V 9-18-06

12.5.1

VARIANCE REQUEST

Iowa Department of Natural Resources

1. Date	: 9/24/91.	13. Decision:	Approved
2. Review Engineer	: Fred Evans	Date:	9/25/91
3. Date Received	: 8/12/91 & 9/4/91		
4. Facility Name	: City of Leon	14. Appeal:	
5. County Number	: 27	Date:	
6. Program Area	: CP		
7. Facility Type	: COI		
8. Subject Area	: 305		
9. Rule Reference	: 64.2(9)		
10. Design Std. Ref.	: 12.5.1		
11. Consulting Engr.	: Howard R. Green		
12. Variance Rule	: 64.2(9)c		

15. Description of Variance Request

The City of Leon proposes to extend a sanitary sewer to service 1 1/2 acres of land to be developed for single-family residences. The existing sanitary sewer, which can be reached by gravity flow, is a 6" diameter V.C pipe on a 1.20% slope and located 300 feet from the land to be developed. Inasmuch as the existing sewer is 6" diameter, the designing engineer is requesting a variance from our design standards to use 6" diameter sewer for the proposed extension to serve this area.

16. Consulting Engineer's Justification

1. The existing sewer system has approximately 230 gpm of additional capacity to serve the anticipated 11 gpm of wastewater flow. (from the area to be developed)

2. Installing an 8" diameter pipe, for connection

16. Consulting Engineer's Justification (cont.)

to the existing sewer, would cause a constriction to sewer flow.

17. Department's Justification

We concur with the engineers proposal to use 6" diameter pipe for the proposed sanitary sewer extension for the following reasons:

1. The proposed 6" sewer will discharge into an existing 6" sewer.
2. The existing 6" sewer has considerable reserve capacity to serve the proposed housing development.
3. Only 3 or 4 single family houses will be served by the proposed sewer. In this regard the City of Leon advises that other areas around the proposed development have sewer service available from other directions.
4. The proposed 6" sewer will have a slope of 4.46%.

18. Precedents Used City of Keokuk - approved 6/3/87; City of Albia - approved 8/3/87; City of Lisbon - approved 1/11/89

19. Staff Reviewer	:	Ralph M. Evans	Date: 9/24/91
20. Supervisor	:	for	Date: 9/24/91
21. Authorized by	:	David W. Cobb	Date: 9/25/91

STATE OF IOWA

TERRY E. BRANSTAD, GOVERNOR

DEPARTMENT OF NATURAL RESOURCES
LARRY J. WILSON, DIRECTOR

April 15, 1988

City of Keystone
City Hall
Keystone, IA 52249

RE: Request for a Variance
Wastewater Treatment Facility
Keystone, Iowa

Gentlemen:

The Iowa Department of Natural Resources in accordance with Subrule 567--64.2(9)c of the Iowa Administrative Code has approved your request for a variance from Iowa Wastewater Facilities Design Standard 18C.6.1 which requires that aerated facultative pond systems consist of at least two aerated cells. The approval of this variance request will permit the City of Keystone to aerate only one cell of the existing two cell lagoon system.

The engineering justification submitted substantially demonstrates that this variance will result in at least equivalent effectiveness while significantly reducing costs.

Sincerely,

DARRELL MCALLISTER
BUREAU CHIEF
SURFACE AND GROUNDWATER PROTECTION BUREAU

DM:FME:mw:M106MW.6

cc: Crawford Engineering & Surveying, Inc., Independence, IA.
Field Office 1

CRAWFORD
Engineering & Surveying, Inc.

207 Second Avenue N.E.
Post Office Box 793
Independence, Iowa 50644
(319) 334-7077

April 6, 1988

Mr. Fred Evans
Department of Natural Resources
Wallace State Office Building
Des Moines, Iowa 50319

RE: Wastewater Treatment Facilities
Keystone, Iowa

Dear Mr. Evans:

Enclosed please find copies of IDNR Schedules G and H which are being forwarded to you on behalf of Keystone, Iowa. A Plan of Action for Keystone was submitted to your department in July, 1987, with alternatives for the City to consider for upgrading the quality of effluent from their wastewater lagoons. Our recommendation in the Plan of Action was for the City to pursue converting the lagoon cells to an aerated lagoon system. The City, however, opted to select expansion of the lagoons to a three-cell controlled discharge system because of the increased operation costs associated with an aerated system.

In the process of determining the hydraulic detention time for the controlled discharge alternative, we discovered the daily wastewater flows were being incorrectly logged. The lift station contains a two-speed pump which was rebuilt two years ago. When the motor was reconnected, the high speed winding was connected to the low speed elapsed time meter. In calibrating the lift station, we found meter readings being logged at 290 gpm were actually 458 gpm.

