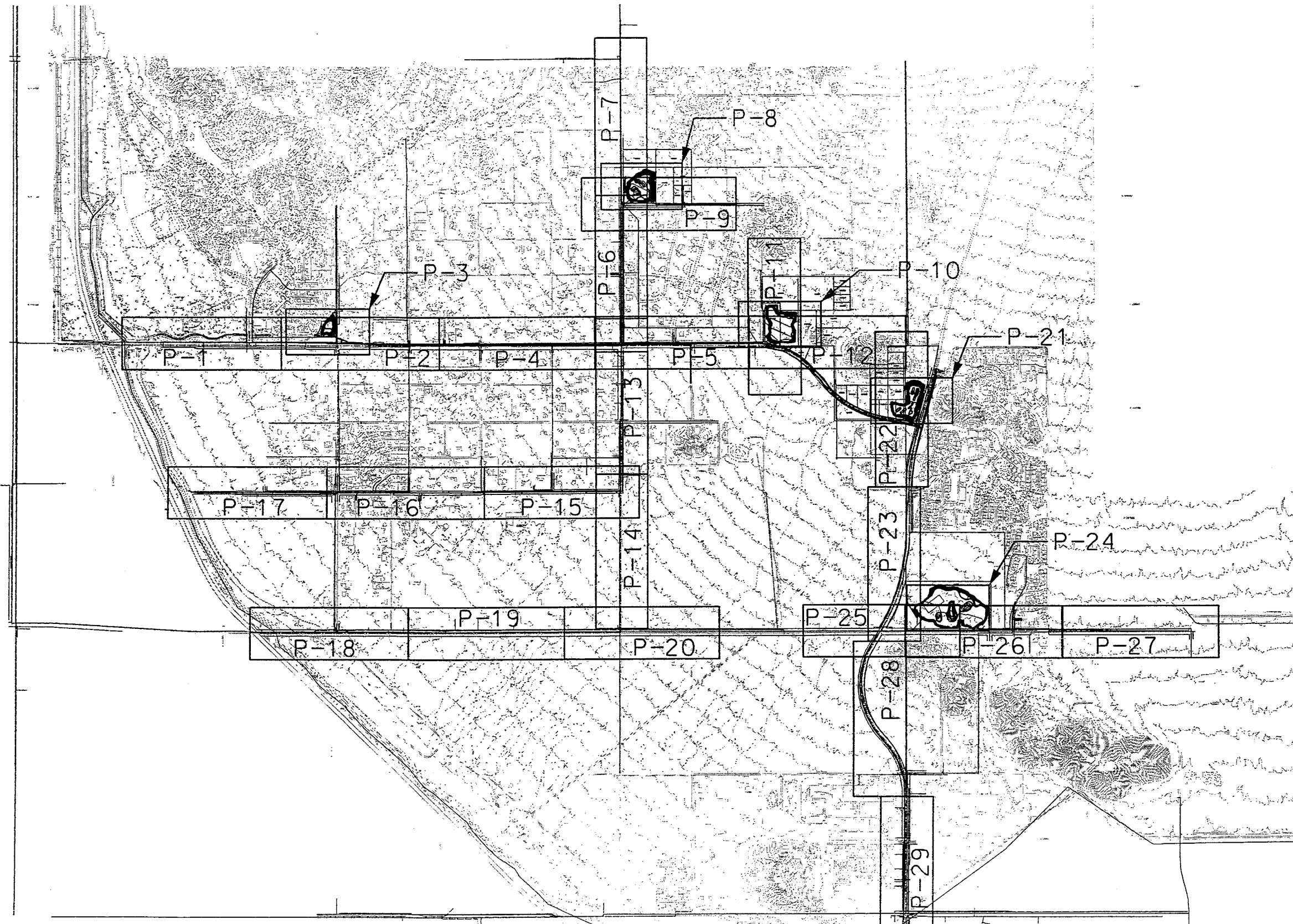


APPENDIX A

15% Design Plans



NOTE:
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FLOOD CONTROL DISTRICT
 OF MARICOPA COUNTY
 ENGINEERING DIVISION

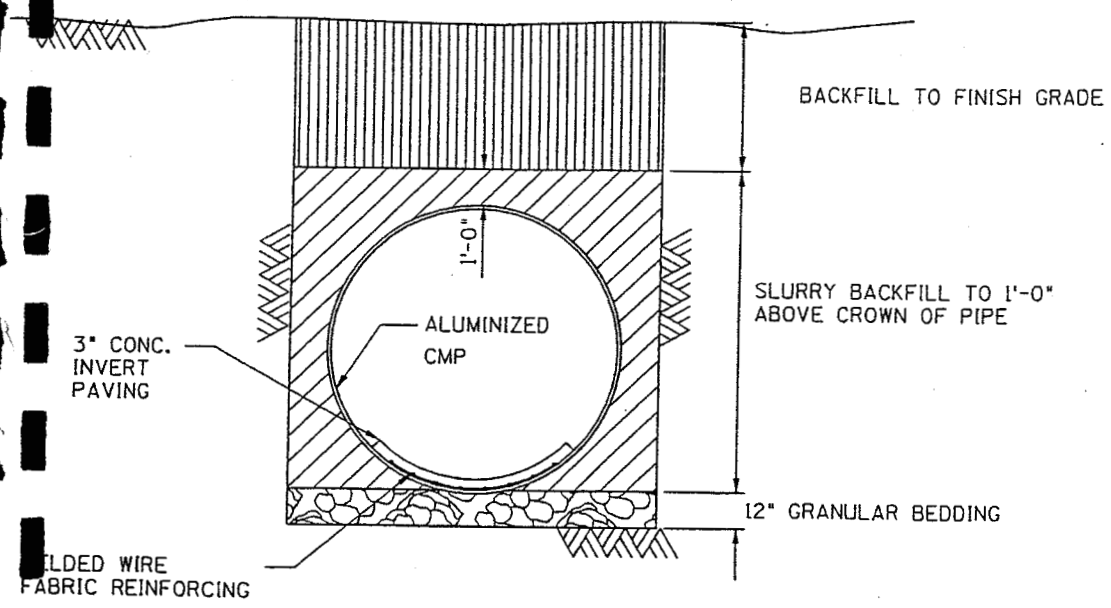
	NAME	DATE
DESIGNED	J. TAILLON	
DRAWN	R. MCKASKLE	
CHECKED		

WOOD, PATEL & ASSOCIATES, INC.
 2051 WEST NORTHERN, SUITE 100
 PHOENIX, ARIZONA (602) 335-8500

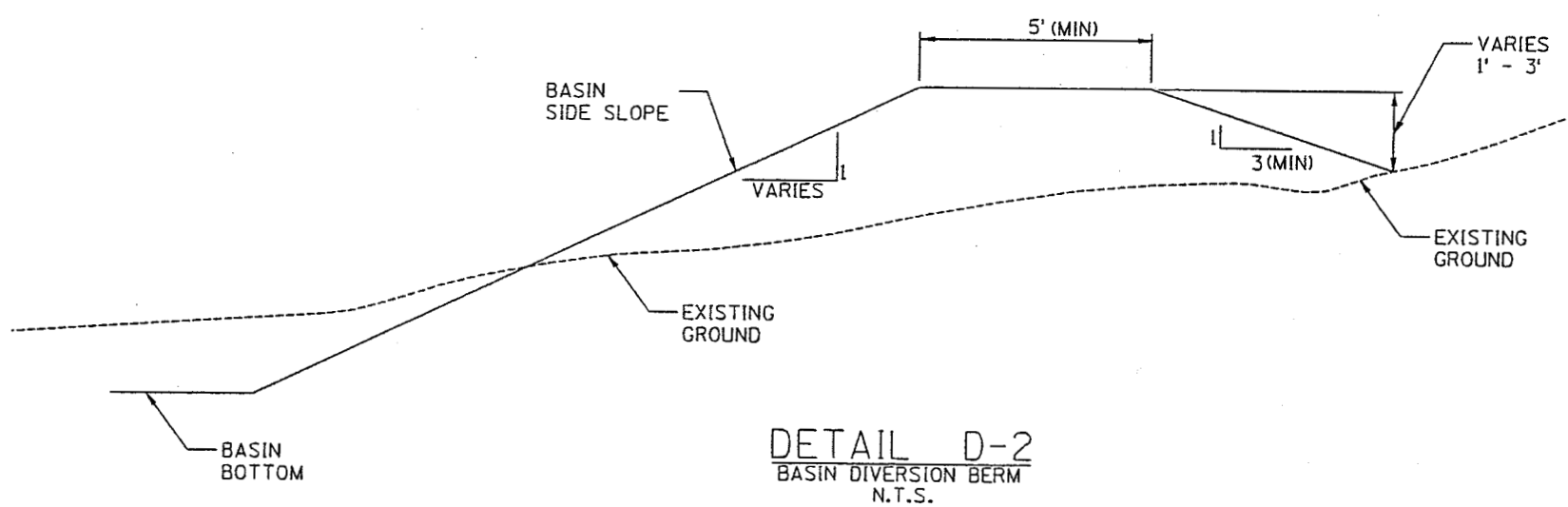
OVERALL INDEX MAP

SHEET
 DWG. I-1

FIGURE:



DETAIL D-1
CMP INSTALLATION DETAIL
N.T.S.



DETAIL D-2
BASIN DIVERSION BERM
N.T.S.

	FLOOD CONTROL DISTRICT OF MARICOPA COUNTY ENGINEERING DIVISION		
	DESIGNED	J. TAILLON	DATE
	DRAWN	R. MCKASKLE	
	CHECKED		
WOOD, PATEL & ASSOCIATES, INC. 2051 WEST NORTHERN, SUITE 100 PHOENIX, ARIZONA (602) 335-8500			
STANDARD DETAILS			SHEET DWG. D-1
FIGURE:			

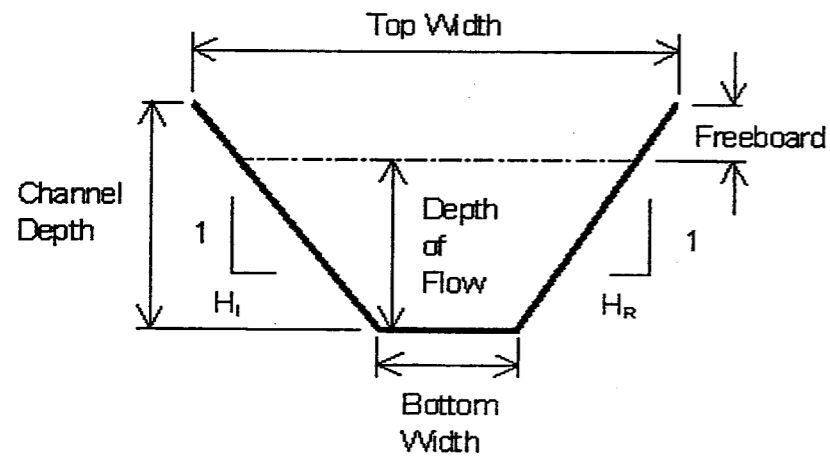
SPOOK HILL AREA DRAINAGE MASTER PLAN
Design Calculation Summary

Existing Channel Properties

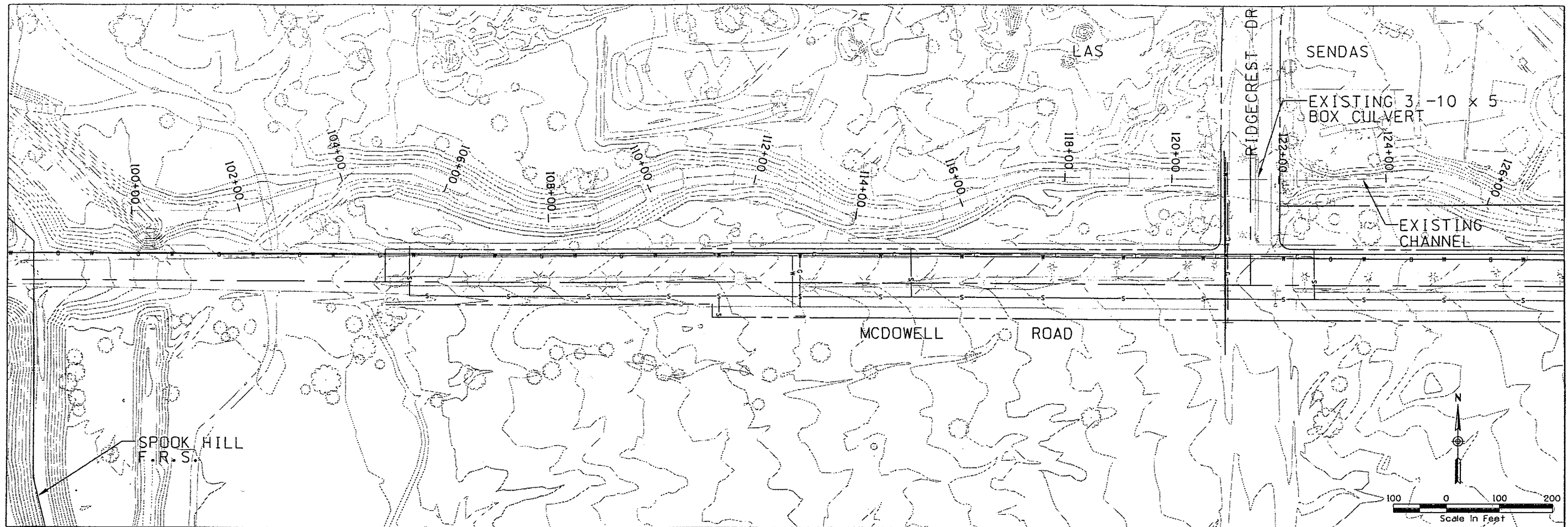
ID	Design Q100 (cfs)	DS Invert EI (ft)	US Invert EI (ft)	Length (ft)	Design Invert Slope (ft/ft)	Total Vert Drop (ft)	Material Type	Manning's "n" Value	Bottom Width W (ft)	Depth of Flow (ft)	Sideslope (H1 Left (HL)	Sideslope (H1 Right (HR)	Area of Flow (sf)	Froude No.	Type of Flow	Velocity (fps)	Topwidth of Flow (ft)
W ¹	1528	1582	1613	1600	0.0195	31	E	0.035	15	3.77	3.75	3.75	147.5	1.22	SUP	11.55	53.27
BC ³		1613	1614	90													
E ²	1528	1614	1621	250	0.0195	7	E	0.035	25	4.48	3.75	3.75	142.5	1.23	SUP	11.95	48.61

- Notes: 1) Channel reach west of Ridgecrest Dr.
2) Channel reach east of Ridgecrest Dr.
3) Existing box culvert

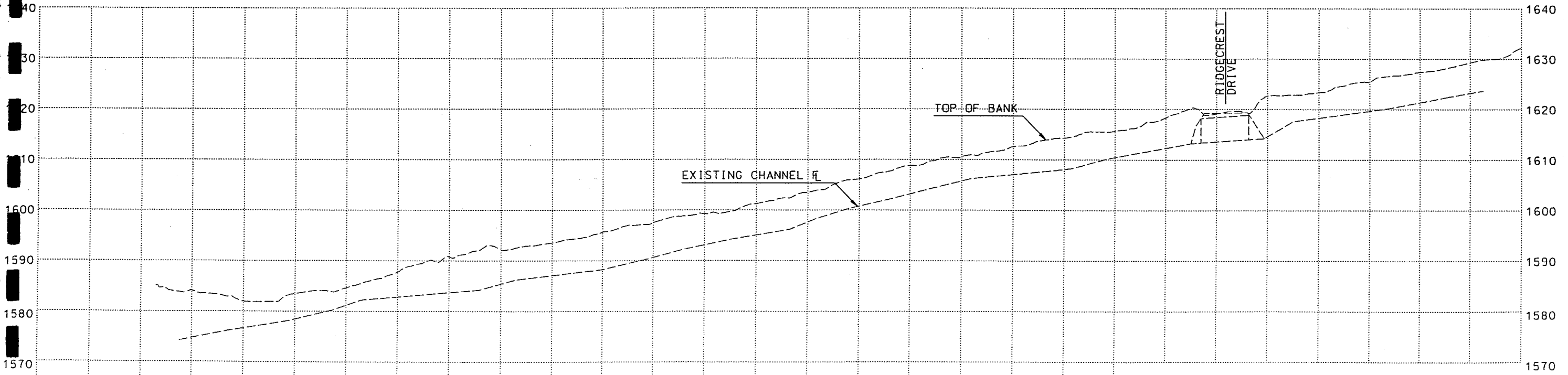
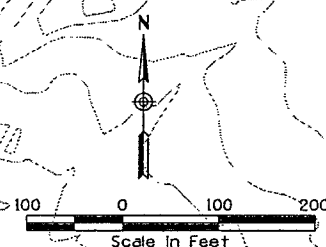
Proposed channel flowline will be lowered by approximately 1 ft along both reaches.
Proposed flowline will taper to existing flowline at US and DS inverts.



Typical Channel Section



SEE SHEET 2 MATCHLINE



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FLOOD CONTROL DISTRICT
 OF MARICOPA COUNTY
 ENGINEERING DIVISION

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DESIGNED	J. TAILLON	
DRAWN	R. MCKASKLE	
CHECKED		

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 PHOENIX, ARIZONA (602) 335-8500

FIGURE:

MCDOWELL ROAD ALIGNMENT

SHEET
 DWG. P-1

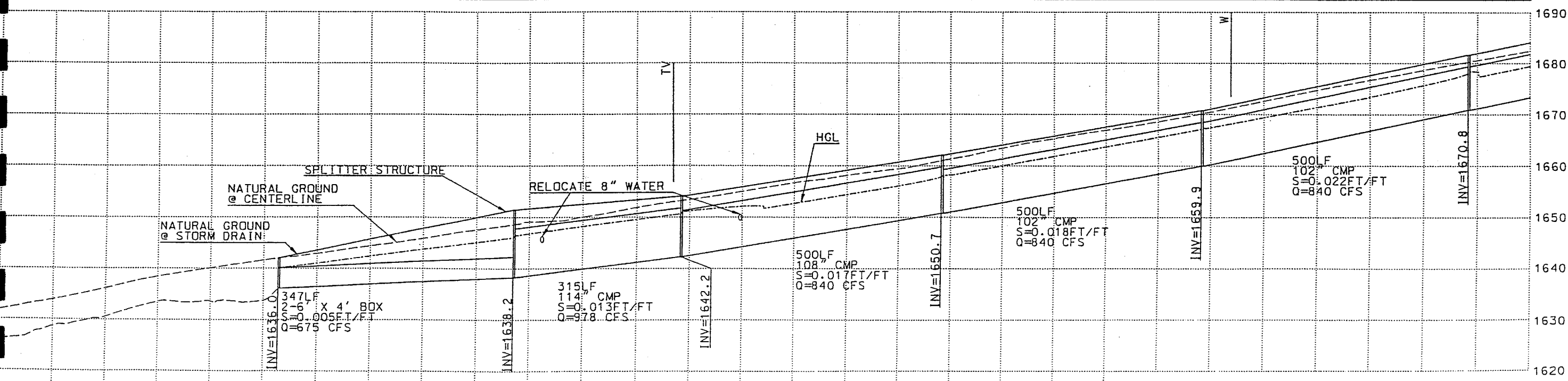
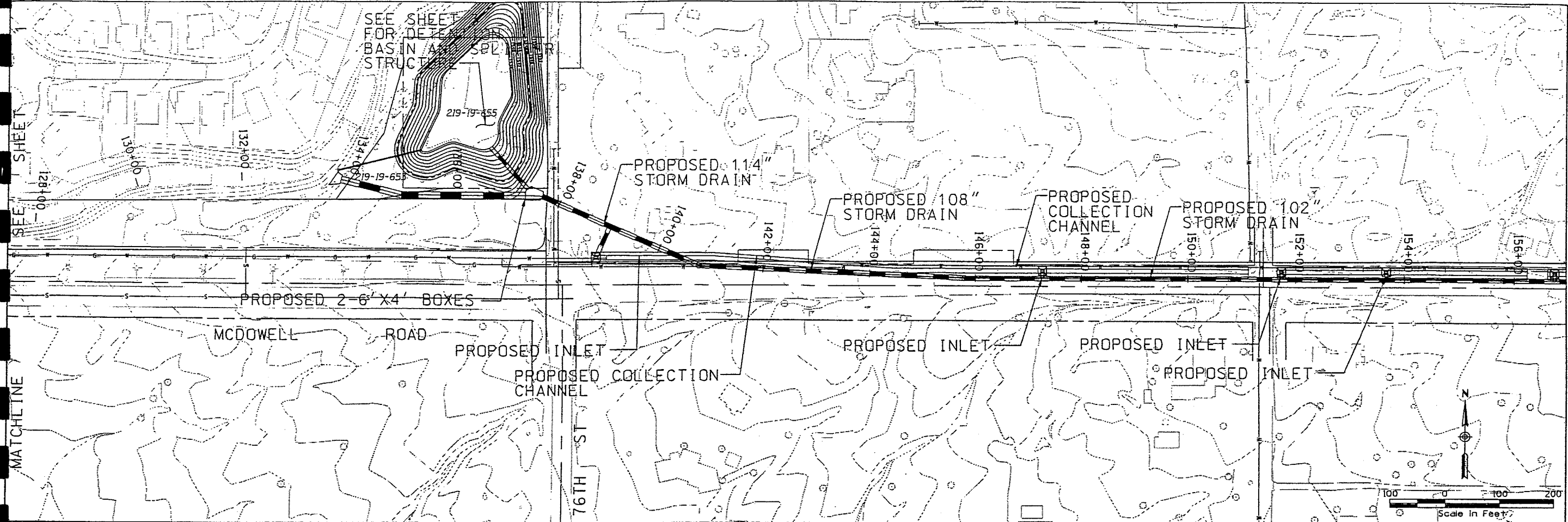
SPOOK HILL AREA DRAINAGE MASTER PLAN
Design Calculation Summary

Storm Drain Properties


US station	DS station	Total System Flow cfs	Length ft	Constructed Slope ft/ft	Section Size in	Mannings n	Average Velocity fps	Upstream Invert Elevation ft	DS Invert Elevation ft	Hydraulic Grade In ft	Hydraulic Grade Out ft
160+80	155+80	770	500	0.0212	102 inch	0.023	15.01	1,681.40	1,670.80	1,688.33	1,678.33
155+80	150+80	840	500	0.0218	102 inch	0.023	16.21	1,670.80	1,659.90	1,678.00	1,667.30
150+80	145+80	840	500	0.0184	102 inch	0.023	16.26	1,659.90	1,650.70	1,667.10	1,658.04
145+80	140+80	840	500	0.017	108 inch	0.023	14.38	1,650.70	1,642.20	1,657.85	1,651.01
140+80	137+65	978	312	0.012821	114 inch	0.023	14.92	1,642.20	1,638.20	1,650.59	1,646.37
137+65	134+18	675	444	0.004955	10 x 4 ft	0.013	16.87	1,638.20	1,636.00	1,646.01	1,640.00

Note: (1) 0.023 Manning's n for corrugated metal pipe with paved invert.

(1) 0.013 Manning's n for reinforced concrete pipe.



