

✓ 9-13-06

VARIANCE REQUEST**Iowa Department of Natural Resources**

1. Date: October 15, 2002
 2. Review Engineer: Larry Bryant
 3. Date Received: September 16, 2002
 4. Facility Name: City of Decorah (Wal-Mart Supercenter SSE)
 5. County Number: 96 Winneshiek
 6. Program Area: CP (Wastewater Construction)
 7. Facility Type: C01 (Collection/Transport)
 8. Subject Area: 355 Directional Boring, Pipe Material;
 387 Directional Boring, Sewer Slope
 9. Rule Reference: 567-64.2(9)a
 10. Design Stds Ref: 12.4 (Materials); 12.6 (Details of Construction)
 11. Consulting Engr: Erdman Engineering, P.C.
 12. Variance Rule: 567-64.2(9)c

13. Decision: *Approved*
 Date: *10/22/02*

14. Appeal:
 Date:

15. Description of Variance Request:

The consulting engineer has requested a variance to directionally bore 400 feet of 10" diameter sewer under a state highway for a sanitary sewer extension. Construction permit #2002-028-S has been issued for the project, however, the contractor has asked to use directionally bored polyethylene pipe for boring underneath the highway. SDR 9 pipe thickness is proposed. Design Standard 12.6 describes the requirements for installation of flexible pipe sanitary sewer using open cut methods including requirements for excavation, pipe bedding, and installation based on ASTM D 2321.

The proposed method of installation is a trenchless method of installing sanitary sewer that is not covered by the IA standards and will utilize a pipe material not covered by Design Standard 12.4 (polyethylene pipe).

16. Consulting Engineer's Justifications

SDR 9 pipe will be used. The IDOT allows either SDR 11 or SDR 9 for directional bore of PE sewer.

17. Department's Justifications**Recommend variance approval:**

Recommend variance approval for HDD with conditions on pipe thickness and minimum full flow velocity. Per the engineer the design slope for the pipe segment is 0.4%, which is in excess of the 0.28% minimum slope required by the Design Standards for 10" diameter sewer. Calculations (see attached) indicate that both short (live-load) and long-term (earth-load) deflection will be less than 5% for SDR-9 PE pipe at the proposed 13-foot depth of bury.

18. Precedents Used

Williamson WWTF – Approved 2/6/01 (PVC SDR 21)
 Douds-Leando WWTF – Approved 3/10/00 (PVC SDR?)
 Fontanelle WWTF – Approved 7/25/00 (PE SDR 9 & 11)
 Kinross WWTF – Approved 7/11/02

Avery WWTF – Approved 6/24/97 (PVC SDR 26)
 Unionville WWTF – Approved 2/19/98 (PVC SDR?)
 Woodburn WWTF – Approved 2/26/98 (PVC SDR?)
 Polk City – Approved 9/11/02 (PE SDR 9)

19. Staff Reviewer: *[Signature]*

Date: *10/15/02*

20. Supervisor: *[Signature]*

Date: *10/15/02*

21. Authorized by: *[Signature]*

Date: *10/22/02*

Wal-Mart Supercenter - Decatur, IA

Situation - State Highway directional bore crossing

$$\text{SDR} = 9$$

Pipe material = PE

$$E_{50 \text{ year}} = 28,200 \text{ psi}$$

$$E_{100 \text{ hours}} = 51,200 \text{ psi}$$

$$\text{Depth of Bury} = 13'$$

Live load $< 100 \text{ lb/ft}^2$ @ 13' depth (see Unibell Handbook pgs 190-194)

Note: Since live load is only temporary, a short term modulus can be used. The E_{100} is probably very conservative in this case, as applied live loads will be much shorter in duration. Due to depth of bury (13'), the dead (earth) load is expected to control.

Assume prism loading

Soil + live load (short-term):

$$P_E = \left[120 \frac{\text{lb}}{\text{ft}^3} (13 \text{ ft}) + 100 \frac{\text{lb}}{\text{ft}^2} \right] \frac{1}{144} = 11.5 \text{ psi}$$

$$\text{Deflection} = \frac{0.0125(11.5)}{\left[\frac{51,200}{12(9-1)^3} \right]} (100) = 1.73\%$$

Soil load (long-term):

$$\text{Deflection} = \frac{0.0125(10.8)}{\left[\frac{28,200}{12(9-1)^3} \right]} (100) = 2.94\%$$

∴ DB of SDR 9 PE under road crossing @ 13' bury is equivalent to IA 5% deflection limit std.