After adjusting the flows to account for this discrepancy, the controlled discharge system would have to be approximately 60% larger than was originally anticipated. The increased size makes the controlled discharge system the least attractive of the alternatives originally considered by the City.

On behalf of the City of Keystone, we are requesting a variance to IDNR design criteria for aerated facultative pond systems. This would allow the City to aerate the north cell of their existing two-cell lagoon system. Justification for this variance is as follows:

1. The City's major problem contributing to non-compliance is excessive infiltration. The existing cell volumes will permit greater detention than required in the design standard.

   ADWF = 65,000

   AWWF = 133,000

Aerated Cell - $\frac{4,206,000 \text{ gals.}}{85,400 \text{ gpd}}$ = 49 days

Storage / Quiescent - $\frac{4,374,000 \text{ gals.}}{85,400 \text{ gpd}}$ = 51 days

2. A variance would allow the City to utilize the existing structures at the lagoon facility.

3. Controls for the aeration system could be located on the dividing dike to avoid duplication of aerated cells. The floating aerators could be relocated to the storage cell in case the aerated cell is out of service.

4. The aerated cell could be equipped with four 3-horsepower units for uniform distribution.

5. The aerated system can be implemented in the existing two-cell system without acquiring additional property.

6. A quiescent zone can be maintained in the south cell with the installation of a baffle curtain wall.

Your review and comments on this request will be appreciated.

Sincerely,

CRAWFORD ENGINEERING & SURVEYING, INC.

John R. Crawford dw.

John R. Crawford, P.E. & L.S.

JRC/dw

Enclosures

cc: Mark Andresen, Mayor
Marsha Cory

IOWA DEPARTMENT OF WATER, AIR AND WASTE MANAGEMENT

WATER QUALITY PROGRAM

CONSTRUCTION PERMIT APPLICATION

SCHEDULE G, TREATMENT PROJECT DESIGN DATA

WAWM USE

DATE PREPARED 6/30/87

DATE REVISED 4/6/88

PROJECT IDENTITY
Wastewater Treatment Facility
Keystone, Iowa

PROJECT NO.

PERMIT NO.

1. Project Description Upgrading WWT Facility

2. Design Basis:

Plant Design Loading		Present ADW	Present AWW	Present MWW	Design Year 2010 ADW	Design Year 2010 AWW	Design Year 2010 MWW
Residential Waste	Population	618	//////////	//////////	650	//////////	//////////
	Flow, MGD	0.062	0.062	0.062	0.065	0.065	0.065
	BOD_5, #/day	105.1	105.1	105.1	110.5	110.5	110.5
	TKN, #/day						
Out of Town Students	Number	50	////////	////////	50	////////	////////
	Flow, MGD	0.001	0.001	0.001	0.001	0.001	0.001
	BOD_5, #/day	2.5	2.5	2.5	2.5	2.5	2.5
	TKN, #/day						
Industrial (locker)	Flow, MGD	0.0005	0.0005	0.0005	0.001	0.001	0.001
	Rated Flow, MGD						
	BOD_5, #/day	15.8	15.8	15.8	31.0	31.0	31.0
	TKN, #/day						
Other (Specify)	Flow, MGD						
	Rated Flow, MGD						
	BOD_5, #/day						
	TKN, #/day						
Infiltration	MGD	--	0.048	0.120	--	0.048	0.120
Inflow	MGD	--	0.025	0.032	--	0.025	0.032
Total	Flow, MGD	0.062	0.135	0.214	0.065	0.138	0.217
	Rated Flow, MGD	0.062	0.135	0.214	0.065	0.138	0.217
	BOD_5, mg/l	239	110	69	265	128	81
	BOD_5, #/day	123.4	123.4	123.4	144	144	144
	TKN, mg/l						
	TKN, #/day						

3. Peak Hourly Dry Weather Flow .104 MGD + Peak Hourly Infiltration .194 MGD + Peak Hourly Inflow .052 MGD=Total Peak Hourly Wet Weather Flow .350 MGD (In Design Year)

4. Identify effluent limitations

		BOD 5 day Avg	BOD 5 day Max	Suspended Solids Avg	Suspended Solids Max	NH_3-N Avg	NH_3-N Max	C BOD Avg	C BOD Max	Avg	Max
Operation Permit Effluent Limits	mg/l	30	30	80	120						
	#/day										
Design Effluent Quality	mg/l			120				40			
	#/day										
30-Day Average				80				25			

