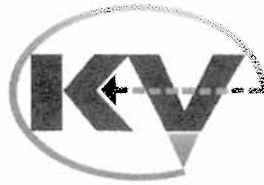


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KAW VALLEY ENGINEERING, INC.

December 12, 2006
A06D2911

Scott C. Lindebak, P.E. & CFM
Public Works - Engineering Division
City of Wichita, Kansas
455 N. Main, 7th Floor
Wichita, KS 67202

**RE: Stormwater – Family Video Addition
A Replat of A Portion of Lot 1, Knight Acres Addition
Central Ave. & Sheridan St. Wichita, Kansas**

Dear Mr. Lindebak,

Kaw Valley Engineering, Inc. (KVE) has prepared the following drainage analysis for the City of Wichita, Kansas for the above referenced development.

INTRODUCTION

The development is approximately 1.27 acres at the Southwest corner of the intersection of Central Ave. & Sheridan St. The purpose of this study is to provide analysis of the proposed stormwater system and the routing of storm water drainage flows associated with the development to ensure existing drainage patterns will be maintained. The site currently has several uses with a commercial building on the corner of the intersection fronting both Central & Sheridan, a residential home with frontage on Central and a vacant portion with frontage on Sheridan. The existing drainage sheet drains to the street frontages, primarily to the north with the far west portion of the property draining to the west. Current slopes are slight with the majority of the property at 1 percent.

PROPOSED IMPROVEMENTS

KVE is proposing to build an 8820 sq ft building with a Family Video and two lease spaces. The construction plans propose to build a storm sewer system to collect the developed drainage. The system includes two Nyloplast drainage structures and a curb inlet. The system will outlet into the existing inlet in Sheridan St. See the attached exhibit of the proposed grading plan.

o t h e r l o c a t i o n s

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14700 W. 114th Terrace Lenexa, Kansas 66215 Tel: 913-894-5150 LX@kveng.com

DRAINAGE ANALYSIS 5-YEAR

Line	Line Length	Incr. Area	Total Area	Runoff Coeff.	Incr C x A	Total C x A	Inlet Time	Time Conc	Rnfall Int	Total Runoff	Pipe Size	Pipe Slope	HGL	Rim
	(ft)	(ac)	(ac)	(C)			(min)	(min)	(in/hr)	(cfs)	(in)	(%)	(ft)	(ft)
1	37	0.28	1.14	0.9	0.25	0.68	5	21.2	4	2.72	10	0.49	6.16	8.8
2	167	0.1	0.86	0.9	0.09	0.43	5	20.3	4.1	1.75	10	0.45	7.45	8.25
3	48	0.76	0.76	0.45	0.34	0.34	20	20	4.1	1.4	10	0.52	7.75	8

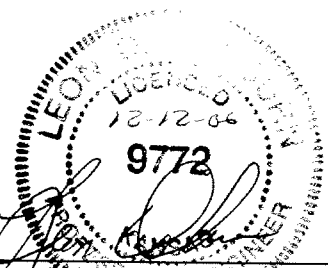
During storms that that would exceed the capacity of the proposed system the overflow would be detained in the parking until it would run over the back of curb to the street as it always has. The drainage areas not accounted for in the above Area (1.27 Acres- 1.14 Acres) are accounted with portions of the property that drain out the entrance drives and the most western piece of the property. See the attached exhibit for the analysis reports and drainage area map.

EXHIBITS

- Exhibit A – Proposed Grading Plan
- Exhibit B – Map showing Drainage Areas
- Exhibit C – Analysis Reports

