File: Chillicothe - WW
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STATE OF IOWA

TERRY E. BRANSTAD, GOVERNOR

DEPARTMENT OF NATURAL RESOURCES
LARRY J. WILSON, DIRECTOR

May 16, 1990

City of Chillicothe
c/o Nancy Annis, City Clerk
P.O. Box 199
Fremont, Iowa 52561

Attn: The Honorable Mayor Price

RE: Variance Request
Wastewater Collection and Treatment Project 1990

Dear Mayor Price:

We have received a variance request to Iowa Wastewater Facilities Design Standards Chapter 13.10.4 in a letter from your consulting engineer, IIW Engineers of Dubuque, Iowa. The request addresses the need of a valve vault for the lift station piping.

That letter also included your reasons to justify the variance request. It stated that major advantage of eliminating a valve vault is cost savings. These shut-off valves would have extended operators. Bypass connector is located on top of the pumps.

The Iowa Administrative Code, Chapter 567--64.2(9)c allows for a variance from design standards when it will result in at least equivalent or improved effectiveness. We have reviewed your request and have decided to deny the variance for the following reasons:

1. Cost savings is not a criteria in granting a variance. A variance can only be approved if justification can show equivalent or improved effectiveness.

2. Maintenance and repairs on the valves are not possible without removing the earth cover. The proposal shows an earth cover of approximately 11.5 feet and excavation will be required for any repairs. The proposal in fact is less effective.

We have reviewed your plans and specifications and have a suggestion for the lift station piping and valves which may

result in a cost savings. The emergency pump connection could be relocated between shutoff valve and the pump on one of the two effluent lines with the use of a tee-section.

The City should be aware that the check valves should be located within a valve pit. As addressed earlier in our previous letter of May 9, 1990, the check valves were not identified. The design of the valve vault shall conform to the applicable requirements listed in the design standards chapter 13.5, 13.10.4 and other pertinent chapters.

In addition, please remove all references of Polyethylene (PE) pipe from your project plans and specifications. PE pipe is not an IDNR approved material either as a water or wastewater pressure pipe. Should you have any questions please call Gabriel Lee at (515) 281-6253.

Sincerely,

Darrell McAllister

DARRELL McALLISTER, BUREAU CHIEF
SURFACE AND GROUNDWATER PROTECTION BUREAU
ENVIRONMENTAL PROTECTION DIVISION

cc: IIW Engineering, Dubuque, IA
Jim Carroll, FmHA, Des Moines,IA
Field Office 6

IOWA DEPARTMENT OF NATURAL RESOURCES
Surface and Groundwater Protection Bureau

Date: November 1, 1989
To: Wayne Farrand
From: Gabe Lee
Subject: Chillicothe: Sand Filters

Received a variance request from Gary Sejkora of IIW for variance request for the site separation distance on October 10. Site survey doesn't give much information. The saga is that the owner of the original site do not want to sign the waiver and the owner of the alternate site have not responded. Both these owners live out of state. The City needs to know soon or they might lose their funding. Geological Survey express some concern about the original site. However they did not expressly forbid the site. The caution was about groundwater contamination from the sand filters. After some letters, Gary is willing to incorporate bentonite seal under the filters. The Geological Survey still express the same concerns since the alternate site is only 200 feet SW of the original site. I have talk to GS and they will respond to us accordingly, have not received anything from them yet since the last phone call on 10-26-89.

Just talked to Dave Claman of Flood Plains and he indicated that they need to protect the site from the 100 year flood and they need a permit from the FP if they are below 100 year flood level. As far as the groundwater it's up to us to decide. Note that high groundwater usually accompanies floods.

I believe we could approve the site based on the technical aspects if sufficient safeguards were made to ensure the protection of the groundwater and floodwater. However, my concern is political, we have not really heard back from the land owner of the alternate site. If we approve the variance request there might be some backlash. I will talk to you later about the case. I will be looking into Riverveiw Estates which has the similar situation.

