5.1 POTENTIAL WASTEWATER TREATMENT ALTERNATIVES

Rules and regulations pertaining to the content of Act 537 plans are contained in Title 25 Pennsylvania Code Chapter 71. These rules and regulations require that each Act 537 plan present and evaluate alternatives for sewage service within the project area. The following sections present several alternatives available to the Region for meeting the wastewater planning needs identified in Chapter 4. The topics covered in this chapter include the following:

1. Conventional collection, conveyance and treatment systems.
2. Community On-lot Disposal Systems (COLDS).
3. Continued use of on-lot disposal systems.
4. Small flow or package treatment facilities.
5. Holding tanks.
6. Sewage management programs.
7. Non-structural/Planning activities.
8. No action alternative.

These general wastewater alternatives have been considered for areas within the Township currently served by OLDS. Initially, many alternatives were considered, however some were dismissed immediately and eliminated from further consideration in the Plan due to cost and technical feasibility. Twelve (12) sewer extension alternatives to provide public sewer service to these areas of the Township currently served by OLDS have been evaluated to determine whether they are cost-effective, environmentally sound, and structurally feasible. These alternatives are listed below:

1A. Low pressure sewer collection system to serve the Matamoras, Route 147 & 225, and Triangle & Lenker Estates Areas in combination with a gravity sewer collection system in the Triangle & Lenker Estates Area for connection to the existing HAWASA gravity sewer collection system.

1B. Gravity sewer collection system to serve the Matamoras, Route 147 & 225, and Triangle & Lenker Estates Areas in combination with three (3) pump stations, force mains, and low pressure sewer in Matamoras and Route 147 & 225 Areas for connection to the existing HAWASA gravity sewer collection system.

1C. Gravity sewer collection system to serve the Matamoras and Triangle & Lenker Estates Areas in combination with a pump station, force main, and low pressure sewer in Matamoras, Route 147 & 225, and Triangle & Lenker Estates Areas for connection to the existing HAWASA gravity sewer collection system.

1D. Combination of gravity sewer collection system and low pressure sewer system to serve the Matamoras, Route 147 & 225, and Triangle & Lenker Estates Areas in concert with a pump station and force main for connection to the existing HAWASA gravity sewer collection system.

2A. Low pressure sewer collection system to serve the Tourist Park Area for connection to the existing HAWASA gravity sewer collection system.

2B. Combination of gravity sewer collection system and low pressure sewer system to serve the Tourist Park Area in concert with a pump station and force main for connection to the existing HAWASA gravity sewer collection system.

3. Combination of gravity sewer collection system and low pressure sewer system to serve the Fetterhoff Church Area in concert with a pump station and force main for connection to the existing HAWASA gravity sewer collection system.

4A. Low pressure sewer collection system to serve the Matamoras, Route 147 & 225, and Triangle & Lenker Estates Areas in combination with a gravity sewer collection system in the Triangle & Lenker Estates Area for connection to the existing HAWASA gravity sewer collection system. Pump station and force main for conveyance of Lenker Estates subdivision Area to the exiting HAWASA gravity sewer collection system.

4B. Gravity sewer collection system to serve the Matamoras, Route 147 & 225, and Triangle & Lenker Estates Areas in combination with three (3) pump stations, force mains, and low pressure sewer in Matamoras and Route 147 & 225 Areas for connection to the existing HAWASA gravity sewer collection system. Pump station and force main for conveyance of Lenker Estates subdivision Area to the exiting HAWASA gravity sewer collection system.

4C. Gravity sewer collection system to serve the Matamoras and Triangle & Lenker Estates Areas in combination with a pump station, force main, and low pressure sewer in Matamoras, Route 147 & 225, and Triangle & Lenker Estates Areas for connection to the existing HAWASA gravity sewer collection system. Pump station and force main for conveyance of Lenker Estates subdivision Area to the exiting HAWASA gravity sewer collection system.

4D. Combination of gravity sewer collection system and low pressure sewer system to serve the Matamoras, Route 147 & 225, and Triangle & Lenker Estates Areas in concert with a pump station and force main for connection to the existing HAWASA gravity sewer collection system. Pump station and force main for conveyance of Lenker Estates subdivision Area to the exiting HAWASA gravity sewer collection system.

4E. Combination of gravity sewer collection system and low pressure sewer system to serve the Matamoras, Route 147 & 225, and Triangle & Lenker Estates Areas in concert with a pump station and force main for connection to the existing HAWASA gravity sewer collection system. Pump station and force main for conveyance of Lenker Estates subdivision Area to the exiting HAWASA gravity sewer collection system. Pump station and force main for conveyance of Lenker Estates subdivision Area, Matamoras Area, and a portion of the Triangle & Lenker Estates Areas to the exiting HAWASA gravity sewer collection system.

All of the alternative extensions presented above are proposed to be conveyed to the HAWASA's wastewater treatment plant and system as described in Chapter 3. The flows conveyed in Alternatives 1 (A-D) and 4 (A-E) are proposed to be conveyed through HAWASA's southern interceptor that discharges directly into the HAWASA WWTP.

The flows from Alternatives 2 (A-B) and 3 are proposed to be discharged into HAWASA's sanitary sewer system located within the Borough of Halifax and conveyed to HAWASA's northern interceptor, as described in Chapter 3, which discharges into the Main Pumping Station. As further described in Chapter 3, the WWTP is in the preliminary design phase for an upgrade (currently being performed by HAWASA's Engineers). The upgrade relies on the projection of flows presented in this Plan, therefore WWTP alternatives will be considered by HAWASA after the submission and adoption of this Plan. Due to this effort by HAWASA and as the Township does not own or operate an existing WWTP, WWTP alternatives were not considered as part of this Plan.

