Chemung County Stormwater Coalition

851 Chemung Street
Horseheads, New York 14845

July 24, 2017

Mr. Tom Skebey, Code Enforcement Officer
Town of Horseheads Code Enforcement Department
150 Wygant Road
Horseheads, New York 14845

Re: Glad Tidings Christian Life Church Building Expansion
Horseheads, New York
Review of Stormwater Management Plan

Mr. Skebey:

I have completed a review of the following submitted information for the above-referenced project regarding the Stormwater Pollution Prevention Plan (SWPPP) and stormwater management system design for that project.

- SWPPP for the Glad Tidings Christian Life Church Building Expansion, Stamped by a NYS Licensed Professional Engineer, Prepared by Fagan Engineers & Land Surveyors, P.C., Dated June 2017, Received June 27, 2017

- FINAL PRINTs Site Plan Drawings for the Glad Tidings Christian Life Church Building Expansion, Stamped by a NYS Licensed Professional Engineer, Prepared by Fagan Engineers & Land Surveyors, P.C., Revision dated June 26, 2017, Received on June 27, 2017

- Letter regarding infiltration testing and determination of groundwater elevations for the Glad Tidings Church, Prepared by Fagan Engineers, dated June 9, 2017

My review comments and questions regarding the SWPPP and stormwater management system for the above-referenced project, based upon the submitted information, are as follows.

1. In regards to the sizing of the proposed storm sewer system, a Manning's "n" value of 0.009 was utilized. As per the Typical Pipe Trench Detail on Sheet C4, the storm sewer shall be ADS N-12 or Hi-Q. The manufacturers of these pipes recommend that a Manning's "n" value of 0.012 be used for design. Refer to the attached manufacturer's literature.

2. In regards to the hydrologic modeling of pre-developed conditions, the following items are noted.

   a. The estimated Time of Concentration for Pre-Developed Drainage Area A appears to be too short, as it appears that this estimate does not consider the flow path that would result in the longest Tc. Given the distinct areas of impervious and pervious within this drainage area, consideration should be given to using two sub-areas to model this area.

   b. Much of Pre-Developed Drainage Area A is tributary to an existing low area to the south of the existing parking area. It appears that this low area would currently act to provide infiltration and/or detention of existing runoff and, as such, should be considered in the modeling of the pre-developed conditions.

Phone: (607) 796-2216
Fax: (607) 739-4392
www.chemungstormwater.org

3. In regards to the hydrologic modeling of post-developed conditions, the following items are noted.

   a. The area of the 973 elevation contour within the proposed infiltration basin appears to have been over-estimated in the Stage versus Storage calculations.

   b. In regards to Post-Developed Drainage Area A-3, the following items are noted.

      - A portion of this sub-area, as per the Developed Drainage Conditions map, is not tributary to the proposed forebay/infiltration basin, although modeling includes all of this area draining to the proposed forebay/infiltration basin.

      - The Time of Concentration for this area seems for this sub-area seems too high, given that most of this area consists of the proposed forebay/infiltration basin (which is near/at a Point of Analysis).

4. The overflow of the proposed infiltration basin, as well as the discharge for the proposed diversion ditch, shall be directed to the steep slope (>12 percent) along the north bank of Newtown Creek. Will this overflow and discharge result in erosion of this slope/bank? Is there a location where the overflow from the proposed infiltration basin and the discharge from the proposed diversion ditch can be directed that is not as steep?

5. As part of the stormwater management plan, runoff from the roof of the proposed building expansion and a portion of the roof of the existing building shall be directed to the proposed forebay/infiltration basin. Will the collection and conveyance of this roof runoff be accomplished via an eave trough/downspout system? Is the building designer aware of this objective of the stormwater management plan? Has the design of the roof drainage system been completed?

7. Will an additional run of storm sewer and stormwater inlet be required to collect the runoff from the area near the northwest corner of the proposed building expansion?

EROSION & SEDIMENT CONTROL

1. Is the proposed concrete washout in a location that will be readily accessible to concrete trucks?

2. Will an Stabilized Construction Entrance be needed for the proposed Eastern Drive?

OPERATION & MAINTENANCE AGREEMENT

1. In accordance with the Town's Stormwater Management and Erosion and Sediment Ordinance, a formal, signed enforceable operation and maintenance agreement for the stormwater collection and management system shall be provided by the Applicant. Furthermore, this agreement must reference and include an approved Operation & Maintenance Plan.