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Flood Control District
of Maricopa County

**FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY
ENGINEERING DIVISION**

	NAME	DATE	
DESIGNED	J. TAILLON		WOOD, PATEL & ASSOCIATES, INC. 2051 WEST NORTHERN, SUITE 100 PHOENIX, ARIZONA (602) 335-8500
DRAWN	I.R. MCKASKLE		
CHECKED			

McDOWELL ROAD ALIGNMENT

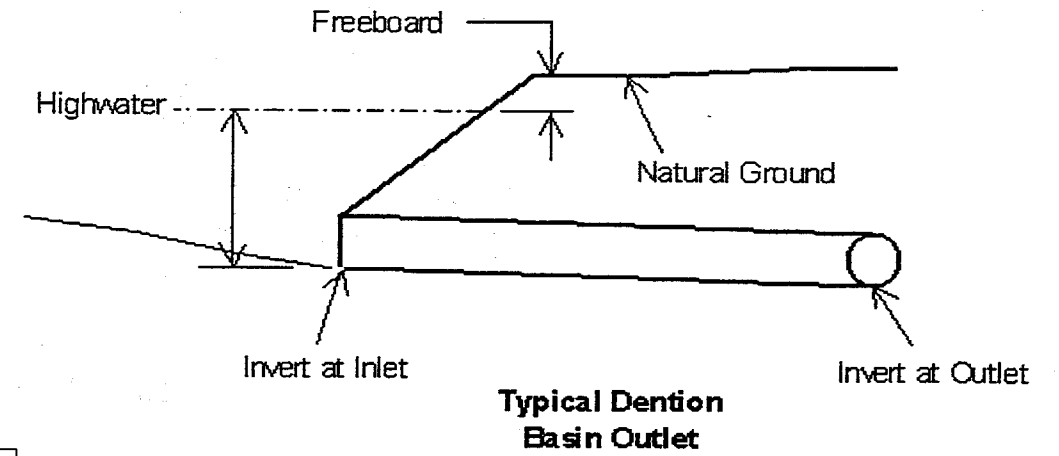
**SHEET
DWG. P-2**

SPOOK HILL AREA DRAINAGE MASTER PLAN
Design Calculation Summary

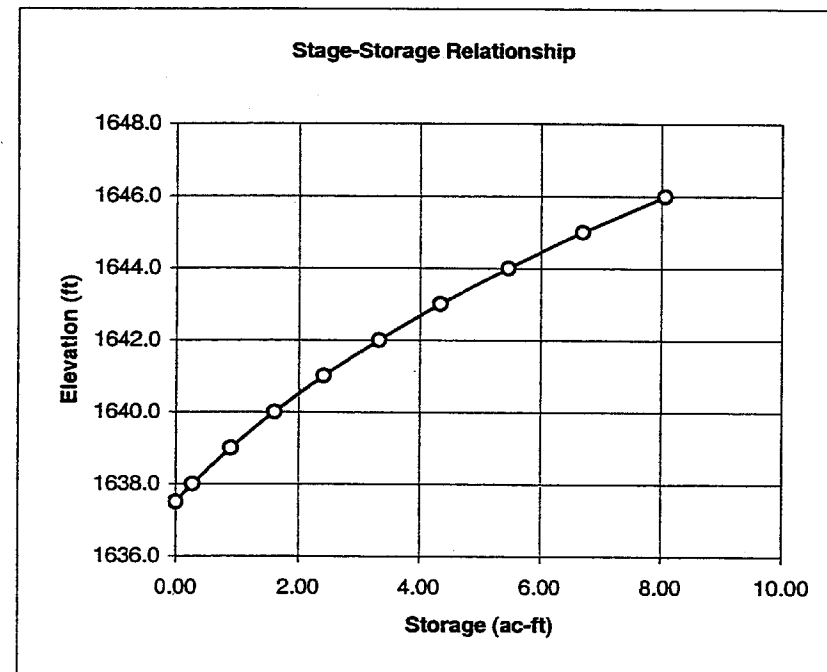
Detention Basin Properties

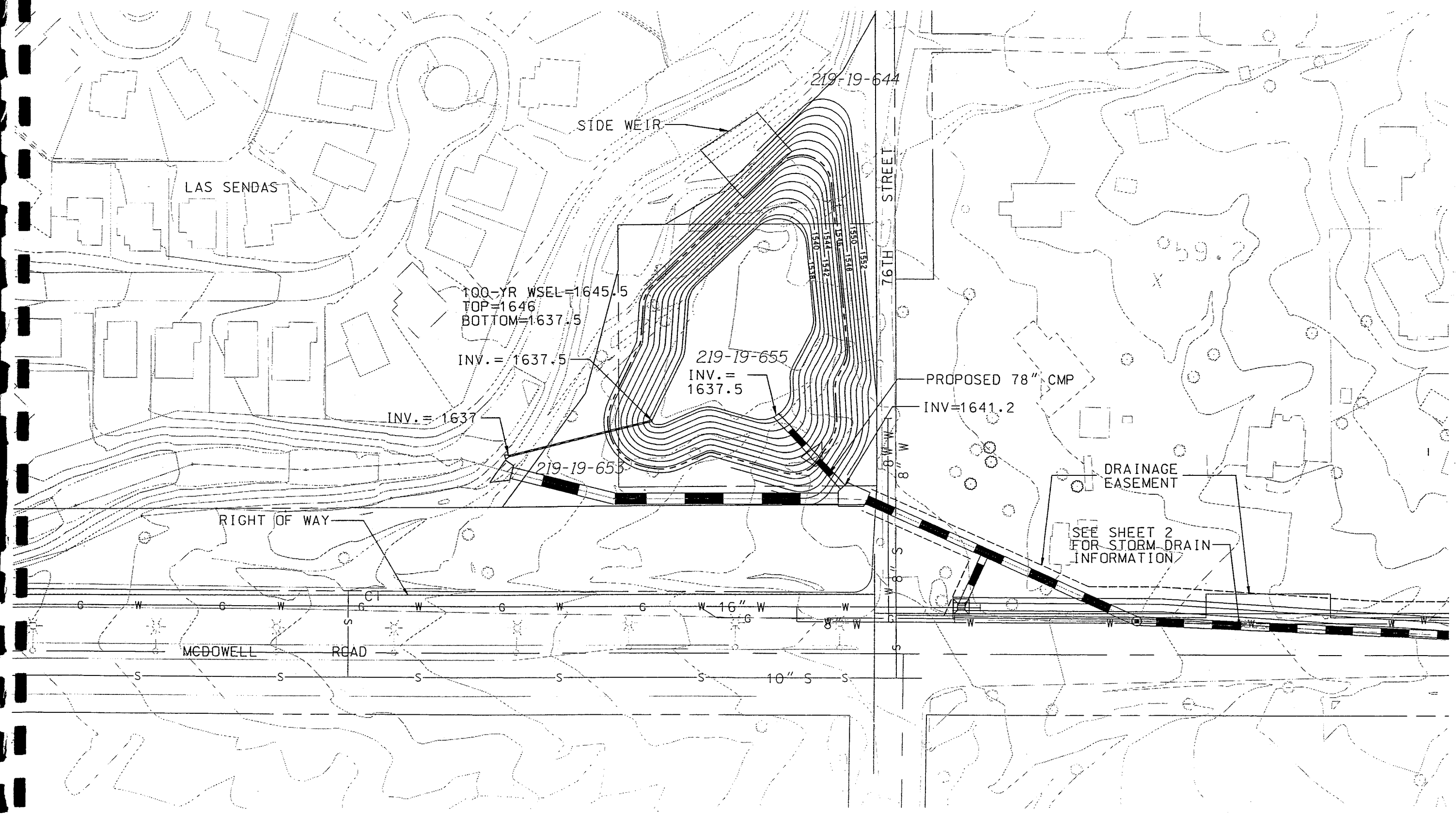
McDowell/76th Street Basin

Basin Land Area	2.6 ac	Outflow Pipe (no. and Dia.)	18 in
Basin Excavation Volume	26014 cy	Pipe Invert @ Inlet	1637.5 ft
Peak Storage	8.1 ac-ft	Pipe Invert @ Outlet	1637 ft
Q100 Inflow	496 cfs	Pipe Length	179 ft
Q100 Bypass	1500 cfs	Pipe Slope	0.003 ft/ft
Highwater El. (Q100)	1645.5 ft	Pipe Centerline @ Inlet	1638.25 ft
Max. Pond. Depth	1646 ft		

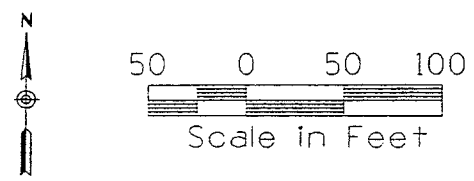


Elevation	Inc. Volume (ac-ft)	Cum. Volume (ac-ft)
1637.5	0.00	0.00
1638	0.27	0.27
1639	0.62	0.89
1640	0.71	1.60
1641	0.81	2.41
1642	0.91	3.32
1643	1.02	4.34
1644	1.13	5.46
1645	1.24	6.70
1646	1.36	8.06





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	FLOOD CONTROL DISTRICT OF MARICOPA COUNTY ENGINEERING DIVISION	
	NAME	DATE
	DESIGNED	
	WOOD, PATEL & ASSOCIATES, INC. 2051 WEST NORTHERN, SUITE 100 PHOENIX, ARIZONA (602) 335-8500	
	MCDOWELL ROAD AND 76TH STREET BASIN	
FIGURE:	SHEET DWG. P-3	

SPOOK HILL AREA DRAINAGE MASTER PLAN

Design Calculation Summary

Storm Drain Properties

US station	DS station	Total System Flow cfs	Length ft	Constructed Slope ft/ft	Section Size in	Mannings n	Average Velocity fps	Upstream Invert Elevation ft	DS Invert Elevation ft	Hydraulic Grade In ft	Hydraulic Grade Out ft
191+82	186+82	705	500	0.0222	90 inch	0.023	16.25	1,745.20	1,734.10	1,753.73	1,741.02
186+82	181+82	705	500	0.0234	90 inch	0.023	16.75	1,734.10	1,722.40	1,740.79	1,729.31
181+82	176+82	705	500	0.0244	90 inch	0.023	16.55	1,722.40	1,710.20	1,729.09	1,717.42
176+82	171+82	740	500	0.019	96 inch	0.023	15.92	1,710.20	1,700.70	1,717.10	1,707.74
171+82	166+82	740	500	0.0218	96 inch	0.023	15.83	1,700.70	1,689.80	1,707.54	1,697.03
166+82	160+80	770	500	0.0168	102 inch	0.023	15.36	1,689.80	1,681.40	1,696.73	1,688.52
160+80	155+80	770	500	0.0212	102 inch	0.023	15.01	1,681.40	1,670.80	1,688.33	1,678.33

Note: (1) 0.023 Manning's n for corrugated metal pipe with paved invert.

(1) 0.013 Manning's n for reinforced concrete pipe.

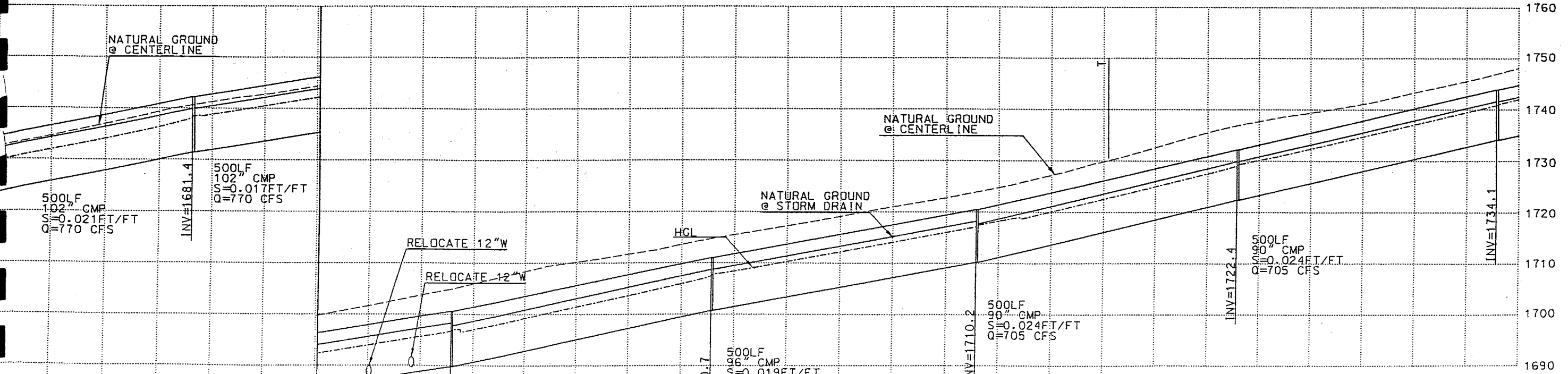
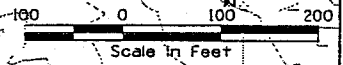
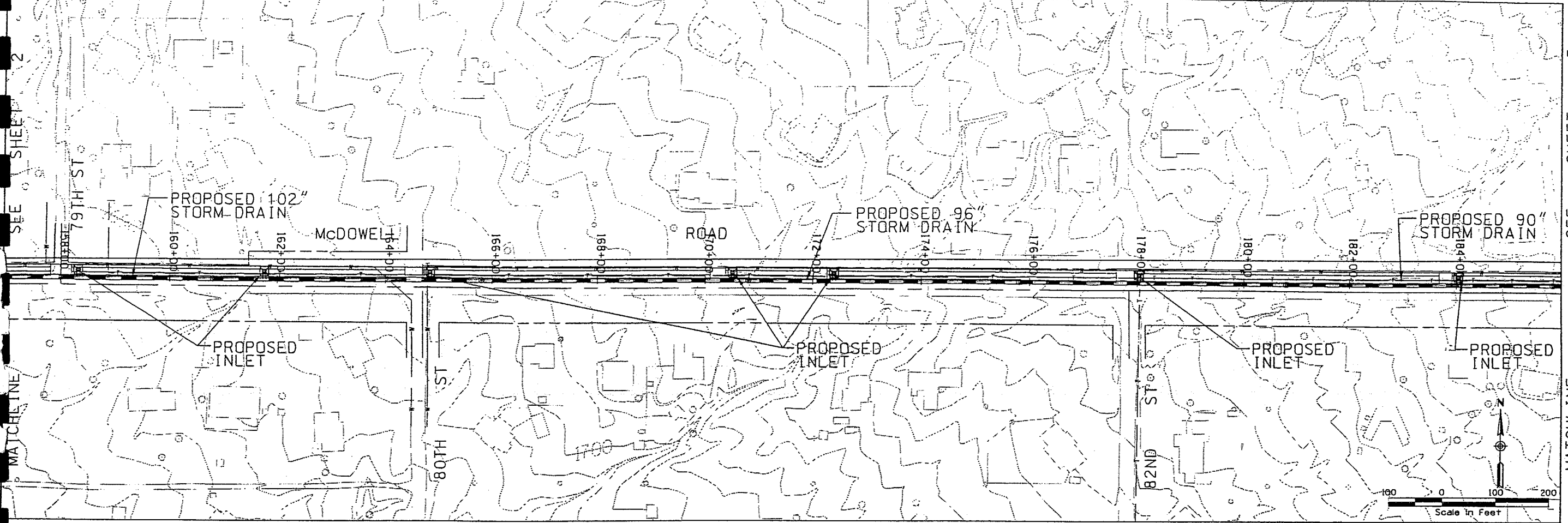
SEE SHEET 2

MATCHLINE

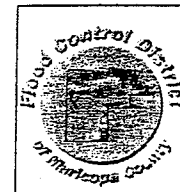
SHEET 5

SEE

MATCHLINE



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FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
ENGINEERING DIVISION

NAME	DATE
DESIGNED J. TAILLON	
DRAWN R. MCKASKLE	
CHECKED	

WOOD, PATEL & ASSOCIATES, INC.
2051 WEST NORTHERN, SUITE 100
PHOENIX, ARIZONA (602) 335-8500

McDOWELL ROAD ALIGNMENT

SHEET
DWG. P-4

FIGURE:

SPOOK HILL AREA DRAINAGE MASTER PLAN
Design Calculation Summary

Storm Drain Properties

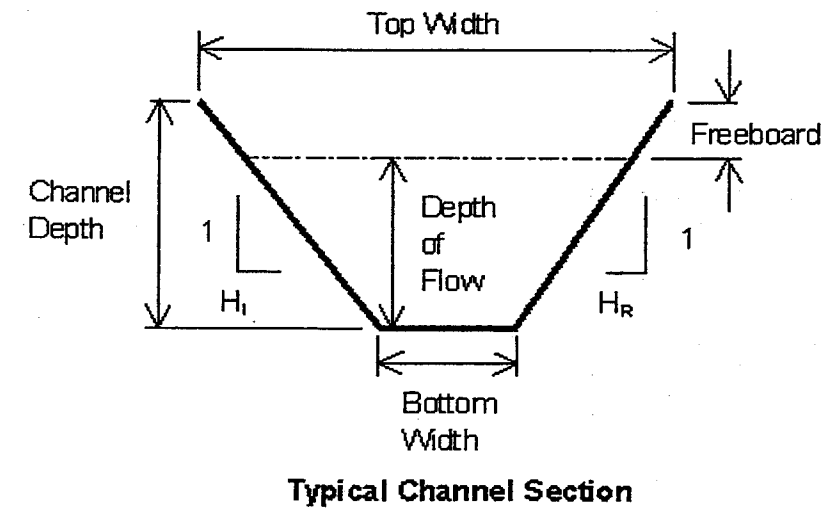
US station	DS station	Total System Flow cfs	Length ft	Constructed Slope ft/ft	Section Size in	Mannings n	Average Velocity fps	Upstream Invert Elevation ft	DS Invert Elevation ft	Hydraulic Grade In ft	Hydraulic Grade Out ft
197+33	193+01	154	420	0.020238	60 inch	0.023	9.07	1,758.50	1,750.00	1,762.06	1,756.47
193+01	192+56	154	45	0.044444	60 inch	0.023	7.84	1,750.00	1,748.00	1,756.37	1,755.88
192+56	191+82	329	74	0.037838	78 inch	0.023	9.91	1,748.00	1,745.20	1,754.96	1,754.05
191+82	186+82	705	500	0.0222	90 inch	0.023	16.25	1,745.20	1,734.10	1,753.73	1,741.02

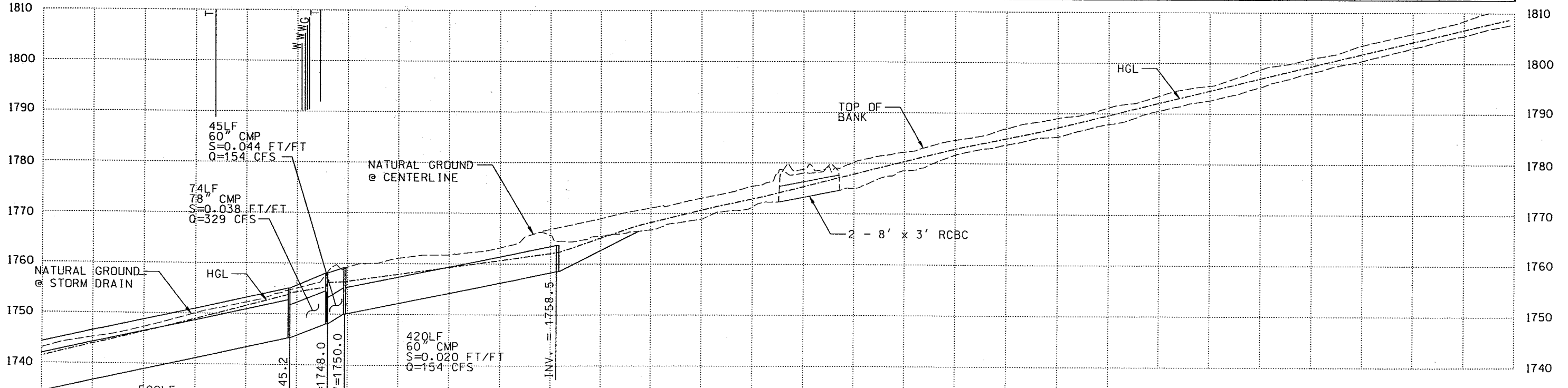
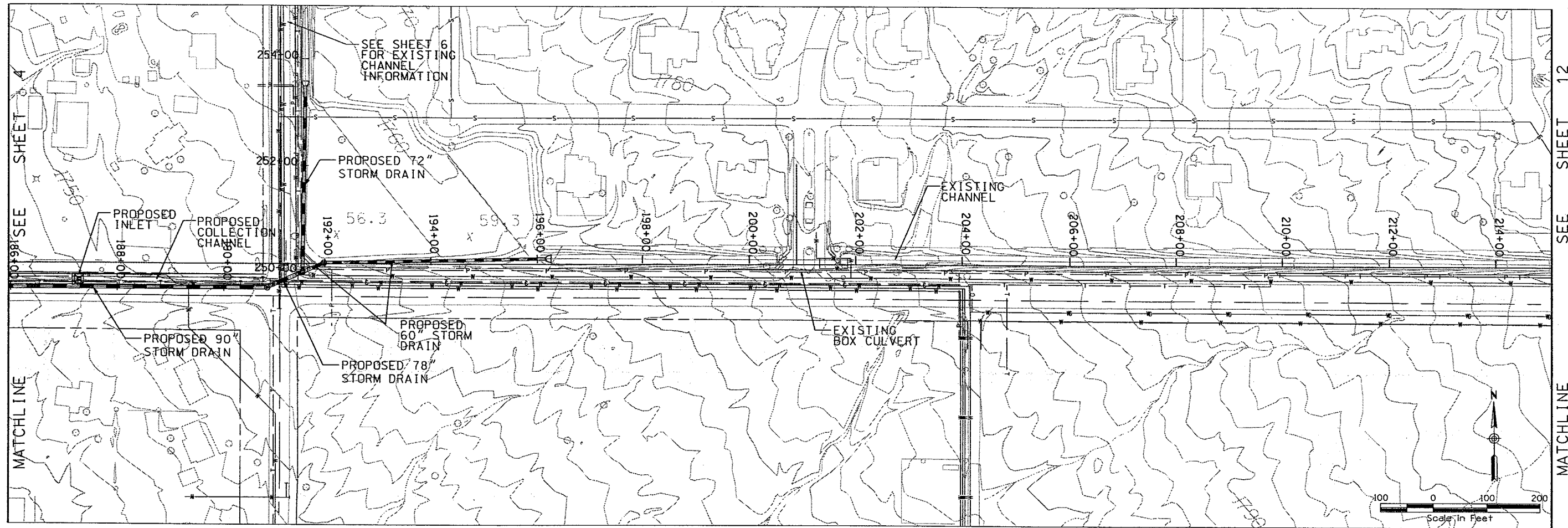
Note: (1) 0.023 Manning's n for corrugated metal pipe with paved invert.
(1) 0.013 Manning's n for reinforced concrete pipe.

Channel Properties

ID	HEC1-ID	US Invert El (ft)	Length (ft)	Computed Invert Slope (ft/ft)	Design Invert Slope (ft/ft)	Total Vert Drop (ft)	No. of Drops	Material Type	Manning's "n" Value	Bottom Width W (ft)	Depth of Flow (ft)	Sideslope (H1) Left (HL)	Sideslope (H1) Right (HR)	Area of Flow (sf)	Froude No.	Type of Flow	Velocity (fps)	Topwidth of Flow (ft)
		1950	1950	0.02	0.02	51.5	0	E	0.03	20	1.03	3	3	23.7	1.204	SUP	6.5	26.16

Channel Material Type: C = Concrete
R = Riprap
G = Grass
E = Natural or Earthen





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	FLOOD CONTROL DISTRICT OF MARICOPA COUNTY ENGINEERING DIVISION		WOOD, PATEL & ASSOCIATES, INC. 2051 WEST NORTHERN, SUITE 100 PHOENIX, ARIZONA (602) 335-8500	
	DESIGNED	J. TAILLON		DATE
	DRAWN	R. MCKASKLE		
EAST McDOWELL ROAD ALIGNMENT			SHEET DWG. P-5	

SPOOK HILL AREA DRAINAGE MASTER PLAN
Design Calculation Summary

Storm Drain Properties

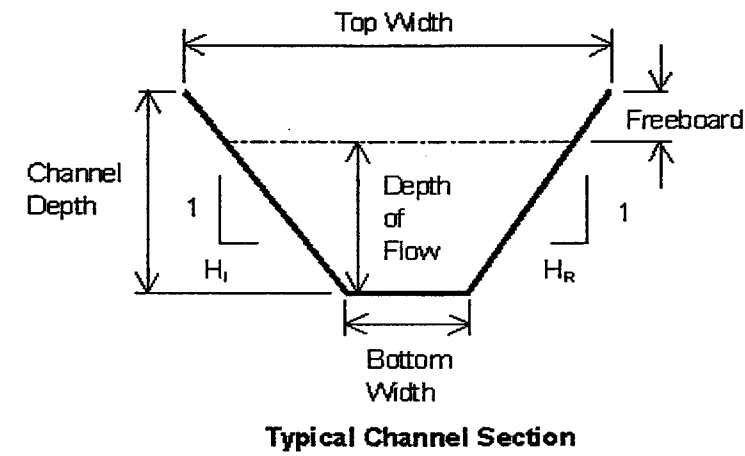
US station	DS station	Total System Flow cfs	Length ft	Constructed Slope ft/ft	Section Size in	Mannings n	Average Velocity fps	Upstream Invert Elevation ft	DS Invert Elevation ft	Hydraulic Grade In ft	Hydraulic Grade Out ft
277+23	275+55	30	75	0.013000	30 inch			1,800.00	1,797.30		
275+55	271+80	175	375	0.002133	54 inch	0.013	7.71	1,796.80	1,796.00	1,800.19	1,798.74
271+80	253+50	175									
253+50	250+00	175	349	0.010029	72 inch	0.023	6.19	1,751.50	1,748.00	1,757.74	1,755.88

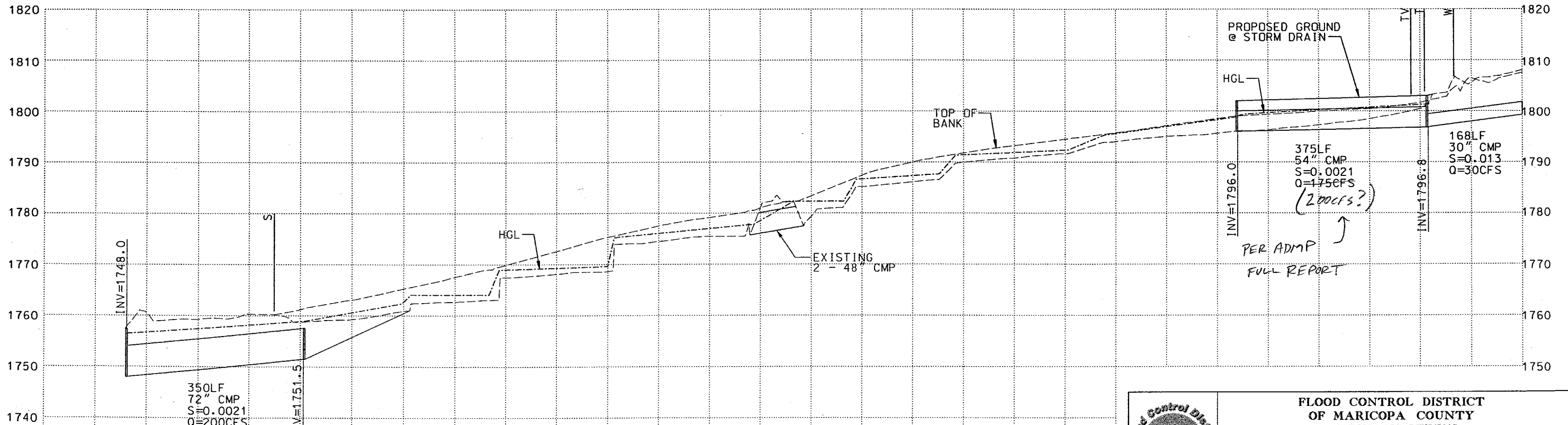
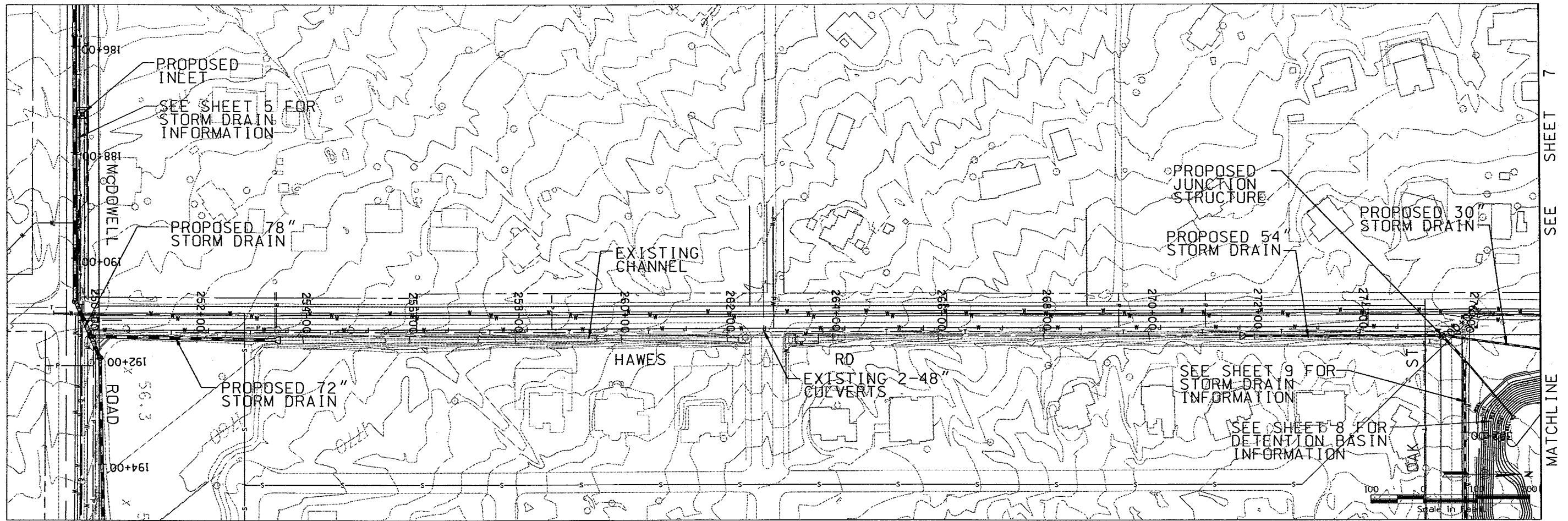
Note: (1) 0.023 Manning's n for corrugated metal pipe with paved invert.
(1) 0.013 Manning's n for reinforced concrete pipe.