VARIANCE REQUEST

Iowa Department of Natural Resources

1. Date	: May 9, 1990	13. Decision:	Denied
2. Review Engineer	: Gabe Lee	Date:	5/10/90
3. Date Received	: Mar 19, 1990		
4. Facility Name	: Chillicothe	14. Appeal:	
5. County Number	: 26	Date:	
6. Program Area	: CP		
7. Facility Type	: CO2		
8. Subject Area	: 314		
9. Rule Reference	: 64.2(9)		
10. Design Std. Ref.	: 13.10.4 (valve vault required for wet well type LS		
11. Consulting Engr.	: II W Engineers & Surveyors, Gary Sejkora		
12. Variance Rule	: 64.2(9)c		

15. Description of Variance Request

Chillicothe currently is an unsewered community. The city has obtained grants from FmHA & DED to finance a collection system and a treatment facility. Treatment will achieved by using an intermittent sand filter. The design flow of the proposed facility is 15,000 gpd @ AWW. Wastewater will be collected by gravity to a septic tank w/ a D.T. of 30 hrs @ AWW flow. There are two submersible pumps in this tank which will pump the partially treated wastewater to the sand filters. Valves of the lift station are not contained in a valve vault but will be buried w/ extented operators. Chapter 13.10.4 of standards requires a valve vault for pumping valves.

16. Consulting Engineer's Justification

1. Eliminating a valve vault will save cost
2. Bypass connections as designed are easier to use.
3. Buried shut-off valves will have extended operators for ease of operations.

16. Consulting Engineer's Justification (cont.)

17. Department's Justification

Staff reviewer recommends denial.

1. Variance could only be granted provide equivalent or improved effectivenen was proven. The consulting engineer has not shown either.
2. Cost savings is not a criteria meeting our requirement to grant a variance.
3. The by-pass connector was located on top of the septic tank. Therefore, this part of the piping does not need to be in a vault. However, effluent piping valves are to be in the ground. Maintainence and repairs on these valves would not be possible without removing the earth cover. Therefore, reducing the effectivenen of the lift station

18. Precedents Used

Star MHP - denied 11/30/84

Mystic - denied 7/16/86

Oak Ridge Est., Mt. Vernon - denied 5/26/89

19. Staff Reviewer : [signature] Date: May 9, 1990

20. Supervisor : [signature] Date: 5/9/90

21. Authorized by : [signature] Date: 5/10/90

IIW ENGINEERS AND SURVEYORS P.C.

0 St. Joseph Dr. • Dubuque, IA 52001 • (319) 556-2464

Carl B. Schoenhard, L.S.
Dennis F. Waugh, P.E., S.E.
Charles A. Cate, P.E.
Gary D. Sejkora, P.E.
Warner R. Wright, P.E., L.S.
Ronald J. Turner, L.S.
Ross K. Abbott, L.S.I.T.

March 16, 1990

Gabriel Lee
Iowa Department of Natural Resources
Wallace State Office Building
900 East Grand
Des Moines, IA 50319

Re: City of Chillicothe, Iowa
Wastewater Collection and Treatment Project
Design Comments
IIW Project No. 90037-2

Dear Gabe:

Under separate cover we are forwarding copies of the drawings and specifications along with construction permit application forms for the Chillicothe, Iowa, Wastewater Collection and Treatment project, finally. The project design is based on locating the sand filters on the "original" site adjacent to the Wapello County road as outlined in the November 23, 1988, Preliminary Design Report for this project.

As you know, the funds available to Chillicothe are very limited. Therefore, during the design process we attempted to evaluate all aspects of the preliminary design in an effort to minimize costs. As a result, we are now proposing a project that varies slightly from the facilities previously proposed.

In the preliminary design report we indicated a pumping rate of 100 to 120 gpm in a four inch pressure main. During design we selected an 80 gallon per minute pump which provides the minimum two feet per second velocity in a four inch line. We feel that this velocity is suitable when pumping septic tank effluent. By utilizing an 80 gpm pump the pump size and resulting horsepower are less. A smaller pump costs less to purchase, costs less to operate and costs less to replace.

As you will note we have proposed the use of submersible pumps without a valve vault. The buried shut-off valves will have extended operators for ease of operation. The specifications require the installation of pump check valves which are removable with the pumps on guide rails. By placing the check valves closer to the pump which permits increasing to four inch piping sooner the discharge head is reduced. The major advantage of eliminating a valve vault is cost savings. Also the bypass connections as designed are easier to use. It is unclear if all the provisions of DNR Chapter 13 apply to this effluent pumping system, however if applicable, we ask that a variance be granted to permit this equivalent system to be constructed at Chillicothe.

The original report proposed four sand filter beds each 25 feet by 100 feet. Our design proposes two beds each 56 feet by 90 feet. The filters, as designed, provide 10,080 square feet of surface area. The halves of each filter can be separated by gate valves allowing isolation, rest and/or repair. In the November 1988 report, we indicated a tapered sand layer with an average 30 inch thickness. The filters shown on project drawings have a uniform 24 inch thickness. We believe that the uniform sand thickness will help provide for uniform system application rates. The sand filters as designed conform to DNR Chapter 69.

Thank you for your consideration and review of this project.