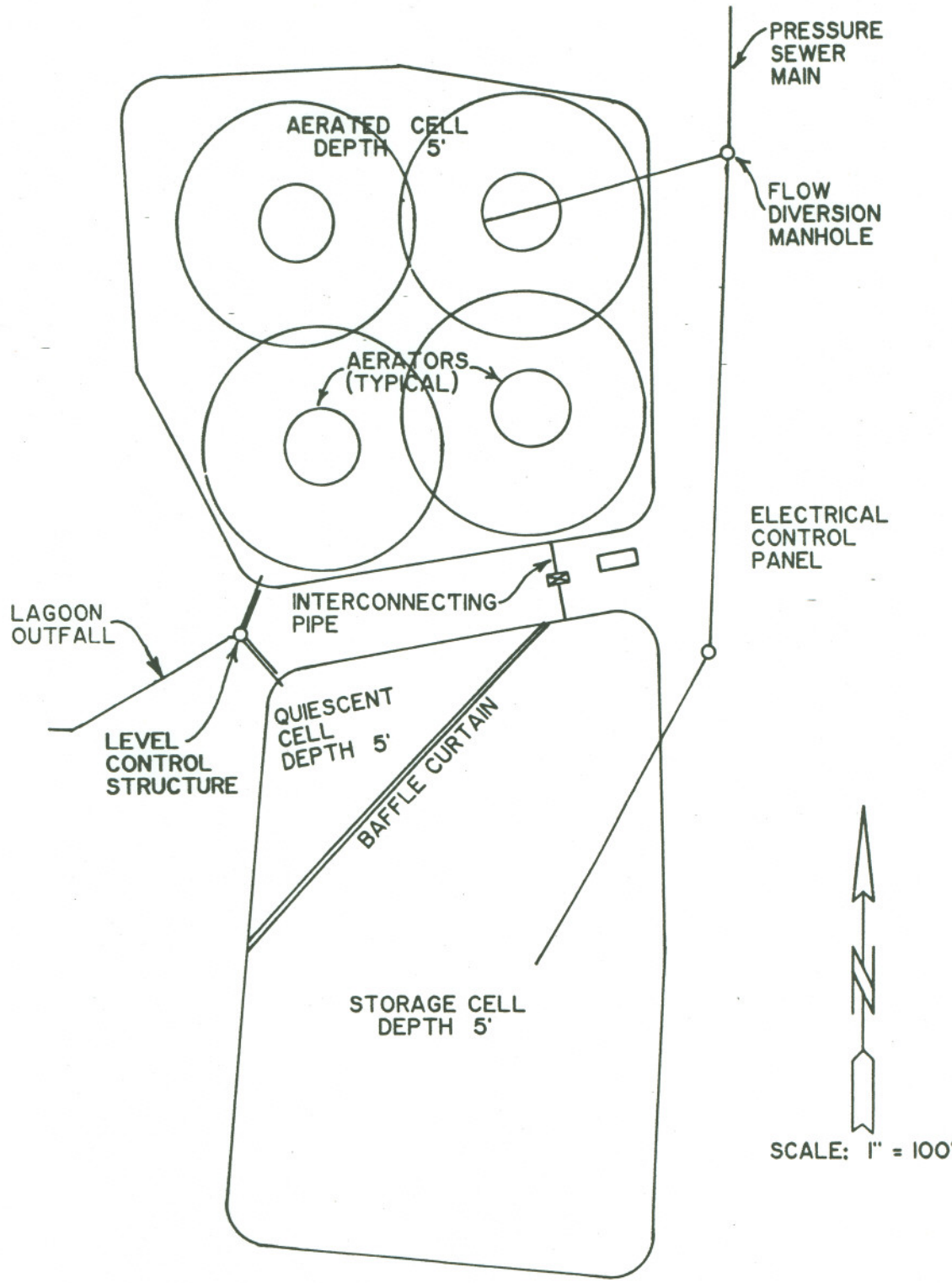
5. Identify significant industrial/commercial contributors:

Waste Contributors	Pre-treat	Operation Hrs/Day	Operation Days/Week	Design Loadings Flow MGD Total	Flow MGD Rated	BOD_5 #/day	Susp. Solids #/day	TKN #/day	Oil & Grease #/day	#/day
Locker			2	0.0005		59				

WAWM form 28-G (Jul 1, 83) (Replaces DEQ Form WQ 133-G, which may be used)

IOWA DEPARTMENT OF WATER, AIR AND WASTE MANAGEMENT

WATER QUALITY PROGRAM	CONSTRUCTION PERMIT APPLICATION SCHEDULE H1, SCHEMATIC FLOW DIAGRAM	WAWM USE
DATE PREPARED 6/30/87	PROJECT IDENTITY Wastewater Treatment Facility Keystone, Iowa	PROJECT NO.
DATE REVISED 4/6/88		PERMIT NO.