A hydraulic analysis (Figure 5-1) was performed to confirm that the south interceptor has enough capacity to accept flows from the proposed extensions. In the most conservative calculations, with a peaking factor of 4, the interceptor would still maintain an average reserve capacity of approximately 52.5%. No upgrades to the south interceptor were considered as part of this Plan. The northern interceptor sanitary sewer mains are assumed have the capacity to service the proposed connections, however, the Main Pumping Station is over capacity and will need to be upgraded to accept the proposed additional flows. As part of the WWTP upgrades, the capacity of the Main Pump Station is proposed to be increased, however due to financial infeasibility of Alternatives 2 (A-B) and Alterative 3, as further detailed in this Section, these sewer extensions are not recommended at this time.

5.2 NEW COLLECTION AND CONVEYANCE FACILITIES

Presently, public sewer only exists within the Borough of Halifax and extends south to the Sheetz located on Parmer Drive. The majority of the Township is served by OLDS.

5.2.1 Conveyance Alternatives

New collection and conveyance facilities were evaluated to extend public sewer and are required to serve the sewer service areas identified by this Act 537 Plan. The apparent immediate needs areas include Matamoras, Triangle & Lenker Estates, and Route 147 & 225 Areas and the proposed extensions are presented as Alternatives 1 (A-D) and 4 (A-E). These extensions are proposed for the 5-10 year planning window, where the remaining proposed alternatives are assumed to be completed beyond the 10-year planning timeframe and will depend on available funding, developer assistance, and upgrades to the Main Pumping Station.

Conventional Gravity Sewers

Conventional gravity sewers convey wastewater by using gravity or the differential elevations between the upstream and downstream points in the system. The sewers must be set deep enough to receive flows from individual buildings. The building sewer or lateral is typically comprised of 4-inch or 6-inch diameter pipe laid at a minimum slope of 1%. Building sewers connect directly to the collecting sewers. Where financially feasible, the collecting sewer is set at a depth that is capable of receiving basement flows. Conventional gravity sewers are constructed to meet minimum state and local requirements. Generally, they are constructed of 8-inch diameter or larger pipe with access manholes spaced a maximum of 400 feet apart and at each change of direction. Conventional systems are connected directly to existing or proposed conveyance and treatment systems. The feasibility of conventional gravity sewers is dependent on factors such as topography, presence of rock, high groundwater tables, and density of homes. The costs of a conventional gravity system can vary dramatically depending on the above noted factors.

Low-pressure Systems

Low-pressure systems including Grinder Pump (GP) systems are an alternative to conventional gravity systems. GP systems shred or reduce the size of raw wastewater solids, producing pumpable slurry which is conveyed to the treatment plant through low-pressure sewer lines. Pressure sewers are most cost-effective in areas where the terrain is rolling, or the line needs to be close to the surface due to low depth to bedrock or a high water table. Pressure sewers have the disadvantage that the material is highly septic and odor problems may arise.

When discussing GP systems, it is necessary to consider both the on-lot element as well as the

collection system elements. The on-lot elements of a GP system consist of 4-inch or 6-inch building sewer that conveys household sewage to an on-lot pump station. On existing homes, either a new connection is made to the existing plumbing system or the existing building sewer is intercepted by the new building sewer and directed to the pump station. The on-lot pump station typically consists of a fiberglass basin with a minimum capacity of 50 gallons. The pumps are either centrifugal or semi-positive displacement units with 1-2 HP motors. The basin includes appropriate valves for isolation of the pumps. Each basin package is provided with a pump control panel, which can either be located remotely at the house or locally at the pump station.

The second component of any GP system is the collection system. A typical low-pressure sewer system consists of small diameter, plastic, pressure piping. All piping downstream of the grinder pump is under low pressure, usually 60 psi or less. The low-pressure collection system is arranged as a branch network with no loops in the system. Appurtenances of a low-pressure system consist of in-line and terminal clean-outs located at 400'-600' intervals, at changes in direction or at changes in pipe size. Air release valves are located within the system at all high points. Isolation valves are installed strategically throughout the system to facilitate maintenance. Discharge from the low-pressure system can be directly routed to a treatment plant provided the difference in elevation is not significant, or to a conventional collection or conveyance system. GP systems have been most applicable in areas where the topography is very flat, has rolling hills, significant rock may be present, high groundwater table is present, or where the system outfall is at a higher elevation than the service area.

Collection System Construction Costs

Typically, an authority or municipality would be responsible for the construction and funding of an extension of public facilities to a previously developed area. In the case of a new development, sewage facilities are generally extended by the developer at their cost and dedicated to the authority or municipality under a written agreement. Estimates of construction cost, overall project costs are included in the focused assessment of the needs areas in Section 5.10.

5.2.2 Repair or Replacement of Existing Collection and Conveyance System Components

No alternatives are anticipated which would facilitate the need for repair or replacement of existing collection or conveyance system mains or interceptors. As the Township does not own or operate a collection and conveyance system, it is owned and operated by HAWASA.

As presented on the next page, a hydrologic analysis was completed to evaluate the downstream capacity of the south interceptor if all potential flows assumed for this plan are introduced to the system. Utilizing the most conservative figures and a peaking factor of 4, the most limiting section was calculated to have a reserve capacity of approximately 11.6%. The average reserve capacity of the interceptor was calculated at approximately 52.5% under the described conditions. As indicated through the analysis, no upgrades are required due to potential flows considered for this Plan.