Channel Properties

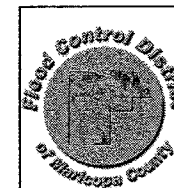
ID	HEC1-ID	US Invert El (ft)	Length (ft)	Computed Invert Slope (ft/ft)	Design Invert Slope (ft/ft)	Total Vert Drop (ft)	No. of Drops	Material Type	Manning's "n" Value	Bottom Width W (ft)	Depth of Flow (ft)	Sideslope (H1) Left (HL)	Sideslope (H1) Right (HR)	Area of Flow (sf)	Froude No.	Type of Flow	Velocity (fps)	Topwidth of Flow (ft)
			1827	.00005-.06	.00005-.07	44.5	0	C	0.016	10	2-6.3	1.3	1.3	9-102	1-3.76	SUP	1.7-19.67	11.64-23.42

Channel Material Type: C = Concrete
R = Riprap
G = Grass
E = Natural or Earthen





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 OF MARICOPA COUNTY
 ENGINEERING DIVISION**

	NAME	DATE
DESIGNED	J. TAILLON	
DRAWN	R. MCKASKLE	
CHECKED		

WOOD, PATEL & ASSOCIATES, INC.
 2051 WEST NORTHERN, SUITE 100
 PHOENIX, ARIZONA (602) 335-8500

HAWES ROAD ALIGNMENT

SHEET
 DWG. P-6

FIGURE:

SPOOK HILL AREA DRAINAGE MASTER PLAN

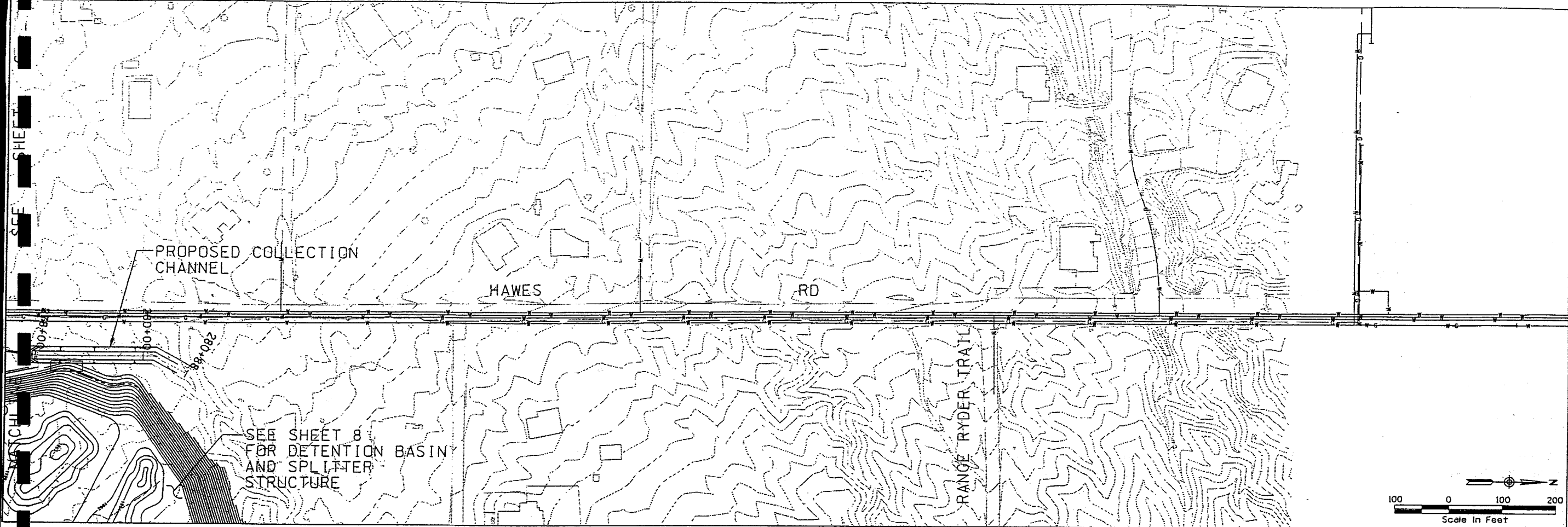
Design Calculation Summary

Storm Drain Properties

US station	DS station	Total System Flow cfs	Length ft	Constructed Slope ft/ft	Section Size in	Mannings n	Average Velocity fps	US Invert Elevation ft	DS Invert Elevation ft	Hydraulic Grade In ft	Hydraulic Grade Out ft
280+88	277+23	(Channel)									
277+23	275+55	30		0.013	30 inch			1800			

Note: (1) 0.023 Manning's n for corrugated metal pipe with paved invert.

(1) 0.013 Manning's n for reinforced concrete pipe.



75
30 CMP
S=0.013 FT/FT
Q=30CFS

S=0.006 FT/FT

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2051 WEST NORTHERN, SUITE 100
PHOENIX, ARIZONA (602) 335-8500

HAWES ROAD ALIGNMENT

SHEET
DWG. P-7

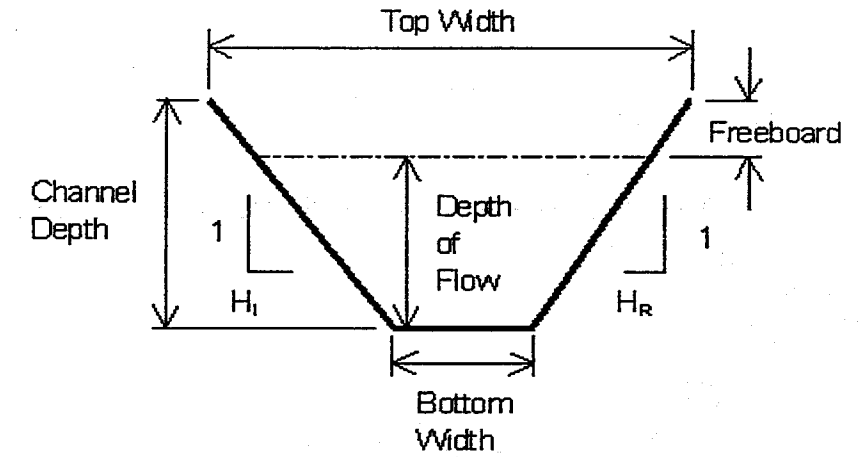
FIGURE:

SPOOK HILL AREA DRAINAGE MASTER PLAN
Design Calculation Summary

Channel Properties

ID	HEC1-ID	Design Q100 (cfs)	DS Invert El (ft)	US Invert El (ft)	Length (ft)	Computed Invert Slope (ft/ft)	Design Invert Slope (ft/ft)	Total Vert Drop (ft)	No. of Drops	Material Type	Manning's "n" Value	Bottom Width W (ft)	Depth of Flow (ft)	Sideslope (H1) Left (HL)	Sideslope (H1) Right (HR)	Area of Flow (sf)	Froude No.	Type of Flow	Velocity (fps)	Topwidth of Flow (ft)
		440			300	0.006	0.006	1.8	0	R	0.03	15	2.95	3	3	70.23	0.753	SUB	6.27	32.68

Channel Material Type: C = Concrete
R = Riprap
G = Grass
E = Natural or Earthen



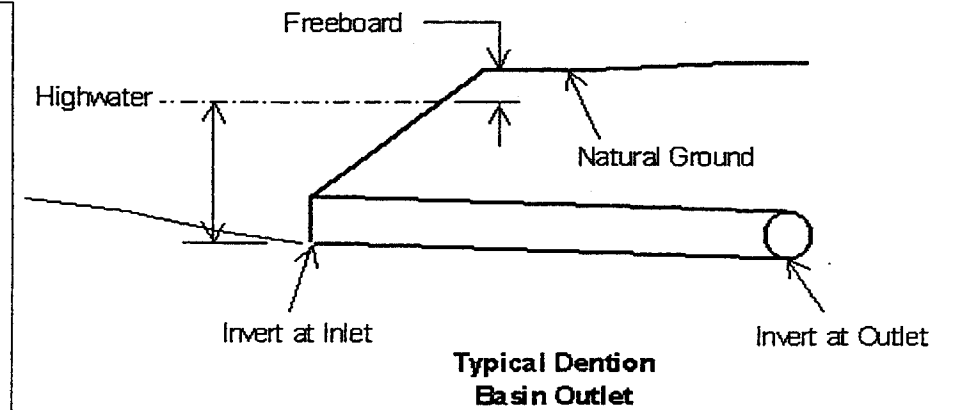
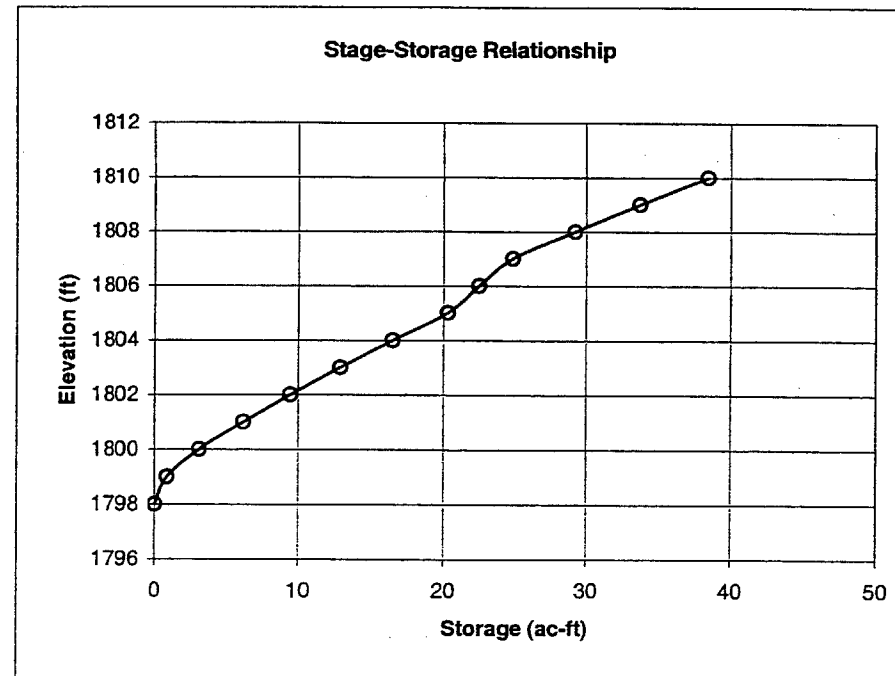
Typical Channel Section

Detention Basin Properties

Oak Street Basin

Basin Land Area	9.4 ac	Outflow Pipe (no. and Dia.)	24 in
Basin Excavation Volume	124033 cy	Pipe Invert @ Inlet	1798 ft
Peak Storage	33.7 ac-ft	Pipe Invert @ Outlet	1797.3 ft
Q100 Inflow	823 cfs	Pipe Length	139.6 ft
Q100 Bypass	150 cfs	Pipe Slope	0.005 ft/ft
Highwater El. (Q100)	1808.9 ft	Pipe Centerline @ Inlet	1799 ft
Max. Pond. Depth	1810 ft		

Elevation	Inc. Volume (ac-ft)	Cum. Volume (ac-ft)
1798	0	0
1799	0.85	0.85
1800	2.31	3.16
1801	3.08	6.24
1802	3.23	9.47
1803	3.38	12.85
1804	3.59	16.44
1805	3.85	20.29
1806	2.2	22.49
1807	2.35	24.84
1808	4.37	29.21
1809	4.53	33.74
1810	4.69	38.43



Typical Detention Basin Outlet

PROPOSED COLLECTION CHANNEL SEE SHEET 7

PROPOSED WEIR OVERFLOW STRUCTURE

PROPOSED 30" STORM DRAIN

PROPOSED 24" STORM DRAIN BLEED OFF

PROPOSED JUNCTION STRUCTURE

SEE SHEET 6 FOR STORM DRAIN INFORMATION

HAWES ROAD

INV=1797.3

OAK STREET

INV=1796.8

INV=1798

INV=1809

INV=1811.5

PROPOSED DIVERSION BERM PER DETAIL D-2 ON SHEET D-1

PROPOSED DIVERSION BERM PER DETAIL D-2 ON SHEET D-1

100-YR WSEL=1808.9
TOP=1810
BOTTOM=1798

INV=1823

PROPOSED 84" CMP
PROPOSED 30" STORM DRAIN

SEE SHEET 9 FOR STORM DRAIN INFORMATION



50 0 50 100

Scale in Feet



FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
ENGINEERING DIVISION

DESIGNED	NAME	DATE
J. TAILLON		
R. MCKASKLE		
CHECKED		

WOOD, PATEL & ASSOCIATES, INC.
2051 WEST NORTHERN, SUITE 100
PHOENIX, ARIZONA (602) 335-8500

OAK STREET BASIN

SHEET
DWG. P-8

FIGURE:

NOTE:
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DISTRICT OF MARICOPA COUNTY.

SPOOK HILL AREA DRAINAGE MASTER PLAN

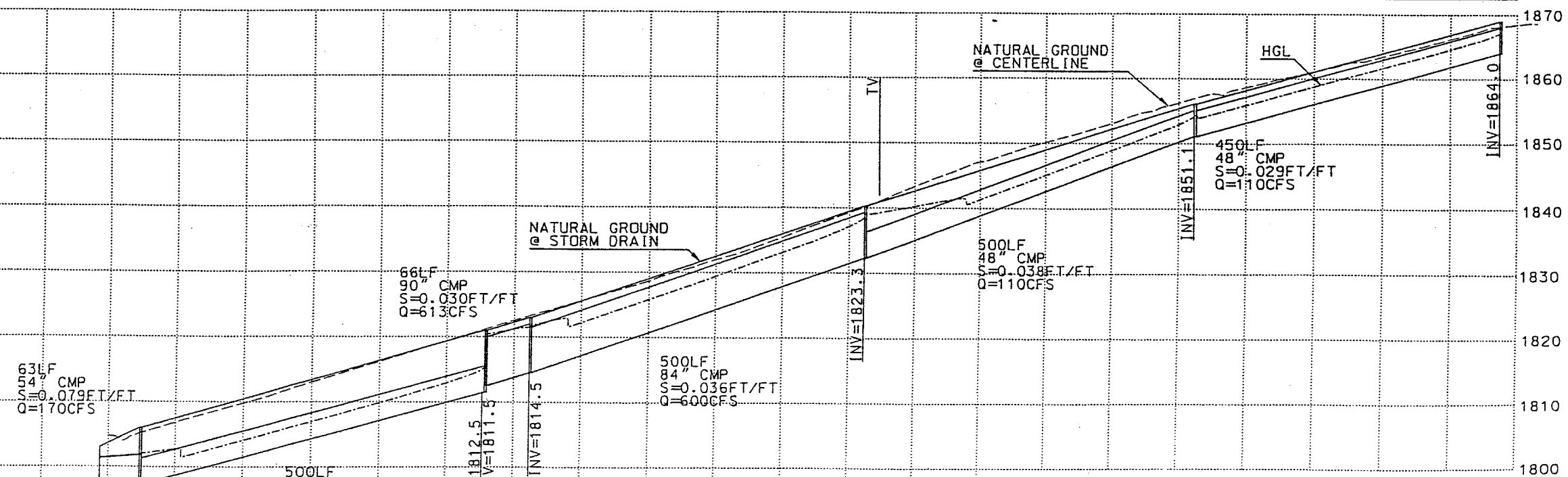
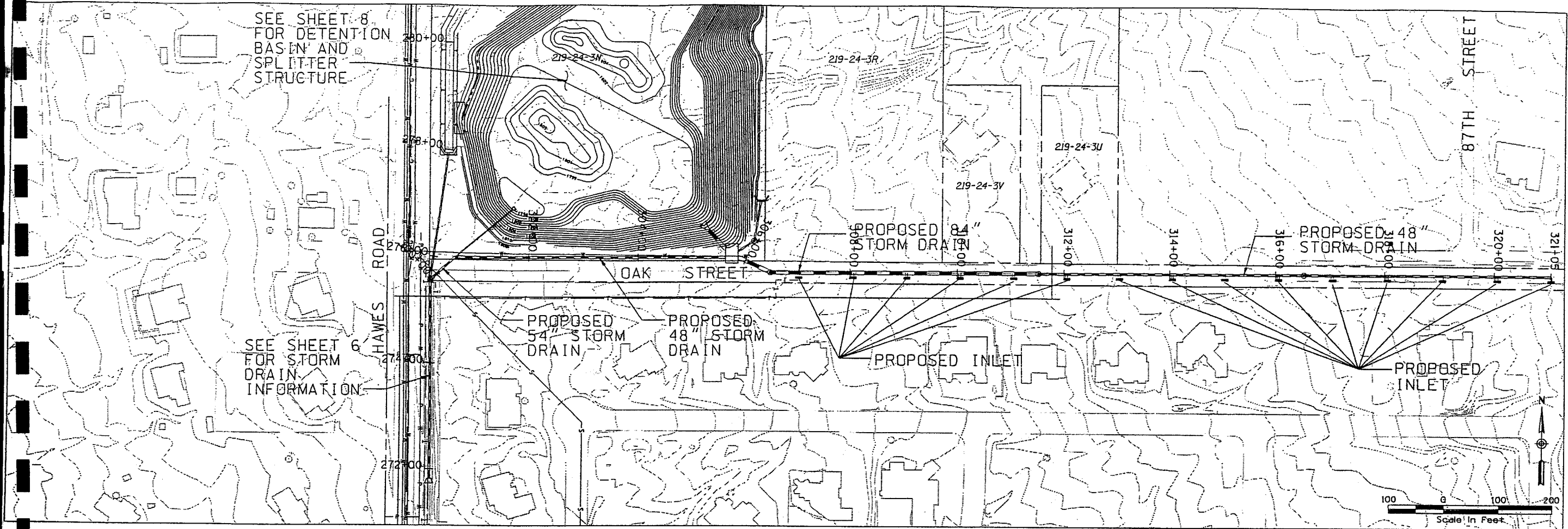
Design Calculation Summary

Storm Drain Properties

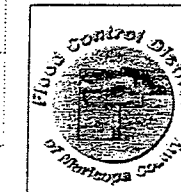
US station	DS station	Total System Flow cfs	Length ft	Constructed Slope ft/ft	Section Size in	Mannings n	Average Velocity fps	Upstream Invert Elevation ft	DS Invert Elevation ft	Hydraulic Grade In ft	Hydraulic Grade Out ft
320+79	316+29	110	450	0.028667	48 inch	0.023	10.1	1,864.00	1,851.10	1,867.17	1,854.40
316+29	311+29	110	500	0.0376	48 inch	0.023	9.52	1,851.10	1,832.30	1,854.27	1,838.91
311+29	306+29	600	500	0.0356	84 inch	0.023	16.05	1,832.30	1,814.50	1,838.57	1,821.73
306+29	305+63	613	66	0.030303	90 inch	0.023	14.1	1,814.50	1,812.50	1,821.47	1,820.40
Basin Splitter Structure											
305+63	300+63	170	509	0.027898	48 inch	0.013	13.74	1,811.50	1,797.30	1,815.23	1,801.32
300+63	300+00	170	63	0.007937	54 inch	0.013	11.85	1,797.30	1,796.80	1,801.10	1,800.62

Note: (1) 0.023 Manning's n for corrugated metal pipe with paved invert.

(1) 0.013 Manning's n for reinforced concrete pipe.



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FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
ENGINEERING DIVISION

DESIGNED	NAME	DATE
DRAWN	J. TAILLON	
CHECKED	R. MCKASKLE	

WOOD, PATEL & ASSOCIATES, INC.
2051 WEST NORTHERN, SUITE 100
PHOENIX, ARIZONA (602) 335-8500

OAK STREET ALIGNMENT

SHEET
DWG. P-9

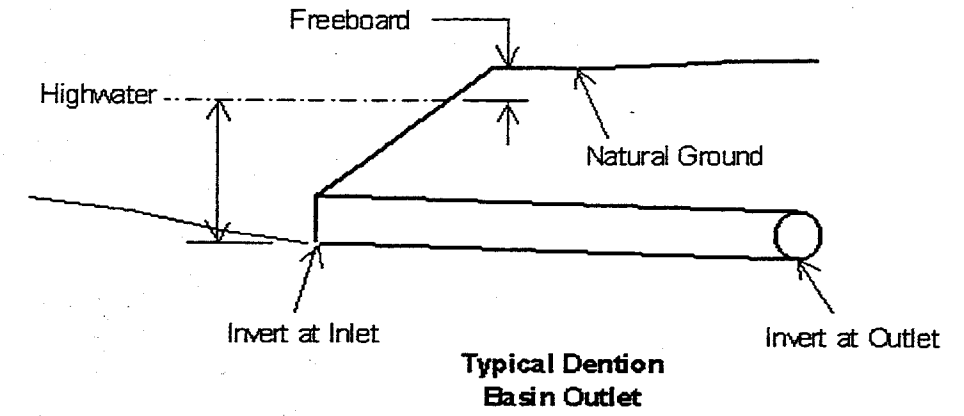
FIGURE:

SPOOK HILL AREA DRAINAGE MASTER PLAN
Design Calculation Summary

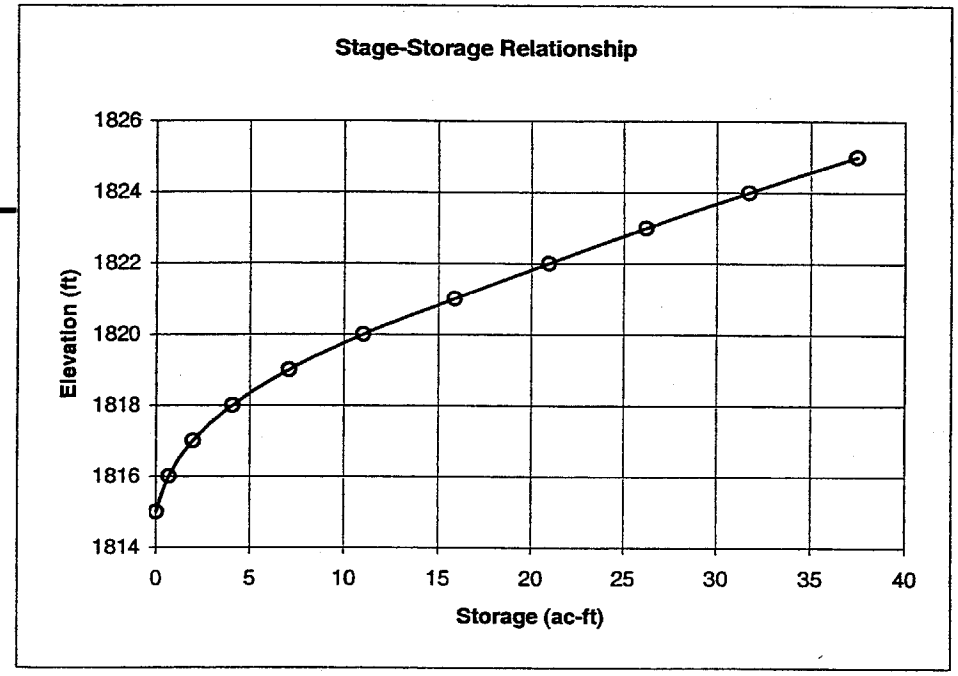
Detention Basin Properties

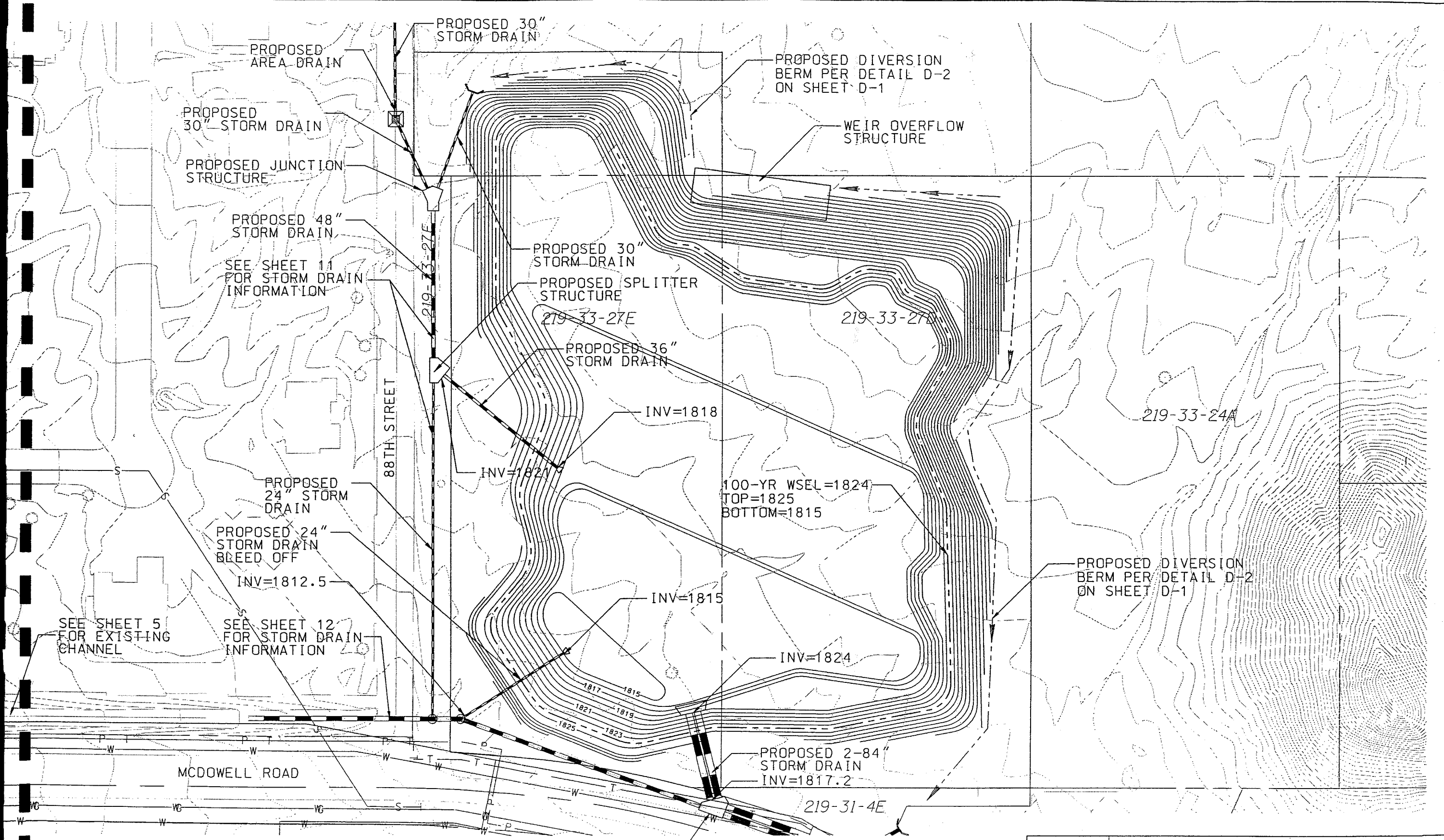
McDowell/88th Street Basin

Basin Land Area	10.3 ac	Outflow Pipe (no. and Dia.)	24 in
Basin Excavation Volume	120806 cy	Pipe Invert @ Inlet	1815 ft
Peak Storage	31.71 ac-ft	Pipe Invert @ Outlet	1814.3 ft
Q100 Inflow	906 cfs	Pipe Length	132.3 ft
Q100 Bypass	140 cfs	Pipe Slope	0.005 ft/ft
Highwater El. (Q100)	1824 ft	Pipe Centerline @ Inlet	1816 ft
Max. Pond. Depth	1825 ft		



Elevation	Inc. Volume (ac-ft)	Cum. Volume (ac-ft)
1815	0	0
1816	0.68	0.68
1817	1.28	1.96
1818	2.11	4.07
1819	3.01	7.08
1820	3.94	11.02
1821	4.85	15.87
1822	5.06	20.93
1823	5.28	26.21
1824	5.5	31.71
1825	5.72	37.43





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	FLOOD CONTROL DISTRICT OF MARICOPA COUNTY		WOOD, PATEL & ASSOCIATES, INC. 2051 WEST NORTHERN, SUITE 100 PHOENIX, ARIZONA (602) 335-8500
	ENGINEERING DIVISION		
	DESIGNED	J. TAILLON	
DRAWN	R. MCKASKLE		
CHECKED			
MCDOWELL ROAD AND 88TH STREET BASIN			SHEET DWG. P-10

FIGURE:

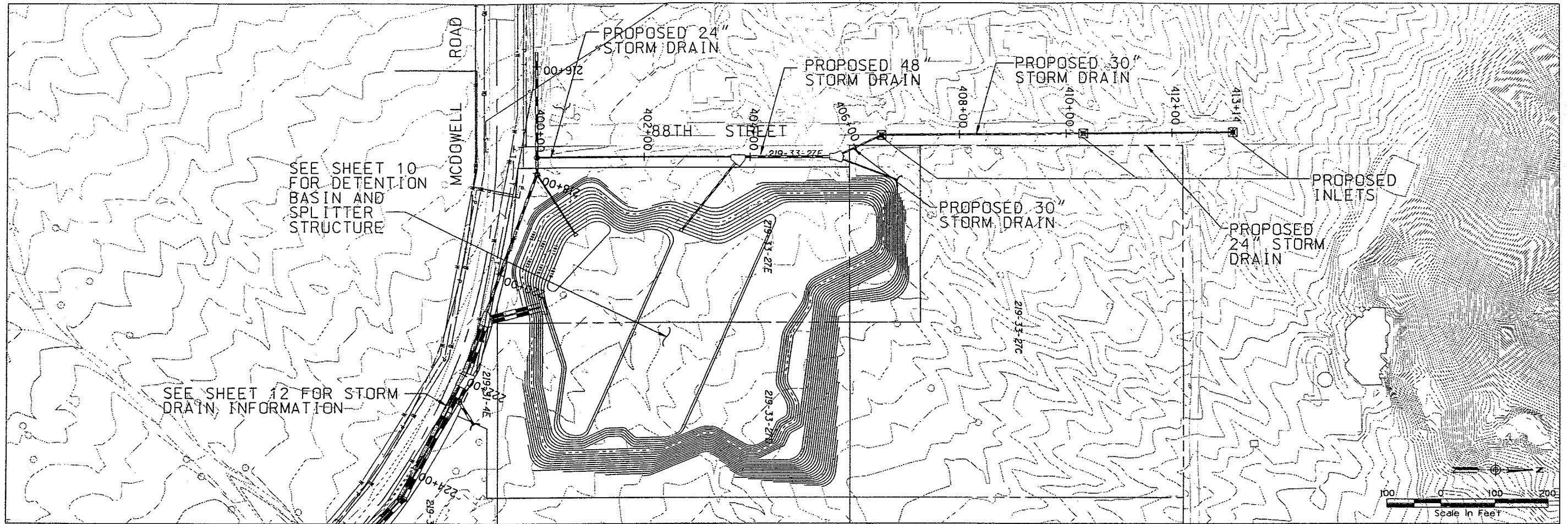
SPOOK HILL AREA DRAINAGE MASTER PLAN
Design Calculation Summary

Storm Drain Properties

US station	DS station	Total System Flow cfs	Length ft	Constructed Slope ft/ft	Section Size in	Mannings n	Average Velocity fps	Upstream Invert Elevation ft	DS Invert Elevation ft	Hydraulic Grade In ft	Hydraulic Grade Out ft
413+13	410+32	8	281	0.003559	24 inch	0.023	2.73	1,835.00	1,834.00	1,836.75	1,835.77
410+32	406+54	25	378	0.02381	30 inch	0.023	6.05	1,834.00	1,825.00	1,835.70	1,828.80
406+54	405+58	25	96	0.020833	30 inch	0.023	5.09	1,825.00	1,823.00	1,828.77	1,827.66
405+58	403+82	71	176	0.011364	48 inch	0.023	5.65	1,823.00	1,821.00	1,827.61	1,826.26
403+82	400+00	32	382	0.024869	24 inch	0.013	10.19	1,821.00	1,811.50	1,824.40	1,816.76

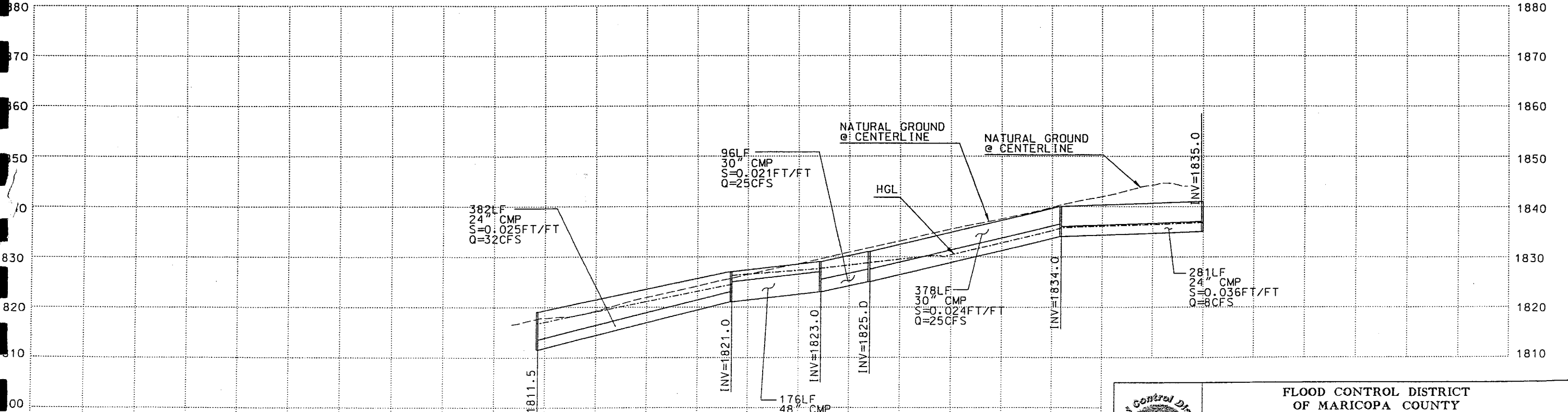
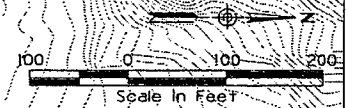
Note: (1) 0.023 Manning's n for corrugated metal pipe with paved invert.

(1) 0.013 Manning's n for reinforced concrete pipe.

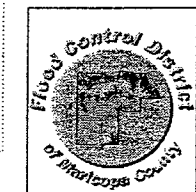


SEE SHEET 10
FOR DETENTION
BASIN AND
SPLITTER
STRUCTURE

SEE SHEET 12 FOR STORM
DRAIN INFORMATION



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**FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY
ENGINEERING DIVISION**

DESIGNED	NAME	DATE
J. TAILLON		
R. MCKASKLE		

WOOD, PATEL & ASSOCIATES, INC.
2051 WEST NORTHERN, SUITE 100
PHOENIX, ARIZONA (602) 335-8500

88TH STREET ALIGNMENT

SHEET
DWG. P-11

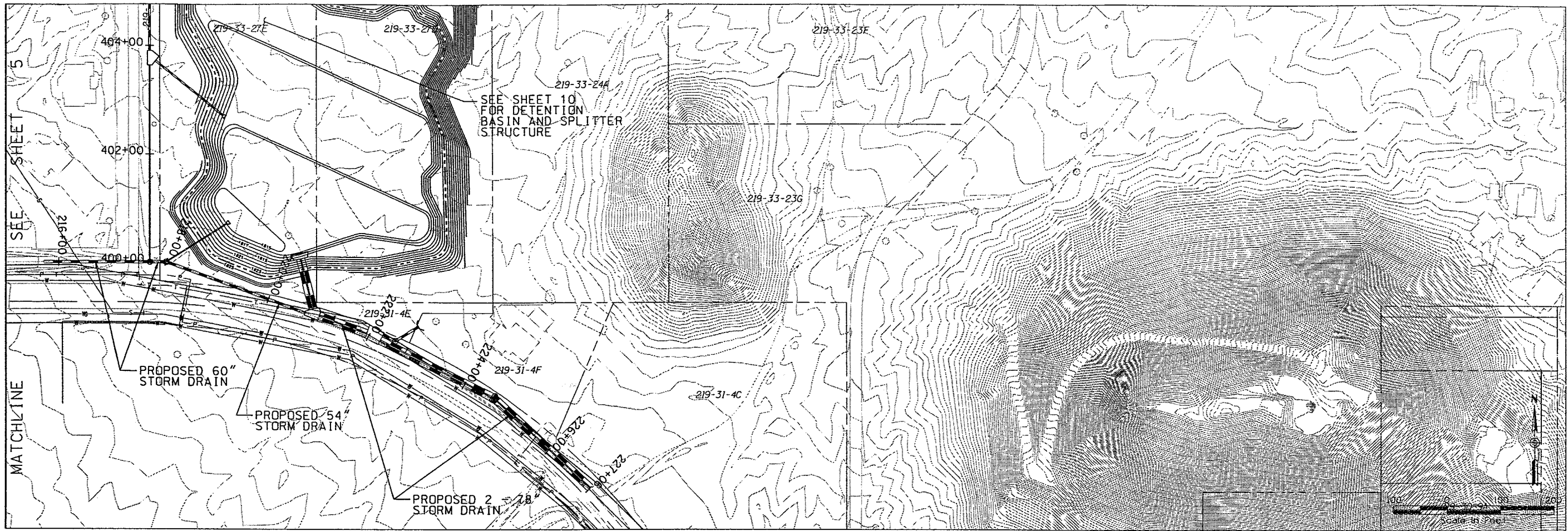
FIGURE:

SPOOK HILL AREA DRAINAGE MASTER PLAN
Design Calculation Summary

Storm Drain Properties

US station	DS station	Total System Flow cfs	Length ft	Constructed Slope ft/ft	Section Size in	Mannings n	Average Velocity fps	Upstream Invert Elevation ft	DS Invert Elevation ft	Hydraulic Grade In ft	Hydraulic Grade Out ft
226+93	224+46	500	247	0.008097	78 inch	0.023	7.53	1,819.90	1,817.90	1,828.02	1,826.27
224+46	221+85	500	261	0.002682	78 inch	0.023	7.53	1,817.90	1,817.20	1,826.22	1,824.36
221+85	220+74	600	111	0.018018	78 inch	0.023	9.04	1,817.20	1,815.20	1,824.24	1,823.10
220+74	218+00	135	274	0.009854	54 inch	0.023	8.49	1,815.20	1,812.50	1,821.16	1,817.12
218+00	217+70	135	30	0.033333	60 inch	0.023	7.04	1,812.50	1,811.50	1,817.04	1,816.87
217+70	215+73	167	197	0.007614	60 inch	0.023	9.6	1,811.50	1,810.00	1,816.76	1,813.71

Note: (1) 0.023 Manning's n for corrugated metal pipe with paved invert.
(1) 0.013 Manning's n for reinforced concrete pipe.

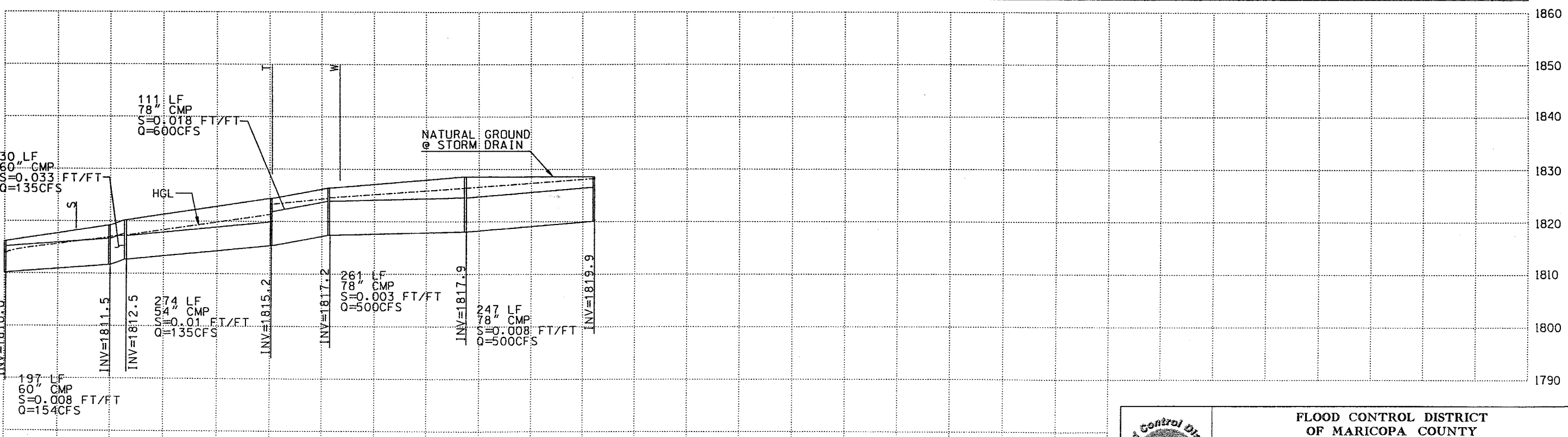


SEE SHEET 10
FOR DETENTION
BASIN AND SPLITTER
STRUCTURE

PROPOSED 60" STORM DRAIN

PROPOSED 54" STORM DRAIN

PROPOSED 2 x 28" STORM DRAIN



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FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY
ENGINEERING DIVISION

DESIGNED	NAME	DATE
J. TAILLON		
R. MCKASKLE		

WOOD, PATEL & ASSOCIATES, INC.
2051 WEST NORTHERN, SUITE 100
PHOENIX, ARIZONA (602) 335-8500

McDOWELL ROAD ALIGNMENT

SHEET
DWG. P-12

FIGURE:

SPOOK HILL AREA DRAINAGE MASTER PLAN

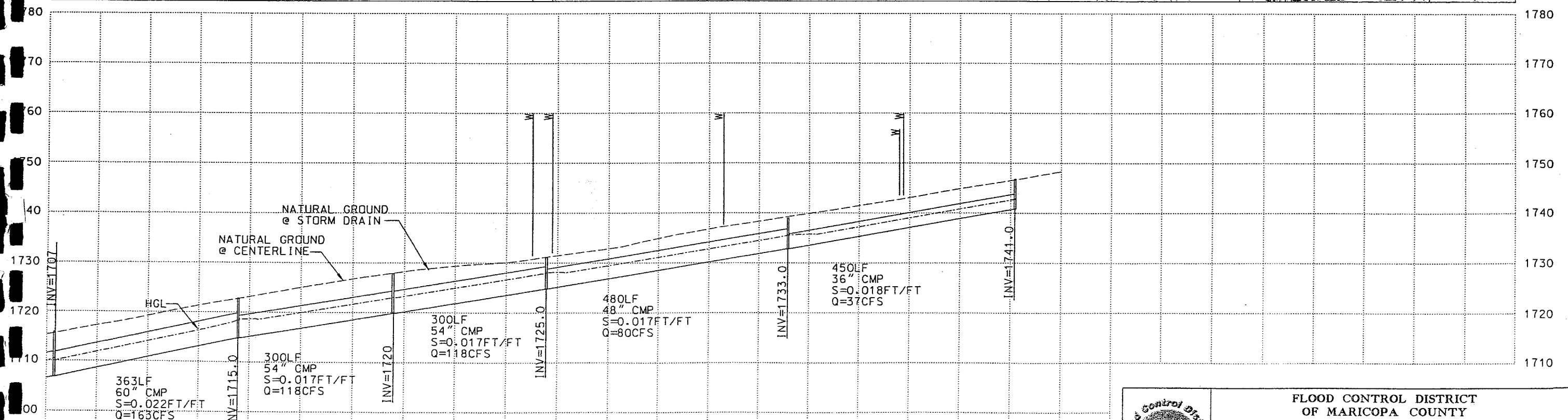
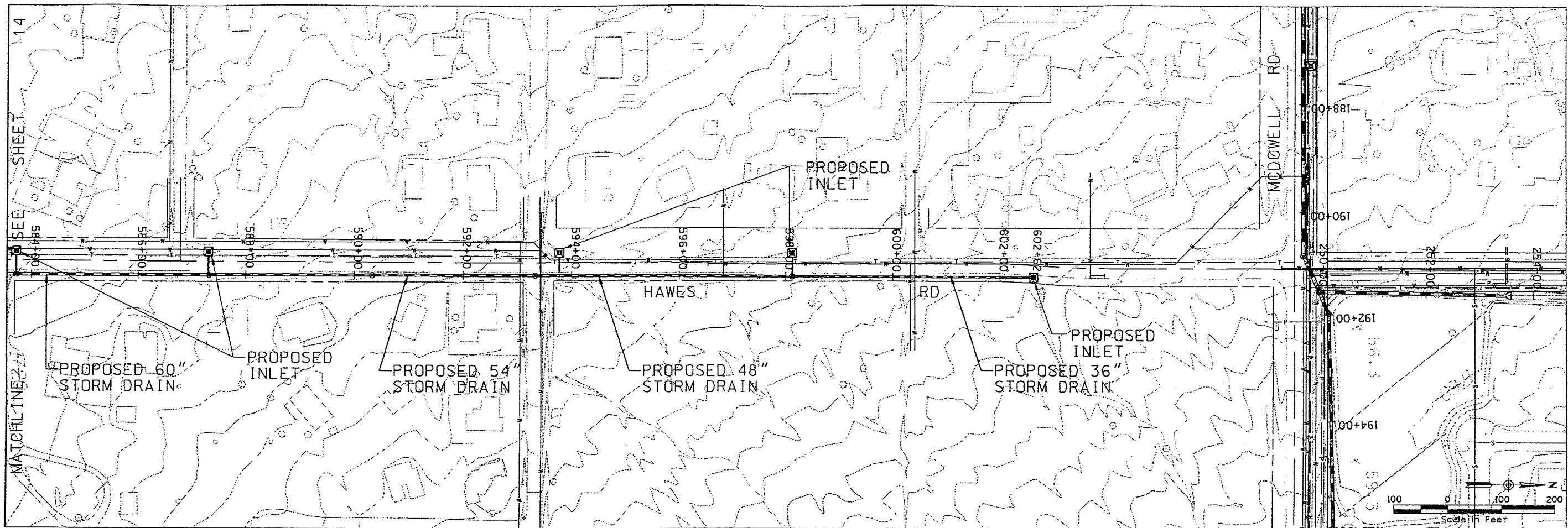
Design Calculation Summary

Storm Drain Properties

US station	DS station	Total System Flow cfs	Length ft	Constructed Slope ft/ft	Section Size in	Mannings n	Average Velocity fps	Upstream Invert Elevation ft	DS Invert Elevation ft	Hydraulic Grade In ft	Hydraulic Grade Out ft
602+61	598+11	37	450	0.017778	36 inch	0.023	6.45	1,741.00	1,733.00	1,742.98	1,735.77
598+11	593+31	80	480	0.016667	48 inch	0.023	8.05	1,733.00	1,725.00	1,735.71	1,728.27
593+31	590+31	118	300	0.016667	54 inch	0.023	9.64	1,725.00	1,720.00	1,728.20	1,723.27
590+31	587+31	118	300	0.016667	54 inch	0.023	9.05	1,720.00	1,715.00	1,723.20	1,718.75
587+31	583+68	163	363	0.022039	60 inch	0.023	11.39	1,715.00	1,707.00	1,718.66	1,710.22
583+68	580+29	163	339	0.022124	60 inch	0.023	9.44	1,707.00	1,699.50	1,710.66	1,705.46

Note: (1) 0.023 Manning's n for corrugated metal pipe with paved invert.

(1) 0.013 Manning's n for reinforced concrete pipe.