IWM form 28-H1 (Jul 1, 83) (Replaces DEQ Form WQ 133-H1, which may be used)

PROPOSED WASTEWATER TREATMENT

Keystone, Iowa

Oxygen Transfer Calculation:

Design BOD_5 Load:	144 lbs./day
Design O_2:	2 lbs. O_2/lbs. BOD_5
Total O_2 Required:	(144 lbs. BOD_5/day)(2 lbs O_2/lb. BOD_5) = 288 lbs. O_2/day
Proposed Aerator Unit:	3 hp with supply capability of 3 lbs. O_2/hp/hr = 9 lbs. O_2/hour
Required Aeration:	$\frac{288 \text{ lbs. } O_2/\text{day}}{9 \text{ lbs. } O_2/\text{hr.}}$ = 32 hrs./day
Required Aeration Units:	(4 units)(8 hrs. operation/unit/day) = 32 hr. operation/day

STATE OF IOWA
DEPARTMENT OF NATURAL RESOURCES
HENRY A. WALLACE BUILDING
DES MOINES, IOWA 50319

CONSTRUCTION PERMIT

City of Leon
City Hall
Leon, Iowa 50144

Permit No.: 91-307-S
File: Leon - Sewage
Re: Sanitary Sewer Improvements
Project No.: S 91-282

In accordance with the provisions of Sections 455B.173.9 and 455B.174.4 Code of Iowa, and Rule 567--64.2(455B) or Rule 567--65.5(455B), or Rule 567--41.12(455B) of the Iowa Administrative Code, the Director of the Department of Natural Resources does hereby issue a permit for the construction of:

300 feet of 6-inch sanitary sewer & appurtenances

The requested variance from our design standards to permit the use of 6-inch diameter sewer has been approved.

The construction of the project shall be initiated within one year of issuance of this permit or this permit is no longer valid. Within thirty days after completion of construction, the permit holder shall submit a certification by a registered professional engineer that the project was completed in accordance with the approved project documents.

Pursuant to Section 455B.174.4, Code of Iowa, you have the right to appeal any condition of this permit by filing with the Director of the Department of Natural Resources a notice of appeal and request for administrative hearing within thirty days of receipt of this permit.

Contact Fred M. Evans at 515/281-8995 with any questions or comments.

For the Department of Natural Resources:

Larry J. Wilson, Director
By: Fred M. Evans
ENVIRONMENTAL PROTECTION DIVISION

Date: September 27, 1991

cc: Howard R. Green Company, Creston, IA

Field Office 5

Plan Distribution

[2] Engineer; [ ] Field Office; [ ] DNR File

The City of Leon respectfully requests that any available priority be given to the consideration of this variance, since the installation of the proposed sewer must be completed this construction season.

If you need any additional information, please do not hesitate to call.

Sincerely,

Mark Duben, P.E.

cc: Dick Sandal - IDNR

Howard R. Green Company
CONSULTING ENGINEERS

August 9, 1991

Mr. Fred Evans, P.E.
Iowa Department of Natural Resources
Henry A. Wallace Building
900 East Grand Avenue
Des Moines, IA 50319

Re: Variance Request
Sanitary Sewer Extension
Leon, Iowa

Dear Fred:

This is a formal request, on behalf of the City of Leon, Iowa, for a variance of Iowa Department of Natural Resources (IDNR) Wastewater Facilities Design Standards Section 12.5.1: Diameter of Public Sanitary Sewers.

The City of Leon would like to extend the existing 6" diameter sanitary sewer system to provide service to 1 1/2 acres of land to be developed for single-family residences. The existing sanitary sewer, which can be reached by gravity flow, is a 6" diameter V.C. pipe installed at 1.20% slope, located 300 ft. from the land to be developed. The capacity of the existing sewer is 230 gpm at a depth of flow of 4 1/2" (3/4 full). The maximum design flow for the existing and proposed areas served by the sewer is 11 gpm.

The City requests the IDNR to grant a variance, and allow the installation of 300 lineal feet of 6" diameter PVC to serve the 1 1/2 acres of single-family residential property, based on the following:

1. The existing sewer system has approximately 230 gpm of additional capacity to serve the anticipated 11 gpm wastewater flow.