Figure 5-1 South Interceptor Reserve Capacity Analysis (588 additional EDUs)

Upstream Manhole No.	Downstream Manhole No.	Diameter (Inches)	Length (Feet)	Upstream Manhole Invert	Downstream Manhole Invert	Pipe Slope (feet/feet)	Pipe Material	Manning N	Pipe Capacity (MGD)	Cumulative EDU Count	Flow Per EDU (GPD)	Peaking Factor	Existing Peak Flow (MGD)	New Cumulative EDU Count	New Peak Flow (MGD)	Existing + New Flow (MGD)	Does Pipe Have Capacity?	Reserve Capacity	Reserve % of Capacity
330	329	10	342.00	620.88	619.92	0.0028	PVC	0.013	0.74	10	250	4	0.010	588	0.588	0.598	Yes	0.14	19.1%
329	328	10	78.00	619.82	619.60	0.0028	PVC	0.013	0.74	10	250	4	0.010	588	0.588	0.598	Yes	0.14	19.3%
328	327	10	64.00	619.50	619.32	0.0028	PVC	0.013	0.74	10	250	4	0.010	588	0.588	0.598	Yes	0.14	19.2%
327	326	10	95.00	619.22	618.95	0.0028	PVC	0.013	0.74	10	250	4	0.010	588	0.588	0.598	Yes	0.15	19.6%
326	325	10	201.00	618.85	618.29	0.0028	PVC	0.013	0.74	10	250	4	0.010	588	0.588	0.598	Yes	0.14	18.8%
325	324	10	379.00	618.19	617.13	0.0028	PVC	0.013	0.74	10	250	4	0.010	588	0.588	0.598	Yes	0.14	19.0%
324	323	10	390.00	617.62	615.63	0.0051	PVC	0.013	1.00	18	250	4	0.018	588	0.588	0.606	Yes	0.39	39.2%
323	322	10	176.00	615.63	615.20	0.0024	PVC	0.013	0.69	22	250	4	0.022	588	0.588	0.610	Yes	0.08	11.6%
322	321A	10	159.00	615.20	614.46	0.0047	PVC	0.013	0.95	23	250	4	0.023	588	0.588	0.611	Yes	0.34	35.8%
321A	321	10	252.00	614.46	608.11	0.0252	PVC	0.013	2.22	27	250	4	0.027	588	0.588	0.615	Yes	1.60	72.2%
321	320	10	228.00	608.11	599.11	0.0395	PVC	0.013	2.77	30	250	4	0.030	588	0.588	0.618	Yes	2.15	77.7%
320	319	10	206.00	599.11	593.53	0.0271	PVC	0.013	2.30	35	250	4	0.035	588	0.588	0.623	Yes	1.67	72.9%
319	318	10	396.00	588.29	580.27	0.0203	PVC	0.013	1.99	39	250	4	0.039	588	0.588	0.627	Yes	1.36	68.4%
318	317	10	400.00	580.27	565.00	0.0382	PVC	0.013	2.73	40	250	4	0.040	588	0.588	0.628	Yes	2.10	77.0%
317	316	10	348.25	565.87	563.00	0.0082	PVC	0.013	1.27	50	250	4	0.050	588	0.588	0.638	Yes	0.63	49.6%
316	315	10	177.80	563.00	560.95	0.0115	PVC	0.013	1.50	50	250	4	0.050	588	0.588	0.638	Yes	0.86	57.4%
315	314	10	213.93	560.95	557.73	0.0151	PVC	0.013	1.71	52	250	4	0.052	588	0.588	0.640	Yes	1.07	62.6%
314	313A	10	175.36	557.73	548.97	0.0500	DIP	0.013	3.12	53	250	4	0.053	588	0.588	0.641	Yes	2.48	79.4%
313A	313	10	223.38	546.97	532.98	0.0626	DIP	0.013	3.49	53	250	4	0.053	588	0.588	0.641	Yes	2.85	81.6%
313	312	10	400.00	532.98	530.74	0.0056	PVC	0.013	1.04	53	250	4	0.053	588	0.588	0.641	Yes	0.40	38.6%
312	311	10	237.84	530.74	528.76	0.0083	PVC	0.013	1.27	56	250	4	0.056	588	0.588	0.644	Yes	0.63	49.4%
311	310	10	300.58	528.76	527.10	0.0055	PVC	0.013	1.04	57	250	4	0.057	588	0.588	0.645	Yes	0.39	37.8%
310	309	10	400.00	527.10	521.13	0.0149	PVC	0.013	1.70	58	250	4	0.058	588	0.588	0.646	Yes	1.06	62.1%
309	308	10	398.52	521.13	506.53	0.0366	PVC	0.013	2.67	58	250	4	0.058	588	0.588	0.646	Yes	2.03	75.8%
308	307	10	400.00	506.53	486.20	0.0508	PVC	0.013	3.15	58	250	4	0.058	588	0.588	0.646	Yes	2.50	79.5%
307	306	10	210.50	486.20	482.47	0.0177	PVC	0.013	1.86	58	250	4	0.058	588	0.588	0.646	Yes	1.21	65.2%
306	305	10	208.93	482.47	443.25	0.1877	DIP	0.013	6.05	58	250	4	0.058	588	0.588	0.646	Yes	5.40	89.3%
305	304	10	355.66	443.25	396.22	0.1322	DIP	0.013	5.07	58	250	4	0.058	588	0.588	0.646	Yes	4.43	87.3%
304	303	10	54.31	396.22	395.01	0.0223	PVC	0.013	2.08	58	250	4	0.058	588	0.588	0.646	Yes	1.44	69.0%
303	302	10	393.55	395.01	393.33	0.0043	PVC	0.013	0.91	58	250	4	0.058	588	0.588	0.646	Yes	0.27	29.2%
302	301	10	340.34	393.33	391.10	0.0066	PVC	0.013	1.13	58	250	4	0.058	588	0.588	0.646	Yes	0.48	42.8%

5.3 UPGRADE OF EXISTING WASTEWATER TREATMENT

As stated above, the upgrade of the HAWASA WWTP is in preliminary design during the time of this Plan's preparation and will rely on flow projections identified within this Plan. As part of the preparation of this Plan, the flow projections are based on providing public sanitary sewer facilities to existing properties within the three (3) potential sewer service areas currently served by OLDS, adjacent developments currently served by private wastewater treatment facilities (Alex Acres Mobile Home Park and Lenker Estates), and build-out of all existing or proposed subdivision and land development plans known at the time of this Plan by the Township. These potential sewer service areas were delineated based on the results of the sanitary sewage and water surveys (Chapter 3) within the Planning Area.