   This agreement shall be binding on all subsequent landowners and recorded in the office of the County Clerk as a deed restriction on the property. Also, the Applicant shall convey to the Town easements and/or rights-of-way to assure access for periodic inspections by the Town or their representatives (and for maintenance if required). These agreements, as well as the Operation & Maintenance Plan, shall be subject to the review and approval of the Town of Horseheads, their attorney, and Chemung County Stormwater Coalition.

If you have any questions regarding these comments, please do not hesitate to contact us. Furthermore, I would be happy to meet to discuss this project.

Sincerely,

Jimmie Joe Carl

Jimmie Joe Carl, P.E.

Cc: Fagan Engineers & Land Surveyors, P.C.

HI-Q® PIPE (PER AASHTO)

THE PERFORMANCE YOU EXPECT. THE INNOVATIONS YOU NEED.

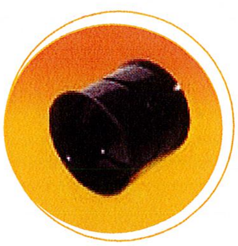
With over 110 years experience, Hancor has provided expert knowledge and innovative product solutions proven in a wide range of field drainage applications. The development of large diameter pipe is only one example of our commitment to providing superior products and improved performance. Our HDPE pipe delivers superior value while providing physical strength and structural design that just cannot be matched by metal or concrete.

HI-Q PIPE IS PERFECT FOR THE FOLLOWING APPLICATIONS:

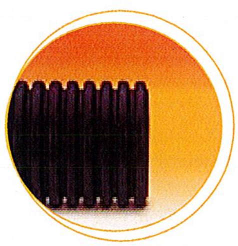
- Culverts
- Cross, Slope or Edge Drains
- Pond Overflows
- Parking Lot Drainage
- Retention/Detention Systems
- Storm Sewers
- Sports Playing Fields
- Golf Courses

FEATURES & BENEFITS

- Meets soil-tight joint performance requirements. Coupling bands are available.
- Available in nominal 20' (6.1 m) lengths, resulting in fewer joints – pipe can easily be cut to the desired lengths in the field.
- Easy-to-handle, safe, lightweight pipe requires less labor and equipment for faster installation and reduced costs.
- HS-25 (Highway traffic loads) rated with a minimum of 1' (0.3 m) of cover for 4" - 48" (100 - 1200 mm) and 2' (0.6 m) for 54" - 60" (1350 - 1500 mm) diameters.
- Provides superior resistance to chemicals, road salts, motor oil and gasoline – will not rust, deteriorate or crumble.
- Withstands repeated freeze/thaw cycles and continuous subzero temperatures.
- Superior hydraulics-smooth interior will ensure no debris or sediment build-up.

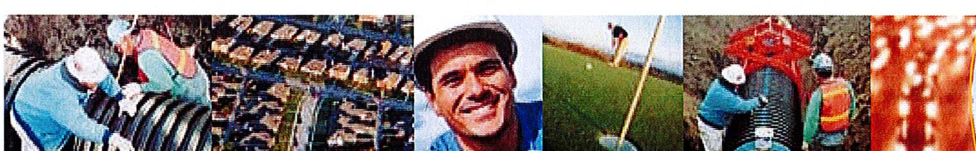


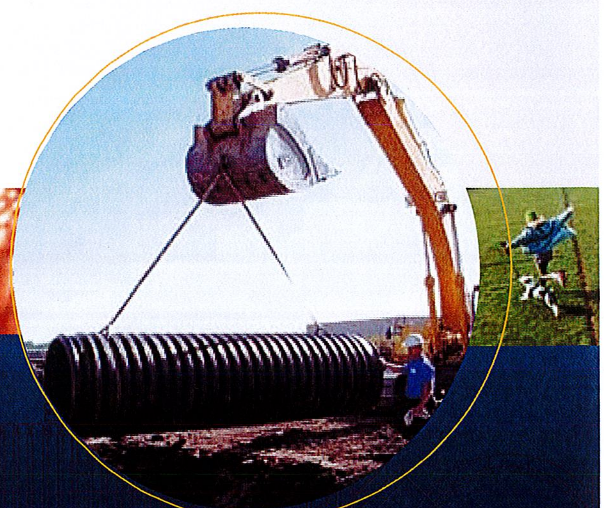
4"-30" (100-750 mm)



4"-12" (100-300 mm)
Bell/Bell Coupler

8"-30" (200-750 mm)
Split Coupler





Hancor Service: Hancor representatives and engineers are committed to providing you with the answers to all your questions, including specifications, installation, backfill recommendations and more.