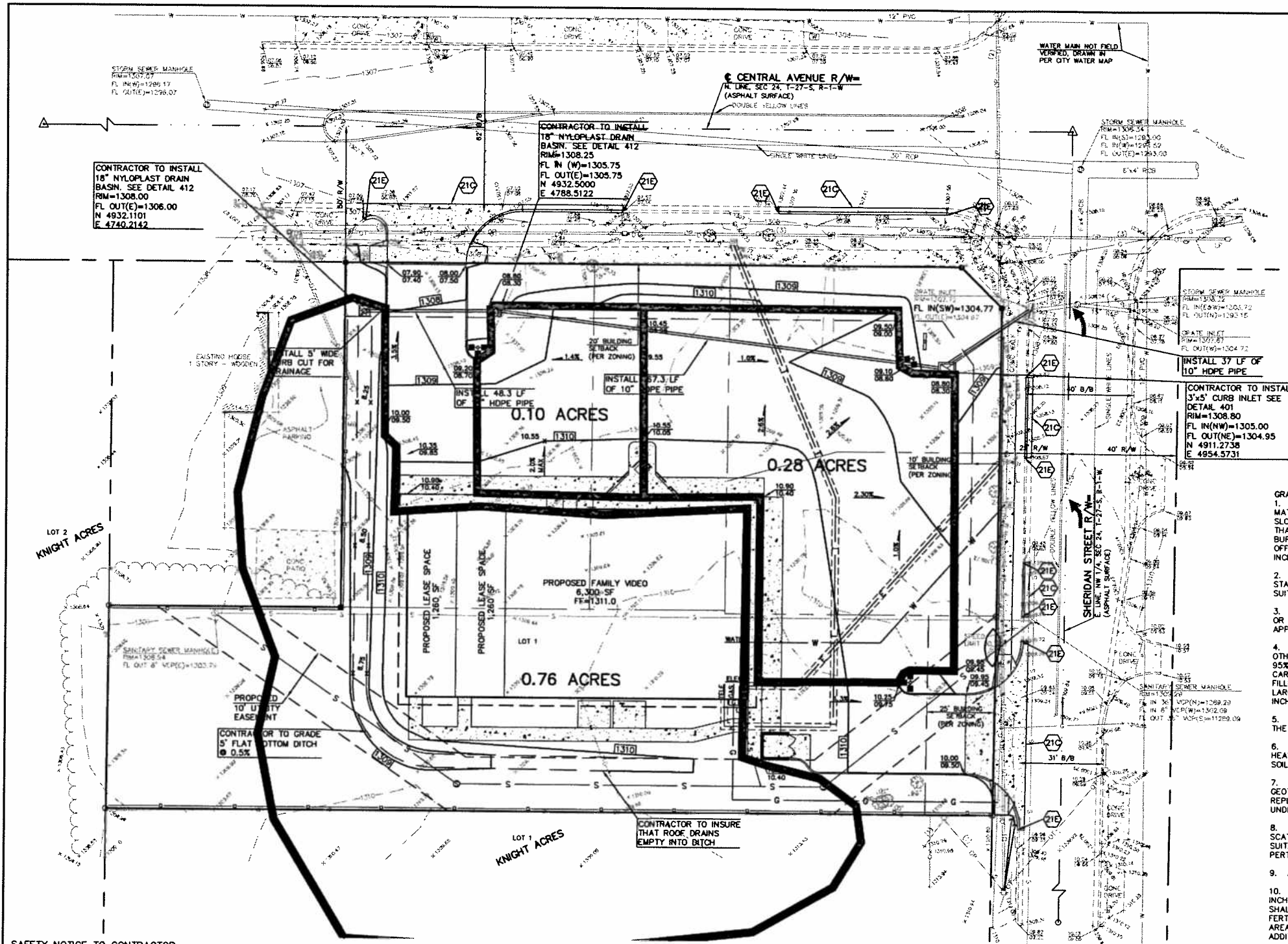


Paul W. Parrish, E.I.T.
 Intern Engineer


 Leon Osbourn
 Project Manager

Attachments

\\cserver2\Projects\A06_2911\Design\Ltr Re Storm Drainage.doc



- GRADING NOTES:**
1. THE CONSTRUCTION AREA SHALL BE CLEARED, GRUBBED, AND STRIPPED OF TOPSOIL AND ORGANIC MATTER FROM ALL AREAS TO BE OCCUPIED BY BUILDING AND PAVING. TOPSOIL FOR REPLACEMENT ON SLOPES MAY BE STOCKPILED ON SITE. EXCESS TOPSOIL MAY BE WASTED IN FILL SLOPES PROVIDED THAT NO TOPSOIL WILL BE WASTED WITHIN 10 FEET OF THE EDGE OF THE BUILDING OR PARKING AREA. BURNING OF TIMBER WILL NOT BE PERMITTED UNLESS APPROVAL IS OBTAINED FROM GOVERNING OFFICIALS. STRIPPING EXISTING TOPSOIL AND ORGANIC MATTER SHALL BE TO A MINIMUM DEPTH OF 6 INCHES.
 2. AREAS TO RECEIVE FILL SHALL BE SCARIFIED AND THE TOP 8-INCH DEPTH COMPACTED TO 95% STANDARD PROCTOR DENSITY. ANY UNSUITABLE AREAS SHALL BE UNDERCUT AND REPLACED WITH SUITABLE MATERIAL BEFORE ANY FILL MATERIAL CAN BE APPLIED.
 3. OFF-SITE FILL MATERIAL SHALL HAVE A PLASTICITY INDEX OF 25 OR LESS, A LIQUID LIMIT OF 45 OR LESS AND CONTAIN NO ROCK LARGER THAN FOUR INCHES. OFF-SITE FILL MATERIAL SHALL BE APPROVED BY THE OWNER PRIOR TO BRINGING ON SITE.
 4. EARTHWORK UNDER THE BUILDING SHALL COMPLY WITH THE PROJECT ARCHITECTURAL PLANS. OTHER FILL MATERIAL SHALL BE MADE IN LIFTS NOT TO EXCEED EIGHT INCHES DEPTH COMPACTED TO 95% STANDARD PROCTOR DENSITY. FILL MATERIAL MAY INCLUDE ROCK FROM ON-SITE EXCAVATION IF CAREFULLY PLACED SO THAT LARGE STONES ARE WELL DISTRIBUTED AND VOIDS ARE COMPLETELY FILLED WITH SMALLER STONES, EARTH, SAND OR GRAVEL TO FURNISH A SOLID EMBANKMENT. NO ROCK LARGER THAN THREE INCHES IN ANY DIMENSION NOR ANY SHALE SHALL BE PLACED IN THE TOP 12 INCHES OF EMBANKMENT.
 5. ALL AREAS OF THE SUBGRADE THAT ARE TO BE STABILIZED SHALL BE DONE IN ACCORDANCE WITH THE SITEMARK SPECIFICATIONS.
 6. AREAS THAT ARE TO BE CUT TO SUBGRADE LEVELS SHALL BE PROOF ROLLED WITH A MODERATELY HEAVY LOADED DUMP TRUCK OR SIMILAR APPROVED CONSTRUCTION EQUIPMENT TO DETECT UNSUITABLE SOIL CONDITIONS.
