



Professional **E**ngineering **C**onsultants, P.A.

STORM WATER SEWER STUDY

FOR

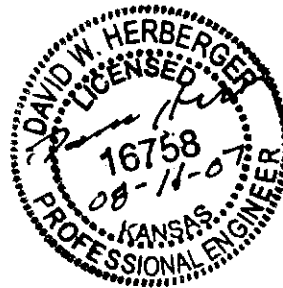
SEDGWICK COUNTY ARENA
500 E. WATERMAN, WICHITA, KS 67202

JULY 23, 2007

PEC PROJECT NO. 35-05493-002-1324

PREPARED BY

PROFESSIONAL ENGINEERING CONSULTANTS, P.A.
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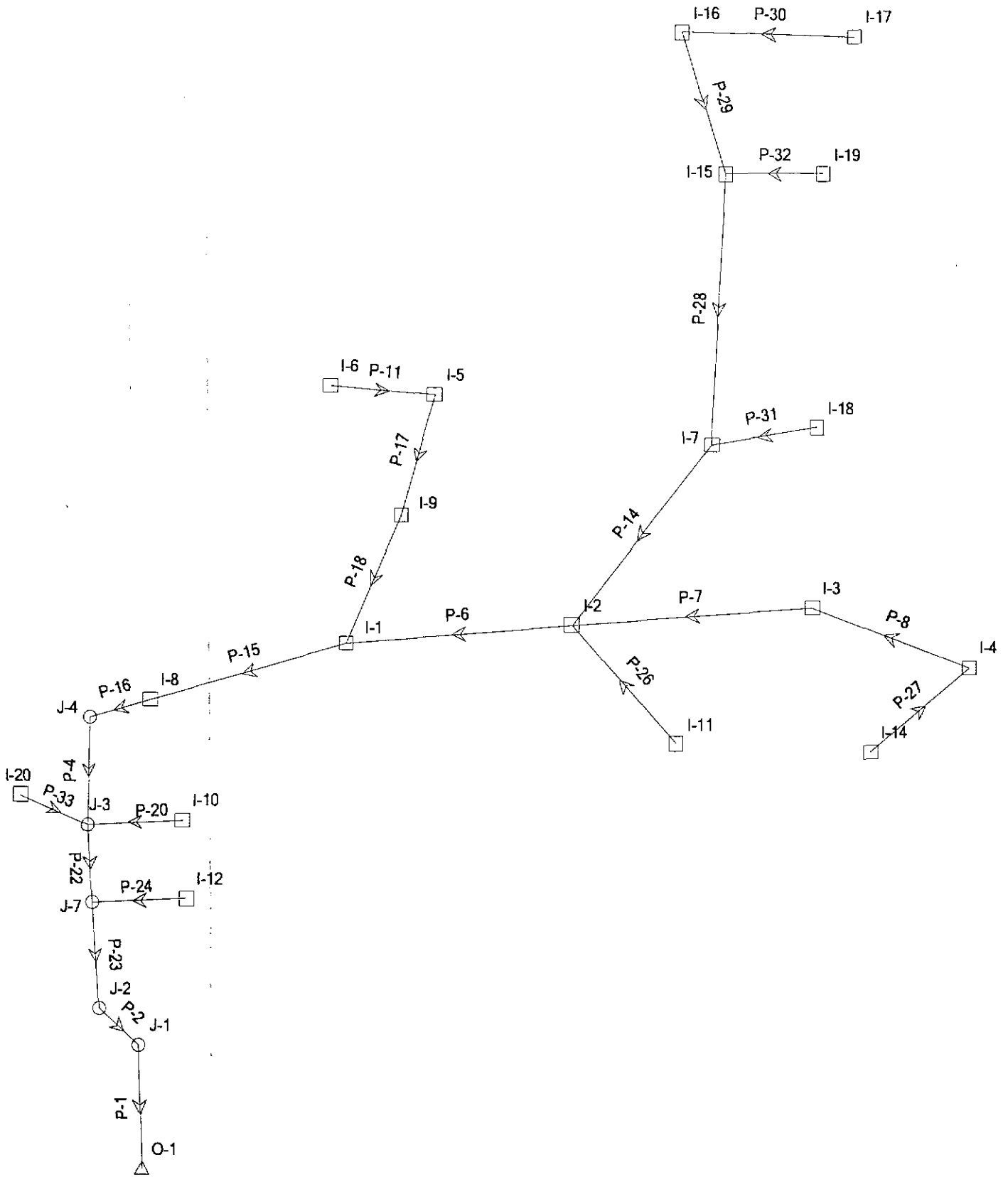
WICHITA
TOPEKA
LAWRENCE
PITTSBURG
TULSA