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**FLOOD CONTROL DISTRICT
 OF MARICOPA COUNTY
 ENGINEERING DIVISION**

DESIGNED	NAME	DATE
J. TAILLON		
R. MCKASKLE		
CHECKED		

WOOD, PATEL & ASSOCIATES, INC.
 2051 WEST NORTHERN, SUITE 100
 PHOENIX, ARIZONA (602) 335-8500

HAWES ROAD ALIGNMENT

**SHEET
 DWG. P-13**

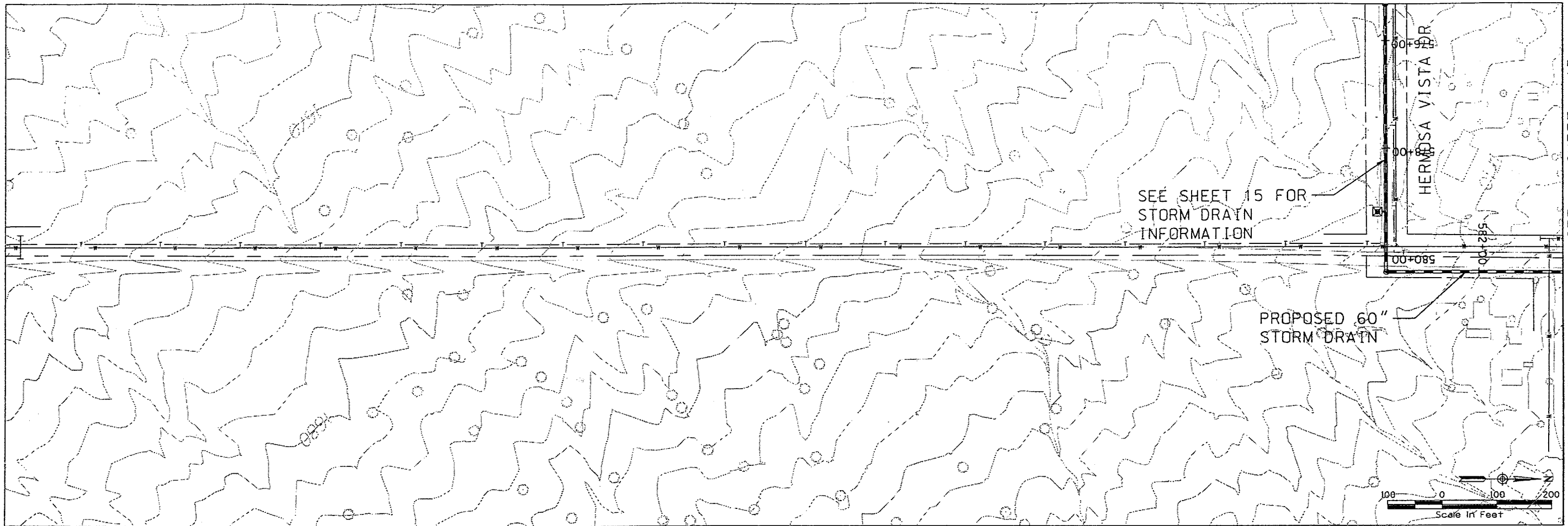
SPOOK HILL AREA DRAINAGE MASTER PLAN
Design Calculation Summary

Storm Drain Properties

US station	DS station	Total System Flow cfs	Length ft	Constructed Slope ft/ft	Section Size in	Mannings n	Average Velocity fps	Upstream Invert Elevation ft	DS Invert Elevation ft	Hydraulic Grade In ft	Hydraulic Grade Out ft
587+31	583+68	163	363	0.022039	60 inch	0.023	11.39	1,715.00	1,707.00	1,718.66	1,710.22
583+68	580+29	163	339	0.022124	60 inch	0.023	9.44	1,707.00	1,699.50	1,710.66	1,705.46

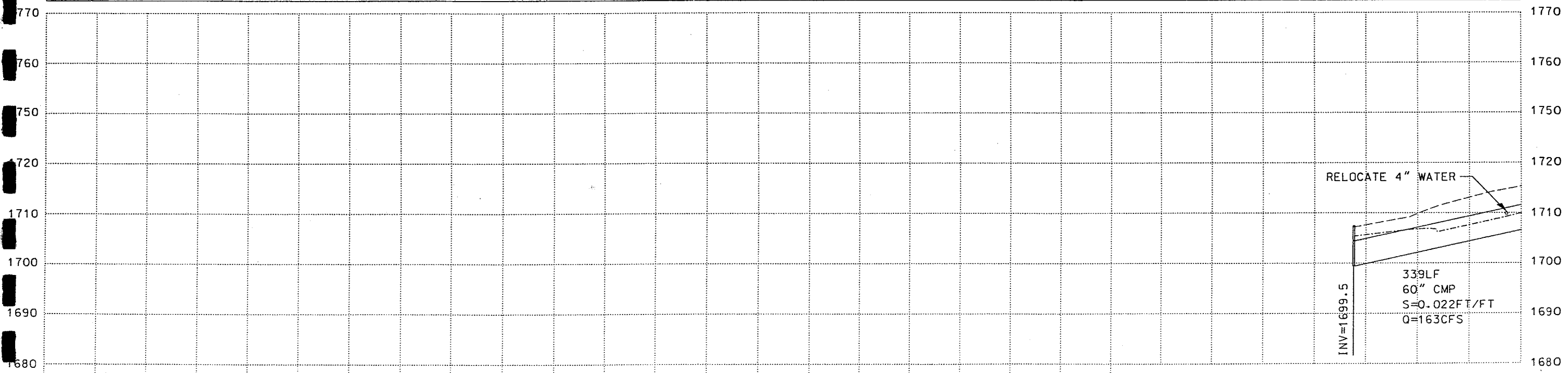
Note: (1) 0.023 Manning's n for corrugated metal pipe with paved invert.

(1) 0.013 Manning's n for reinforced concrete pipe.



SEE SHEET 13

MATCHLINE



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FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY
ENGINEERING DIVISION

	NAME	DATE
DESIGNED	J. TAILOR	
DRAWN	R. MCKASKLE	
CHECKED		

WOOD, PATEL & ASSOCIATES, INC.
2051 WEST NORTHERN, SUITE 100
PHOENIX, ARIZONA (602) 335-8500

HAWES ROAD ALIGNMENT

SHEET
DWG. P-14

FIGURE:

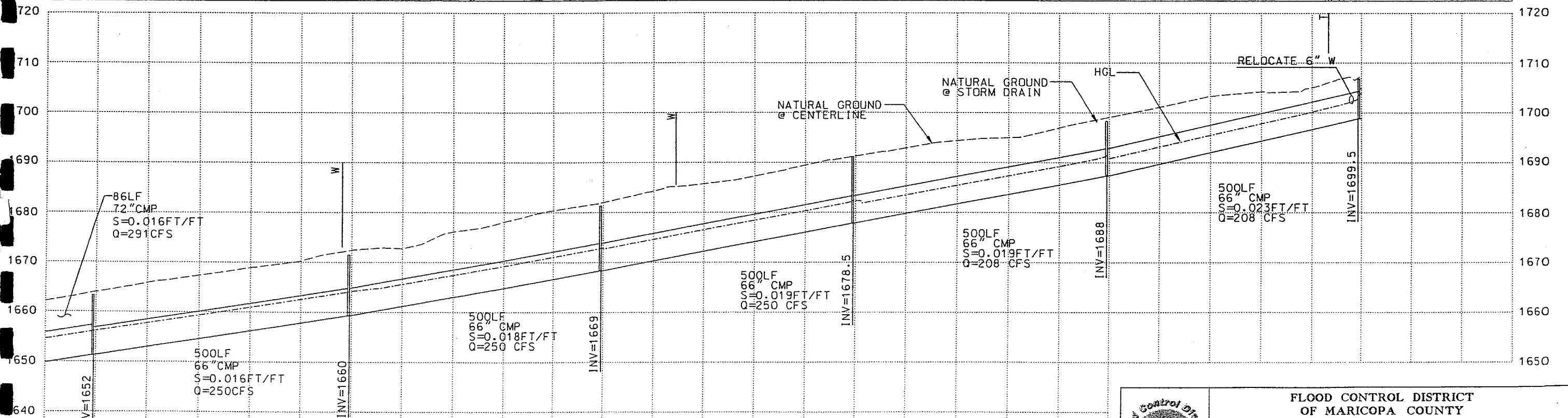
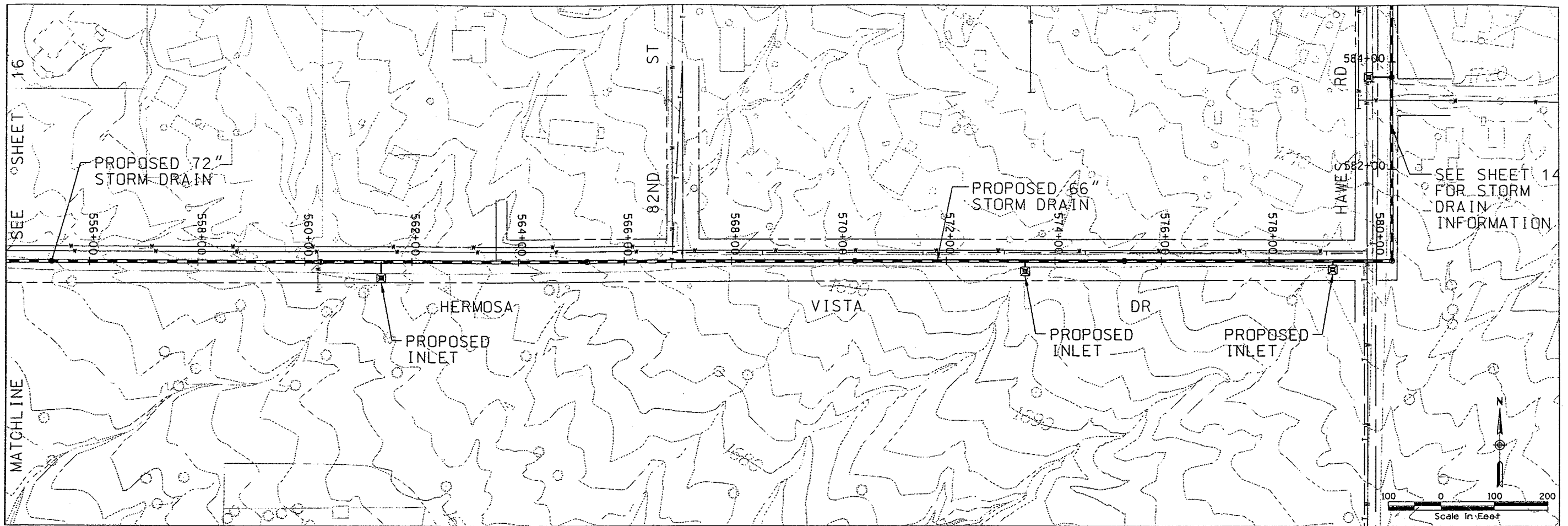
SPOOK HILL AREA DRAINAGE MASTER PLAN
Design Calculation Summary

Storm Drain Properties

US station	DS station	Total System Flow cfs	Length ft	Constructed Slope ft/ft	Section Size in	Mannings n	Average Velocity fps	Upstream Invert Elevation ft	DS Invert Elevation ft	Hydraulic Grade In ft	Hydraulic Grade Out ft
580+31	575+31	208	500	0.023	66 inch	0.023	10.99	1,699.50	1,688.00	1,703.54	1,692.13
575+31	570+31	208	500	0.019	66 inch	0.023	10.53	1,688.00	1,678.50	1,692.04	1,683.03
570+31	565+31	250	500	0.019	66 inch	0.023	12.08	1,678.50	1,669.00	1,682.91	1,673.54
565+31	560+31	250	500	0.018	66 inch	0.023	11.75	1,669.00	1,660.00	1,673.42	1,664.85
560+31	555+31	250	500	0.016	66 inch	0.023	11.38	1,660.00	1,652.00	1,664.74	1,656.84
555+31	550+31	291	500	0.016	72 inch	0.023	11.7	1,652.00	1,644.00	1,656.72	1,649.18

Note: (1) 0.023 Manning's n for corrugated metal pipe with paved invert.

(1) 0.013 Manning's n for reinforced concrete pipe.



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FLOOD CONTROL DISTRICT
 OF MARICOPA COUNTY
 ENGINEERING DIVISION

DESIGNED	NAME	DATE
J. TAILLON		
R. MCKASKLE		

WOOD, PATEL & ASSOCIATES, INC.
 2051 WEST NORTHERN, SUITE 100
 PHOENIX, ARIZONA (602) 335-8500

HERMOSA VISTA DRIVE ALIGNMENT

SHEET
 DWG. P-15

FIGURE:

SPOOK HILL AREA DRAINAGE MASTER PLAN

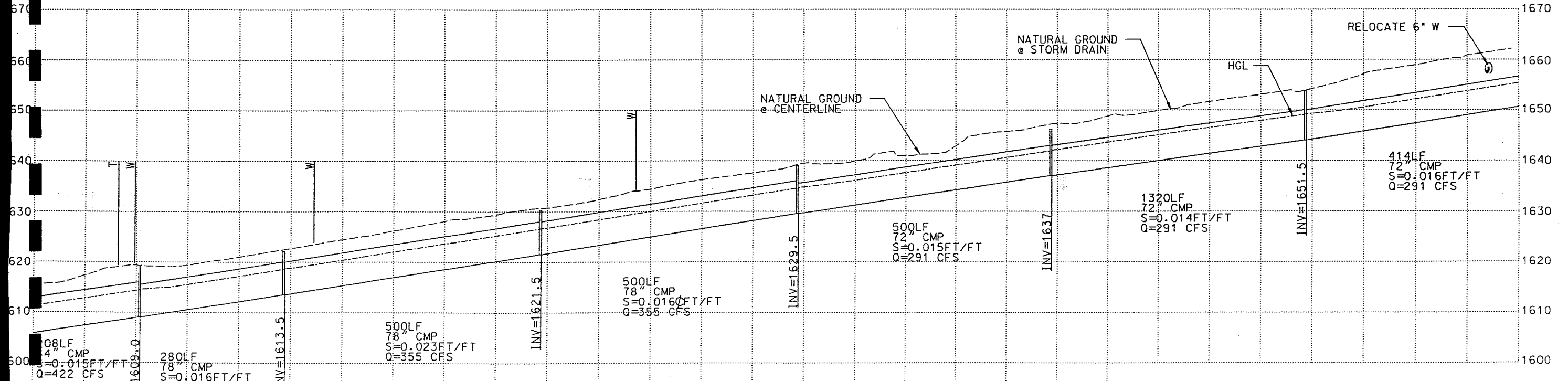
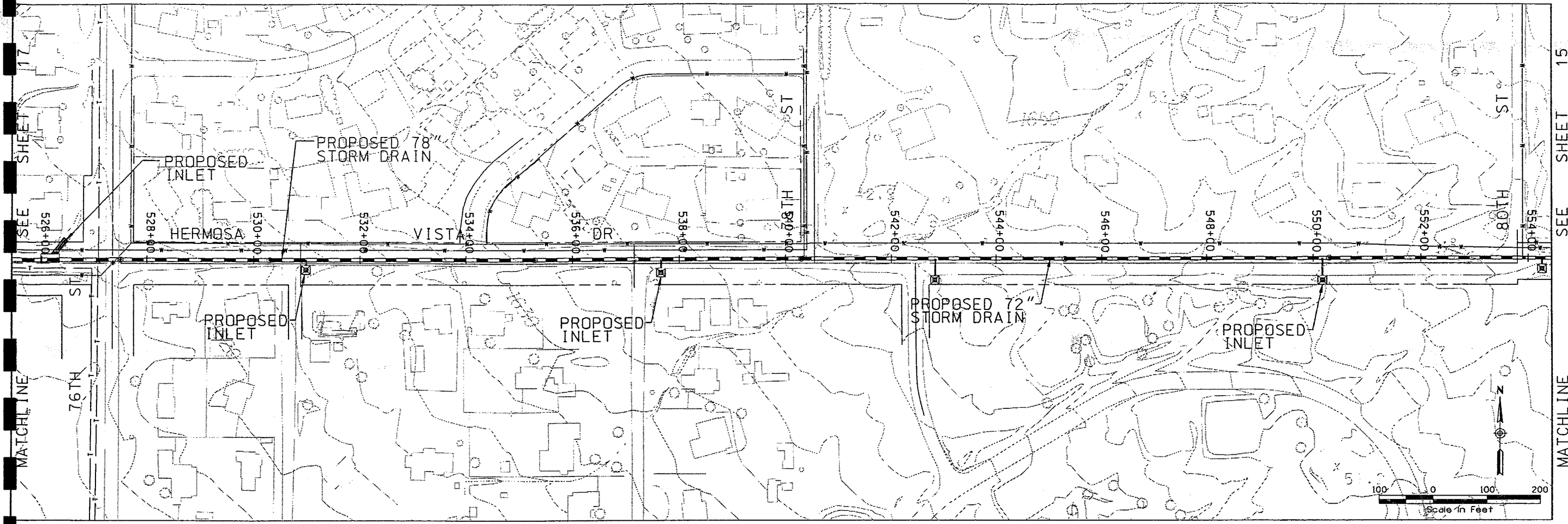
Design Calculation Summary

Storm Drain Properties

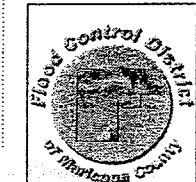
US station	DS station	Total System Flow cfs	Length ft	Constructed Slope ft/ft	Section Size in	Mannings n	Average Velocity fps	Upstream Invert Elevation ft	DS Invert Elevation ft	Hydraulic Grade In ft	Hydraulic Grade Out ft
555+31	550+31	291	500	0.016	72 inch	0.023	11.7	1,652.00	1,644.00	1,656.72	1,649.18
550+31	545+31	291	500	0.014	72 inch	0.023	11.49	1,644.00	1,637.00	1,649.08	1,641.99
545+31	540+31	291	500	0.015	72 inch	0.023	11.52	1,637.00	1,629.50	1,641.88	1,634.68
540+31	535+31	355	500	0.016	78 inch	0.023	12.67	1,629.50	1,621.50	1,634.55	1,626.68
535+31	530+31	355	500	0.016	78 inch	0.023	12.67	1,621.50	1,613.50	1,626.55	1,618.68
530+31	527+51	355	280	0.016071	78 inch	0.023	12.3	1,613.50	1,609.00	1,618.55	1,614.54
527+51	523+29	422	420	0.015476	84 inch	0.023	13.07	1,609.00	1,602.50	1,614.41	1,608.04

Note: (1) 0.023 Manning's n for corrugated metal pipe with paved invert.

(1) 0.013 Manning's n for reinforced concrete pipe.



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FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY
ENGINEERING DIVISION

DESIGNED	NAME	DATE
J. TAILLON		
R. MCKASKLE		
CHECKED		

WOOD, PATEL & ASSOCIATES, INC.
2051 WEST NORTHERN, SUITE 100
PHOENIX, ARIZONA (602) 335-8500

HERMOSA VISTA DRIVE ALIGNMENT

SHEET
DWG. P-16

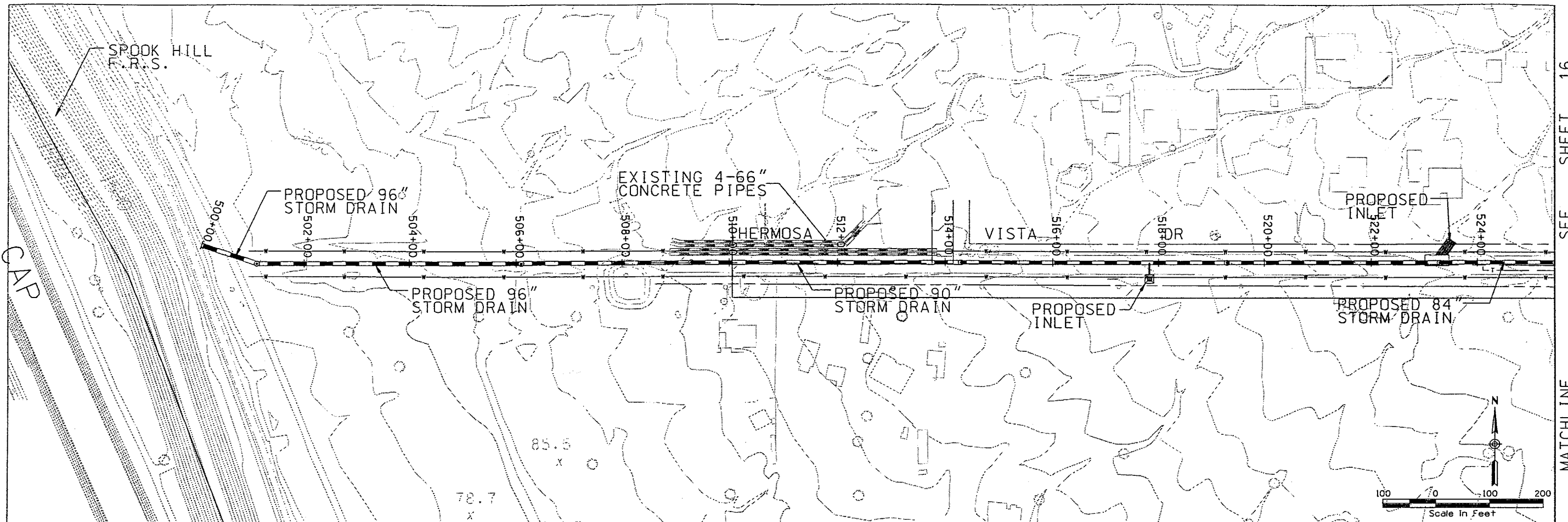
FIGURE:

SPOOK HILL AREA DRAINAGE MASTER PLAN
Design Calculation Summary

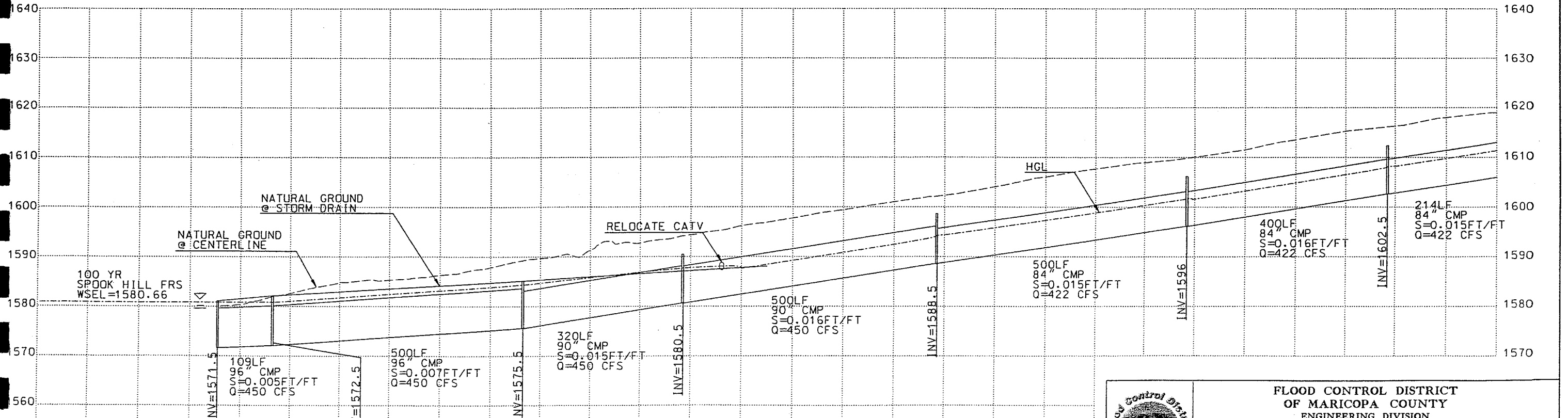
Storm Drain Properties

US station	DS station	Total System Flow cfs	Length ft	Constructed Slope ft/ft	Section Size in	Mannings n	Average Velocity fps	Upstream Invert Elevation ft	DS Invert Elevation ft	Hydraulic Grade In ft	Hydraulic Grade Out ft
527+51	523+29	422	420	0.015476	84 inch	0.023	13.07	1,609.00	1,602.50	1,614.41	1,608.04
523+29	519+29	422	400	0.01625	84 inch	0.023	13	1,602.50	1,596.00	1,607.91	1,601.60
519+29	514+29	422	500	0.015	84 inch	0.023	12.9	1,596.00	1,588.50	1,601.47	1,594.13
514+29	509+29	450	500	0.016	90 inch	0.023	11.7	1,588.50	1,580.50	1,594.00	1,587.56
509+29	506+09	450	320	0.015625	90 inch	0.023	10.35	1,580.50	1,575.50	1,587.48	1,584.20
506+09	501+09	450	500	0.007	96 inch	0.023	8.95	1,575.50	1,572.00	1,584.20	1,580.39
501+09	500+00	450	109	0.004587	96 inch	0.023	8.95	1,572.00	1,571.50	1,580.33	1,579.50

Note: (1) 0.023 Manning's n for corrugated metal pipe with paved invert.
(1) 0.013 Manning's n for reinforced concrete pipe.



SEE SHEET 16 MATCHLINE



NOTE:
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 THE LOCATIONS OF ALL STRUCTURES, UTILITIES AND RIGHT-OF-WAY ARE APPROXIMATE
 AND ARE BASED UPON RECORD DOCUMENTS. AERIAL TOPOGRAPHY WAS PRODUCED AT A
 SCALE OF 1 INCH = 200 FEET WITH A 2 FOOT CONTOUR INTERVAL. MAPPING WAS
 PREPARED BY KENNEY AERIAL MAPPING AND WAS PROVIDED BY THE FLOOD CONTROL
 DISTRICT OF MARICOPA COUNTY.