The wastewater flow projections developed for this Act 537 Plan were based on the following conditions and assumptions:

- Wastewater flows generated for all Structural Alternatives are based on a 5-year annual average daily flow of 144.2 gallons per day (gpd) per equivalent dwelling unit (EDU) as identified in the Halifax Area Water and Sewer Authority's Chapter 94 Wasteload Management Report for Calendar Year 2017.

- Alex Acres Mobile Home Park (MHP) connections are based on an annual average flow of 78 gpd from existing flow records.

- Future growth within the three (3) potential sewer service areas is based on 20% of non-MHP EDUs.

- Lenker Estates estimated existing and projected EDUs are based on existing aerial imagery and final subdivision/land development plans received by the Halifax Township dated May 2002 through October 2013 for Phases I-III.

As mentioned in Chapter 4, all projected flows are tributary to the Halifax Area Water and Sewer Authority's (HAWASA) Wastewater Treatment Plant (WWTP). The Main Pumping Station located at the HAWASA WWTP is (at the time of this Plan) considered to be hydraulically overloaded in accordance with 25 Pa. Code § 94.12. In addition, a Draft Consent Order and Agreement (COA) was issued to HAWASA by the Pennsylvania Department of Environmental Protection (PA DEP) on January 10, 2018 for WWTP effluent violations occurring between March 2013 and September 2017. WWTP Upgrades are currently being evaluated by HAWASA and are, in some capacity, dependent on the sewage facilities recommended as part of this Halifax Township Act 537 Official Sewage Facilities Plan. Coordination of this Plan with HAWASA is critical to establish a successful and practical implementation schedule, determine funding, and ensure that all facilities are installed in a manner that is both environmentally responsible and economically feasible.

5.4 CONTINUED USE OF ON-LOT DISPOSAL SYSTEMS

Additional On-lot disposal systems (OLDS) are not being considered as an option in this Act 537 Planning Effort for areas where public sewer is not currently available. Therefore, no additional soil, slope and/or hydrogeological evaluations are assumed. As discussed in Chapter 2, the majority of the soil within the Township is not suitable for OLDS due to high groundwater table, slow permeability, flooding, steep slopes, and shallow depth to bedrock. It is anticipated that the

existing OLDS will remain in use while non-failing and permissible in Areas where sewer extensions are not proposed.

5.4.1 – Repair, Replacement or Upgrade of Existing Malfunctioning Systems

The Township's certified SEO is authorized to require the repair of any on-lot malfunction by the following methods approved by Title 25, Chapter 73 of the Pennsylvania Code: cleaning, repair or replacement of components of the existing system, adding capacity or otherwise altering or replacing the system's treatment tank, expanding the existing disposal area, replacing the existing disposal area, replacing the gravity distribution system with a pressurized system, replacing the system with a holding tank, or other alternatives as appropriate for the specific site.

It is recommended that the confirmed malfunctions be rehabilitated and/or repaired by providing a suitably sized drainage bed or replaced. The suspected and potential malfunctions are recommended to be further investigated by the SEO to determine the needs for rehabilitation, replacement, or upgrades.

5.4.2 – Water Conservation

Another method for improving the operation of on-lot systems is to encourage the use of water conservation devices. In lieu of repair by methods mentioned above, the SEO may require the installation of water conservation equipment and the institution of water conservation practices in structures served. Water using devices and appliances in the structure may be required to be retrofitted with water saving appurtenances or they may be required to be replaced by water conserving devices and appliances. Wastewater generation in the structure may also be reduced by requiring changes in water use patterns in the structure served. The use of laundry facilities may be limited to one load per day or discontinued altogether.

5.5 COMMUNITY ON-LOT, SMALL FLOW OR PACKAGE TREATMENT

There are no Community On-Lot Disposal Systems within the Township. Community On-lot Disposal Systems, or COLDS, are essentially small, centralized collection systems that serve isolated developed areas and involve the discharge of treated effluent to the subsurface. Many COLDS simply consist of a large septic tank followed by an absorption bed, while others consist of a conventional treatment plant with effluent discharged into the subsurface. COLDS commonly service relatively small, isolated communities (i.e. less than 50 EDU's); however, there are some large COLDS that service larger communities of several hundred households. A majority of the Township contains severely limited soil and slopes that may be unsuitable for such a system and several areas within each planning area where contaminated water samples have been collected, therefore no further evaluations were completed and no COLDS were proposed.