 7. IN ALL AREAS OF EXCAVATION, IF UNSUITABLE SOIL CONDITIONS ARE ENCOUNTERED, A QUALIFIED GEOTECHNICAL ENGINEER SHALL RECOMMEND TO THE OWNER THE METHODS OF UNDERCUTTING AND REPLACEMENT OF PROPERLY COMPACTED, APPROVED FILL MATERIAL. ALL PROOFROLLING AND UNDERCUTTING SHOULD BE PERFORMED DURING A PERIOD OF DRY WEATHER.
 8. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE CONTROL OF DUST AND DIRT RISING AND SCATTERING IN THE AIR DURING CONSTRUCTION AND SHALL PROVIDE WATER SPRINKLING OR OTHER SUITABLE METHODS OF CONTROL. THE CONTRACTOR SHALL COMPLY WITH ALL GOVERNING REGULATIONS PERTAINING TO ENVIRONMENTAL PROTECTION.
 9. ALL SLOPES ARE TO BE 3:1 OR FLATTER UNLESS OTHERWISE INDICATED.
 10. ALL SLOPES AND AREAS DISTURBED BY CONSTRUCTION SHALL BE GRADED SMOOTH AND FOUR INCHES OF TOPSOIL APPLIED. IF ADEQUATE TOPSOIL IS NOT AVAILABLE ON-SITE, THE CONTRACTOR SHALL PROVIDE TOPSOIL, APPROVED BY THE OWNER, AS NEEDED. THE AREA SHALL THEN BE SEED, FERTILIZED, MULCHED, WATERED AND MAINTAINED UNTIL HARDY GRASS GROWTH IS ESTABLISHED IN ALL AREAS. ANY AREAS DISTURBED FOR ANY REASON SHALL BE CORRECTED BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE OWNER PRIOR TO FINAL ACCEPTANCE OF THE PROJECT.
 11. CONTRACTOR SHALL USE SILT FENCE, BALES OF HAY OR OTHER MEANS OF CONTROLLING EROSION ALONG THE EDGE OF THE PROPERTY OR OTHER BOTTOM OF SLOPE LOCATIONS.
 12. CONTRACTOR IS TO REMOVE AND DISPOSE OF ALL DEBRIS, RUBBISH AND OTHER MATERIALS RESULTING FROM PREVIOUS AND CURRENT DEMOLITION OPERATIONS.
 13. THE CONTRACTOR SHALL TAKE ALL PRECAUTIONS NECESSARY TO AVOID PROPERTY DAMAGE TO ADJACENT PROPERTIES DURING THE CONSTRUCTION PHASES OF THIS PROJECT. THE CONTRACTOR WILL BE HELD SOLELY RESPONSIBLE FOR ANY DAMAGES TO THE ADJACENT PROPERTIES OCCURRING DURING THE CONSTRUCTION PHASES OF THIS PROJECT.
 14. IT IS NOT THE DUTY OF THE ENGINEER OR THE OWNER TO REVIEW THE ADEQUACY OF THE CONTRACTOR'S SAFETY MEASURES, IN, ON OR NEAR THE CONSTRUCTION SITE AT ANY TIME DURING CONSTRUCTION.
 15. THE SITEMARK FOR THIS PROJECT SHALL MEET OR EXCEED THE STANDARD SITEMARK SPECIFICATIONS.
 16. PIPE LENGTHS ARE CENTER TO CENTER OF STRUCTURE OR TO END OF END SECTIONS.