Sincerely,

IIW ENGINEERS AND SURVEYORS, P.C.

Gary Sejkora rw

Gary Sejkora, P.E.

GS/rw

Copy: Nancy Annis, City Clerk w/plans and specs
Bill Dew, City Attorney w/plans and specs
Al Heuton, Area XV w/plans and specs
John Pyle, FmHA w/plans and specs (2 sets)

File: Chillicothe-u
GSL

STATE OF IOWA

TERRY E. BRANSTAD, GOVERNOR

DEPARTMENT OF NATURAL RESOURCES
LARRY J. WILSON, DIRECTOR

September 19, 1990

LA

City of Chillicothe
c/o Nancy Annis, City Clerk
P.O. Box 199
Fremont, Iowa 52561

Attn: The Honorable Mayor Price

RE: Wastewater Collection and Treatment Project
City of Chillicothe, Iowa
Subj: Request for variances

Dear Mayor Price:

We have received a request for reconsideration of our May 16, 1990 variance denial in a letter dated August 29, 1990 from your consulting engineer IIW Engineers of Dubuque, Iowa. Your consultant's letter included more information for us to consider for the denied variance. His letter also asked for approval to use SDR 35 PVC piping for sand filter distribution and collection lines.

We have reviewed the additional information submitted by your consulting engineer. We have decided to abide with our previous decision. Your request for a variance on Iowa Wastewater Facilities Design Standards Chapter 13.10.4 remains denied. The State's design standards require a valve pit primarily to provide access for maintenance and replacement of valves. We do not see equivalent or improved effectiveness in your submitted system. We allow check valves to be located in the wet well. Such valves have to be designed specifically as a component of the pump. However, under such condition we still require a separate valve pit for the shut-off valves.

We have also reviewed your request to allow the use of SDR 35 PVC piping for sand filter distribution and collection lines. IAC Chapter 69.9(2)b requires Schedule 40 PVC piping or other suitable materials for the process piping. We have determined that SDR 35 PVC piping is suitable for sand filter distribution and collection lines for your proposed sand filter system. Should you have any questions please call Gabriel Lee at 515/281-6253.

Sincerely

Darrell McAllister

DARRELL McALLISTER, CHIEF
SURFACE AND GROUNDWATER PROTECTION BUREAU
ENVIRONMENTAL PROTECTION DIVISION

cc: Gary Sejkora, IIW Engineers, Dubuque, Iowa
IDNR F.O. 6

IIW ENGINEERS AND SURVEYORS P.C.

St. Joseph Dr. • Dubuque, IA 52001 • (319) 556-2464 • Fax (319) 556-7811

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Gary D. Sejkora, P.E.
Warner R. Wright, P.E., L.S.
Ronald J. Turner, L.S.
Ross K. Abbott, L.S.I.T.

August 29, 1990

Mr. Gabriel Lee
Iowa Department of Natural Resources
Wallace State Office Building
900 East Grand Ave.
Des Moines, IA 50319

Re: City of Chillicothe, Iowa
Wastewater Collection and Treatment Project
Request for Variances
IIW Project No. 90037-3

Dear Gabe:

On behalf of the City of Chillicothe, we are writing to ask for reconsideration of the May 16, 1990, denial of the variance request to eliminate the effluent pumping station valve vault. We are also asking for an interpretation of a portion of Chapter 69 and, if necessary, a variance to allow the use of SDR 35 PVC pipe for sand filter distribution and collection lines.

VALVE VAULT

On March 16, 1990, this office submitted plans and specifications for the above referenced project. The plans called for submersible effluent pumps with check valves which were to be removable with the pumps. Buried gate valves were to be provided to isolate each pump. A standby pumping connection in the wet well was also included.

In our submittal letter we requested a variance primarily on the basis of cost savings. On May 16, 1990, the DNR denied the variance indicating that cost savings was not a criteria for granting a variance and that justification showing equal or improved effectiveness must be submitted in support of a variance request. On May 24, 1990, the DNR indicated that you have approved pump stations that utilize a check valve removable with the pump. In a letter dated June 5, 1990, we commented on the denial of the variance but we revised the plans to add a valve vault.

After receipt of bids we find we must reduce project costs. Therefore, we again look at elimination of the valve vault to reduce costs and ask the DNR to reconsider the denial of the variance. In order to justify the variance, we present the following comments regarding equal or improved effectiveness:

ok. 1) A check valve on the pump discharge line will have the same functional effectiveness regardless of location and will prevent reverse flow when the pumps are off.