HI-Q PIPE (PER AASHTO) SPECIFICATIONS

SCOPE

This specification describes 4- through 60-inch (100 to 1500 mm) Hancor Hi-Q pipe (per AASHTO) for use in gravity-flow drainage applications.

PIPE REQUIREMENTS

Hi-Q pipe (per AASHTO) shall have a smooth interior and annular exterior corrugations.

- 4- through 10-inch (100 to 250 mm) shall meet AASHTO M252, Type S.
- 12- through 60-inch (300 to 1500 mm) shall meet AASHTO M294, Type S or ASTM F2306.
- Manning's "n" value for use in design shall be 0.012. 3 *

JOINT PERFORMANCE

Pipe shall be joined with coupling bands covering at least two full corrugations on each end of the pipe. Standard connections shall meet or exceed the soil-tight requirements of AASHTO M252, AASHTO M294, or ASTM F2306.

Gasketed connections shall incorporate a closed-cell synthetic expanded rubber gasket meeting the requirements of ASTM D1056 Grade 2A2. Gaskets, when applicable, shall be installed by the pipe manufacturer.

FITTINGS

Fittings shall conform to AASHTO M252, AASHTO M294, or ASTM F2306.

MATERIAL PROPERTIES

Virgin material for pipe and fitting production shall be high-density polyethylene conforming with the minimum requirements of cell classification 424420C for 4- through 10-inch (100 to 250 mm) diameters, or 435400C for 12- through 60-inch (300 to 1500 mm) diameters, as defined and described in the latest version of ASTM D3350, except that carbon black content should not exceed 4%. The 12- through 60-inch (300 to 1500 mm) virgin pipe material shall comply with the notched constant ligament-stress (NCLS) test as specified in Section 9.5 and 5.1 of AASHTO M294 and ASTM F2306 respectively.

INSTALLATION

Installation shall be in accordance with ASTM D2321 and Hancor's published installation guidelines, with the exception that minimum cover in trafficked areas for 4- through 48-inch (100 to 1200 mm) diameters shall be one foot (0.3 m) and for 54- and 60-inch (1350 - 1500 mm) diameters, shall be 2 ft. (0.6 m) in single run applications. Backfill for minimum cover situations shall consist of Class 1, Class 2 (minimum 90% SPD) or Class 3 (minimum 90%) material. Maximum fill heights depend on embedment material and compaction level; please refer to Technical Note 2.02. Contact your local Hancor representative or visit our website at www.hancor.com for a copy of the latest installation guidelines.

PIPE DIMENSIONS

Pipe I.D., in. (mm)	4 (100)	6 (150)	8 (200)	10 (250)	12 (300)	15 (375)	18 (450)	24 (600)	30 (750)	36 (900)	42 (1050)	48 (1200)	54 (1350)	60 (1500)
Pipe O.D.,* in. (mm)	4.8 (122)	6.9 (175)	9.1 (231)	11.4 (290)	14.5 (368)	18 (457)	22 (559)	28 (711)	36 (914)	42 (1067)	48 (1219)	54 (1372)	61 (1544)	67 (1702)

*Pipe O.D. values are provided for reference purposes only, values stated for 12- through 60-inch are ± 1 inch. Contact a sales representative for exact values.

DIRECT CONTACT
Customer Service
888-FOR PIPE (367-7473)
Fax 888-FAX PIPE (329-7473) 24 hours a day

ELECTRONIC MEDIA
Web Site
Find market- and application-specific information and the latest industry news at our On-Line Pipeline – **www.hancor.com**

Hancor 401 Olive St., Findlay, OH 45840

#1122/0708 (08354)

3-1 OVERVIEW OF HYDRAULIC CONSIDERATIONS

The Manning's equation is the most widely recognized means of determining pipe capacity for gravity flow installations. As such, it provides the basis of the hydraulic design consideration for corrugated high density polyethylene (HDPE) and polypropylene (PP) pipe.

