

**WEST HANOVER TOWNSHIP ACT 537 SPECIAL STUDY**

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**FIGURES**

- FIGURE 1 Houck Manor Low Pressure Alternative
- FIGURE 2 Holiday Park Gravity System

**ATTACHMENTS**

- I. 2014 Houck Manor and Holiday Park Public Sewer Alternatives Evaluation Report
- II. Sewer System Capacity Analysis Worksheets
- III. PHMC and PNDI Survey Results Related to Selected Alternatives
- IV. Special Study Public Notice Proof of Publication
- V. Response to Public Comment
- VI. Township Resolution Approving the Special Study

**Table 2.1.2 Houck Manor Low Pressure Alternatives**

<b>Alternative</b>	<b>Description</b>	<b>Number of Users</b>
1	Low pressure sewers on Hillside Road, Walnut Avenue, and Chestnut Avenue convey wastewater to a low pressure sewer on Linglestown Road that will follow Linglestown Road to Piketown Road, then proceed to discharge to the existing manhole BC-12 near the High School.	44
2	Low pressure sewers serve the residents on Hillside Rd, Walnut Avenue, and Chestnut Avenue as described for Low Pressure Alternative 1. However, in Alternative 2, a low pressure sewer is constructed on Linglestown Road beginning at Walnut Avenue, and connecting to an existing manhole near the intersection of Royal Terrace Drive and Linglestown Road in the Winslett development.	48
1 with LP to North Piketown Rd	Alternative 1 with low pressure sewer extended to Piketown Road north from Linglestown Road.	53
1 with LP to Linglestown Rd East of Chestnut	Alternative 1 with low pressure sewer extended to Linglestown Road east of Chestnut Avenue.	54
2 with LP to Linglestown Rd West of Walnut	Alternative 2 with low pressure sewer extended to Linglestown Road west of Walnut Avenue towards Piketown Road	58

The Authority selected the Low Pressure Alternative 2 with the option to include Linglestown Road between Piketown Road and Walnut Avenue for design. The selected alternative differs from that recommended in the 2006 Facilities Plan Update in the following ways:

- The selected alternative is completely low pressure with no gravity sewers;
- Properties along Linglestown Road between Walnut Avenue and Piketown Road are included in the sewered area; and
- The selected alternative is designed to discharge to the existing public sewer system in the Winslett development instead to the public system on Piketown Road near the Central Dauphin High School.

The low pressure system alternative was selected because it is amenable to the geology and topography of the area. The entire low pressure system can be constructed within Township and State rights-of-way eliminating the need for several thousand feet of easements through private property, lower installation depth requirements for the low pressure system minimizes the need for rock excavation in an area with geologically shallow depth to bedrock thereby reducing construction cost and minimizing the potential for damage to private property from blasting, and the low pressure alternative favors lower overall construction cost and ease of construction.

A disadvantage of the low pressure system is that it is not readily expandable which does not provide an opportunity to develop areas beyond Houck Manor. However, the Township's current Comprehensive Plan as well as the 2006 Facilities Plan Update do not anticipate extending the public sewer system to areas beyond Houck Manor. Therefore, there is no need to construct the Houck Manor sewer system to accommodate growth outside the development.

The estimated construction cost for Low Pressure Alternative 2 with the option to extend low pressure service to Linglestown Road between Piketown Road and Walnut Avenue is \$1,002,000 based on 2014 construction costs. This cost is approximately one-third the cost of the gravity and combined gravity/low pressure alternatives. The service area is shown in Figure 1.

## 2.2 Holiday Park Alternatives

Seven (7) alternatives using either gravity or low pressure sewers to serve Holiday Park were evaluated in the 2014 Alternatives Evaluation Report. These are summarized on Table 2.2.1 below.