SAFETY NOTICE TO CONTRACTOR
 IN ACCORDANCE WITH GENERALLY ACCEPTED CONSTRUCTION PRACTICES, THE CONTRACTOR WILL BE SOLELY AND COMPLETELY RESPONSIBLE FOR CONDITIONS OF THE JOB SITE, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY DURING PERFORMANCE OF THE WORK. THIS REQUIREMENT WILL APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS.

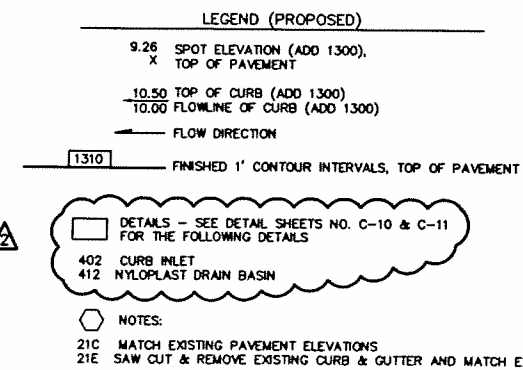
WARRANTY / DISCLAIMER
 THE DESIGNS REPRESENTED IN THESE PLANS ARE IN ACCORDANCE WITH ESTABLISHED PRACTICES OF CIVIL ENGINEERING FOR THE DESIGN FUNCTIONS AND USES INTENDED BY THE OWNER AT THIS TIME. HOWEVER, NEITHER KAW VALLEY ENGINEERING, INC NOR ITS PERSONNEL CAN DO WARRANTY THESE DESIGNS OR PLANS AS CONSTRUCTED, EXCEPT IN THE SPECIFIC CASES WHERE KAW VALLEY ENGINEERING PERSONNEL INSPECT AND CONTROL THE PHYSICAL CONSTRUCTION ON A CONTEMPORARY BASIS AT THE SITE.

CAUTION - NOTICE TO CONTRACTOR
 THE CONTRACTOR IS SPECIFICALLY CAUTIONED THAT THE LOCATION AND/OR ELEVATION OF EXISTING UTILITIES AS SHOWN ON THESE PLANS IS BASED ON RECORDS OF THE VARIOUS UTILITY COMPANIES AND, WHERE POSSIBLE, MEASUREMENTS TAKEN IN THE FIELD. THE INFORMATION IS NOT TO BE RELIED ON AS BEING EXACT OR COMPLETE. THE CONTRACTOR MUST CALL THE APPROPRIATE UTILITY COMPANY AT LEAST 72 HOURS BEFORE ANY EXCAVATION TO REQUEST EXACT FIELD LOCATION OF UTILITIES. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO RELOCATE ALL EXISTING UTILITIES WHICH CONFLICT WITH PROPOSED IMPROVEMENTS SHOWN ON THE PLANS. THE CONTRACTOR SHALL EXPOSE EXISTING UTILITIES AT LOCATIONS OF POSSIBLE CONFLICTS PRIOR TO ANY CONSTRUCTION.

NOTE:

1. CONTRACTOR SHALL REFER TO ARCHITECTURAL PLANS FOR EXACT LOCATIONS AND DIMENSIONS OF ENTRANCE, SLOPED PAVING, EXIT PORCHES, RAMPS, TRUCK DOCKS, PRECISE BUILDING DIMENSIONS AND EXACT BUILDING UTILITY ENTRANCE LOCATIONS.
2. THESE PLANS HAVE NOT BEEN VERIFIED WITH FINAL ARCHITECTURAL CONTRACT DRAWINGS. CONTRACTOR SHALL VERIFY AND NOTIFY THE ENGINEER OF ANY DISCREPANCIES. CONTRACTOR IS FULLY RESPONSIBLE FOR REVIEW AND COORDINATION OF ALL DRAWINGS AND CONTRACT DOCUMENTS.