Scenario: Final Design

Node Report

Label	Area (acres)	Inlet C	Time of Concentration (min)	Local CA (acres)	Local Intensity (in/hr)	Local Rational Flow (gpm)	Additional Carryover (gpm)	Rim Elevation (ft)	Hydraulic Grade Line In (ft)	Hydraulic Grade Line Out (ft)
I-1	0.37	0.90	15.00	0.33	4.62	696	0	95.00	94.35	94.35
I-2	0.59	0.90	15.00	0.53	4.62	1,110	0	95.40	94.72	94.72
I-3	0.51	0.90	15.00	0.46	4.62	959	0	96.38	94.78	94.78
I-4	1.13	0.90	15.00	1.02	4.62	2,126	0	96.57	94.82	94.82
I-5	0.47	0.90	15.00	0.42	4.62	884	0	96.42	94.38	94.38
I-6	0.44	0.90	15.00	0.40	4.62	828	0	95.00	94.40	94.40
I-7	0.33	0.90	15.00	0.30	4.62	621	0	96.11	94.87	94.87
I-8	0.20	0.90	15.00	0.18	4.62	376	0	94.96	94.24	94.24
I-9	0.15	0.90	15.00	0.14	4.62	282	0	95.00	94.36	94.36
I-10	0.00	0.00	0.00	0.00	0.00	0	2,775	99.00	95.00	95.00
I-11	0.00	0.00	0.00	0.00	0.00	0	420	99.00	95.09	95.09
I-12	0.05	0.90	15.00	0.05	4.62	94	0	98.22	93.71	93.71
I-14	0.00	0.00	0.00	0.00	0.00	0	315	99.00	95.08	95.08
I-15	0.33	0.90	15.00	0.30	4.62	621	0	95.96	95.56	95.56
I-16	0.50	0.90	15.00	0.45	4.62	941	0	96.29	95.68	95.68
I-17	0.50	0.90	15.00	0.45	4.62	941	0	96.32	95.72	95.72
I-18	0.33	0.90	15.00	0.30	4.62	621	0	96.18	94.88	94.88
I-19	0.33	0.90	15.00	0.30	4.62	621	0	95.96	95.57	95.57
I-20	2.00	0.90	15.00	1.80	4.62	3,762	0	95.21	94.03	94.03
J-1								95.64	93.01	93.01
J-2								94.91	93.09	93.09
J-3								95.21	93.99	93.99
J-4								95.65	94.16	94.16
J-7								95.20	93.71	93.71
O-1								94.50	92.78	92.78

Scenario: Final Design



Calculation Results Summary

Scenario: Final Design

>>>> Info: Subsurface Network Rooted by: O-1
 >>>> Info: Subsurface Design iterations: 2
 >>>> Info: Convergence was achieved.

>>>> Info: Subsurface Network Rooted by: O-1
 >>>> Info: Subsurface Analysis iterations: 3
 >>>> Info: Convergence was achieved.

CALCULATION SUMMARY FOR SURFACE NETWORKS

Label	Inlet Type	Inlet	Total Intercepted Flow (gpm)	Total Bypassed Flow (gpm)	Capture Efficiency (%)	Gutter Spread (ft)	Gutter Depth (ft)
I-20	Generic Inlet	Generic Default 100%	3,762	0	100.0	0.00	0.00
I-17	Generic Inlet	Generic Default 100%	941	0	100.0	0.00	0.00
I-16	Generic Inlet	Generic Default 100%	941	0	100.0	0.00	0.00
I-15	Generic Inlet	Generic Default 100%	621	0	100.0	0.00	0.00
I-11	Generic Inlet	Generic Default 100%	420	0	100.0	0.00	0.00
I-12	Generic Inlet	Generic Default 100%	94	0	100.0	0.00	0.00
I-8	Generic Inlet	Generic Default 100%	376	0	100.0	0.00	0.00
I-7	Generic Inlet	Generic Default 100%	621	0	100.0	0.00	0.00
I-4	Generic Inlet	Generic Default 100%	2,126	0	100.0	0.00	0.00
I-3	Generic Inlet	Generic Default 100%	959	0	100.0	0.00	0.00
I-2	Generic Inlet	Generic Default 100%	1,110	0	100.0	0.00	0.00
I-1	Generic Inlet	Generic Default 100%	696	0	100.0	0.00	0.00
I-9	Generic Inlet	Generic Default 100%	282	0	100.0	0.00	0.00
I-6	Generic Inlet	Generic Default 100%	828	0	100.0	0.00	0.00
I-5	Generic Inlet	Generic Default 100%	884	0	100.0	0.00	0.00
I-10	Generic Inlet	Generic Default 100%	2,775	0	100.0	0.00	0.00
I-14	Generic Inlet	Generic Default 100%	315	0	100.0	0.00	0.00
I-18	Generic Inlet	Generic Default 100%	621	0	100.0	0.00	0.00
I-19	Generic Inlet	Generic Default 100%	621	0	100.0	0.00	0.00