**Table 2.2.1 Holiday Park Alternatives**

Alternative No.	Description	No. of Users
1	All gravity sewers throughout conveying wastewater to Pumping Station located at Pinecrest and Piketown Roads. The force main from the Pumping Station discharges to a manhole in the Winslett development.	46
2	Same as Alternative 1, except the Pinecrest Pumping Station and force main is replaced by a gravity sewer on Piketown Road from Holiday Park to a manhole to be constructed in Houck Manor at the intersection of Hillside Road and Piketown Road. The depth of sewers will exceed 20 ft. in some areas making construction of the gravity sewer difficult and expensive.	46
North Piketown Road Gravity Sewer Option	This option extends the gravity sewer system on Piketown Road approximately 730 feet to pick up an additional 3 EDUs. In order to maintain gravity flow, however, the depth of the sewers near Piketown Road and Tucker Street must be increased to 15 to 20 feet, adding a degree of difficulty and expense to the construction. Alternatively, service to this area can be provided through a low pressure sewer, which would not require the depth of the sewers in the vicinity of Tucker Street and Piketown Road to be lowered.	49
Moyer Road Gravity Sewer Option	The gravity sewer system could be extended approximately 1200 feet east of Piketown road on Moyer Road to serve an additional 14 EDUs. The topography of the area will allow sewer depths of 8 feet or less.	60
Low Pressure Alternative	Low pressure sewers replace the Pinecrest Pumping Station and force main, and all of the gravity sewers serving Holiday Park. The low pressure sewers will discharge to a manhole in Winslett Phase VII.	51
North Piketown Road Low Pressure Sewer Option	This option extends the low pressure sewer system on Piketown Road for a distance of 730 feet north of Tucker St. to pick up an additional 3 EDUs.	54
Moyer Road Low Pressure Option	This option extends the low pressure sewer system approximately 1200 feet east on Moyer Road towards Winslett to pick up an additional 9 EDUs.	60

The alternative selected by the Authority was Alternative 1, however with extended service to the first four properties on Moyer Road east of Piketown Road for a total of 56 users.

Like the recommended Alternative 3 from the 2006 Facilities Update Plan, selected Alternative 1 is a gravity sewer system conveying collected wastewater to Piketown Road west of Moyer Road. The primary difference between the recommended Alternative 3 from the 2006 Facilities Plan Update and the selected Alternative 1 from the 2014 Alternatives Evaluation Report is the wastewater collected is conveyed to a pumping station located on the south side of Piketown Road at Pinecrest Road. The proposed discharge from the Holiday Park pumping station is to a manhole in Phase 7 of the Winslett development located south of Holiday Park. Alternative 3 recommended in the 2006 Facilities Plan Update proposed construction of a gravity interceptor to convey wastewater collected in Holiday Park along Piketown Road to a gravity manhole located on Piketown Road at Hillside Avenue in Houck Manor. With the selection of the low pressure alternative for Houck Manor, there would be no gravity sewers to accept flow from Holiday Park. Consequently, a pumping station is proposed to take the place of the Piketown Road interceptor.

The estimated construction cost of the selected Alternative 1 is \$1,363,000. This is similar to the planning level cost estimate for Alternative 3 from the 2006 Facilities Plan Update. The service area is shown in Figure 2.

### 3.0 Cost Impact of Selected Alternatives on Rate Payers

#### 3.1 Houck Manor Alternatives

Construction costs and the equivalent cost per connection for the various Houck Manor alternatives were evaluated for all of the alternatives considered in the 2014 Alternatives Evaluation Report. The Authority currently has sufficient capital reserves to finance construction of the selected low pressure Alternative 2 identified in the 2014 Alternatives Evaluation Report, including the cost of the single grinder pumps and controls which the Authority intends to provide at no additional cost to the property owners. Therefore, the Authority does not anticipate assessing additional fees beyond the standard fees to cover the cost of constructing a low pressure system serving Houck Manor nor would a general user fee increase be required. User fees are currently \$156/quarter. Property owners connecting to the low pressure system will be assessed the tapping fees currently in effect. The charges to be assessed are summarized below.

Capacity Component Tapping Fee/EDU:	\$4,030
Collection Component Tapping Fee/EDU:	\$ 180
Customer Facilities Fee per connection:	<u>\$ 175</u>
TOTAL FEES	\$4,385

The Authority's capital reserves are not sufficient to completely support construction of any of the all-gravity or combined low pressure/gravity alternatives. Therefore, a borrowing would be required to fund the project. Such additional debt will cause an increase to user fees for the entire public sewer service area. Although the Authority has agreed to use existing reserves to fund the selected low pressure alternative for Houck Manor, the Board does not believe it is fiscally responsible to arbitrarily require the existing rate payers to subsidize a more expensive gravity alternative through increased user fees to accommodate additional borrowing. Consequently, the residents of Houck Manor would be expected to fund any alternative other than the selected low pressure option through a Special Purpose Tapping Fee.