2. Installing an 8" diameter pipe, for connection to the existing sewer, would cause a constriction to sewer flow.

806 Wyoming Street • P.O. Box 39 • Creston, Iowa 50801-0039 • Phone 515/782-5154 • FAX 515/782-6511

Howard R. Green Company
CONSULTING ENGINEERS

July 17, 1991

Dick Sandal
Iowa Department of Natural Resources
Henry A. Wallace Building
900 East Grand
Des Moines, Iowa 50319

Dear Mr. Sandal:

The City of Leon has been contacted by Southwestern Community College in regards to the College constructing a new house within the City.

This will require the City to extend an existing 6" VCP sanitary sewer main to the proposed house site.

The city requests a variance to allow them to extend the existing main using 6" SDR 35 PVC pipe.

Attached are construction permit application forms A, B, C, a plan and profile of the proposed sewer, and a drawing showing the area where the sewer will be placed.

If you have any additional questions, please contact me.

Sincerely,

Mark Duben

806 Wyoming Street • P.O. Box 39 • Creston, Iowa 50801-0039 • Phone 515/782-5154 • FAX 515/782-6511

Sewer Variance

Calc's for

CONSULTING ENGINEERS
4250 Glass Rd. N.E., P.O. Box 9009
Cedar Rapids, Iowa 52409
Phone 319/395-7805

Job No.

By M.J.F Date 8-9-91

Checked Date

6"Ø SEWER - FLOW AT 75% FULL

SINGLE FAMILY HOUSING @ 10 people/ACRE @ 100 gpcd DRY WEATHER FLOW

MH → MH	SIZE (in)	LENGTH (ft)	SERVICE (AC)	PEOPLE	PEAK FACTOR	ULTIMATE FLOW (gpm)
6-B TO 6A	6" PVC	300	1.5	15	4.5	4.7
6-13 TO 6-A	6" VCP	250	0.9	9	4.5	2.8
6-A TO 6-12	6" VCP	144	3.7 (1.3)	37	4.3	11.0
6-12 to 6-4	6" VCP	149	3.7	37	4.3	11.0
C.O. TO 6-4	6" VCP	520	3.7	37	4.3	11.0
6-4 TO 6-3	8" VCP	245	9.0 (1.6)	90	4.2	26.2
6-3 TO 6-2	8" VCP	200	10.4 (1.4)	104	4.2	30.3
C.O TO 6-1	8" VCP	300	2.0	20	4.4	8.6
6-1 TO 6-2	8" VCP	275	13.8 (0.6)	138	4.2	40.2
6-2 TO 6-9	8" VCP	320	13.8	138	4.2	40.2

CRITICAL AREAS TO CHECK CAPACITY: ① 6" VCP MH 6-A TO MH 6-12
② 6" VCP MH 6-12 TO MH 6-4
③ 8" VCP MH 6-2 TO MH 6-9

① CAPACITY of 6"Ø VCP @ 1.20% SLOPE, 0.75 FULL

BY MANNINGS $Q_{cfs} = \frac{1.49}{n} A r^{2/3} s^{1/2}$

$n = 0.014$
$A = 0.158\ ft^2$ @ ¾ FULL
$r = A/W.P = 0.158^{ft^2}/1.047' = 0.151'$
$s = 0.012^{ft/ft}$

$Q = 0.522$ cfs = 234.3 gpm

@ 234 gpm, A 6"Ø SEWER OR ANY 8"Ø SEWER will HANDLE THE PEAK FLOW OF 40.2 gpm (WORST CASE)

Don't Check FURTHER

City of Leon

August 29, 1991

Fred Evans
Wallace State Office Building
Des Moines, Iowa 50319

Re: Leon Sewer Extension Line
Smith's Addition to the
City of Leon, Iowa

Dear Mr. Evans:

In reference to the construction permit for the sewer line in Leon. This line will service a maximum of three to four houses. Other areas around have the sewer available from other directions.

The City of Leon in the future will not be requesting any extension of this line.

Should you need any further information please advise.

Respectfully,

Jack Van Laar

Jack Van Laar, Mayor
City of Leon, Iowa

cc:file

Printed on Recycled Paper

WASTEWATER PERMITS SECTION

CONSTRUCTION PERMIT APPLICATION

SCHEDULE C, Lateral Sewer Extension

DATE PREPARED	PROJECT IDENTITY	DNR USE
7-15-1991	Proposed Sanitary Sewer Improvements Leon, Iowa	PROJECT NO.
DATE REVISED		PERMIT NO.