2) The check valves proposed are to be removable from the wet well when the pump is removed allowing check valve maintenance above grade. With check valves in a valve vault the maintenance is far more difficult due to crowded access in a four foot diameter valve vault; and the fact that, in this situation, wastewater will leak into the valve vault if the check valve is disassembled. drain is required or sump pump.

3) The initial plans called for the bypass and air release connection to be in the wet well just under the access hatch. This location would provide an improved access for connection of the standby pump when compared to the bottom of a dark manhole.

4) Without a valve vault there is no need for a sump pump. Thus the maintenance of the system will be reduced. use drain then !

5) Buried gate valves provide for equivalent effectiveness in shutting off the flow from the force main back into the pump chamber. As to maintenance and repair, AWWA gate valves are buried in varying depths in water systems and wastewater treatment lagoons across Iowa and the nation. These valves are known for their dependable service and lack of any need for maintenance, especially when their level of use is considered. In working with the low bidder for this project we have identified an alternate force main route that reduces the depth of the valves to four to five feet below grade. still have to modified routing.

6) The design of the valve vault as approved by the DNR includes a manual force main air release. Obviously, the operator must enter the valve vault to operate the air release. If the valve vault were eliminated, the air release would be relocated to just under the wet well lid, the safety of the facilities would be improved.

Enclosed is a copy of the drawing as originally submitted to DNR without the valve vault. We hope that you will conclude that the elimination of the valve vault at Chillicothe provides equivalent (and in our opinion improved) effectiveness.

SAND FILTER PIPING

Paragraph b. of subsection 69.9(2) on page 21 of Chapter 69 of the DNR Standards addresses the requirements for pipeline in sand filters. These pipelines are the distribution lines on top of the filter and the collection lines on the bottom of the filter. The paragraph in question indicates, "These lines shall be equivalent to Schedule 40 PVC pipe or other suitable materials." By way of this letter we ask for a determination as to what pipe is equivalent to Schedule 40 PVC and/or what are other suitable materials.

It would appear that in Chapter 12 the DNR has already determined that SDR 35 PVC plastic pipe per ASTM D3034 is a suitable material for sanitary sewers when installed per ASTM D2321. SDR 35 PVC sewers have been successfully installed at depths in excess of 20 feet. The distribution and collection pipes in the sand filters are three and six feet deep. The sand filter piping is to be embedded in crushed stone which meets or exceeds the requirements for embedment material in the ASTM installation standard for PVC pipe. Therefore, SDR 35 PVC pipe would have suitable load carrying capacity.

Schedule 40 PVC in the four inch size has a greater wall thickness and stiffness when compared to SDR 35 PVC. However, SDR 35 PVC is of the same material and thus will have the same resistance to wastewater. The inside diameter of SDR 35 PVC is essentially the same as Schedule 40 and thus has the same capacity to handle anticipated wastewater flows and volumes. The SDR 35 PVC pipe will have the same perforations as Schedule 40 PVC and thus will function to distribute and collect wastewater in an equivalent manner. The SDR 35 PVC pipe has a greater impact resistance than Schedule 40.

As you may be aware, Schedule 40 PVC pipe is typically manufactured with a dual rating for drain, waste and vent (ASTM D1785) as well as pressure pipe applications (ASTM D2665). In addition, Schedule 40 PVC pipe is installed in self supporting applications (vent stack in plumbing) and full of water (industrial process). It is our opinion that the thicker wall of the Schedule 40 pipe is to accommodate self supporting applications, not underground burial.

We have reviewed Illinois and Wisconsin regulations as to sand filter piping applications. Illinois allows SDR 35 PVC pipe. Wisconsin allows PVC pipe per ASTM D2729 which has a wall thickness of only 63% of SDR 35 and a stiffness of only 24% of SDR 35. Indeed both states permit the use of corrugated polyethylene per ASTM F405 which is the pipe used for highway, site and farm field drainage.

We hope you will agree that SDR 35 PVC pipe is functionally equivalent to Schedule 40 PVC pipe in sand filter applications. We also hope you can agree it is a "suitable" material in accordance with Chapter 69. If Chapter 69 can not be interpreted to allow SDR 35 we ask your consideration of a variance to permit uses of SDR 35 for the Chillicothe sand filters.

Thank you for your assistance and understanding. As you know, it is difficult to find an affordable wastewater treatment facility for a community so small.

Sincerely,

IIW ENGINEERS AND SURVEYORS, P.C.

Gary Sejkora, P.E.

rw

Copy: Nancy Annis, City Clerk
Bill Dew, City Attorney
Al Heuton, Area XV
John Pyle, FmHA, Centerville
Jim Carroll, FmHA, Des Moines