Special Purpose Tapping Fees are used to offset the construction cost for facilities constructed to serve a specific area. This fee is intended to cover all or part of the construction cost for the specific facilities. The Special Purpose Tapping Fee would be added to the Capacity Component Tapping Fee and the Customer Facilities Fee to arrive at the total cost to the property owner. Table 3.1.1 below summarizes the assessed charges for the all-gravity and combined gravity/low pressure Alternatives without support from the Authority.

**Table 3.1.1 Special Purpose Tapping Fees**

Alternative	Estimated Construction Cost	Number of Users	Special Purpose Tapping Fee/user	Other Tapping Fees	Total Assessed Cost per User
1A	\$2,929,000	64	\$45,800	\$4,205	\$50,005
1B	\$3,291,000	82	\$40,100	\$4,205	\$44,305
1C	\$2,378,000	64	\$37,000	\$4,205	\$41,205
1D	\$2,760,000	82	\$33,700	\$4,205	\$37,905
2A	\$2,728,000	64	\$42,600	\$4,205	\$46,805
2B	\$2,154,000	64	\$33,700	\$4,205	\$37,905

If the entire cost of system is to be assessed as a Special Purpose Tapping Fee, the cost per property would range from \$37,905 to \$50,005 after addition of the Capacity Component Tapping Fee and the Customer Facilities Fee to the Special Purpose Tapping Fee. However, if the Authority would subsidize a portion of the overall construction cost of the gravity and combination gravity/low pressure alternatives in an amount equivalent to the cost of the selected Low Pressure Alternative (\$1,002,000), the assessed value per property would be reduced. In that event, the total fees assessed could range from \$22,205 to \$34,314, with the all-gravity system Alternative 1A being the most expensive. Table 3.1.2 summarizes the assessed charges with the Authority subsidizing a portion of the cost of construction.

**Table 3.1.2 Subsidized Special Purpose Tapping Fees**

Alternative	Estimated Construction Cost	Number of Users	Amount Subsidized by the Authority	Special Purpose Tapping Fee/user	Other Tapping Fees	Total Assessed Cost per User
1A	\$2,929,000	64	\$1,002,000	\$30,109	\$4,205	\$34,314
1B	\$3,291,000	82	\$1,002,000	\$27,915	\$4,205	\$32,120
1C	\$2,378,000	64	\$1,002,000	\$21,500	\$4,205	\$25,705
1D	\$2,760,000	82	\$1,002,000	\$21,439	\$4,205	\$25,644
2A	\$2,728,000	64	\$1,002,000	\$26,929	\$4,205	\$31,174
2B	\$2,154,000	64	\$1,002,000	\$18,000	\$4,205	\$22,205

## 4.0 Existing Public Sewer System Capacity Analysis

### 4.1 Existing Gravity Sanitary Sewer System

A capacity evaluation of the existing gravity sanitary sewer system was performed to confirm that there is adequate capacity to accommodate the pumped flows from the Houck Manor low pressure system and the Holiday Park Pumping Station. Both systems will discharge to the Winslett development. The Holiday Park Pumping Station will discharge to dead-end manhole P-180 in the Hidden Meadow Lane cul-de-sac in Phase 7 of the development. The Houck Manor low pressure system discharge is to Manhole P-24 located near the intersection of Linglestown Road and Royal Terrace Drive. The path of the flow is through the Winslett, Millstone, and Brookview developments ending at existing Authority Pumping Station 11 located along Piketown Road south of Sandy Hollow Road.

