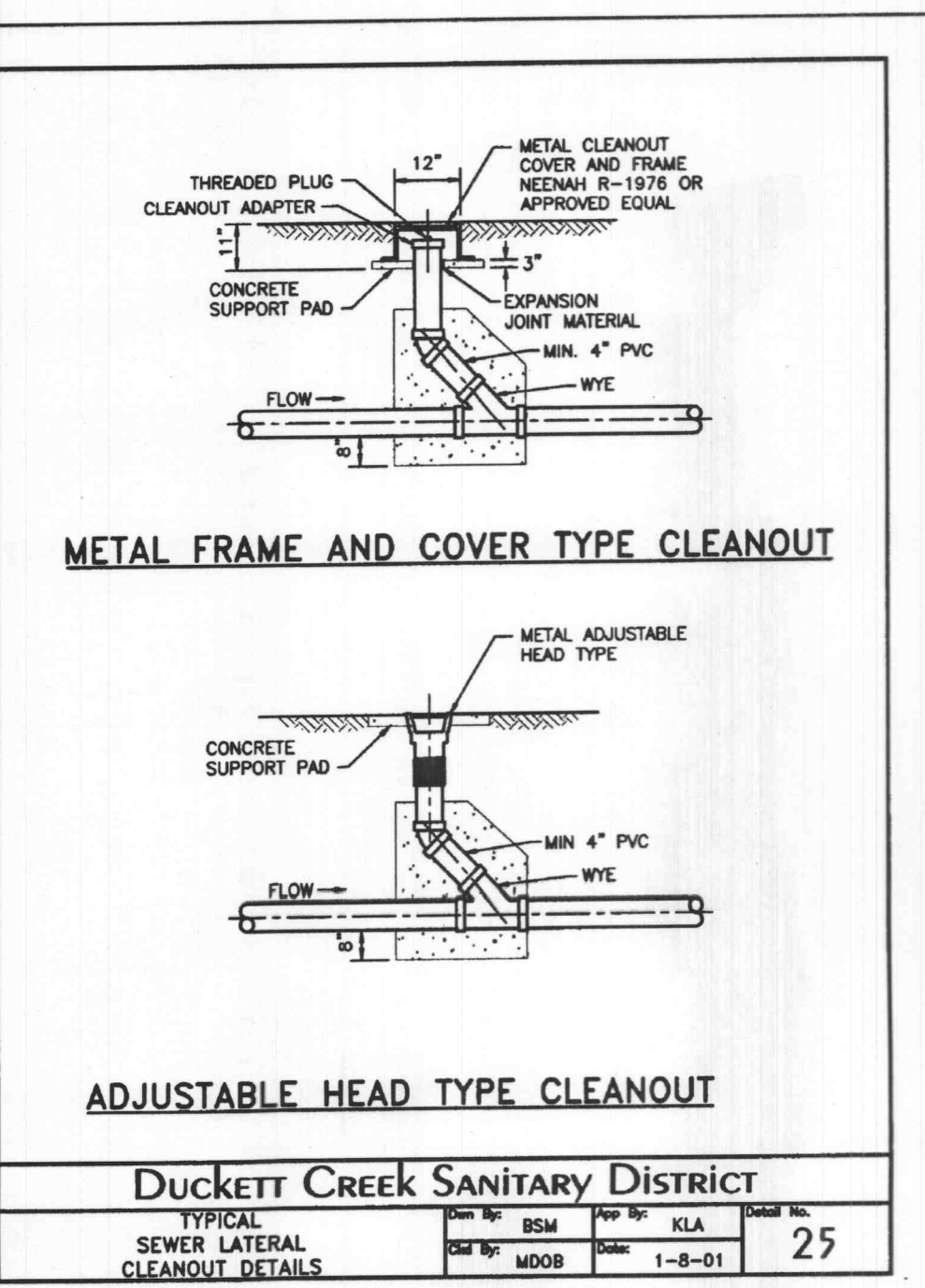


**PRECAST MANHOLE**  
(n.t.s.)

**HYDRAULIC CALCULATIONS** SEE RUNOFF CALCULATIONS FOR Q (inflow) FOR EACH STRUCTURE

Structure Number	U.S. structure	D.S. structure	U.S. structure		Length (ft)	Flowline Grade (ft)	Pipe Size (in.)	Full Flow Cap. (cfs)	Total (Q) (cfs)	Mean Full Flow Vel. (ft/s)	Bend Coef.	Velocity Head (ft)	Q <sub>v</sub> (ft <sup>3</sup> /s)	Pipe Coef. (n)	HEAD LOSS			Hydraulic Elevations			Structure Upper H.E. + H <sub>u</sub>	TOP of Structure Elevation	Free-Board	Structure Number	
			U.S. structure	D.S. structure											Junction	Bend	Total	U.S. F.L. + Dia.	D.S. H.E. + H <sub>u</sub>	D.S. H.E.					
5	5	4	541.00	540.00	64.00	0.0158	12	5.28	2.14	2.72	0	0.12	0.25	0.011	0.17	0.00	0.00	0.00	542.00	541.17	541.00	542.00	545.00	3.00	5
4	4	1	538.75	538.75	58.00	0.0172	12	5.54	2.97	3.78	0.11	0.22	0.06	0.011	0.29	0.18	0.01	0.00	540.75	540.04	539.75	540.75	544.42	3.67	4
1	1		538.48								nil								539.48	540.00	539.48	540.00	548.00	6.52	1
3	3	2	541.10	540.35	72.00	0.0104	12	4.31	0.82	1.04	0	0.02	0.01	0.011	0.03	0.00	0.00	0.00	542.10	541.38	541.35	542.10	544.56	2.46	3
2	2	1	540.15	538.75	141.00	0.0100	12	4.22	0.94	1.20	0.7	0.02	0.02	0.011	0.07	0.01	0.01	0.00	541.15	540.05	539.98	541.15	548.00	4.85	2