1. Design Basis

	Initial		Design Year ( )	
Residential service area	1.5	Acres	1.5	Acres
Population	3	Persons	15	Persons
Flow (100 GPCD)	300	GPD	1,500	GPD
BOD_5 (0.17 #/d/cap)	0.51	#/day	2.55	#/day
Industrial service area		Acres		Acres
Rated Flow		GPD		GPD
BOD_5		#/day		#/day
Other _____		Acres		Acres
Rated Flow		GPD		GPD
BOD_5		#/day		#/day
Total BOD_5	0.51	#/day	2.55	#/day
Total Flow	300	GPD	1,500	GPD
Peak Hourly Flow	1,350	GPD	6,750	GPD

2. Pipe

	8 inch	10 inch	12 inch	6"
Diameter				
Material				SDR 35 PVC
Joint				Gasketed
Minimum Slope	%	%	%	% 4.46%
Maximum Manhole Space	Ft.	Ft.	Ft.	Ft. 300'
Total Sewer Length	Ft.	Ft.	Ft.	Ft. 300'
Maximum Cover	Ft.	Ft.	Ft.	Ft. 9.0'
Minimum Cover	Ft.	Ft.	Ft.	Ft. 5.0'

3. Construction specifications (indicate ASTM No. or other standard included in the specifications). A brief description is required in each part.

A. Bedding class ASTM D-2321

B. Pipe laying ASTM D-2321

C. Compaction ASTM D-2321

D. Manhole ASTM C-478 (Precast Sections); ASTM A-48 (Covers)

E. Specified maximum infiltration/exfiltration rate 200 GPDPMPI

F. Infiltration/exfiltration test procedures see spec. item 4.10.3, pg. DS 4-33

G. Alignment & grade test procedures

(1) During construction: Stake & batter board X Laser _____

(2) After construction: Lamping X Other _____

H. Deflection test procedures see spec. item 4.10.3 pg. DS 4-33

4. Are detailed manhole drawings included? Yes [X] No [ ] Typical frame and cover assembly cast iron.

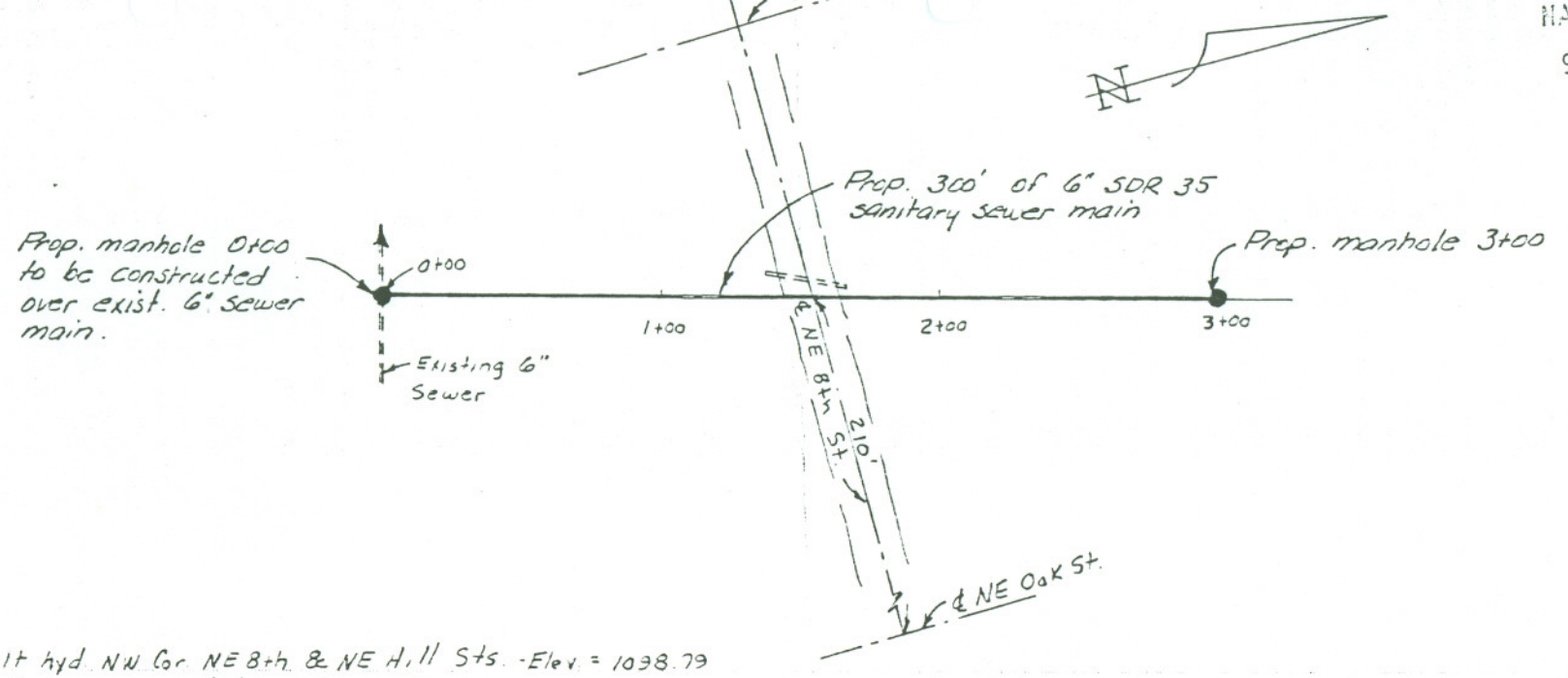
Are manhole covers nonvented? Yes [X] No [ ] Manhole diameter 48 in.