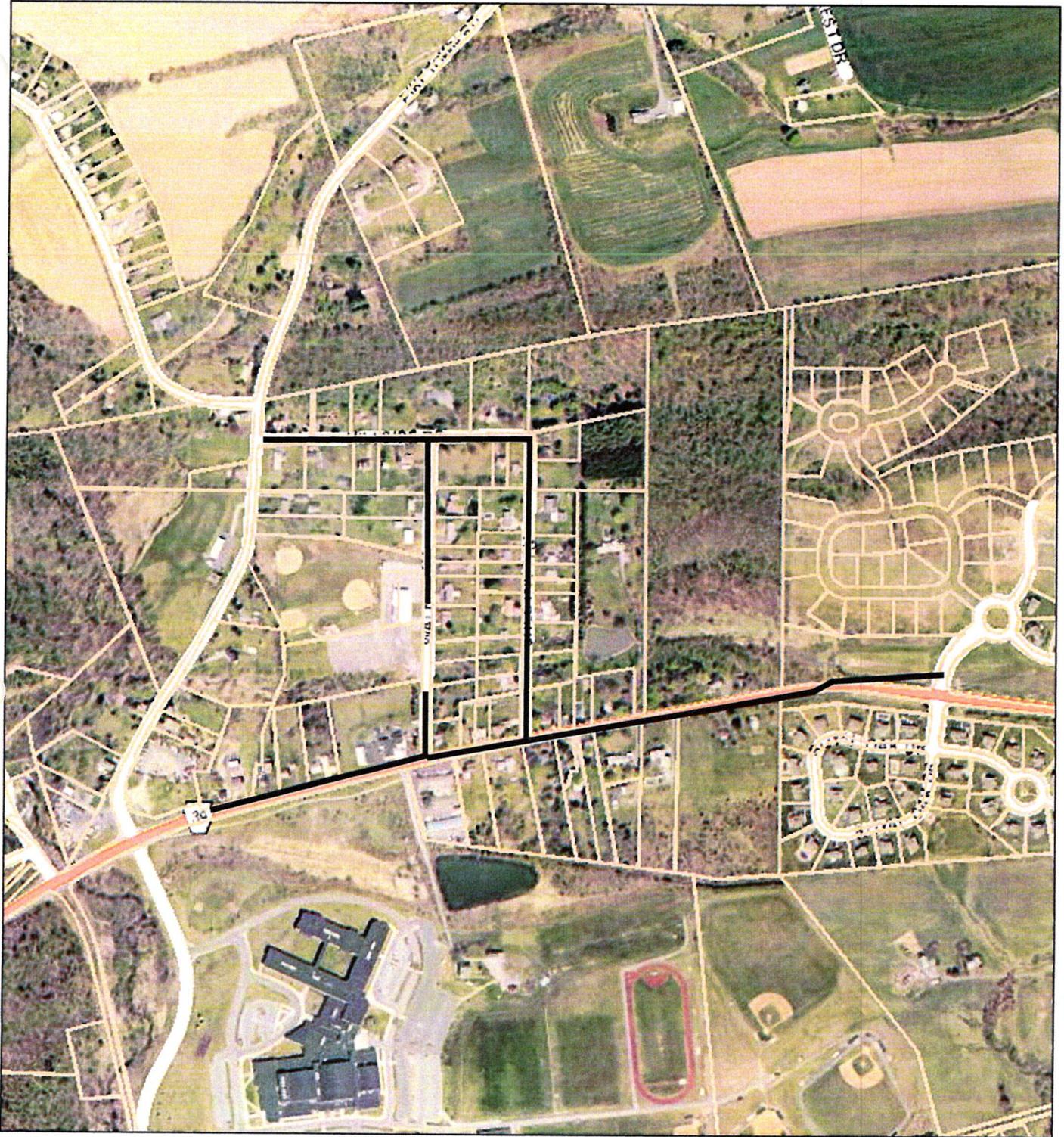
The capacity calculation worksheets are included in this Special Study as Attachment II. The Rational Method was used to determine the design discharge rate for the Houck Manor low pressure system. The calculated flow rate for 55 EDUs is approximately 50 gpm which is equivalent to a peak daily flow rate of 72,000 gallons/day. The 140 gallons/minute design pumping capacity of the Holiday Park Pumping Station represents the peak flow rate from Holiday Park. The 140 gallons/minute is equivalent to a peak daily flow rate of 201,600 gallons/day. The peak flowrate from the remaining residential properties in the flow path is calculated by multiplying the number of properties by 175 gallons/day planning average daily flow rate/EDU and a peaking factor of 4.