	FLOOD CONTROL DISTRICT OF MARICOPA COUNTY		WOOD, PATEL & ASSOCIATES, INC. 2051 WEST NORTHERN, SUITE 100 PHOENIX, ARIZONA (602) 335-8500											
	ENGINEERING DIVISION													
	<table border="1"> <tr> <th>DESIGNED</th> <td>J. TAILLON</td> <th>DATE</th> <td></td> </tr> <tr> <th>DRAWN</th> <td>R. MCKASKLE</td> <td></td> <td></td> </tr> <tr> <th>CHECKED</th> <td></td> <td></td> <td></td> </tr> </table>	DESIGNED		J. TAILLON	DATE		DRAWN	R. MCKASKLE			CHECKED			
DESIGNED	J. TAILLON	DATE												
DRAWN	R. MCKASKLE													
CHECKED														
SHEET DWG. P-17														

SPOOK HILL AREA DRAINAGE MASTER PLAN

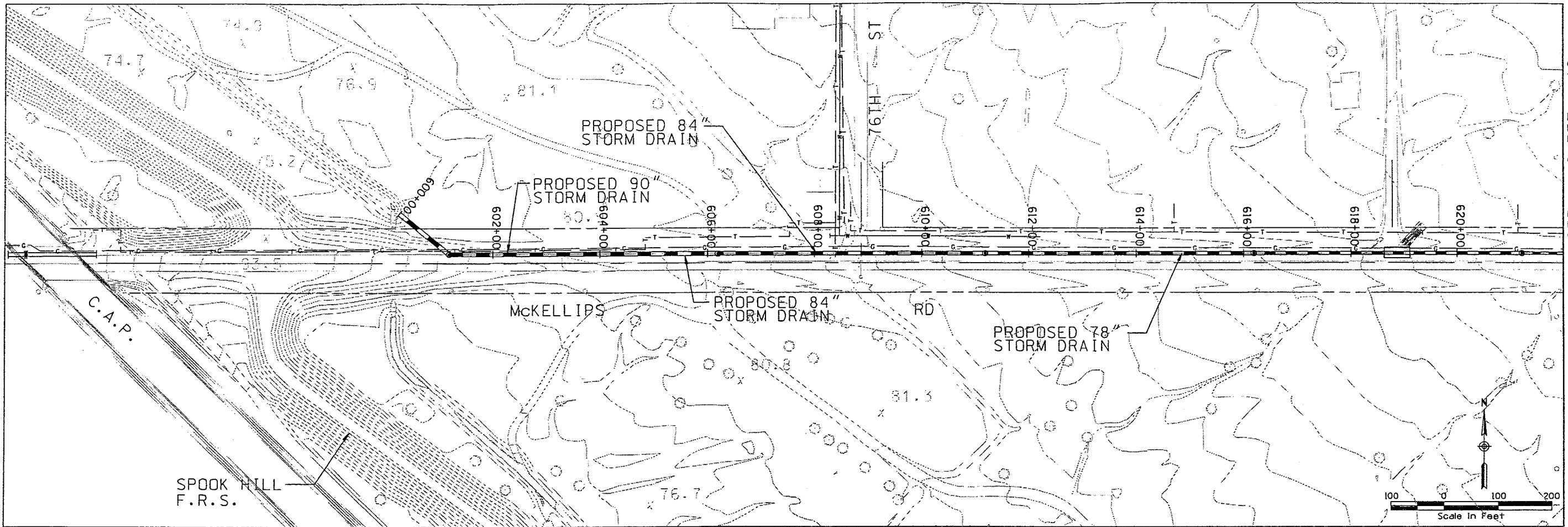
Design Calculation Summary

Storm Drain Properties

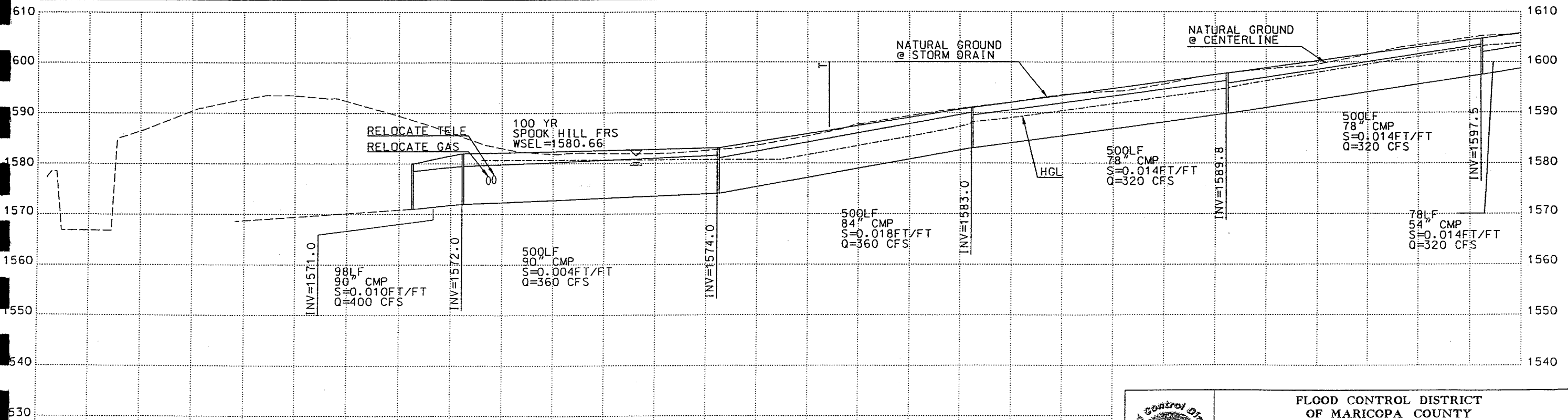
US station	DS station	Total System Flow cfs	Length ft	Constructed Slope ft/ft	Section Size in	Mannings n	Average Velocity fps	Upstream Invert Elevation ft	DS Invert Elevation ft	Hydraulic Grade In ft	Hydraulic Grade Out ft
625+98	620+98	130	500	0.017	54 inch	0.023	8.98	1,606.00	1,597.50	1,609.50	1,603.23
620+98	615+98	320	500	0.0154	72 inch	0.023	12.15	1,597.50	1,589.80	1,603.06	1,594.85
615+98	610+98	320	500	0.0136	78 inch	0.023	11.55	1,589.80	1,583.00	1,594.74	1,588.19
610+98	605+98	360	500	0.018	84 inch	0.023	10.8	1,583.00	1,574.00	1,588.00	1,581.46
605+98	600+98	360	500	0.004	90 inch	0.023	9.04	1,574.00	1,572.00	1,581.41	1,577.75
600+98	600+00	400	98	0.010204	90 inch	0.023	11.81	1,572.00	1,571.00	1,577.59	1,576.18

Note: (1) 0.023 Manning's n for corrugated metal pipe with paved invert.

(1) 0.013 Manning's n for reinforced concrete pipe.



SEE SHEET 19 MATCHLINE



NOTE:
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 SCALE OF 1 INCH = 200 FEET WITH A 2 FOOT CONTOUR INTERVAL. MAPPING WAS
 PREPARED BY KENNEY AERIAL MAPPING AND WAS PROVIDED BY THE FLOOD CONTROL
 DISTRICT OF MARICOPA COUNTY.

	FLOOD CONTROL DISTRICT OF MARICOPA COUNTY		WOOD, PATEL & ASSOCIATES, INC. 2051 WEST NORTHERN, SUITE 100 PHOENIX, ARIZONA (602) 335-8500	
	ENGINEERING DIVISION			
	DESIGNED	NAME		DATE
	DRAWN	R. MCKASKLE		
CHECKED				
McKELLIPS ROAD ALIGNMENT			SHEET DWG. P-18	

FIGURE:

SPOOK HILL AREA DRAINAGE MASTER PLAN

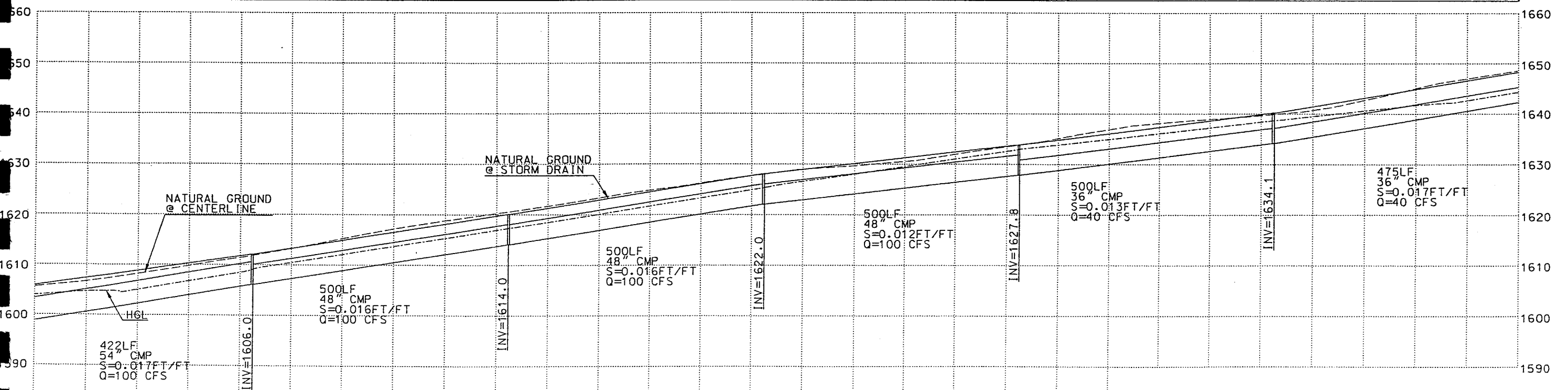
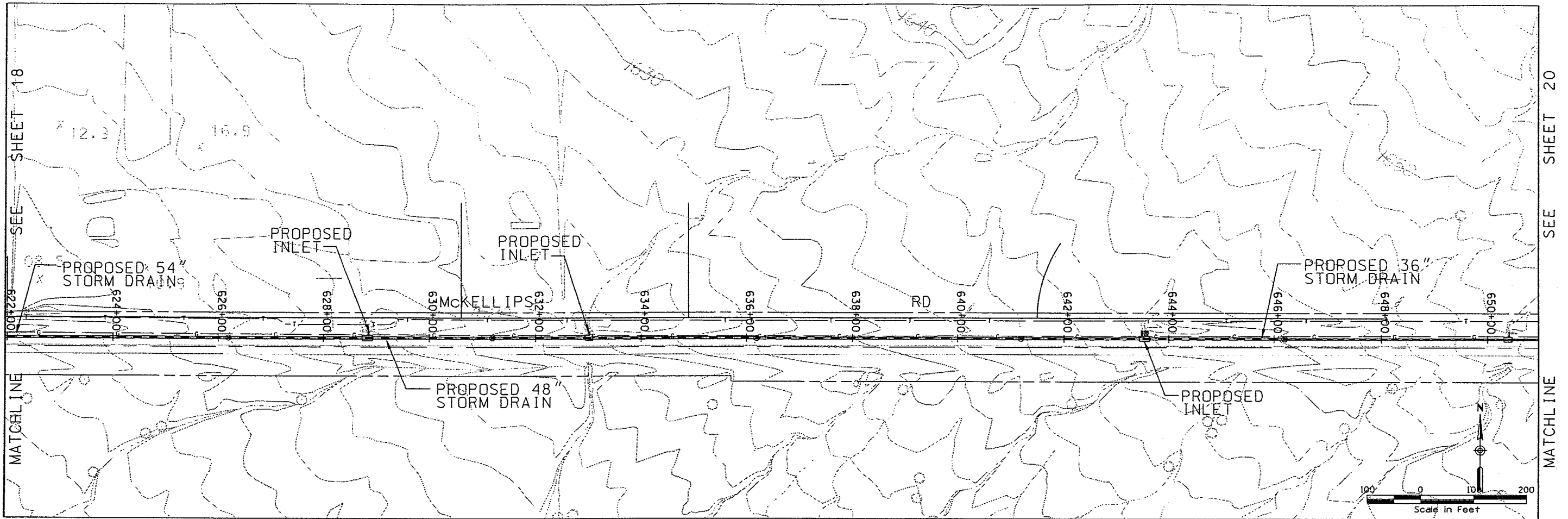
Design Calculation Summary

Storm Drain Properties

US station	DS station	Total System Flow cfs	Length ft	Constructed Slope ft/ft	Section Size in	Mannings n	Average Velocity fps	Upstream Invert Elevation ft	DS Invert Elevation ft	Hydraulic Grade In ft	Hydraulic Grade Out ft
650+98	645+98	40	500	0.017	36 inch	0.023	6.7	1,642.60	1,634.10	1,644.66	1,638.10
645+98	640+98	130	500	0.0126	54 inch	0.023	8.61	1,634.10	1,627.80	1,638.00	1,632.06
640+98	635+98	130	500	0.0116	54 inch	0.023	9.11	1,627.80	1,622.00	1,632.01	1,625.49
635+98	630+98	130	500	0.016	54 inch	0.023	9.92	1,622.00	1,614.00	1,625.42	1,617.49
630+98	625+98	130	500	0.016	54 inch	0.023	9.81	1,614.00	1,606.00	1,617.42	1,609.58
625+98	620+98	130	500	0.017	54 inch	0.023	8.98	1,606.00	1,597.50	1,609.50	1,603.23

Note: (1) 0.023 Manning's n for corrugated metal pipe with paved invert.

(1) 0.013 Manning's n for reinforced concrete pipe.



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 DISTRICT OF MARICOPA COUNTY.



FLOOD CONTROL DISTRICT
 OF MARICOPA COUNTY
 ENGINEERING DIVISION

DESIGNED	NAME	DATE
J. TAILLON		
R. MCKASKLE		

WOOD, PATEL & ASSOCIATES, INC.
 2051 WEST NORTHERN, SUITE 100
 PHOENIX, ARIZONA (602) 335-8500

McKELLIPS ROAD ALIGNMENT

SHEET
 DWG. P-19

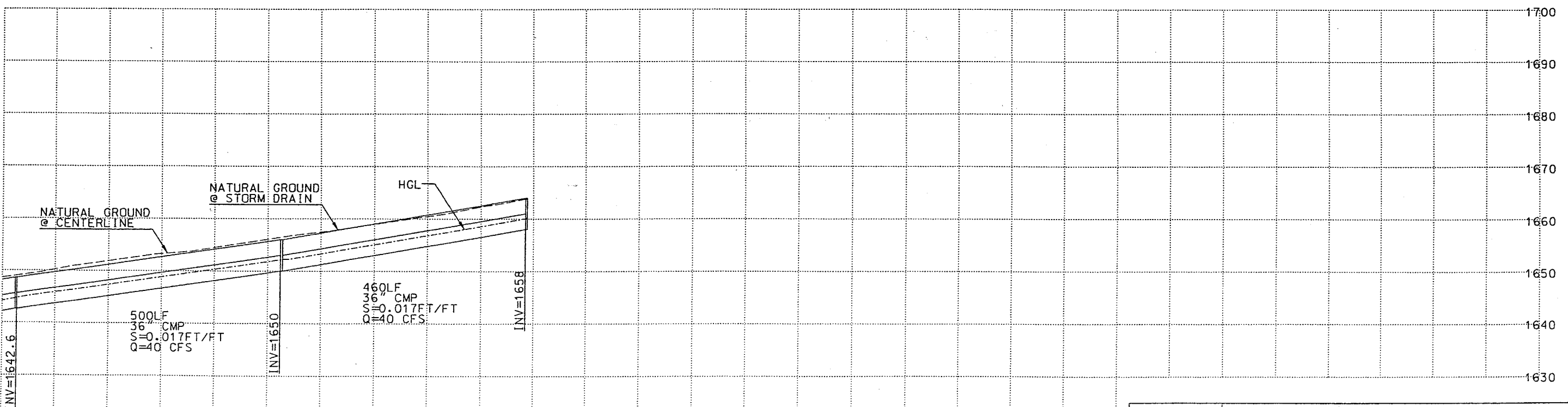
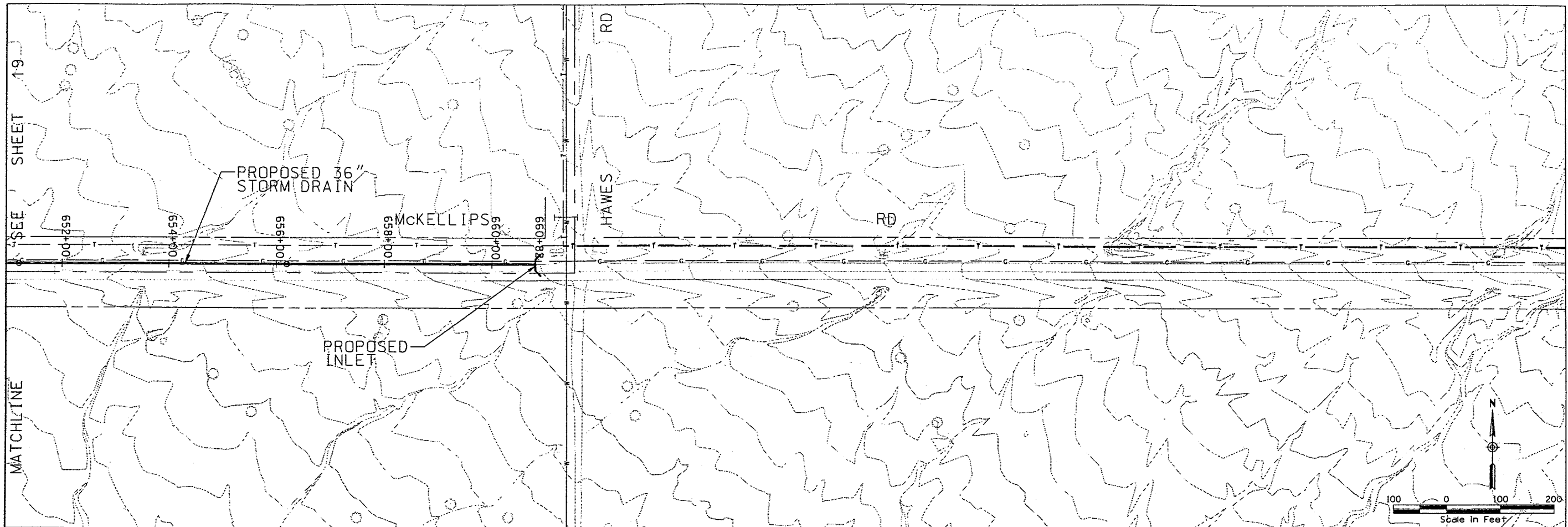
FIGURE:

SPOOK HILL AREA DRAINAGE MASTER PLAN
Design Calculation Summary

Storm Drain Properties

US station	DS station	Total System Flow cfs	Length ft	Constructed Slope ft/ft	Section Size in	Mannings n	Average Velocity fps	Upstream Invert Elevation ft	DS Invert Elevation ft	Hydraulic Grade In ft	Hydraulic Grade Out ft
660+58	655+98	40	460	0.017391	36 inch	0.023	7.45	1,658.00	1,650.00	1,660.06	1,652.21
655+98	650+98	40	500	0.0148	36 inch	0.023	7.37	1,650.00	1,642.60	1,652.17	1,644.73
650+98	645+98	40	500	0.017	36 inch	0.023	6.7	1,642.60	1,634.10	1,644.66	1,638.10

Note: (1) 0.023 Manning's n for corrugated metal pipe with paved invert.
(1) 0.013 Manning's n for reinforced concrete pipe.



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 DISTRICT OF MARICOPA COUNTY.



FLOOD CONTROL DISTRICT
 OF MARICOPA COUNTY
 ENGINEERING DIVISION

	NAME	DATE
DESIGNED	J. TAILLON	
DRAWN	R. MCKASKLE	
CHECKED		

WOOD, PATEL & ASSOCIATES, INC.
 2051 WEST NORTHERN, SUITE 100
 PHOENIX, ARIZONA (602) 335-8500

MCKELLIPS ROAD ALIGNMENT

SHEET
 DWG. P-20

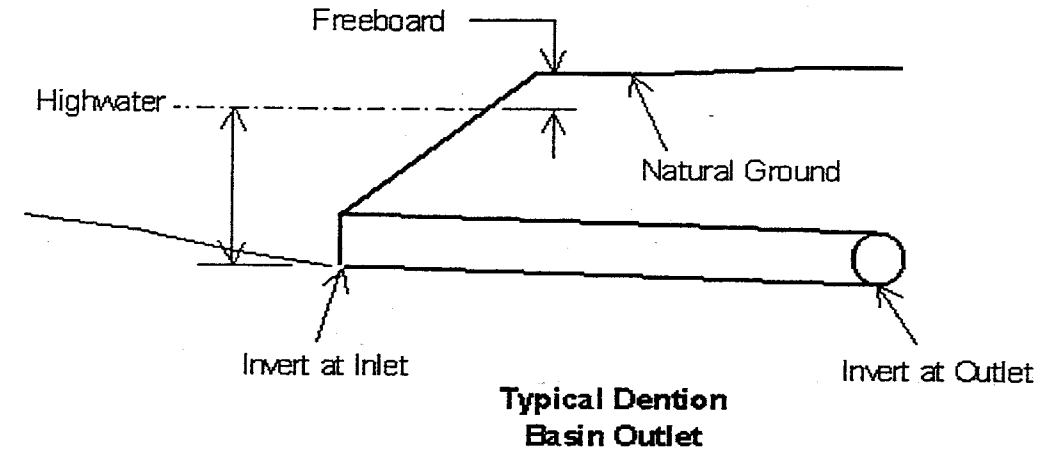
FIGURE:

SPOOK HILL AREA DRAINAGE MASTER PLAN
Design Calculation Summary

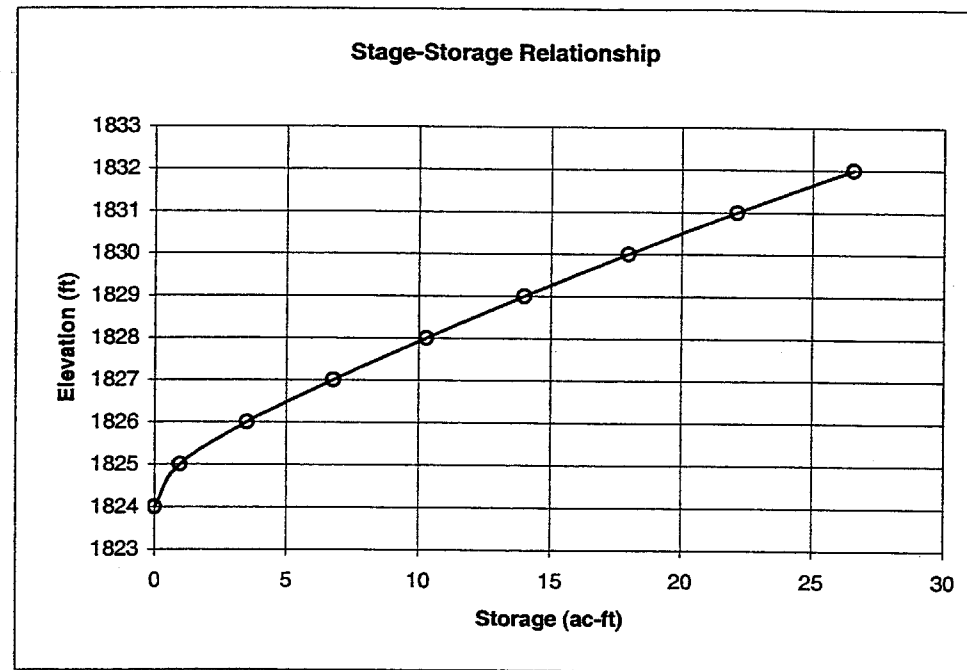
Detention Basin Properties

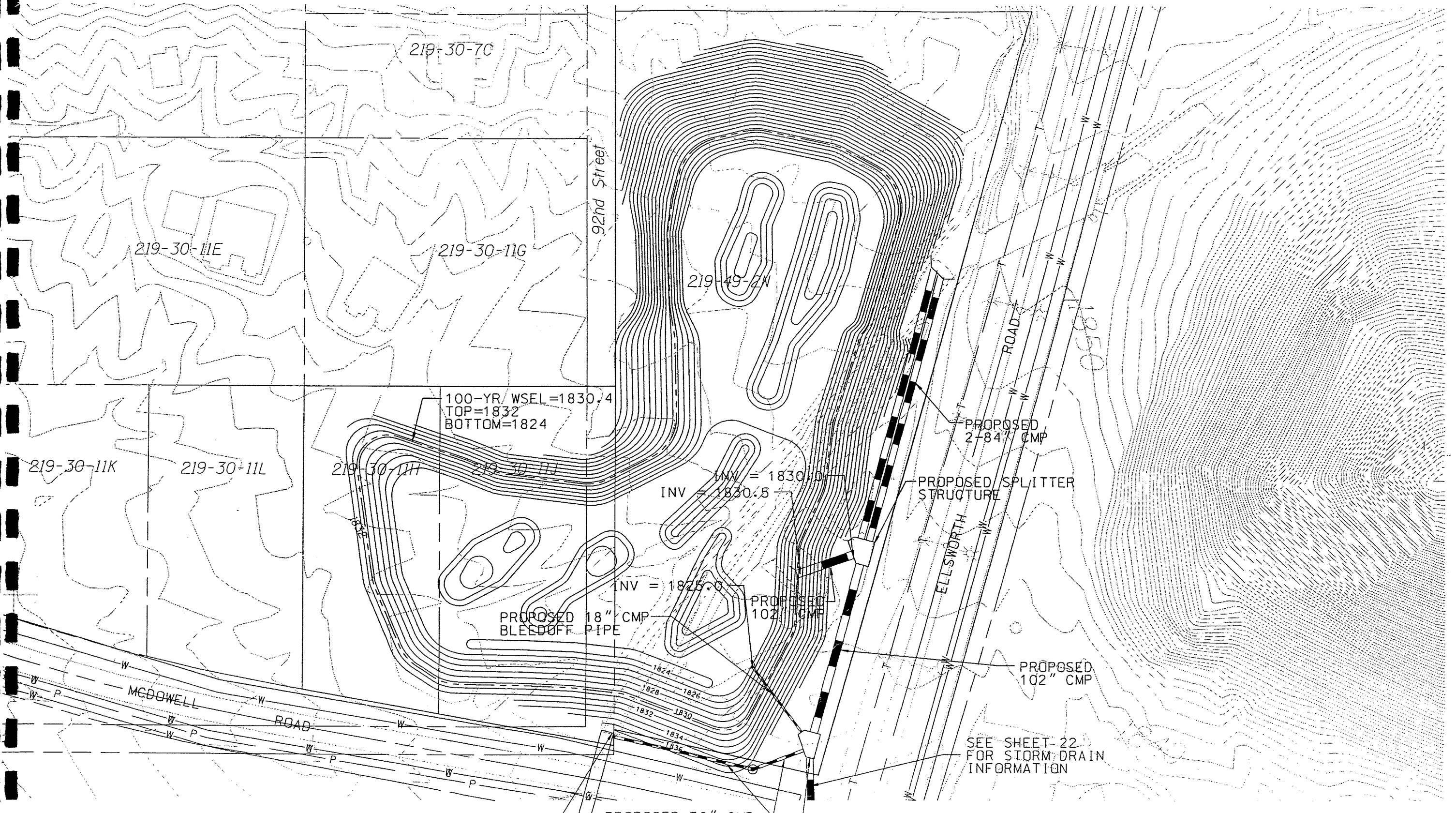
McDowell/Ellsworth Roads Basin

Basin Land Area	8.8 ac	Outflow Pipe (no. and Dia.)	18 in
Basin Excavation Volume	85571 cy	Pipe Invert @ Inlet	1825 ft
Peak Storage	19.2 ac-ft	Pipe Invert @ Outlet	1824.6 ft
Q100 Inflow	611 cfs	Pipe Length	88.8 ft
Q100 Bypass	478 cfs	Pipe Slope	0.005 ft/ft
Highwater El. (Q100)	1830.4 ft	Pipe Centerline @ Inlet	1825.75 ft
Max. Pond. Depth	1832 ft		



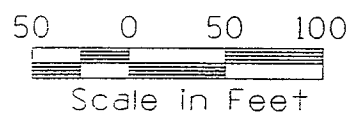
Elevation	Inc. Volume (ac-ft)	Cum. Volume (ac-ft)
1824	0	0
1825	0.97	0.97
1826	2.53	3.50
1827	3.28	6.78
1828	3.50	10.28
1829	3.72	14.00
1830	3.95	17.95
1831	4.17	22.12
1832	4.41	26.53





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 DISTRICT OF MARICOPA COUNTY.