There are four (4) non-municipal package or small flow treatment facilities located within the Township as described in Chapter 3. Expansion and upgrades to these facilities are not being considered as part of this planning effort. Alternative 4 (A-E) considers the abandonment of the Lenker Estates WWTP and connection to the HAWASA sanitary sewer system through the proposed gravity sewer extension. Alternatives 2 (A-B) considers the discharge of flows from the Alex Acres Facility to the proposed collection system. No other alternatives consider Strohecker WWTP or Camp Hebron WWTP due to needs and financial feasibility. No costs associated with the abandonment and acceptance of flows from existing wastewater treatment facilities are assumed due to the existing Township SALDO which indicates, where public sanitary sewer systems

exist within 1,000 feet of the development site, the deployment is required to connect to the available sanitary sewer system. Additionally, each of the NPDES permits for these respective facilities indicates the following within Paragraph D, under "Other Requirements," "If, after the issuance of this permit, DEP approves a municipal sewage facilities official plan or an amendment to an official plan under Act537 (Pennsylvania Sewage Facilities Act, the Act of January 24, 1966, P.L. 1535 as amended) in which sewage from the herein approved facilities will be treated and disposed of at other planned facilities, the permittee shall, upon notification from the municipality or DEP, provide for the conveyance of its sewage to the planned facilities, abandon use and decommission the herein approved facilities including the proper disposal of solids, and notify DEP accordingly."

5.6 HOLDING TANKS

Holding tanks are vessels designed and constructed to store sewage prior to ultimate disposal at another site. Pumper trucks are the preferred method of conveyance of holding tank wastes. Due to the high maintenance costs resulting from frequent pumping, holding tanks are not considered to be a viable long-term alternative for typical residential demands. However, they may be viable solutions for transient residential, commercial or industrial sites with minimal wastewater flow.

Installation of a holding tank may be required by the Township's certified SEO as a rehabilitative measure to repair an OLDS. In the event that rehabilitative or replacement measures are not feasible or do not prove effective, the Township may require the owner to apply for a permit to construct a holding tank. It is recommended that the Township should issue holding tank permits only as required for the temporary repair of malfunctioning OLDS. The issuance of holding tank permits shall continue in accordance with DEP regulations and requirements of the Township's Ordinances. The Township's existing Holding Tank Ordinance is provided in Appendix B.

5.7 SEWAGE MANAGEMENT PROGRAMS

To ensure the proper operation and maintenance of OLDS within the Township currently not proposed to be served by public sewer systems, Halifax Township will evaluate the implementation of an Ordinance governing municipal management of OLDS to provide management of the Township's OLDS systems. A draft Ordinance will be developed during the initial two (2) years of the Plan and a template for the draft Ordinance is included as Appendix H. The Ordinance will be completed and finalized by year 4 ensuing the adoption of the Act 537 Plan. This Ordinance intends to provide requirements for the permitting, inspection, operation, maintenance, and rehabilitation of OLDS within the Township. Select items from the Ordinance may include the following:

- No person shall install, construct, or request bid proposals for construction, or alter an individual sewage system or community sewage system or construct or request bid proposals for construction or install or occupy any building or structure for which an individual sewage system or community sewage system is to be installed without first obtaining a permit from the Township's Sewage Enforcement Officer, which permit shall indicate that the site and the plans and specifications of such system are in compliance with the provisions of the Clean Streams Law and the Pennsylvania Sewage Facilities Act and the regulations adopted pursuant to those Acts.

- Applicants for sewage permits may be required to notify the Sewage Enforcement Officer of the schedule for construction of the permitted On-lot Sewage Disposal System so that inspection(s) in addition to the final inspection required by the Sewage Facilities Act may be scheduled and performed by the Sewage Enforcement Officer.
- Any On-lot Sewage Disposal System may be inspected by an authorized agent at any reasonable time as of the effective date of the Ordinance. Such inspection may include a physical tour of the property, the taking of samples from surface water, wells, other groundwater sources, the sampling of the contents of the sewage disposal system itself and/or the introduction of a traceable substance into the interior plumbing of the structure served to ascertain the path and ultimate destination of wastewater generated in the structure.
- An authorized agent shall inspect systems known to be, or alleged to be, malfunctioning. Should said inspections reveal that the system is indeed malfunctioning; the authorized agent shall order action to be taken to correct the malfunction.
- Each person owning a building served by an On-lot Sewage Disposal System which contains a septic tank shall have the septic tank pumped by an authorized pumper/hauler within three years of the effective date of the Ordinance. Thereafter that person shall have the tank pumped at least once every five years or whenever an inspection reveals that the septic tank is filled with solids or scum in excess of 1/3 of the liquid depth of the tank. Justification, including sufficient evidence that the septic tank does not require pumping every five years, may be submitted to the SEO for review and approval. Receipts from the authorized pumper/hauler shall be submitted to the Township within the prescribed one and five year pumping periods.
- The required pumping frequency may be increased or decreased at the discretion of the Township if the septic tank is undersized, if solids buildup in the tank is above average, if the hydraulic load on the system increases significantly above average, if a garbage grinder is used in the building, if the system malfunctions or for other good cause shown.
- Within seven (7) days of notification by the Township that a malfunction has been identified, the property owner shall make application to the Sewage Enforcement Officer for a permit to repair or replace the malfunctioning system. Within 30 days of initial notification by the Township, construction of the permitted repair or replacement shall commence.

Please refer to Appendix H for a template Ordinance that will be considered for the preparation of Township's Draft On-Lot Sewage Management Ordinance.

5.7.1 Public Education

The Township will publically educate residents on the potential requirements of a proposed OLDS Management Ordinance and provide resources to the Township's residents as necessary.

The Township will publically advertise and make the Plan available at both the Township Office and through the Township's website, where the public will have an opportunity to review and comment on the Plan during a 30-day public comment period. The Plan is also proposed to be posted on the Township's website. Following adoption of the Plan by the Township, a copy will remain on file at the Township Office.

5.8 NON-STRUCTURAL/PLANNING ACTIVITIES

The existing Township rules, regulations and planning activities appear sufficient to sustain the

anticipated level of development in the Township as long as sufficient public sewage facilities are provided to handle anticipated growth and development as described in Chapter 4. In addition, the Township's development and adoption of the On-lot Sewage Management Program will recommend regular maintenance of on-lot systems in the Township thereby reducing the frequency of malfunctioning systems. It does not appear that new non-structural planning activities are needed at this time.