There are a total of 315 residential properties contributing flow to the public sewer system along the flow path conveying wastewater from the Winslett development to the existing Authority Pumping Station 11. The reserve capacity of the system is determined by the limiting section of pipe in the flow path. The limiting section was determined to be the manhole run between manholes FS 13.2 to FS-13.1 in the Millstone development. The full-pipe flow capacity of the limiting section of the flow path is 649,435 gallons/day providing for a reserve capacity equal to 303,469 gallons/day. Therefore, based on the capacity analysis performed, there is sufficient capacity in the existing gravity sewer system to accommodate the peak flows from both the Houck Manor low pressure system and the Holiday Park Pumping Station.

### 4.2 Existing Authority Pumping Station 11

The wastewater generated in both Houck Manor and Holiday Park is conveyed to Pumping Station 11. Pumping Station 11, which was designed to include capacity for both Houck Manor and Holiday Park, has a rated capacity of 450 gallons/minute, or an equivalent peak capacity equal to 648,000 gallons/day. The 2016 Chapter 94 records the maximum flow to Pumping Station 11 for 2016 as 123,000 gallons/day. The maximum flow projected for 2018 is 208,000 gallons/day allowing for a reserve capacity equivalent to 440,000 gallons/day. The estimated combined peak flowrate from Houck Manor and Holiday Park is 187,200. Therefore, there is sufficient capacity in Pumping Station 11 to accommodate the estimated maximum flow from Houck Manor and Holiday Park.

**FIGURE 1**  
**HOUCK MANOR LOW PRESSURE SYSTEM**



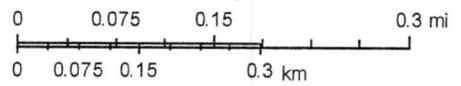
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**Lines**

— Override 1

Parcels

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**FIGURE 2**  
**HOLIDAY PARK GRAVITY SYSTEM**



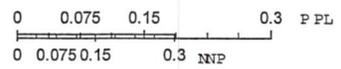
March 5, 2018

**Lines**

-  Override 1
-  Override 2

**Areas**

-  Override 1
-  Parcels



WEST HANOVER TOWN P ACT 537 SPECIAL STUDY  
SEWER SYSTEM CAPACITY ANALYSIS

ADF Usage/EDU, gpd 175 Manning n 0.009  
Peaking Factor 4 Pipe Type SDR-35

DEVELOPMENT	MH RUN	PIPE SIZE, in.	SLOPE, %	PEAK CAPACITY, gpd	TRIBUTARY PEAK FLOW, gpd	TOTAL ACCUMULATED PEAK FLOW, gpd	REMAINING PEAK FLOW CAPACITY, gpd
Holiday Park PS Discharge	P 180				201600	201600	
Winslett Phase 7	P 180 - P 179	8	1.34%	1,308,673	4,900	206500	1,102,173
Winslett Phase 7	P 179 - P 178	8	4.12%	2,294,708	1,400	207900	2,086,808
Winslett Phase 7	P 178 - P 177	8	3.44%	2,096,805	3,500	211400	1,885,405
Winslett Phase 7	P 177 - P 176	8	8.33%	3,262,881	0	211400	3,051,481
Winslett Phase 7	P 176 - P 175	8	0.50%	799,399	0	211400	587,999
Winslett Phase 5	P 175 - P 170	8	0.75%	979,060	0	211400	767,660
Winslett Phase 5	P 170 - P 169	8	0.45%	755,845	700	212100	543,745
Winslett Phase 5	P 169 - P 168	8	0.55%	838,417	700	212800	625,617
Winslett Phase 5	P 168 - P 167	8	0.43%	741,332	2,100	214900	526,432
Winslett Phase 5	P 167 - P 166	8	0.62%	890,173	1,400	216300	673,873
Winslett Phase 5	P 166 - P 165	8	0.71%	952,594	3,500	219800	732,794
Winslett Phase 5	P 165 - P 162	8	1.41%	1,342,420	2,800	222600	1,119,820
Winslett Phase 4	P162 (WS 52)-P 24	8	0.50%	799,399	1,400	224000	575,399
Houck Manor Discharge					72,000	296000	
Winslett Phase 2	P 24 - P 4	8	0.47%	775,046	0	296,000	479,046
Winslett Phase 2	P 4 - P 3	8	4.32%	2,349,744	9,100	305100	2,044,644
Winslett Phase 2	P 3 - P 1	8	3.13%	2,000,096	18,200	323300	1,676,796
Watson Interceptor	P 2 - FS 13.5	8	1.03%	1,147,354	0	323300	824,054
Watson Interceptor	FS 13.15 - FS 13.14	8	3.10%	1,990,488	0	323300	1,667,188
Watson Interceptor	FS 13.14 - FS 13.13	8	1.33%	1,303,781	0	323300	980,481
Watson Interceptor	FS 13.13 - FS 13.12	8	1.38%	1,328,062	0	323300	1,004,762
Watson Interceptor	FS 13.12 - FS 13.11	8	0.45%	758,377	0	323300	435,077
Watson Interceptor	FS 13.11 - FS 13.10	8	0.33%	649,435	0	323300	326,135
Watson Interceptor	FS 13.10 - FS 13.9	8	0.53%	823,032	0	323300	499,732
Millstone	FS 13.9 - FS 13.8	8	1.11%	1,191,078	37,800	361100	829,978
Millstone	FS 13.8 - FS 13.7	8	0.67%	925,372	3,500	364600	560,772
Millstone	FS 13.7 - FS 13.6	8	1.20%	1,238,424	0	364600	873,824