THE COORDINATES PROVIDED ON THIS PLAN ARE FOR INFORMATION AND CHECKING PURPOSES ONLY. IT IS THE CONTRACTOR'S RESPONSIBILITY TO CALCULATE CONSTRUCTION STAKING COORDINATES ACCORDING TO THE DIMENSIONS SHOWN ON THESE PLANS. CONTRACTOR SHALL VERIFY THE ACCURACY OF THE COORDINATES SHOWN HEREON BEFORE CONSTRUCTION.



PROJ. NO.	A06_2911
DATE	AUG 7, 2006
DESIGNER	LDO
DRAWN BY	LRR
CFN	2911GP
SHEET	1

REV	DATE	DESCRIPTION
0	06-07-06	INITIAL ISSUE
		DSN
		DWN
		CHK

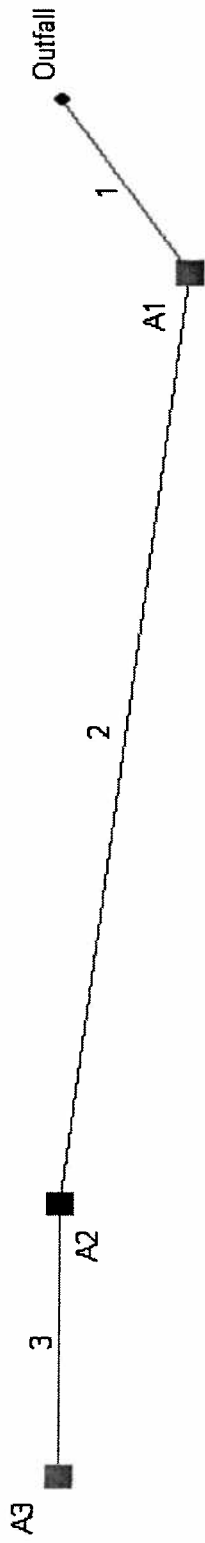
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 Office: Junction City, Mo. Kansas City, Mo. Lansing, Pa.