ERDMAN ENGINEERING, P.C.

708 COMMERCE DRIVE
P. O. BOX 246
DECORAH, IOWA 52101-0246

PHONE (563) 382-4194
FAX (563) 382-3623

Civil Engineering



Land Surveying

September 12, 2002

Mr. Larry Bryant
Iowa Department of Natural Resources
Wallace State Office Building
900 East Grand Avenue
Des Moines, Iowa 50319

Re: Variance Request for Permit #2002-028
Wal-Mart Supercenter, Decorah, Iowa

Dear Mr. Bryant:

Please review this request for a variance to Permit #2002-028 for Project #S2002-028, the Wal-Mart Supercenter Site in Decorah, Iowa. The permit was original issued to Buescher Frankenberg Associates, Inc. of Washington, Missouri and Erdman Engineering, P.C. of Decorah, Iowa, acting as the City of Decorah's Consulting Engineer, is requesting the variance.

The original permit covers 400 l.f. of 10" diameter sanitary sewer pipe & boring under State Highway #9 near its intersection with County Road A-52. We are requesting a variance to directional bore installation 400 l.f. of HDPE 10" diameter DR-9 equivalent pipe, joined using heat fusion, in place of that stated in the permit. Upon reviewing the information which you e-mailed our office we are requiring the Contractor to use DR-9 thickness pipe to error on the side of caution in this load-bearing situation. This pipe will be bored under the highway in the same location as that previously proposed and approved in the permit. The sewer line will be gravity fed and all other conditions specified in the original permit will be met

Thank you for your assistance.

Sincerely,

Michael Weis

MRW/kh

Cc: Joe Feldmann, Buescher, Frankenburg Associates, Inc.

13' cover

SDR 9 is allowed by IDOT for DB road crossings but it is a "jump on the bandwagon thing."

400' @ 0.4%



STATE OF IOWA

THOMAS J. VILSACK, GOVERNOR
SALLY J. PEDERSON, LT. GOVERNOR

DEPARTMENT OF NATURAL RESOURCES
JEFFREY R. VONK, DIRECTOR

October 16, 2002

Kim Lane, Director of Real Estate
Wal-Mart
2001 SE 10th Street
Bentonville, AR 72716

RE: Variance Request for Permit #2002-028
Wal-Mart Supercenter, Decorah, Iowa

Dear Ms. Lane:

The Iowa Department of Natural Resources has received a variance request for the above referenced project from Erdman Engineering, P.C., acting on behalf of the City of Decorah. In accordance with subrule 567 IAC 64.2(9) we have reviewed the variance request to directionally bore approximately 400 feet of 10" diameter HDPE sanitary sewer under a highway crossing. Variances from the Iowa Wastewater Facilities Design Standards Sections 12.4 and 12.6 to allow installation of HDPE gravity sewer for the 400-foot segment by directional boring are approved with the following conditions:

1. The HDPE pipe shall have a wall thickness equivalent to SDR 9 or thicker.
2. The average sewer slope between manholes including the maximum allowable elevation tolerances must provide a calculated minimum full flow pipe velocity of 2.0 feet per second based on Kutter's formula using an "n" value of 0.013.
3. A change order for the project revisions must be submitted and approved by the Department. Construction of the project revisions shall not proceed until the changes have been approved.

The above decision is based on our review of justification presented to support your requests and our concurrence that the resulting project will provide substantially equivalent effectiveness as would be provided by technical compliance with the design standards on these issues. This approval is for the above referenced project only.

If there are any questions, please contact Larry Bryant at 515/281-8847.

Sincerely,



Jack Riessen, P.E., Chief
Water Quality Bureau

c: Field Office 1
Michael Weis/Erdman Engineering, P.C.
Joe Feldman/Buescher, Frankenburg Associates, Inc.
City Clerk/City of Decorah