Discharge curves allow pipe sizing through use of graphs once the design capacity requirements and slope have been established. Each product will have its own discharge curve based on its Manning's "n" value. This section provides flow capacities based on recommended design "n" values for ADS products. It should be noted that factors such as bends, manhole connections, debris and sediment result in hydraulic losses that will affect actual flow capacity and should be considered in final pipe selection.

By reducing all of the coefficients and constants in the Manning equation down to a single factor, called the conveyance factor (K), another method of pipe sizing can be utilized. By knowing the Manning's "n" value for various pipe materials, the use of conveyance factor charts will allow the designer to develop comparative product options easily. Use of this method frequently results in more than one satisfactory pipe type and size for a given drainage need, thereby allowing the designer to compare product options in order to determine the most cost-effective solution.

Final pipe selection should also include a review of the velocity conditions. Higher flow velocities help keep sediment contained in stormwater from settling along the bottom of the pipe. A reduction in sediment can also reduce the frequency of maintenance and help ensure that the hydraulic function of the pipe will continue throughout its design life. These velocities, however, must be kept within the maximum performance limits of the pipe and the associated facility.

3-2 DESIGN MANNING'S VALUE

Within the pipe industry, there is a wide range of Manning's "n" values, or roughness coefficients, for various types of pipe. Several items should be considered prior to selecting an "n" value for a given pipe material when designing any gravity flow system.

1. Manning's "n" values developed for any given pipe material will depend on depth of flow for partially full pipe and flow velocity for full flow conditions. Manning's "n" values are commonly provided for full flow conditions, but should not be assumed unless specifically noted. For most calculations, "n" is assumed to be constant; however, it shall be the discretion of the individual designer to use a constant or varying "n" value.

2. Storm sewers, culverts and sanitary sewers are typically subject to collection of debris and sediment, which adversely effect flow rates. Consideration should be given for the collection of debris and sedimentation and adjust the design "n" value accordingly. Pipe inside surface texture, geometry, joint opening and pipe material can also influence collection of debris and sedimentation depending on the susceptibility of the debris to either adhere to the pipe surface or be trapped and caught by other obstructions.

Tests conducted at Utah State University Water Research Laboratory show minimum Manning's "n" values of less than 0.010 for corrugated HDPE pipe with a smooth interior liner. To accommodate actual field conditions and to incorporate a safety factor, ADS recommends using a Manning's "n" value of 0.012 for corrugated HDPE and PP products with a smooth interior liner. There is considerable justification for both HDPE and PP products to be designed with the same Manning's "n" value. Both smooth interior products are made using the same mold blocks and are produced on the same manufacturing equipment. From a material standpoint, both HDPE and PP are polyolefin materials, very similar in chemical makeup, that behave similarly during processing. Also, ADS performs regular internal quality checks which assure the liner roughness of polypropylene is equal to, if not better than, the liner roughness of HDPE products with an established Manning's "n" value of 0.012. In general, it is common engineering practice to include a safety factor of 20-30% to the Manning's values determined during laboratory testing. However, it should be noted, this practice is not utilized for most Manning's "n" values provided for metal pipes. Recommended design Manning's "n" values for all ADS pipe products are listed in Table 3-1.

Table 3-2
Conveyance Factors (Metric Units)

Design Manning's Values for ADS Thermoplastic Pipe *		
Product	**Diameter**	**Design Manning's "n"**
N-12, MEGA GREEN, N-12 STIB, N-12 WTIB, HP STORM, SaniTite, SaniTite HP, N-12 Low Head	100-1500mm	"n" = 0.012
Single Wall Highway and Heavy Duty *	450-600mm 300-375mm 250mm 200mm 75-150mm	"n" = 0.020 "n" = 0.018 "n" = 0.017 "n" = 0.016 "n" = 0.015
TripleWall and Smoothwall Sewer & Drain	75-150mm	"n" = 0.009 **
Conveyance Equations: k = Q/(s^0.5) Q = k s^0.5		