CALCULATION SUMMARY FOR SUBSURFACE NETWORK WITH ROOT: O-1

Label	Number of Sections	Section Size	Section Shape	Length (ft)	Total System Flow (gpm)	Average Velocity (ft/s)	Hydraulic Grade Upstream (ft)	Hydraulic Grade Downstream (ft)
P-1	1	36 inch	Circular	73.50	16,800	5.30	93.01	92.78
P-2	1	36 inch	Circular	25.70	16,823	5.30	93.09	93.01
P-23	1	36 inch	Circular	191.40	16,991	5.36	93.71	93.09
P-24	1	15 inch	Circular	21.10	94	0.17	93.71	93.71
P-22	1	36 inch	Circular	87.60	16,985	5.35	93.99	93.71
P-20	1	15 inch	Circular	35.20	2,775	16.54	95.00	93.99
P-4	1	36 inch	Circular	121.60	11,067	3.49	94.16	93.99
P-33	1	24 inch	Circular	30.00	3,762	2.67	94.03	93.99
P-16	1	36 inch	Circular	56.50	11,143	3.51	94.24	94.16
P-15	1	36 inch	Circular	84.50	10,917	3.44	94.35	94.24
P-6	1	30 inch	Circular	167.20	8,630	3.92	94.72	94.35
P-18	1	24 inch	Circular	43.30	1,903	1.35	94.36	94.35
P-26	1	8 inch	Circular	104.80	420	2.68	95.09	94.72
P-14	1	24 inch	Circular	97.40	4,085	2.90	94.87	94.72

Calculation Results Summary

P-7	1	30 inch	Circular	183.10	3,347	1.52	94.78	94.72
P-17	1	24 inch	Circular	72.40	1,676	1.19	94.38	94.36
P-28	1	18 inch	Circular	172.80	2,981	3.76	95.56	94.87
P-31	1	18 inch	Circular	41.60	621	0.78	94.88	94.87
P-8	1	24 inch	Circular	74.30	2,441	1.73	94.82	94.78
P-11	1	18 inch	Circular	54.20	828	1.04	94.40	94.38
P-32	1	18 inch	Circular	39.00	621	0.78	95.57	95.56
P-29	1	18 inch	Circular	75.80	1,821	2.30	95.68	95.56
P-27	1	8 inch	Circular	128.50	315	2.01	95.08	94.82
P-30	1	18 inch	Circular	94.20	941	1.19	95.72	95.68

Label	Total System Flow (gpm)	Ground Elevation (ft)	Hydraulic Grade Line In (ft)	Hydraulic Grade Line Out (ft)
O-1	16,735	94.50	92.78	92.78
J-1	16,800	95.64	93.01	93.01
J-2	16,823	94.91	93.09	93.09
J-7	16,991	95.20	93.71	93.71
I-12	94	98.22	93.71	93.71
J-3	16,985	95.21	93.99	93.99
I-10	2,775	99.00	95.00	95.00
J-4	11,067	95.65	94.16	94.16
I-20	3,762	95.21	94.03	94.03
I-8	11,143	94.96	94.24	94.24
I-1	10,917	95.00	94.35	94.35
I-2	8,630	95.40	94.72	94.72
I-9	1,903	95.00	94.36	94.36
I-11	420	99.00	95.09	95.09
I-7	4,085	96.11	94.87	94.87
I-3	3,347	96.38	94.78	94.78
I-5	1,676	96.42	94.38	94.38
I-15	2,981	95.96	95.56	95.56
I-18	621	96.18	94.88	94.88
I-4	2,441	96.57	94.82	94.82
I-6	828	95.00	94.40	94.40
I-19	621	95.96	95.57	95.57
I-16	1,821	96.29	95.68	95.68
I-14	315	99.00	95.08	95.08
I-17	941	96.32	95.72	95.72