5.9 NO ACTION ALTERNATIVE

The no action alternative is the continued use of residential on-lot systems. The impacts of no action to address existing, short-term, and long-term sewage facilities include several considerations. Most of the discussion within this Plan has focused on the environmental and public health and safety concerns associated with the functioning of the existing on-lot sewage. The obvious impacts of no action to improve any adverse conditions encountered include degradation of public water supplies, disease, loss of recreational use of waterways, environmental hazards, such as fish kills, and other tragedies. Economically, the no action alternative could result in substantial fines and/or penalties and restrict or prohibit growth to the Township's potential growth and development areas. The No Action Alternative was briefly considered and rejected.

5.10 STRUCTURAL ALTERNATIVES FOR UN-SEWERED AREAS

Alternatives to provide public sewer service to the Matamoras, Route 147 & 225, Triangle & Lenker Estates, Tourist Park, and Fetterhoff Church Plan Areas are provided in the sections below. These Areas are all needs Areas due to the density of potential, suspected, and confirmed OLDS malfunctions, well contamination, severe soil limitations, and potential growth.

The twelve (12) focused alternatives for providing public sewer service to the areas defined above are presented below and are evaluated on the basis of cost-effectiveness, environmental soundness, and structural feasibility. Cost estimates for the alternatives are provided in the tables provided below. Maps of each of the structural alternatives which identified proposed facilities are presented in Appendix I. Cost estimates are presented for comparative purposes when applicable and are detailed in the tables provided. Present worth, annual debt service, annual O&M and total annual cost per EDU for each alternative are also presented in the tables provided. Annual debt service is estimated based on a 20-year, 2.063% term as provided by PENNVEST cap rate funding for Dauphin County, a 40-year, 3.25% term as provided by USDA, and a 20-year, 4.5% term as assumed by tax exempt (Bond) financing. Actual debt service will depend on the financing scheme chosen and the actual finances of the project when completed. Present worth is estimated based on a 20-year, 4.25% term.

Chapter 6 provides an analysis of the funding methods available to finance the alternatives evaluated in this section. It is important to note that the preparation of detailed funding scenarios, analyses of financial service charges, cash flow analyses based on anticipated revenues, a user service charge system, administrative costs, and personnel costs would require additional information beyond the scope of this Plan. Please refer to Chapter 6 for the funding analysis.

5.10.1 Alternatives for the Matamoras, Route 147 & 225, Triangle & Lenker Estates Areas

As mentioned in this Plan, the Matamoras, Route 147 & 225, Triangle & Lenker Estates Areas are

considered needs areas and are suggested for implementation of public sewer service. These Areas are considered to be of the highest need with the largest concentration of issues observed from the vicinity of Roadcap Lane to the vicinity of Matamoras Road. All alternatives evaluated for inclusion in this Plan have the flexibility for a future extension to serve this area if the need arises.

Alternative 1A provides public sewer service to the Matamoras, Route 147 & 225, and Triangle & Lenker Estates Areas. A combination of gravity sewer and low-pressure sewer is proposed to collect the wastewater and convey flows to existing HAWASA manholes. For this alternative it is anticipated that that 327 properties would require a grinder pump and low pressure sewer lateral to connect to the proposed sanitary sewers. However, a final determination of the number of grinder pumps needed requires additional topographical survey and design-level efforts beyond the scope of this Plan. All flows would then be conveyed via gravity to HAWASA's WWTP through the south interceptor.

Alternative 1B provides public sewer service to the Matamoras, Route 147 & 225, and Triangle & Lenker Estates Areas. A combination of gravity sewer and low-pressure sewer is proposed to collect the wastewater and convey it to new pump stations (Pump Station 1, Pump Station 2, and Pump Station 3). Pump Station 1 is proposed south of Camp Hebron on the east side of Route 147 with a force main conveying flows to a proposed 8-inch gravity sewer located in Route 147. Pump Station 2 is proposed west of Lauren Lane and east of Route 147 with a short force main conveying flows to a proposed 8-inch gravity sewer located in Route 147 and east of Elm Street. Pump Station 3 is proposed east of Route 147 and on the north side of Powells Valley Road with a force main conveying flows to an existing HAWASA manhole located in Route 147. It is anticipated that 27 properties would require a grinder pump and low pressure sewer lateral to connect to the proposed sanitary sewers in Alternative 1B. However, a final determination of the number of grinder pumps needed requires additional topographical survey and design-level efforts beyond the scope of this Plan. All flows would then be conveyed via gravity to HAWASA's WWTP through the south interceptor.

Alternative 1C modifies Alternative 1B by replacing the gravity sewers and Pump Stations 2 and 3 with grinder pumps and low pressure sewer conveyance lines. 127 additional grinder pumps are proposed in this alternative. Low pressure sewers are often a favored alternative to gravity sewers in areas of undulating topography or in areas that require minimum excavation such as state roads, and may result in lower construction costs due to shallow line depth compared to traditional gravity sewers.

Alternative 1D modifies Alternative 1C by replacing the grinder pumps and low pressure sewer conveyance lines with gravity lines in downward sloping areas. This alternative would reduce the amount of grinder pumps by 13.

Alternative 4A modifies Alternative 1A by introducing flows from the Lenker Estates Subdivision via force main and pump station assumed to be funded by the developer.

Alternative 4B modifies Alternative 1B by introducing flows from the Lenker Estates Subdivision via force main and pump station assumed to be funded by the developer.

Alternative 4C modifies Alternative 1C by introducing flows from the Lenker Estates Subdivision via force main and pump station assumed to be funded by the developer.