EXISTING ELLIPTICAL
 PIPES 2 - 64" x 43"



FLOOD CONTROL DISTRICT
 OF MARICOPA COUNTY
 ENGINEERING DIVISION

	NAME	DATE
DESIGNED	J. TAILLON	
DRAWN	R. MCKASKLE	
CHECKED		

WOOD, PATEL & ASSOCIATES, INC.
 2051 WEST NORTHERN, SUITE 100
 PHOENIX, ARIZONA (602) 335-8500

McDOWELL ROAD AND ELLSWORTH ROAD BASIN

SHEET
 DWG. P-21

FIGURE:

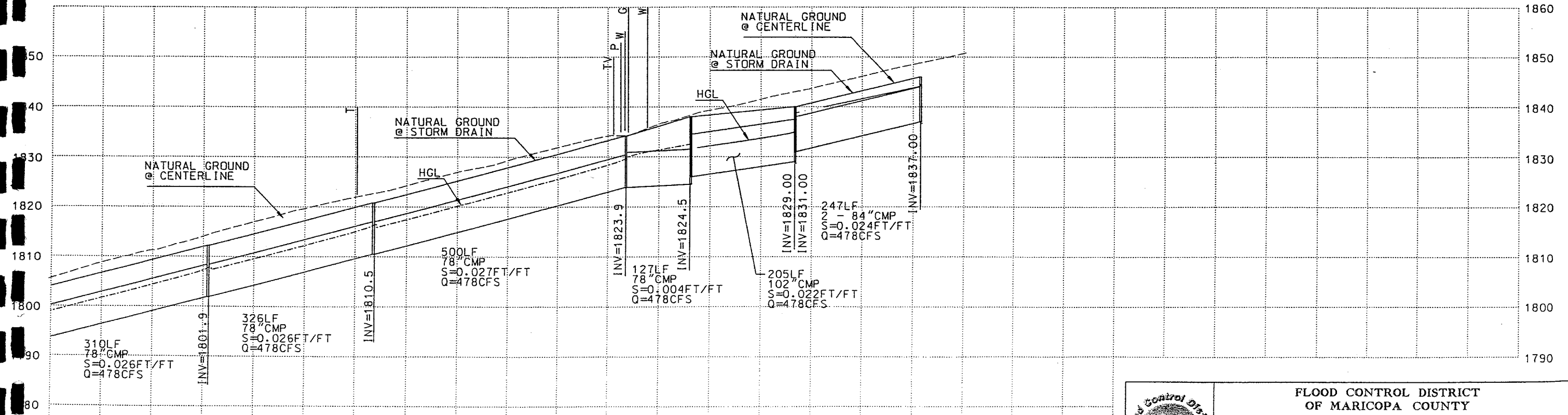
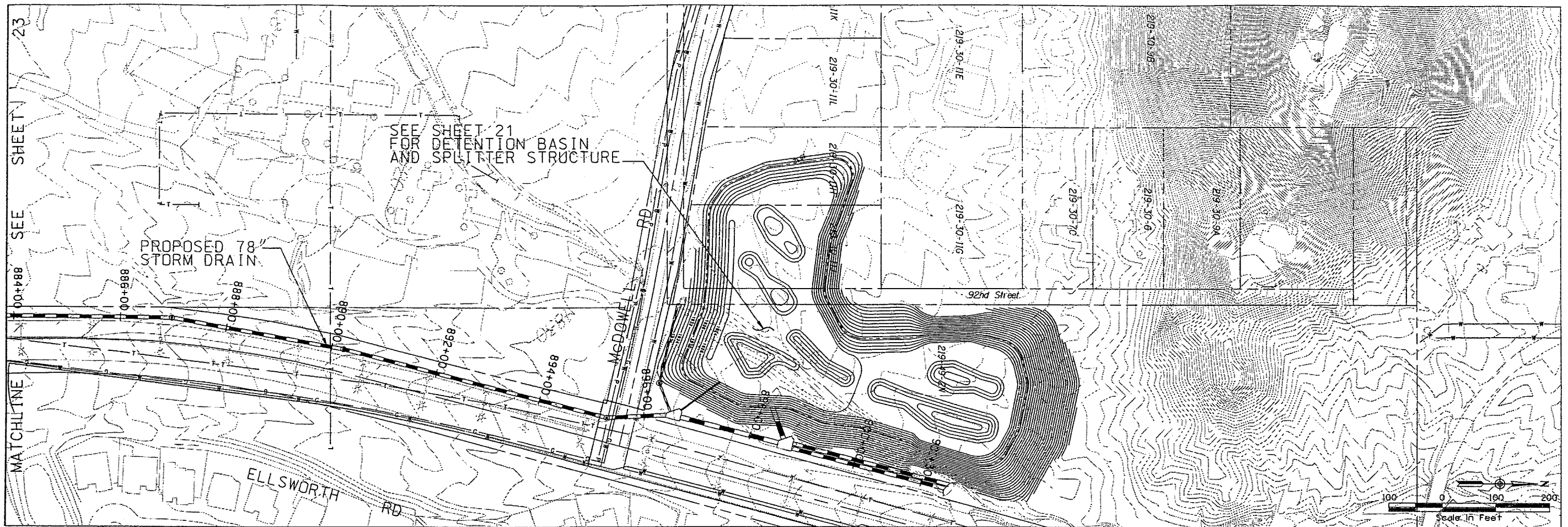
SPOOK HILL AREA DRAINAGE MASTER PLAN
Design Calculation Summary

Storm Drain Properties

US station	DS station	Total System Flow cfs	Length ft	Constructed Slope ft/ft	Section Size in	Mannings n	Average Velocity fps	Upstream Invert Elevation ft	Invert Elevation ft	Hydraulic Grade ft	Hydraulic Grade Out ft
900+99	898+52	1,061.00	247	0.024291	84 inch	0.023	13.78	1,837.00	1,831.00	1,844.08	1,838.75
898+52	896+47	570	205	0.014634	102 inch	0.023	13.8	1,829.00	1,826.00	1,834.99	1,831.63
896+47	895+20	478	500	0.03	78 inch	0.023	15.25	1,823.90	1,810.50	1,829.63	1,816.42
895+20	890+20	478	325.7	0.03	78 inch	0.023	15.25	1,810.50	1,801.90	1,816.23	1,807.82
890+20	886+94	478	499.9	0.03	78 inch	0.023	15.25	1,801.90	1,788.70	1,807.63	1,794.62
886+94	881+94	478	500	0.03	78 inch	0.023	15.25	1,788.70	1,774.80	1,794.43	1,780.72

Note: (1) 0.023 Manning's n for corrugated metal pipe with paved invert.

(1) 0.013 Manning's n for reinforced concrete pipe.



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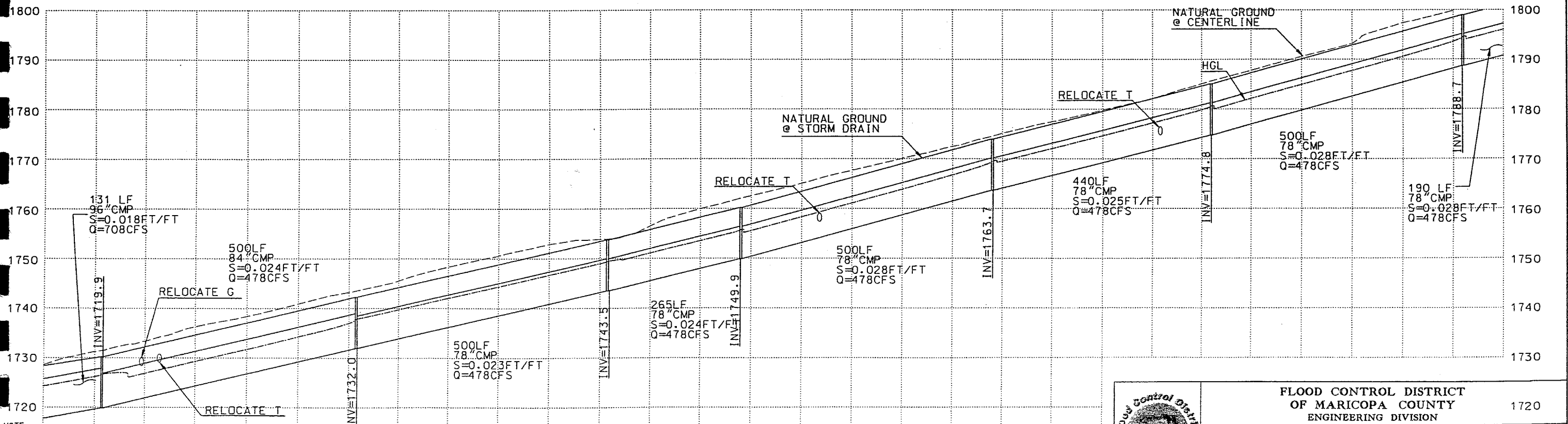
	FLOOD CONTROL DISTRICT OF MARICOPA COUNTY		WOOD, PATEL & ASSOCIATES, INC. 2051 WEST NORTHERN, SUITE 100 PHOENIX, ARIZONA (602) 335-8500
	ENGINEERING DIVISION		
	DESIGNED J. TAILLON	DATE	
DRAWN R. MCKASKLE			
CHECKED			
ELLSWORTH ROAD ALIGNMENT			SHEET DWG. P-22

SPOOK HILL AREA DRAINAGE MASTER PLAN
Design Calculation Summary

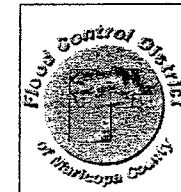
Storm Drain Properties

US station	DS station	Total System Flow cfs	Length ft	Constructed Slope ft/ft	Section Size in	Mannings n	Average Velocity fps	Upstream Invert Elevation ft	DS Invert Elevation ft	Hydraulic Grade ft	Hydraulic Grade Out ft
881+94	876+94	478	500	0.03	78 inch	0.023	15.25	1,788.70	1,774.80	1,794.43	1,780.72
876+94	872+54	478	439.6	0.03	78 inch	0.023	15.25	1,774.80	1,763.70	1,780.53	1,769.62
872+54	867+54	478	499.9	0.03	78 inch	0.023	15.25	1,763.70	1,749.90	1,769.43	1,755.82
867+54	864+89	478	265.1	0.02	78 inch	0.023	15.17	1,749.90	1,743.50	1,755.63	1,749.51
864+89	859+89	478	500.2	0.02	78 inch	0.023	15.19	1,743.50	1,732.00	1,749.33	1,737.89
859+89	854+89	478	500	0.02	84 inch	0.023	13.33	1,732.00	1,719.90	1,737.73	1,726.77
854+89	853+58	699	131	0.02	96 inch	0.023	15.30	1,719.90	1,711.90	1,726.58	1,718.88

Note: (1) 0.023 Manning's n for corrugated metal pipe with paved invert.
(1) 0.013 Manning's n for reinforced concrete pipe.



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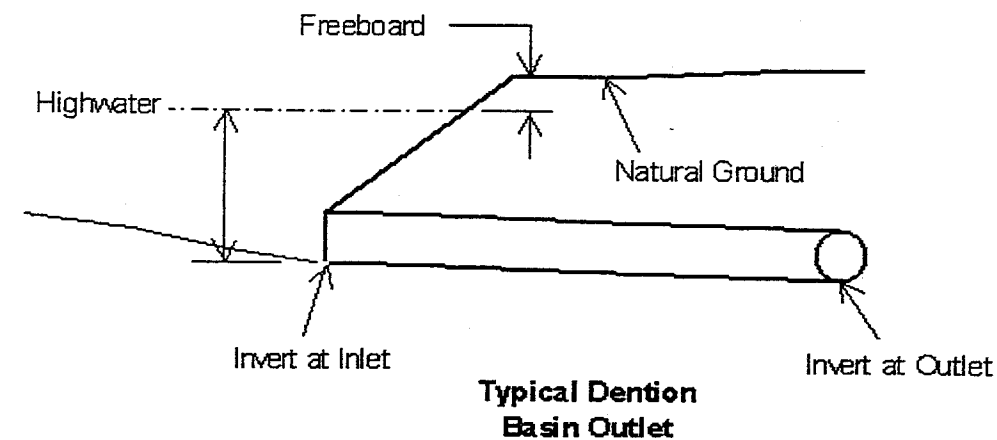
DESIGNED		NAME	DATE	WOOD, PATEL & ASSOCIATES, INC. 2051 WEST NORTHERN, SUITE 100 PHOENIX, ARIZONA (602) 335-8500
		J. TAILLON		
DRAWN		R. McKASKLE		
CHECKED				
ELLSWORTH ROAD ALIGNMENT				SHEET
FIGURE:				DWG. P-23

SPOOK HILL AREA DRAINAGE MASTER PLAN
Design Calculation Summary

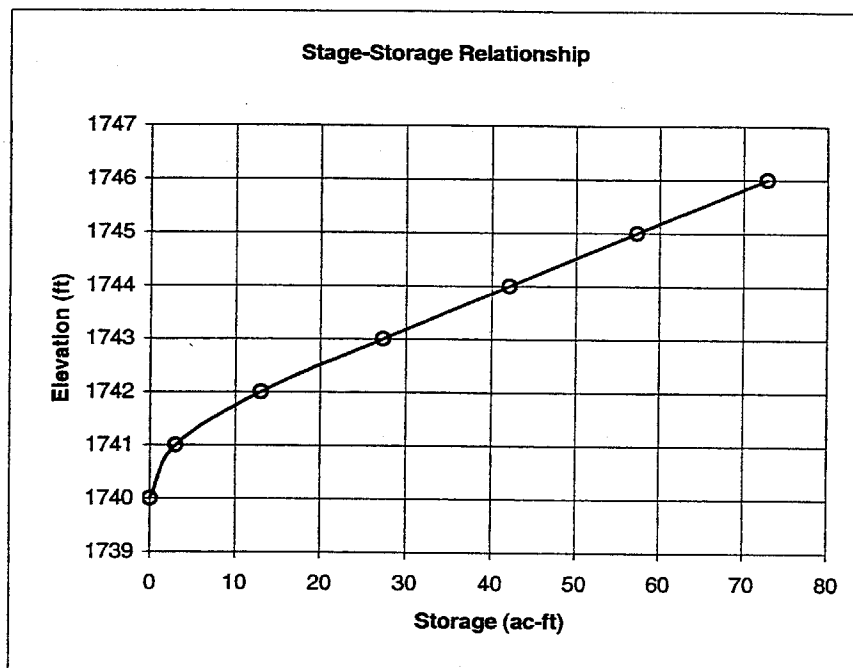
Detention Basin Properties

McKellips/Ellsworth Roads Basin

Basin Land Area	32.2 ac	Outflow Pipe (no. and Dia.)	36 in
Basin Excavation Volume	234869 cy	Pipe Invert @ Inlet	1740 ft
Peak Storage	51.2 ac-ft	Pipe Invert @ Outlet	1739.1 ft
Q100 Inflow	957 cfs	Pipe Length	186.3 ft
Q100 Bypass	200 cfs	Pipe Slope	0.005 ft/ft
Highwater El. (Q100)	1744.6 ft	Pipe Centerline @ Inlet	1741.5 ft
Max. Pond. Depth	1746 ft		



Elevation	Inc. Volume (ac-ft)	Cum. Volume (ac-ft)
1740	0	0
1741	3.02	3.02
1742	9.99	13.01
1743	14.35	27.36
1744	14.75	42.11
1745	15.14	57.25
1746	15.55	72.80



1162
1158
1154
1150
1148
1146
1144
1142

PROPOSED DIVERSION
BERM PER DETAIL D-2
ON SHEET D-1

PROPOSED
CHANNEL
COLLECTION

100-YR WSEL=1744.6
TOP=1746
BOTTOM=1740

INV=1742

PROPOSED WEIR
OVERFLOW
STRUCTURE

INV= 1740

PROPOSED 36"
STORM DRAIN

PROPOSED 36"
STORM DRAIN

PROPOSED 48"
STORM DRAIN

SEE SHEET-25
FOR STORM DRAIN
INFORMATION

INV= 1733

INV. = 1728

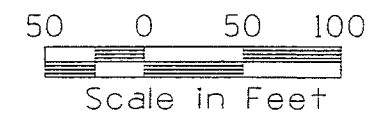
INV=1744.6

SEE SHEET 26
FOR STORM DRAIN
INFORMATION

PROPOSED 2-84" CMP

INV=1737.5

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DISTRICT OF MARICOPA COUNTY.



FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY
ENGINEERING DIVISION

	NAME	DATE
DESIGNED	J. TAILLON	
DRAWN	R. MCKASKLE	
CHECKED		

WOOD, PATEL & ASSOCIATES, INC.
2051 WEST NORTHERN, SUITE 100
PHOENIX, ARIZONA (602) 335-8500

BOULDER MOUNTAIN
ELEMENTARY SCHOOL BASIN

SHEET
DWG. P-24

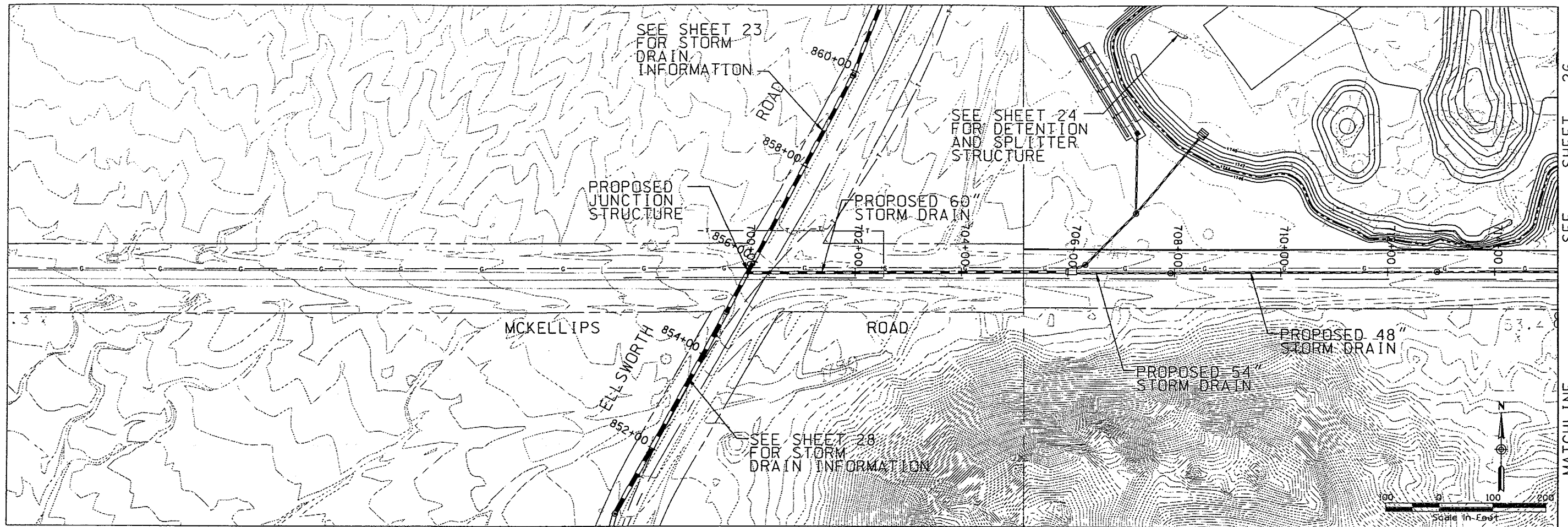
FIGURE:

SPOOK HILL AREA DRAINAGE MASTER PLAN
Design Calculation Summary

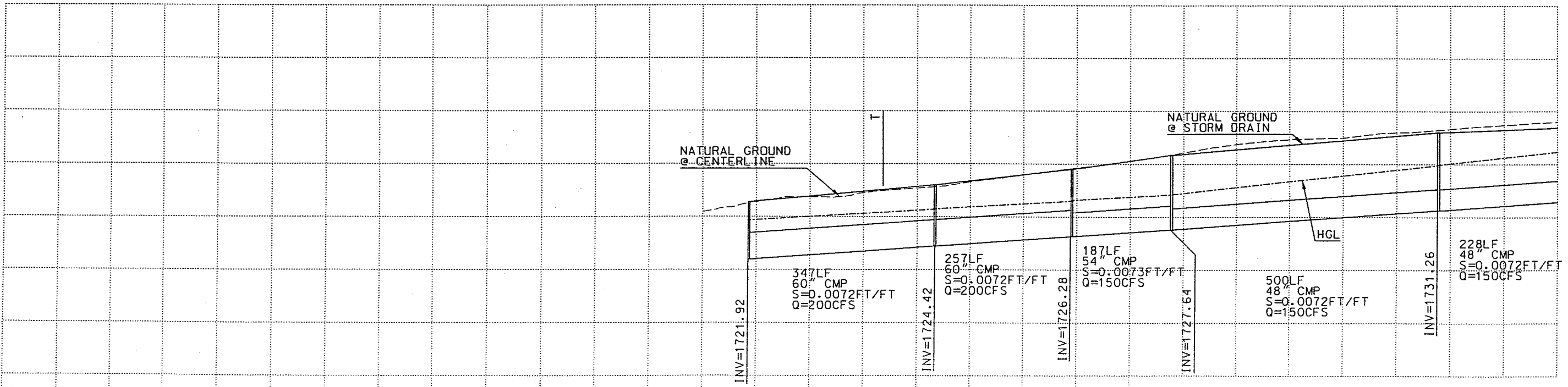
Storm Drain Properties

US station	DS station	Total System Flow cfs	Length ft	Constructed Slope ft/ft	Section Size in	Mannings n	Average Velocity fps	Upstream Invert Elevation ft	DS Invert Elevation ft	Hydraulic Grade In ft	Hydraulic Grade Out ft
717+93	712+91	150	500	0.00724	48 inch	0.013	11.94	1,734.88	1,731.26	1,745.38	1,739.93
712+91	707+91	150	500	0.00724	48 inch	0.013	11.94	1,731.26	1,727.64	1,739.75	1,734.30
707+91	706+04	150	187	0.007273	54 inch	0.013	9.43	1,727.64	1,726.28	1,734.23	1,733.14
706+04	703+47	200	257	0.007237	60 inch	0.013	10.19	1,726.28	1,724.42	1,732.98	1,731.47
703+47	700+00	200	347	0.007205	60 inch	0.013	10.19	1,724.42	1,721.92	1,731.39	1,729.34

Note: (1) 0.023 Manning's n for corrugated metal pipe with paved invert.
(1) 0.013 Manning's n for reinforced concrete pipe.



SEE SHEET 26
MATCHLINE



1760
1750
1740
1730
1720

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FLOOD CONTROL DISTRICT OF MARICOPA COUNTY ENGINEERING DIVISION		
DESIGNED	NAME	DATE
J. TAILLON		
R. MCKASKLE		
WOOD, PATEL & ASSOCIATES, INC. 2051 WEST NORTHERN, SUITE 100 PHOENIX, ARIZONA (602) 335-8500		
M-KELLIPS ROAD ALIGNMENT		SHEET DWG. P-25

FIGURE:

SPOOK HILL AREA DRAINAGE MASTER PLAN

Design Calculation Summary

Storm Drain Properties

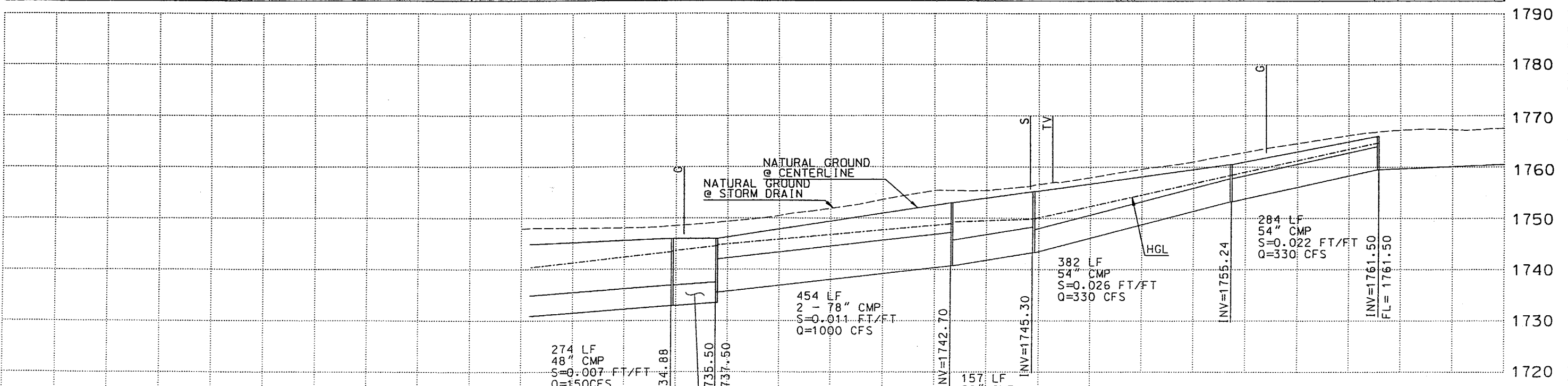
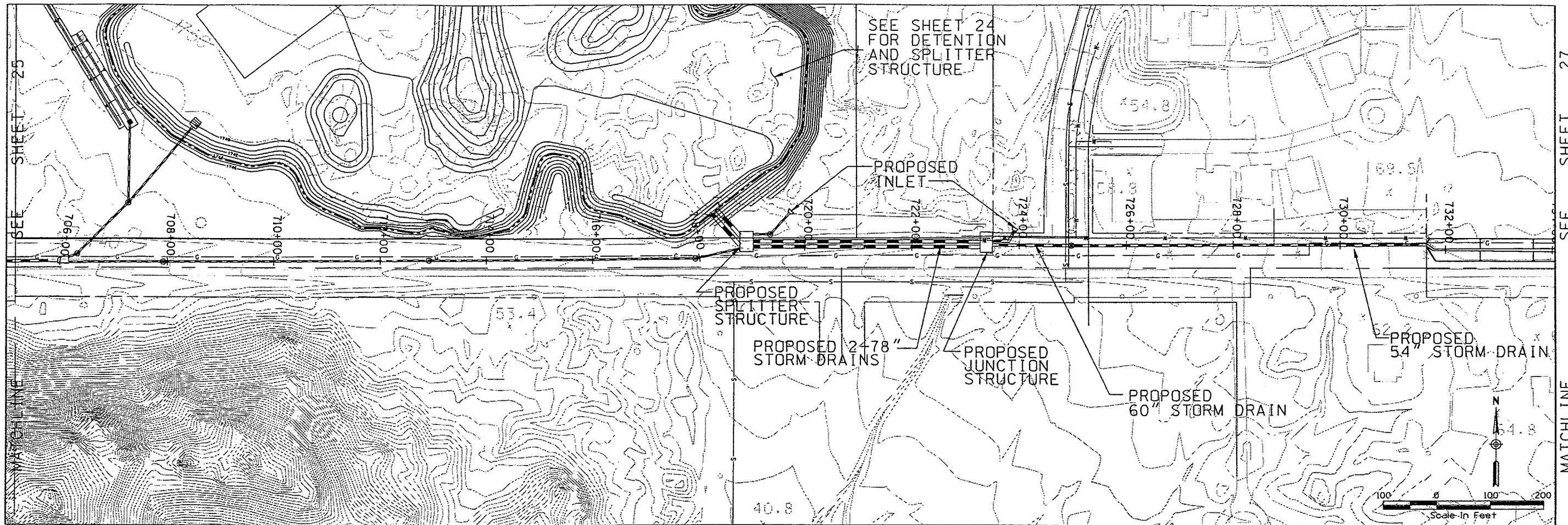
US station	DS station	Total System Flow cfs	Length ft	Constructed Slope ft/ft	Section Size in	Mannings n	Average Velocity fps	Upstream Invert Elevation ft	DS Invert Elevation ft	Hydraulic Grade In ft	Hydraulic Grade Out ft
731+56	728+72	330	284	0.022042	54 inch	0.023	10.37	1,761.50	1,755.24	1,766.69	1,760.43
728+72	724+90	330	382	0.026021	54 inch	0.023	10.37	1,755.24	1,745.30	1,760.35	1,751.93
724+90	723+33	330	157	0.016561	60 inch	0.013	8.4	1,745.30	1,742.70	1,751.87	1,751.24
723+33	718+79	1,000	454	0.011454	78 inch	0.013	15.07	1,742.70	1,737.50	1,750.89	1,746.76
Splitter Structure											
718+79	717+93	150	86	0.007209	48 inch	0.013	11.94	1,735.50	1,734.88	1,746.46	1,745.52
717+93	712+91	150	500	0.00724	48 inch	0.013	11.94	1,734.88	1,731.26	1,745.30	1,739.84

Note: (1) 0.023 Manning's n for corrugated metal pipe with paved invert.