WEST HANOVER TOWN P ACT 537 SPECIAL STUDY  
SEWER SYSTEM CAPACITY ANALYSIS

DEVELOPMENT	MH RUN	PIPE SIZE, in.	SLOPE, %	PEAK CAPACITY, gpd	TRIBUTARY PEAK FLOW, gpd	TOTAL ACCUMULATED PEAK FLOW, gpd	REMAINING PEAK FLOW CAPACITY, gpd
Millstone	FS 13.6 - FS 13.5	8	1.20%	1,238,424	0	364600	873,824
Millstone	FS 13.5 - FS 13.4	8	0.52%	815,230	5,600	370200	445,030
Millstone	FS 13.4 - FS 13.3	8	0.82%	1,023,731	14,000	384200	639,531
Millstone	FS 13.3 - FS 13.2	8	1.70%	1,474,019	0	384200	1,089,819
Millstone	FS 13.2 - FS 13.1	8	0.37%	687,669	0	384200	303,469
Millstone	FS 13.1 - FS 13	8	0.82%	1,023,731	0	384200	639,531
Sany Hollow Road	FS 13 - FS 12	8	1.58%	1,421,043	9,800	394000	1,027,043
Brookview (Fort Stewart)	FS 12 - FS 11	10	2.75%	3,399,161	0	394000	3,005,161
Brookview (Fort Stewart)	FS 11 - FS 10	10	1.17%	2,217,167	0	394000	1,823,167
Brookview (Fort Stewart)	FS 10 - FS 9	10	0.32%	1,159,526	0	394000	765,526
Brookview (Fort Stewart)	FS 9 - FS 8	10	0.53%	1,492,256	0	394000	1,098,256
Brookview (Fort Stewart)	FS 8 - FS 7	10	0.41%	1,312,494	6,300	400300	912,194
Brookview (Fort Stewart)	FS 7 - FS 6	10	0.40%	1,296,389	0	400300	896,089
Brookview (Fort Stewart)	FS 6 - FS 5	10	0.45%	1,375,028	18,900	419200	955,828
Brookview (Fort Stewart)	FS 5 - FS 4	10	0.45%	1,375,028	0	419200	955,828
Brookview (Fort Stewart)	FS 4 - FS 3	10	0.47%	1,405,253	0	419200	986,053
Brookview (Fort Stewart)	FS 3 - FS 2	10	0.96%	2,008,358	17,500	436700	1,571,658
Brookview (Fort Stewart)	FS 2 - FS 1	10	0.42%	1,328,404	18,900	455600	872,804
Brookview (Fort Stewart)	FS 1 - PS 11	10	0.52%	1,478,111	0	455600	1,022,511

Limiting Capacity

649,435

Minimum Reserve Capacity

303,469