Alternative 4D modifies Alternative 1D by introducing flows from the Lenker Estates Subdivision via force main and pump station assumed to be funded by the developer.

Alternative 4E modifies Alternative 4D by conveying flows from the Matamoras and Triangle & Lenker Estates via a gravity sanitary sewer main to a proposed Pump Station 2 located at the existing site of the Lenker Estates WWTP. The costs are assumed to be shared between the Township or HAWASA and the developer in this Alternative based on planned EDUs conveyed to the proposed pump station. In this alternative the Township or HAWASA would assume the cost of approximately 57.45% of the pump station and force main for conveyance to a proposed gravity sewer located on Elm Street based on proposed EDUs.

5.10.2 Alternatives for the Tourist Park Area

The Tourist Park Area is considered a needs area due to the density of potential, suspected, and confirmed OLDS malfunctions, well contamination, severe soil limitations, and potential growth and is suggested for implementation of public sewer service. All alternatives evaluated for inclusion in this Plan have the flexibility for a future extension to serve this area if the need arises.

Alternative 2A provides public sewer service to the Tourist Park Area. A low-pressure sewer is proposed to collect the wastewater and convey flows to an existing HAWASA manhole on North River Road (Route 147). For this alternative, it is anticipated that 111 properties would require a grinder pump and low pressure sewer lateral to connect to the proposed sanitary sewers. However, a final determination of the number of grinder pumps needed requires additional topographical survey and design-level efforts beyond the scope of this Plan. All flows would then be conveyed via gravity to HAWASA's WWTP through the north interceptor to the Main Pumping Station.

Alternative 2B modifies Alternative 2A by utilizing a combination of gravity sewer and low-pressure sewer to collect the wastewater and convey it to a new pump station (Pump Station 1). Pump Station 1 is proposed south of Grand View Drive on the west side of Route 147 with a force main conveying flows to an existing HAWASA manhole located in Route 147. It is anticipated that the amount of properties that would require a grinder pump and low pressure sewer lateral would reduce by 33 with this alternative. A final determination of the number of grinder pumps needed requires additional topographical survey and design-level efforts beyond the scope of this Plan. All flows would then be conveyed via gravity to HAWASA's WWTP through the north interceptor to the Main Pumping Station.

5.10.3 Alternative for the Fetterhoff Church Area

The Fetterhoff Church Area is considered a needs area due to the density of potential, suspected, and confirmed OLDS malfunctions, well contamination, severe soil limitations, and potential growth and is suggested for implementation of public sewer service. All alternatives evaluated for inclusion in this Plan have the flexibility for a future extension to serve this area if the need arises.

Alternative 3 provides public sewer service to the Fetterhoff Church Area. A combination of gravity sewer and low-pressure sewer is proposed to collect the wastewater and convey it to a new pump station (Pump Station 1). Pump Station 1 is proposed next to Armstrong Creek and north of Armstrong Valley Road (Route 225) with a force main conveying flows to an existing HAWASA manhole located in Route 225. It is anticipated that 10 properties would require a grinder pump and low pressure sewer lateral to connect to the proposed sanitary sewers in Alternative 1A. However, a final determination of the number of grinder pumps needed requires additional

topographical survey and design-level efforts beyond the scope of this Plan. All flows would then be conveyed via gravity to HAWASA's WWTP through the north interceptor to the Main Pumping Station.

5.10.4 Alternative for Future Flow Capacity

These alternatives do not consider any growth or expansion that the Township may experience in the future, but future flow capacity can be addressed during the design phase of these alternatives. It is unknown at this time whether the HAWASA WWTP upgrade will consider future growth and expansion that the Township may experience beyond the recommended alternatives presented in this Plan.

5.10.5 No Action Alternative

The No Action structural alternative represents the status quo. It proposes the continued repair and construction of on-lot facilities in compliance with Chapter 72 Standards and under the guidance and permitting of the Township's SEO. In some cases these systems will not be feasible based on the site limitations, including unsuitable soil, slope, and space restrictions.

This option represents the least upset to the community and status quo; however, it does not address the issues raised in the sanitary survey – those of greywater discharges, malfunctioning systems, and fecal contamination of wells in the Plan Areas. Greywater discharge malfunctions could be alleviated by connecting them to existing on-lot treatment systems, however it is likely that the systems will fail under the increased loading.

Costs for repair and replacement of systems will vary greatly from property to property; therefore, a realistic cost estimate for comparison purposes could not be prepared for this alternative.

5.10.6 Comparative Cost Estimates of Study Area Structural Alternatives

The following assumptions were used to develop the cost estimates presented in this Plan:

1. LPS Main - Aggregate Backfill 25% of total length.
2. LPS Main - Suitable Backfill 75% of total length.
3. Length of LPL connections: 20' per connection; Aggregate Backfill 50% of total length and Suitable Backfill 50% of total length.
4. Assume 1 ARV per 5,280 feet.
5. LPS cleanout required every 500-feet
6. Depth of sewer is 10 - 12-feet
7. Depth of manholes are 11-feet
8. Manhole is required every 350-feet
9. Service lateral connection includes 20-feet of 6" PVC pipe, wye, and cleanout per connection
10. Municipal Paving is assumed to be 3" 25mm base and 1.5" 9.5mm wearing trench restoration.
11. PennDOT Paving is assumed to be 5" 37.5mm base and 2" 12.5mm wearing mill and overlay wearing (approximately one-lane width).
12. Pump station estimates do not include control building, acquisition of land.
13. Pump station does not include emergency generator.