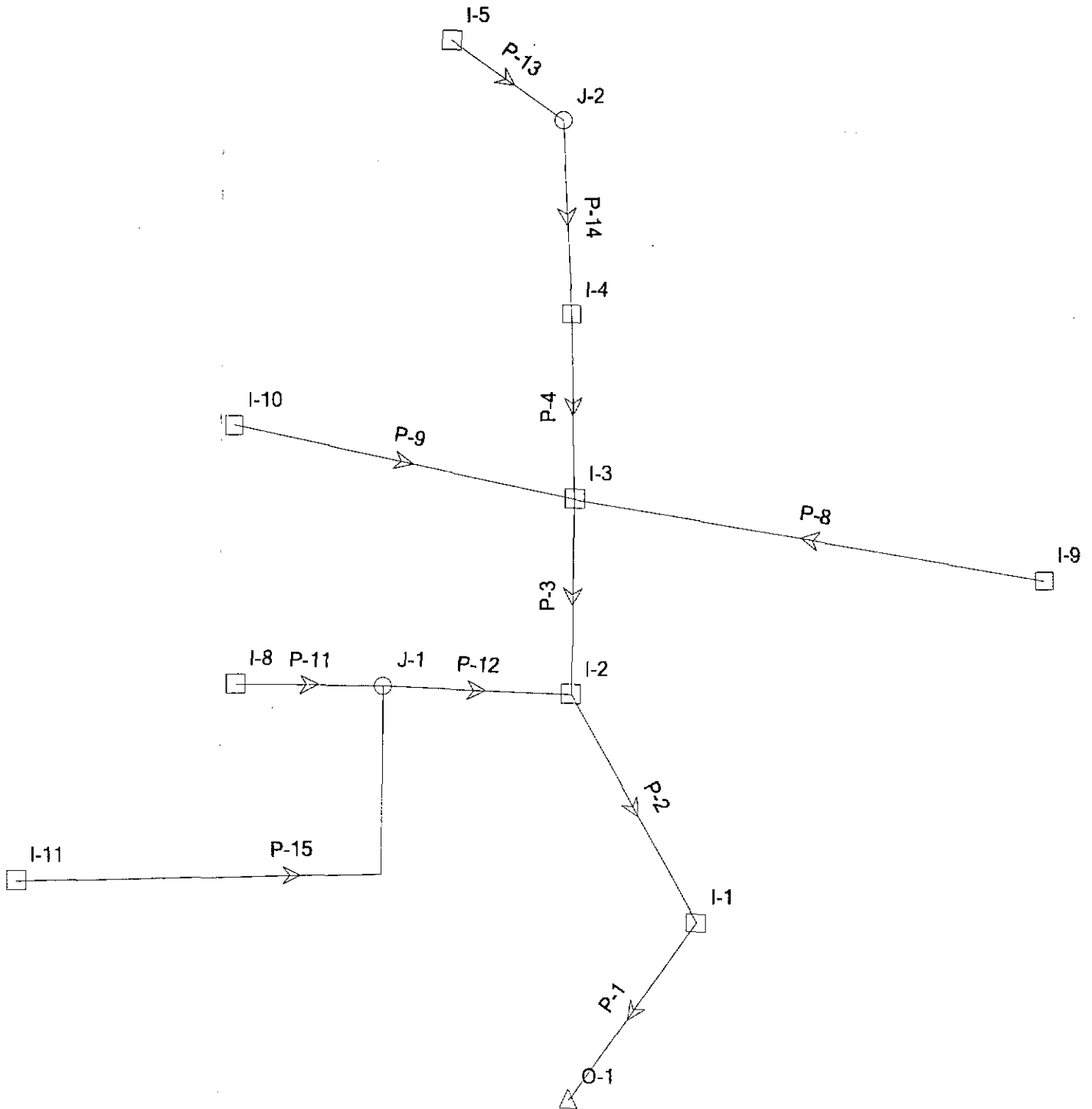
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Scenario: Final Design

Node Report

Label	Description	Area (acres)	Inlet C	Time of Concentration (min)	Local CA (acres)	Local Intensity (in/hr)	Local Rational Flow (gpm)	Additional Carryover (gpm)	Rim Elevation (ft)	Hydraulic Grade Line In (ft)	Hydraulic Grade Line Out (ft)
I-1		0.53	0.90	15.00	0.48	4.62	997	0	95.00	93.60	93.60
I-2		0.48	0.90	15.00	0.43	4.62	903	0	95.40	93.65	93.65
I-3		0.41	0.90	15.00	0.37	4.62	771	0	96.80	93.66	93.66
I-4		0.46	0.90	15.00	0.41	4.62	865	0	96.60	93.67	93.67
I-5		0.40	0.90	15.00	0.36	4.62	752	0	96.95	94.77	94.60
I-8		0.00	0.00	0.00	0.00	0.00	0	4,500	99.00	94.53	94.53
I-9		0.28	0.90	15.00	0.25	4.62	527	0	96.20	93.91	93.91
I-10		0.09	0.90	15.00	0.08	4.62	169	0	95.00	93.66	93.66
I-11		0.00	0.00	0.00	0.00	0.00	0	20	99.00	94.27	94.27
J-1									97.70	94.27	94.27
J-2									98.20	93.67	93.67
O-1									96.39	93.53	93.53