FAMILY VIDEO
 CENTRAL AVENUE & SHERIDAN STREET
 WICHITA, KANSAS

Drainage Map

Hydraflow Plan View

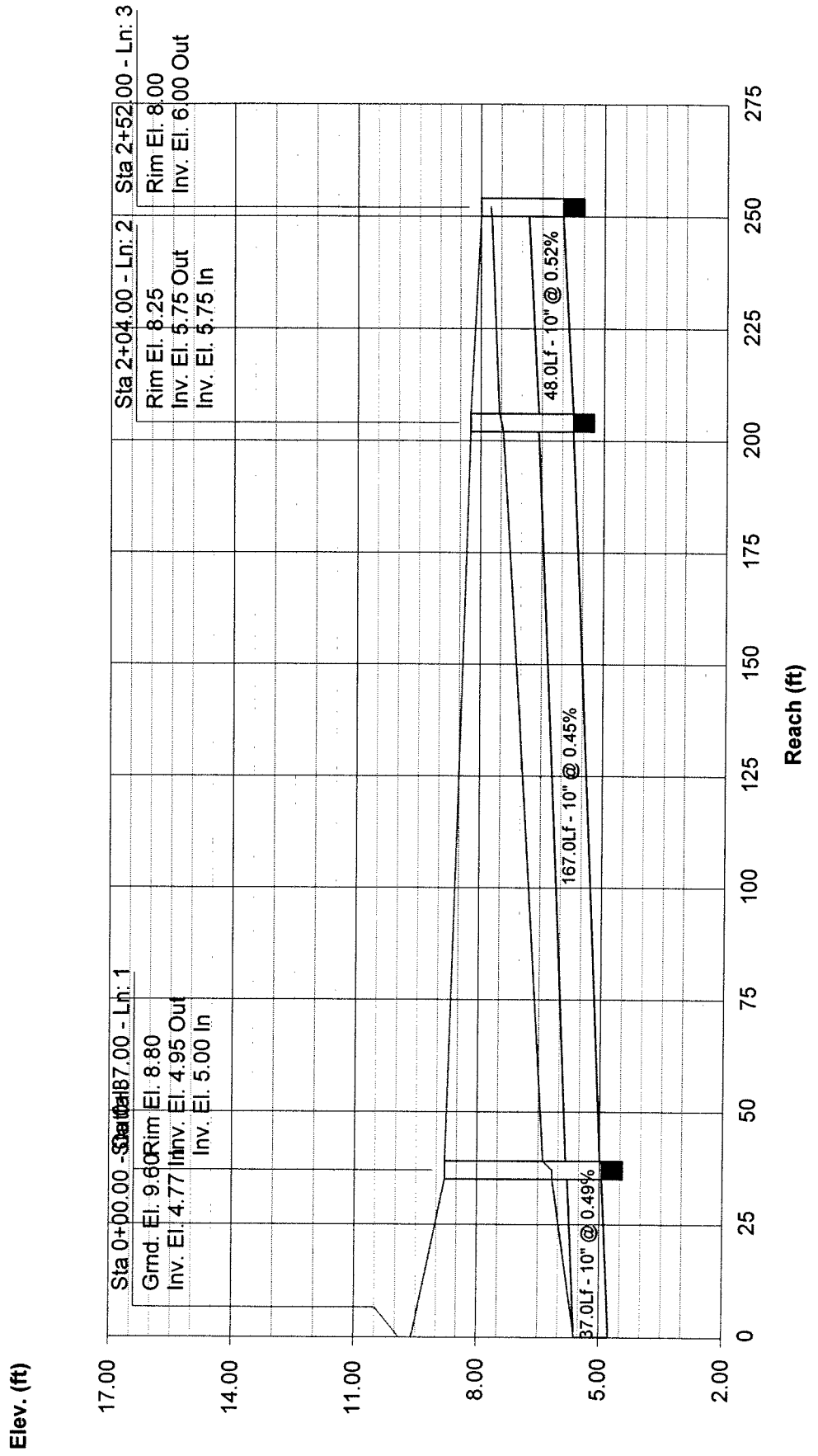


Project File: Storm Drainage.stm

No. Lines: 3

12-12-2006

Storm Sewer Profile



Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line size (in)	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line slope (%)	HGL down (ft)	HGL up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns line No.
1	A1-A0	2.72	10 c	37.0	4.77	4.95	0.486	5.60*	6.16*	0.00	6.16	End
2	A2-A1	1.75	10 c	167.0	5.00	5.75	0.449	6.38*	7.45*	0.04	7.49	1
3	A3-A2	1.40	10 c	48.0	5.75	6.00	0.521	7.55*	7.75*	0.03	7.77	2
Project File: Storm Drainage.stm							Number of lines: 3			Run Date: 12-12-2006		
NOTES: c = cir; e = ellip; b = box; Return period = 5 Yrs. ; *Surcharged (HGL above crown).												

FL-DOT Report

Line No	To Line	Type of struc	n - value	Len (ft)	Drainage Area			Time of conc (min)	Time of flow in sect (min)	Inten (I) (in/hr)	Total CA	Add Q		Inlet elev (ft)	Elev of HGL			Rise Span	HGL Pipe	Actual		Date: 12-12-2006			
					C1 = 0.2	C2 = 0.5	C3 = 0.9					Total flow	Q		Up (ft)	Down (ft)	Fall (ft)			Size (in)	Slope (%)		Vel (ft/s)	Cap (cfs)	Frequency: 5 yrs
1	End	Curb	0.013	37.0	0.00	0.00	0.00	21.18	0.12	4.0	0.68	0.00	8.80	6.16	5.60	0.56	10	1.50	4.99	2.72	A1-A0				
					0.00	0.00	0.00										5.78	5.60		10		0.49	2.80	1.53	
					0.00	0.00	0.00										4.95	4.77	0.18	Cir					
2	1	DrGt	0.013	167.0	0.00	0.00	0.00	20.31	0.86	4.1	0.43	0.00	8.25	7.45	6.38	1.07	10	0.64	3.21	1.75	A2-A1				
					0.00	0.00	0.00										6.58	5.83		10		0.45	2.69	1.47	
					0.00	0.00	0.00										5.75	5.00	0.75	Cir					
3	2	DrGt	0.013	48.0	0.00	0.00	0.00	20.00	0.31	4.1	0.34	0.00	8.00	7.75	7.55	0.20	10	0.41	2.56	1.40	A3-A2				
					0.00	0.00	0.00										6.83	6.58		10		0.52	2.90	1.58	
					0.00	0.00	0.00										6.00	5.75	0.25	Cir					

NOTES: Intensity = 66.04 / (Inlet time + 12.90) ^ 0.80 (in/hr) ; Time of flow in section is based on full flow.

Project File: Storm Drainage.stm