Manhole opening diameter 22 in. Material _____

5. Minimum sewer & water main separation: Horizontal 10 ft. Vertical 18 in. Are specifications included? Yes

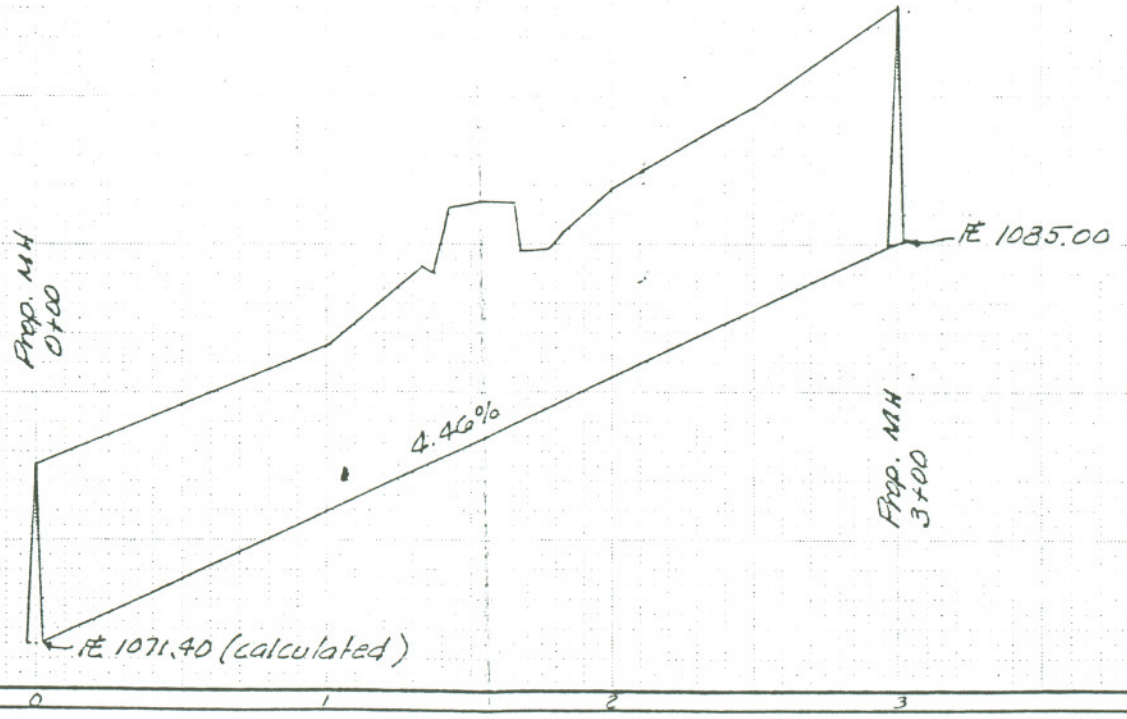
6. Stream, road, or railroad crossing protection NA