Scenario: Final Design



Calculation Results Summary

J-2	751	98.20	93.67	93.67
I-5	752	96.95	94.77	94.60

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Calculation Results Summary

Scenario: Final Design

>>>> Info: Subsurface Network Rooted by: O-1
 >>>> Info: Subsurface Analysis iterations: 3
 >>>> Info: Convergence was achieved.

CALCULATION SUMMARY FOR SURFACE NETWORKS

Label	Inlet Type	Inlet	Total Intercepted Flow (gpm)	Total Bypassed Flow (gpm)	Capture Efficiency (%)	Gutter Spread (ft)	Gutter Depth (ft)
I-10	Generic Inlet	Generic Default 100%	169	0	100.0	0.00	0.00
I-9	Generic Inlet	Generic Default 100%	527	0	100.0	0.00	0.00
I-4	Generic Inlet	Generic Default 100%	865	0	100.0	0.00	0.00
I-3	Generic Inlet	Generic Default 100%	771	0	100.0	0.00	0.00
I-2	Generic Inlet	Generic Default 100%	903	0	100.0	0.00	0.00
I-1	Generic Inlet	Generic Default 100%	997	0	100.0	0.00	0.00
I-8	Generic Inlet	Generic Default 100%	4,500	0	100.0	0.00	0.00
I-5	Generic Inlet	Generic Default 100%	752	0	100.0	0.00	0.00
I-11	Generic Inlet	Generic Default 100%	20	0	100.0	0.00	0.00

CALCULATION SUMMARY FOR SUBSURFACE NETWORK WITH ROOT: O-1

Label	Number of Sections	Section Size	Section Shape	Length (ft)	Total System Flow (gpm)	Average Velocity (ft/s)	Hydraulic Grade Upstream (ft)	Hydraulic Grade Downstream (ft)
P-1	1	36 inch	Circular	88.20	8,162	2.57	93.60	93.53
P-2	1	36 inch	Circular	84.50	7,468	2.35	93.65	93.60
P-12	1	18 inch	Circular	67.20	4,520	5.70	94.27	93.65
P-3	1	36 inch	Circular	185.40	2,463	0.78	93.66	93.65
P-15	1	8 inch	Circular	214.90	20	1.83	94.27	94.27
P-11	1	18 inch	Circular	28.50	4,500	5.67	94.53	94.27
P-9	1	18 inch	Circular	120.80	169	0.21	93.66	93.66
P-8	1	15 inch	Circular	115.40	527	5.27	93.91	93.66
P-4	1	30 inch	Circular	80.20	1,478	0.67	93.67	93.66
P-14	1	30 inch	Circular	71.10	751	0.34	93.67	93.67
P-13	1	18 inch	Circular	42.00	752	8.08	94.60	93.67

Label	Total System Flow (gpm)	Ground Elevation (ft)	Hydraulic Grade Line In (ft)	Hydraulic Grade Line Out (ft)
O-1	8,121	96.39	93.53	93.53
I-1	8,162	95.00	93.60	93.60
I-2	7,468	95.40	93.65	93.65
J-1	4,520	97.70	94.27	94.27
I-3	2,463	96.80	93.66	93.66
I-11	20	99.00	94.27	94.27
I-8	4,500	99.00	94.53	94.53
I-10	169	95.00	93.66	93.66
I-9	527	96.20	93.91	93.91
I-4	1,478	96.60	93.67	93.67



LETTER OF TRANSMITTAL

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TO: City of Wichita
Public Works
Wichita, Ks

DATE: 8/16/07
PROJECT NO.: 35-05493-002-1324
PROJECT: Downtown Arena

ATTENTION: Ms. Vicky Huang, P.E.
FROM: Rod R. Young

REFERENCE: Storm Water Study

WE ARE SENDING YOU: Attached Under separate cover via _____ the following items:
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 Copy of letter Change order _____

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1			Storm Water Sewer Study
1			Public Works, Engineering Division - Final Drainage Plan Submittal Checklist

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REMARKS: Vicky: We are also sending PDFs of the attached.
Please call with questions.

COPIES TO: Rob Hartman, PEC By: Rod R. Young, P.E. 

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