1	1	0	538.48	537.87	30.50	0.0200	18	16.14	3.91	2.21	0.65	0.08	0.30	0.012	0.04	0.09	0.01	0.00	539.98	539.41	539.37	539.98	548.00	6.02	1
0	0		537.87								nil								539.37	539.41	539.37	540.00	548.33	6.98	0

**FORMULAS:**  
 MEAN FULL FLOW VELOCITY:  $V = Q_{ACT} / A_{PIPE}$   
 FRICTION LOSS (ft):  $HF = 2.87 m^2 (LV^{1.49})$   
 VELOCITY HEAD:  $V_h = V^2 / 2g$   
 JUNCTION LOSSES (JUNC.):  $[Q_{in} V_{in} + \sum (Q_{in} V_{in})] / 1.33 [Q_{out}]$   
 BEND LOSSES (BEND) =  $(V^2) \times \text{ANGLE COEFFICIENT}$   
**NOTES:**  
 1. IF MORE THAN ONE INCOMING LINE, CALC. EACH BEND LOSS AND ADD TOGETHER.  
 2. NO STRUCTURE LOSSES TO BE CALCULATED AT A DROP  
 3. IF  $Q_{v} > Q_{vmax}$ , NO JUNCTION LOSSES TO BE CALCULATED.



REVISED 01/27/04 PER CITY COMMENTS DATED 01/23/04  
 REVISED 1/12/04 PER CITY COMMENTS DATED 12/29/03 & DCSD COMMENTS DATED 12/11/03

New Frontier Bank  
 STORM DRAIN & SEWER DETAILS

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 GEORGE MICHAEL STOCK  
 NUMBER E-25116  
 REGISTERED PROFESSIONAL ENGINEER

P&Z 9831.42.02

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 P.M.G. 12/03/03 G.M.S. 12/03/03 203-3097 C7 of 9