Are specifications included? NA

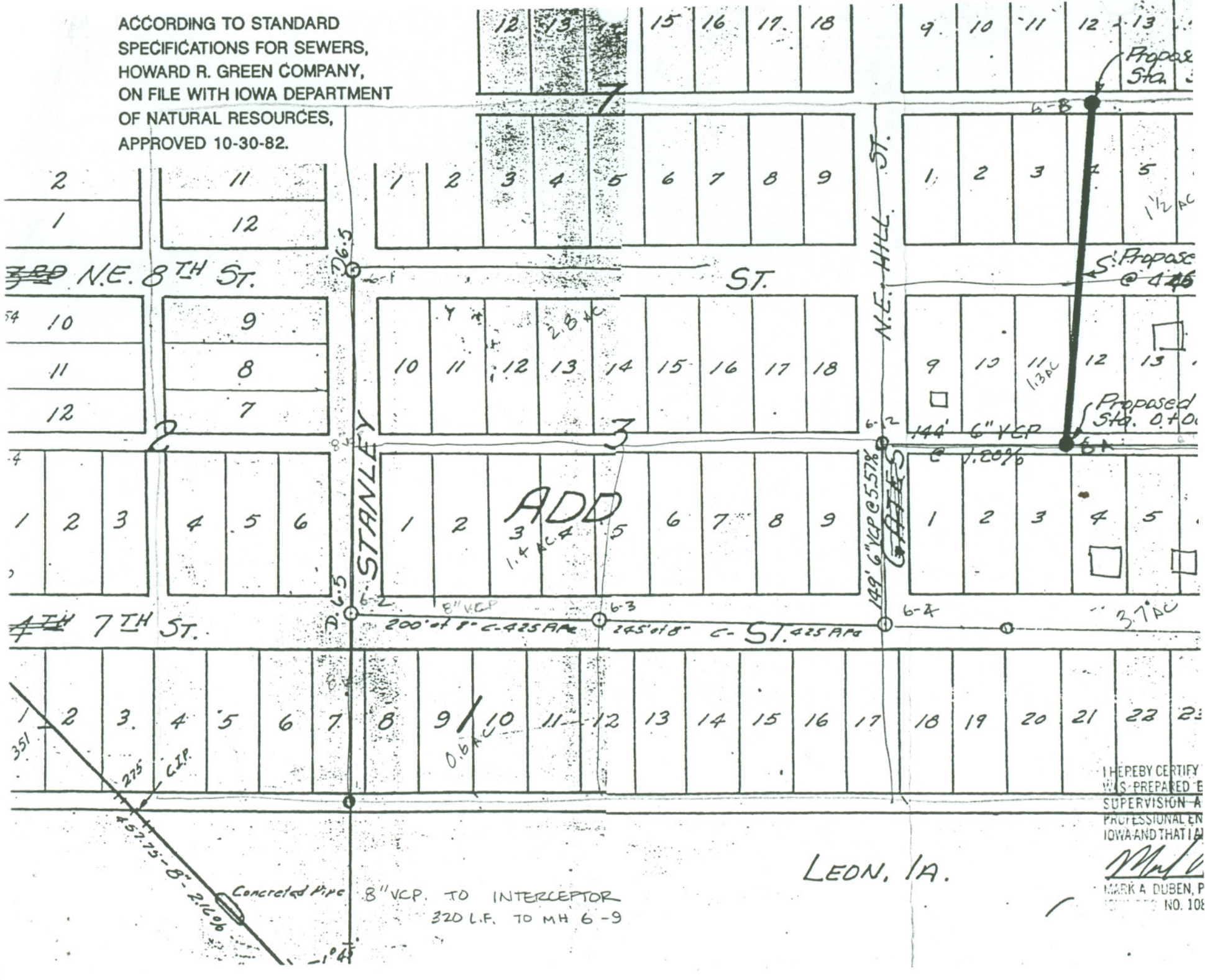


V. bolt hyd. NW Cor. NE 8th & NE Hill Sts. -Elev. = 1038.79

Proposed 6" Sanit
Main Extensio
LEON, IA.



NOTE - ALL CONSTRUCTION, M
& EQUIPMENT SHALL B
ACCORDING TO STAND
SPECIFICATIONS FOR S
HOWARD R. GREEN CO
ON FILE WITH IOWA DE
OF NATURAL RESOURC
APPROVED 10-30-82.


ACCORDING TO STANDARD SPECIFICATIONS FOR SEWERS, HOWARD R. GREEN COMPANY, ON FILE WITH IOWA DEPARTMENT OF NATURAL RESOURCES, APPROVED 10-30-82.
N.E. 8TH ST.
7TH ST.
STANLEY ADD
N.E. HILL ST.
ST.
Proposed Sta.
Proposed Sta. 0+00
144' 6" VCP @ 1.20%
149' 6" VCP @ 5.57%
8" VCP
200' of 8" C-425 APE
245' of 8" C-425 APE
1.4 AC
2.8 AC
1.3 AC
3.7 AC
0.6 AC
D-6.5
6-1
6-2
6-3
6-4
6-5
6-6
6-7
6-8
351
275
C.I.P.
457.75'-8"-2.60%
Concreted Pipe
8" VCP. TO INTERCEPTOR
320 L.F. TO MH 6-9
LEON, IA.
I HEREBY CERTIFY
WAS PREPARED B
SUPERVISION A
PROFESSIONAL EN
IOWA AND THAT I A
MARK A. DUBEN, P
NO. 108