Conveyance Factors for Circular Pipe Flowing Full																		
		Manning's "n" Values																
Dia. (mm)	**Area (sq. m.)**	**0.009**	**0.010**	**0.011**	**0.012**	**0.013**	**0.014**	**0.015**	**0.016**	**0.017**	**0.018**	**0.019**	**0.020**	**0.021**	**0.022**	**0.023**	**0.024**	**0.025**
75	0.004	0.03	0.03	0.03	0.03	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.01	0.01	0.01	0.01
100	0.008	0.07	0.07	0.06	0.06	0.05	0.05	0.04	0.04	0.04	0.04	0.04	0.03	0.03	0.03	0.03	0.03	0.03
150	0.018	0.22	0.20	0.18	0.16	0.15	0.14	0.13	0.12	0.12	0.11	0.10	0.10	0.09	0.09	0.09	0.08	0.08
200	0.031	0.47	0.43	0.39	0.36	0.33	0.30	0.28	0.27	0.25	0.24	0.22	0.21	0.20	0.19	0.19	0.18	0.17
250	0.049	0.86	0.77	0.70	0.64	0.59	0.55	0.52	0.48	0.45	0.43	0.41	0.39	0.37	0.35	0.34	0.32	0.31
300	0.071	1.40	1.26	1.14	1.05	0.97	0.90	0.84	0.79	0.74	0.70	0.66	0.63	0.60	0.57	0.55	0.52	0.50
375	0.110	2.53	2.28	2.07	1.90	1.75	1.63	1.52	1.42	1.34	1.27	1.20	1.14	1.09	1.04	0.99	0.95	0.91
450	0.159	4.12	3.71	3.37	3.09	2.85	2.65	2.47	2.32	2.18	2.06	1.95	1.85	1.76	1.68	1.61	1.54	1.48
525	0.216	6.21	5.59	5.08	4.66	4.30	3.99	3.73	3.49	3.29	3.11	2.94	2.80	2.66	2.54	2.43	2.33	2.24
600	0.283	8.87	7.98	7.26	6.65	6.14	5.70	5.32	4.99	4.70	4.43	4.20	3.99	3.80	3.63	3.47	3.33	3.19
675	0.358	12.14	10.93	9.93	9.11	8.41	7.80	7.28	6.83	6.43	6.07	5.75	5.46	5.20	4.97	4.75	4.55	4.37
750	0.442	16.08	14.47	13.16	12.06	11.13	10.34	9.65	9.04	8.51	8.04	7.62	7.24	6.89	6.58	6.29	6.03	5.79
825	0.535	20.73	18.66	16.96	15.55	14.35	13.33	12.44	11.66	10.98	10.37	9.82	9.33	8.89	8.48	8.11	7.77	7.46
900	0.636	26.15	23.53	21.39	19.61	18.10	16.81	15.69	14.71	13.84	13.07	12.39	11.77	11.21	10.70	10.23	9.81	9.41
1050	0.866	39.44	35.50	32.27	29.58	27.31	25.36	23.67	22.19	20.88	19.72	18.68	17.75	16.90	16.14	15.43	14.79	14.20
1125	0.994	47.41	42.67	38.79	35.56	32.82	30.48	28.45	26.67	25.10	23.70	22.46	21.33	20.32	19.39	18.55	17.78	17.07
1200	1.131	56.31	50.68	46.07	42.23	38.99	36.20	33.79	31.68	29.81	28.16	26.67	25.34	24.13	23.04	22.04	21.12	20.27
1350	1.431	77.09	69.38	63.08	57.82	53.37	49.56	46.26	43.36	40.81	38.55	36.52	34.69	33.04	31.54	30.17	28.91	27.75
1500	1.767	102.10	91.89	83.54	76.58	70.69	65.64	61.26	57.43	54.05	51.05	48.36	45.95	43.76	41.77	39.95	38.29	36.76
1800	2.545	166.04	149.43	135.85	124.53	114.95	106.74	99.62	93.62	87.90	83.02	78.65	74.72	71.16	67.92	64.97	62.26	59.77

* Corrugated Polyethylene Pipe Association (2000) "Hydraulic Considerations for Corrugated Polyethylene Pipe"

** "Lingedburg, Michael, "Civil Engineer Reference Manual"[4]