(1) 0.013 Manning's n for reinforced concrete pipe.

Channel Properties

Design Q100 (cfs)	DS Invert EI (ft)	Design Invert Slope (ft/ft)	Total Vert Drop (ft)	Vert. Drop (ft)	Material Type	Mannings "n" Value	Bottom Width W (ft)	Depth of Flow (ft)	Sideslope (H1) Left (HL)	Sideslope (H1) Right (HR)	Area of Flow (sf)	Perimeter (ft)	Froude No.	Type of Flow	Velocity (fps)	Channel Topwidth (ft)
317	1761.5	0.0022	5.72	5.72	C	0.025	3-35	.81 - 5.19	3	3-4	30-90	35.37- 40.88	.04 - .39	SUB	.29 - 3.57	33.74 - 40.65



NOTE:
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 AND ARE BASED UPON RECORD DOCUMENTS. AERIAL TOPOGRAPHY WAS PRODUCED AT A
 SCALE OF 1 INCH = 200 FEET WITH A 2 FOOT CONTOUR INTERVAL. MAPPING WAS
 PREPARED BY KENNEY AERIAL MAPPING AND WAS PROVIDED BY THE FLOOD CONTROL
 DISTRICT OF MARICOPA COUNTY.



FLOOD CONTROL DISTRICT
 OF MARICOPA COUNTY
 ENGINEERING DIVISION

DESIGNED	NAME	DATE
J. TAILLON		
R. MCKASKLE		

WOOD, PATEL & ASSOCIATES, INC.
 2051 WEST NORTHERN, SUITE 100
 PHOENIX, ARIZONA (602) 335-8500

McKELLIPS ROAD ALIGNMENT

SHEET
 DWG. P-26

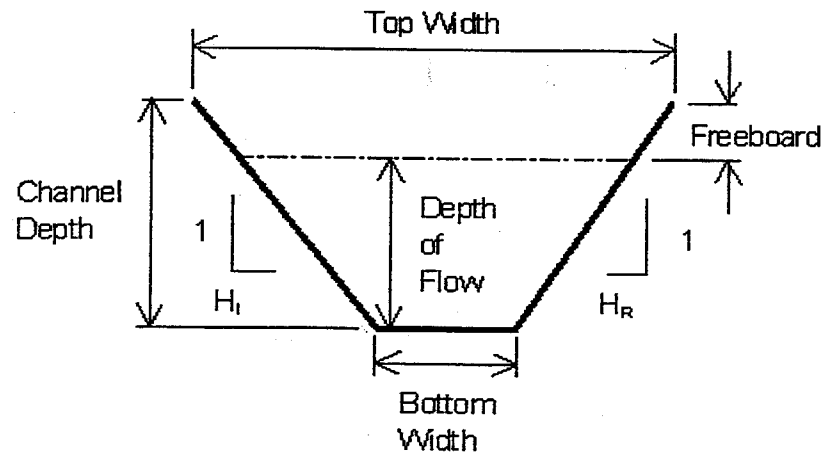
FIGURE:

SPOOK HILL AREA DRAINAGE MASTER PLAN
Design Calculation Summary

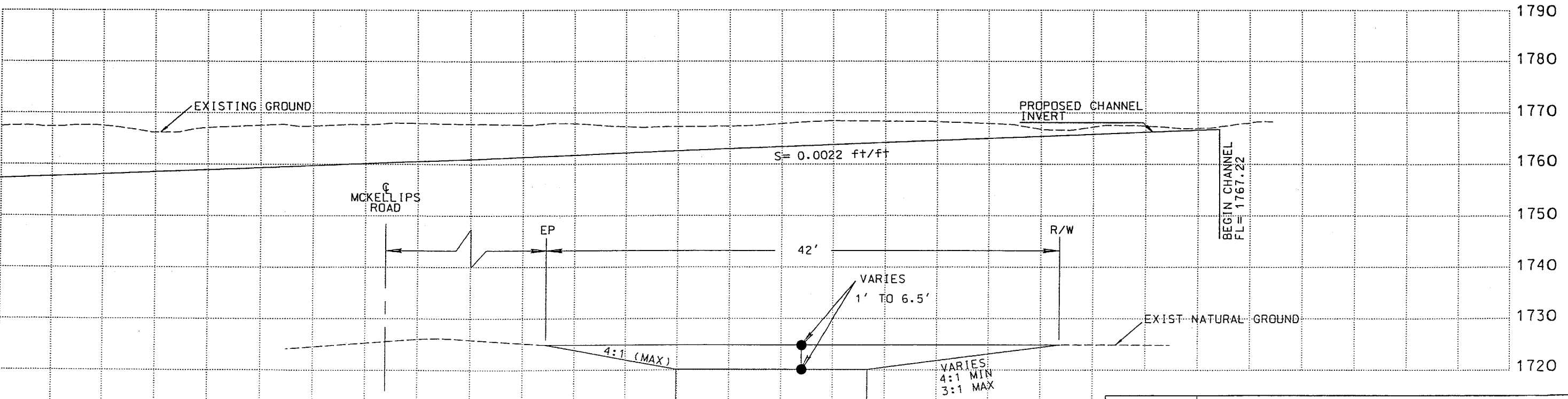
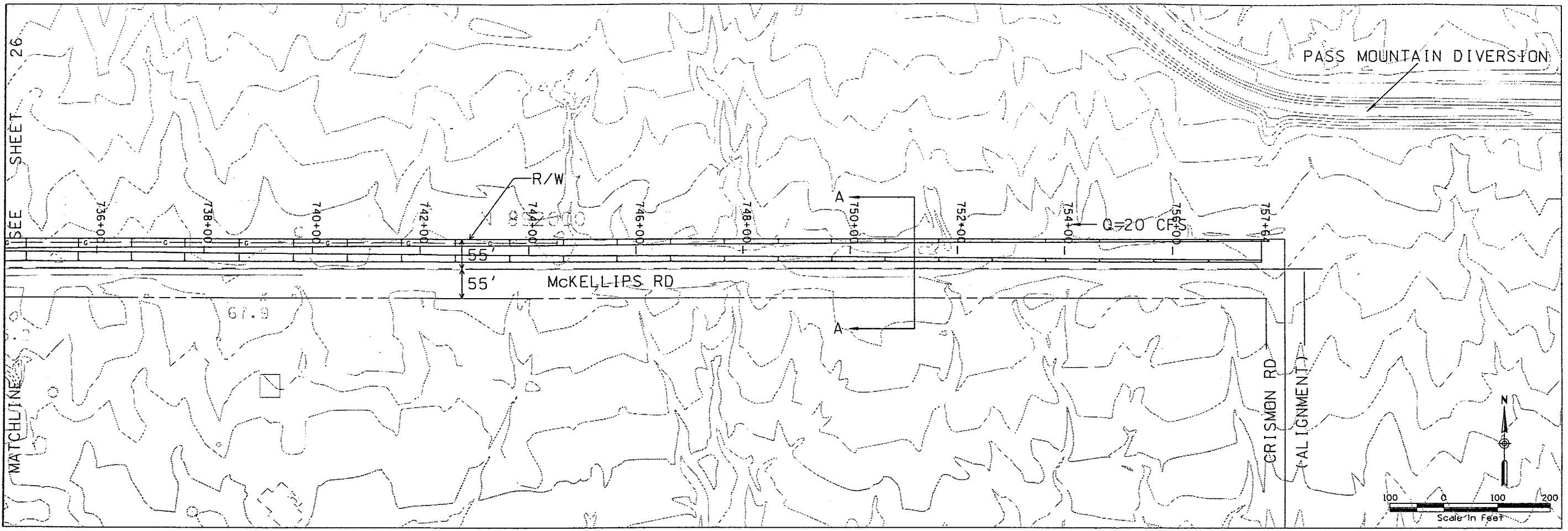
Channel Properties

Design Q100 (cfs)	DS Invert El (ft)	US Invert El (ft)	Length (ft)	Design Invert Slope (ft/ft)	Total Vert Drop (ft)	Vert. Drop (ft)	Material Type	Manning's "n" Value	Bottom Width W (ft)	Depth of Flow (ft)	Sideslope (H1) Left (HL)	Sideslope (H1) Right (HR)	Area of Flow (sf)	Perimeter (ft)	Froude No.	Type of Flow	Velocity (fps)	Channel Topwidth (ft)
317	1761.5	1767.22	2600	0.0022	5.72	5.72	E	0.025	3-35	.81 - 5.19	3	3-4	30-90	35.37- 40.88	.04 - .39	SUB	.29 - 3.57	33.74 - 40.65

Channel Material Type: C = Concrete
R = Riprap
G = Grass
E = Natural or Earthen

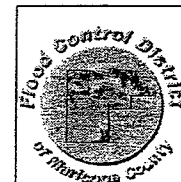


Typical Channel Section



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TYPICAL SECTION McKELLIPS CHANNEL
LOOKING WEST



FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY
ENGINEERING DIVISION

DESIGNED	NAME	DATE
J. TAILLON		
R. MCKASKLE		

WOOD, PATEL & ASSOCIATES, INC.
2051 WEST NORTHERN, SUITE 100
PHOENIX, ARIZONA (602) 335-8500

McKELLIPS ROAD ALIGNMENT

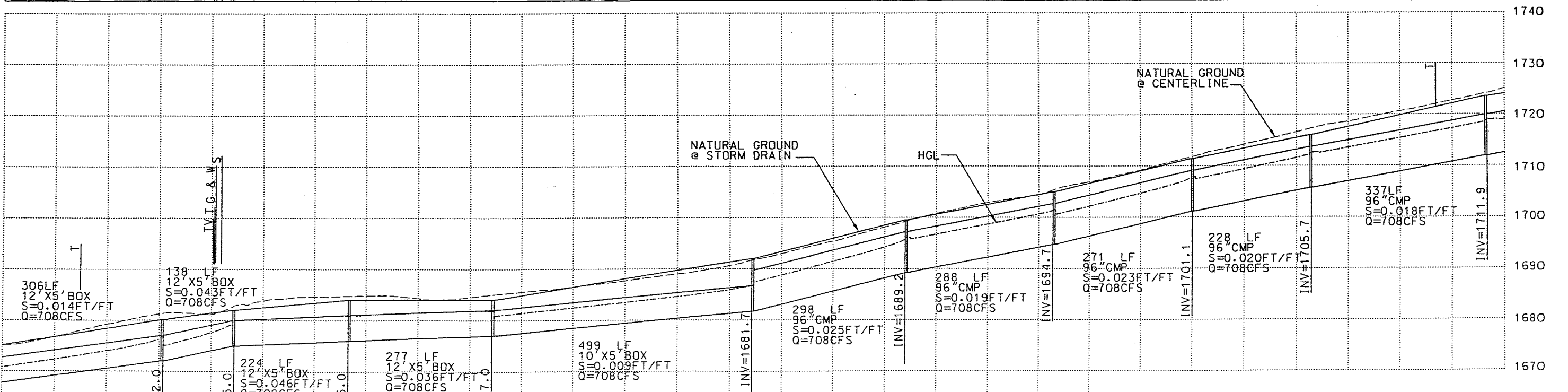
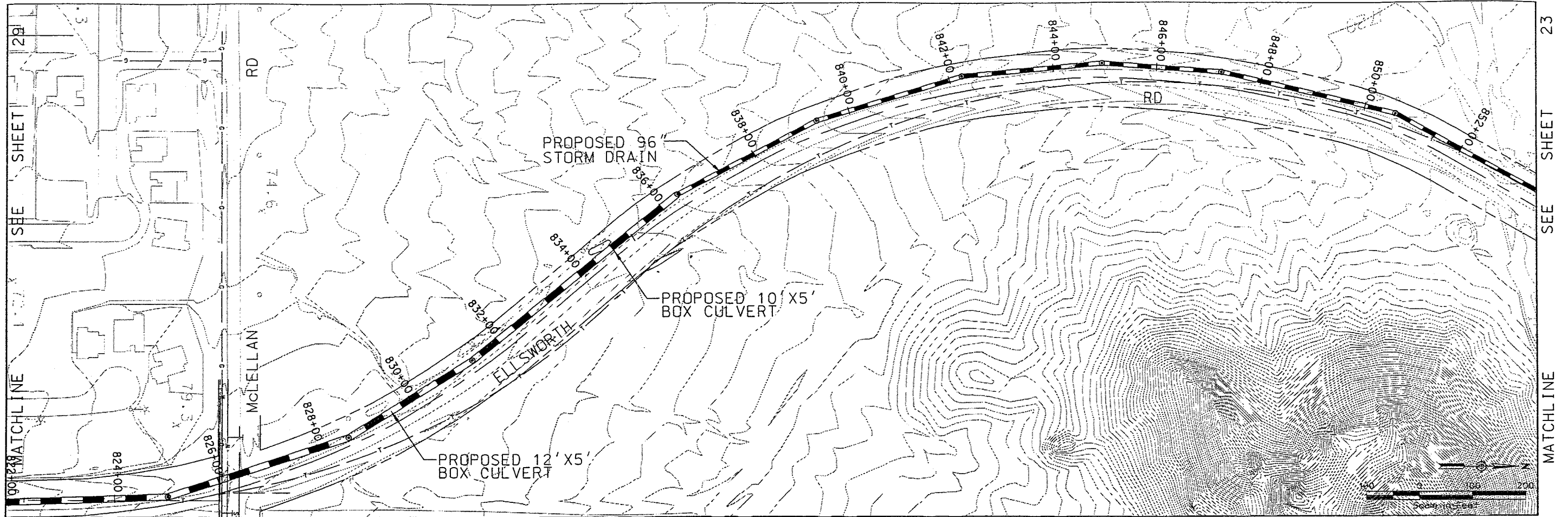
SHEET
DWG. P-27

SPOOK HILL AREA DRAINAGE MASTER PLAN
Design Calculation Summary

Storm Drain Properties

US station	DS station	Total System Flow cfs	Length ft	Constructed Slope ft/ft	Section Size in	Mannings n	Average Velocity fps	Upstream Invert Elevation ft	DS Invert Elevation ft	Hydraulic Grade In ft	Hydraulic Grade Out ft
854+89	853+58	699	433	0.02	96 inch	0.023	15.30	1,719.90	1,711.90	1,726.58	1,718.88
853+58	850+21	699	336.8	0.02	96 inch	0.023	15.40	1,711.90	1,705.70	1,718.58	1,712.57
850+21	847+93	699	227.5	0.02	96 inch	0.023	15.40	1,705.70	1,701.10	1,712.38	1,707.97
847+93	845+22	699	270.5	0.02	96 inch	0.023	15.40	1,701.10	1,694.70	1,707.78	1,701.57
845+22	842+34	699	288.4	0.02	96 inch	0.023	15.40	1,694.70	1,689.20	1,701.38	1,696.07
842+34	839+36	699	297.7	0.03	96 inch	0.023	16.94	1,689.20	1,681.70	1,695.88	1,687.39
839+36	831+39	699	499.4	0.01	10 x 5 ft	0.013	16.05	1,681.70	1,677.00	1,686.70	1,680.86
831+39	828+62	699	276.9	0.00	12 x 5 ft	0.013	11.99	1,677.00	1,676.00	1,681.72	1,681.00
828+62	826+38	699	224.3	0.00	12 x 5 ft	0.013	11.99	1,676.00	1,675.00	1,680.72	1,680.00
826+38	825+00	699	137.6	0.02	12 x 5 ft	0.013	12.09	1,675.00	1,672.00	1,679.72	1,676.91
825+00	820+00	699	500.6	0.01	12 x 5 ft	0.013	12.18	1,672.00	1,665.00	1,676.72	1,669.84

Note: (1) 0.023 Manning's n for corrugated metal pipe with paved invert.
(1) 0.013 Manning's n for reinforced concrete pipe.



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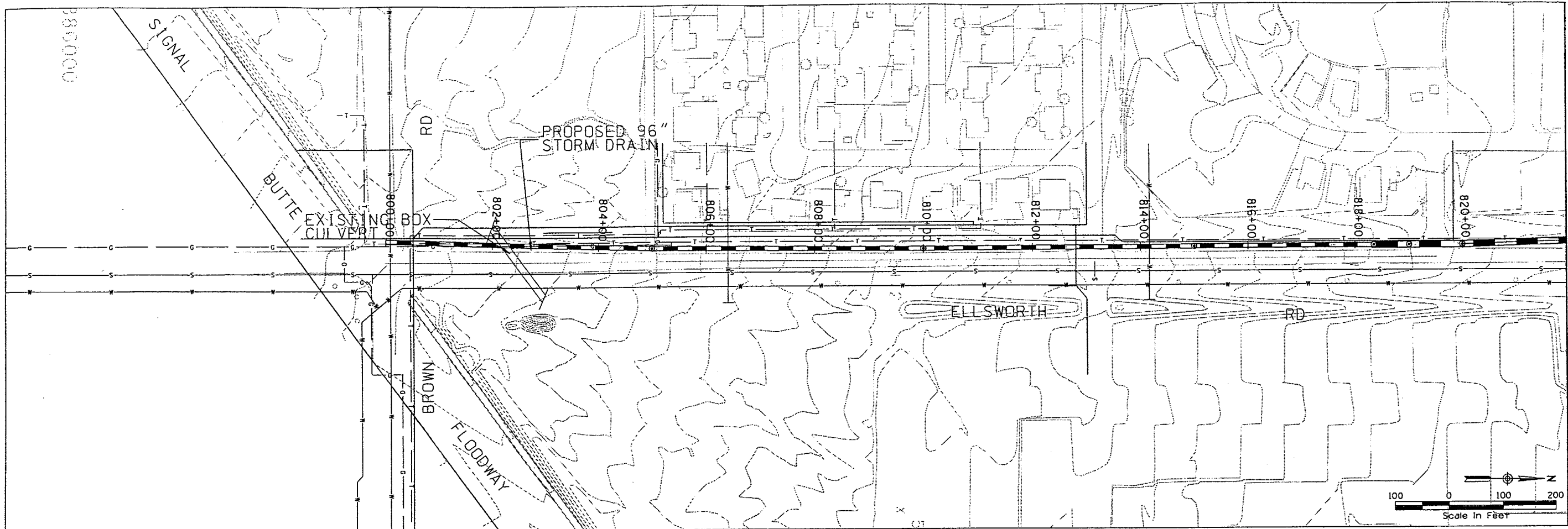
	FLOOD CONTROL DISTRICT OF MARICOPA COUNTY		WOOD, PATEL & ASSOCIATES, INC. 2051 WEST NORTHERN, SUITE 100 PHOENIX, ARIZONA (602) 335-8500											
	ENGINEERING DIVISION													
	<table border="1"> <tr> <th>DESIGNED</th> <th>NAME</th> <th>DATE</th> </tr> <tr> <td>J. TAILLON</td> <td></td> <td></td> </tr> <tr> <th>DRAWN</th> <td>R. MCKASKLE</td> <td></td> </tr> <tr> <th>CHECKED</th> <td></td> <td></td> </tr> </table>	DESIGNED		NAME	DATE	J. TAILLON			DRAWN	R. MCKASKLE		CHECKED		
DESIGNED	NAME	DATE												
J. TAILLON														
DRAWN	R. MCKASKLE													
CHECKED														
ELLSWORTH ROAD ALIGNMENT			SHEET DWG. P-28											

SPOOK HILL AREA DRAINAGE MASTER PLAN
Design Calculation Summary

Storm Drain Properties

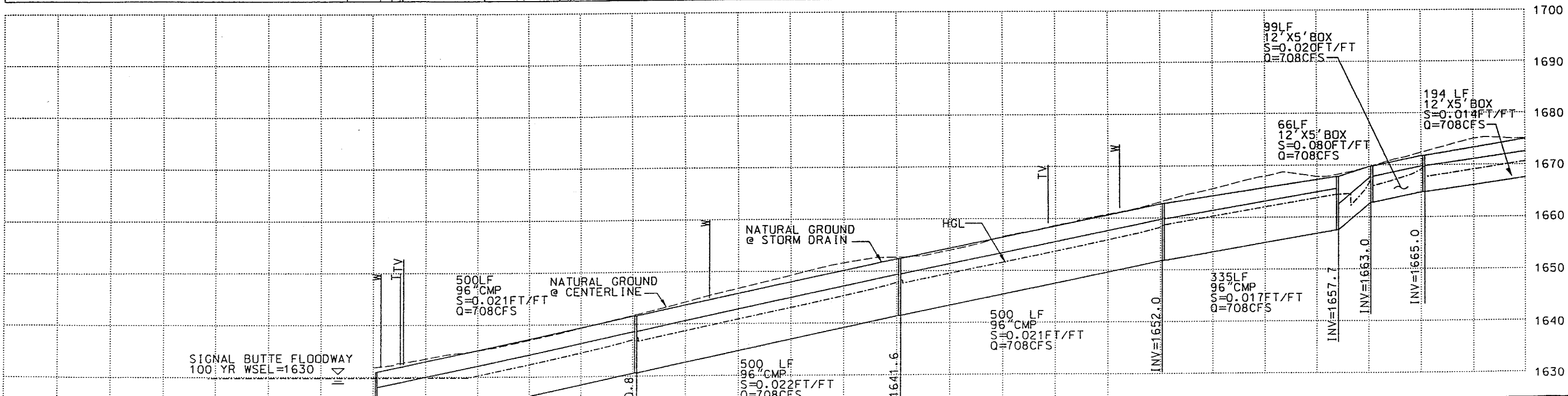
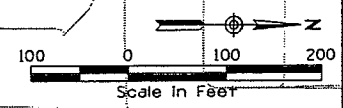
US station	DS station	Total System Flow cfs	Length ft	Constructed Slope ft/ft	Section Size in	Mannings n	Average Velocity fps	Upstream Invert Elevation ft	DS Invert Elevation ft	draulic Grade ft	Hydraulic Grade Out ft
825+00	820+00	699	500.6	0.01	12 x 5 ft	0.013	12.18	1,672.00	1,665.00	1,676.72	1,669.84
820+00	819+01	699	98.9	0.02	12 x 5 ft	0.013	15.31	1,665.00	1,663.00	1,669.72	1,666.18
819+01	818+35	699	66	0.08	12 x 5 ft	0.013	11.99	1,663.00	1,657.70	1,667.72	1,664.57
818+35	815+00	699	334.3	0.02	96 inch	0.023	15.22	1,657.70	1,652.00	1,664.57	1,658.87
815+00	810+00	699	500.2	0.020792	96 inch	0.023	15.4	1,652.00	1,641.60	1,658.68	1,648.47
810+00	805+00	699	499.7	0.021613	96 inch	0.023	15.4	1,641.60	1,630.80	1,648.28	1,637.67
805+00	800+00	699	500	0.0212	96 inch	0.023	16.28	1,630.80	1,620.20	1,637.48	1,626.31

Note: (1) 0.023 Manning's n for corrugated metal pipe with paved invert.
(1) 0.013 Manning's n for reinforced concrete pipe.



SEE SHEET 28

MATCHLINE



SIGNAL BUTTE FLOODWAY
100 YR WSEL=1630

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	FLOOD CONTROL DISTRICT OF MARICOPA COUNTY ENGINEERING DIVISION		WOOD, PATEL & ASSOCIATES, INC. 2051 WEST NORTHERN, SUITE 100 PHOENIX, ARIZONA (602) 335-8500	
	DESIGNED	J. TAILLON		DATE
	DRAWN	R. McRASKLE		
ELLSWORTH ROAD ALIGNMENT			SHEET DWG. P-29	