14. Estimates do not include permitting fees.

Using the assumptions outlined above, several cost opinions were prepared to use as a basis to compare the cost effectiveness of each structural alternative. Where applicable, a direct cost comparison of alternatives has been provided. Annual costs per EDU are based on these project costs and an assumed loan on the full project cost. It should be noted that the cost estimates prepared in this Act 537 Plan are first level cost estimates appropriate for planning level detail and should not be considered as final costs for financing purposes. The estimated tapping fees (based on the current HAWASA tapping fees and estimated EDUs) have been subtracted from the estimated project costs for the financial alternative comparisons.

Tables 5-1 through 5-12 present the cost estimates for the structural alternatives and Tables 5-13 through 5-21 provides a summarization of the estimates. Tables 5-13 through 5-21 include the estimated annual cost and payment of annual debt service for each alternative. As a means of comparison, the Halifax Area Water and Sewer Authority currently charges residential users $115 per quarter (per EDU) and commercial users $140 per quarter (per EDU).

The structural alternatives providing public sewer service to the Matamoras, Route 147 & 225, Triangle & Lenker Estates Areas were found to be the most costly of all the structural alternatives evaluated in this Plan, but Alternative 3 (Fetterhoff Church Area) resulted in the greatest monthly cost per user based on projected EDUs. The estimated monthly cost per user for Alternative 3 is approximately $405/month (Based on 100% PENNVEST Financing). Alternative 3 was also found to be the least expensive structural alternative evaluated for this Plan.

Alternative 1B was estimated to be the most costly out of all the structural alternatives and resulted in the greatest annual cost per user based on projected EDUs for the Matamoras, Route 147 & 225, Triangle & Lenker Estates Areas. Estimated monthly cost per user for construction of Alternative 1B is approximately $168/month (Based 100% PENNVEST Financing). Alternative 1A was estimated to be the least expensive structural alternative serving the Matamoras, Route 147 & 225, Triangle & Lenker Estates Areas with an estimated monthly cost per existing user for construction of approximately $126/month (Based 100% PENNVEST Financing). Alternative 4A was estimated to be the structural alternative with the lowest monthly cost per user in the Matamoras, Route 147 & 225, Triangle & Lenker Estates Areas and in all planning areas. The estimated monthly cost per user for Alternative 4A is approximately $82/month (Based 100% PENNVEST Financing and assuming connection of the Lenker Estates subdivision).

Alternative 2B was estimated to be the most costly out of all the structural alternatives resulted in the greatest annual cost per user based on projected EDUs for the Tourist Park Area. The estimated monthly cost per use for construction of Alternative 2B is approximately $159/month (Based on 100% PENNVEST Financing).

All estimated monthly costs mentioned above for comparison purposes do not include any grant money or financial contributions from developers.

Table 5-1 Cost Opinion for Matamoras, Route 147 & 225, and Triangle & Lenker Estates Areas Alternative 1A

OPINION OF PROBABLE PROJECT COST
FOR
HALIFAX TOWNSHIP ACT 537 SEWAGE FACILITIES PLAN
SEWER DISTRICT NO. 1 - MATAMORAS, TRIANGLE & LENKER ESTATES, ROUTES 147 & 225
ALTERNATIVE 1A: COMBINATION OF GRAVITY SEWER AND LOW PRESSURE SEWER
SEWER EXTENSION

ITEM NO.	DESCRIPTION	EST. QUANTITY	UNIT	UNIT PRICE	EXTENSION
GENERAL					
1	MOBILIZATION @ 5%	1	L.S.	$ 311,200.00	$ 311,200.00
2	TRAFFIC MAINTENANCE & PROTECTION @ 2.5%	1	L.S.	$ 155,600.00	$ 155,600.00
3	EROSION AND SEDIMENTATION CONTROL @ 2.5%	1	L.S.	$ 155,600.00	$ 155,600.00
LOW PRESSURE SEWER					
4	2" HDPE LOW PRESSURE SEWER - AGGREGATE BACKFILL	6,305	L.F.	$ 60.00	$ 378,300.00
5	2" HDPE LOW PRESSURE SEWER - SUITABLE BACKFILL	20,495	L.F.	$ 55.00	$ 1,127,225.00
6	1.25" HDPE LOW PRESSURE LATERAL - AGGREGATE BACKFILL	3,270	L.F.	$ 50.00	$ 163,500.00
7	1.25" HDPE LOW PRESSURE LATERAL - SUITABLE BACKFILL	3,270	L.F.	$ 40.00	$ 130,800.00
8	LOW PRESSURE LATERAL CONNECTION	327	EA.	$ 1,500.00	$ 490,500.00
9	AIR/VACUUM RELEASE VALVES	3	EA.	$ 7,750.00	$ 23,250.00
10	INLINE CLEANOUT	54	EA.	$ 2,700.00	$ 145,800.00
11	TERMINAL CLEANOUT	10	EA.	$ 2,500.00	$ 25,000.00
12	GRINDER PUMP - SIMPLEX	327	EA.	$ 6,500.00	$ 2,125,500.00
13	CONNECTION TO EXISTING MANHOLE	2	EA.	$ 1,250.00	$ 2,500.00
GRAVITY SEWER					
14	8" PVC MAIN - AGGREGATE BACKFILL	2,372	L.F.	$ 160.00	$ 379,520.00
15	8" PVC MAIN - SUITABLE BACKFILL	593	L.F.	$ 120.00	$ 71,160.00
16	8" X 6" WYE	20	L.F.	$ 250.00	$ 5,000.00
17	6" SERVICE LATERAL - AGGREGATE BACKFILL	200	L.F.	$ 75.00	$ 15,000.00
18	6" SERVICE LATERAL - SUITABLE BACKFILL	200	L.F.	$ 55.00	$ 11,000.00
19	6" SERVICE LATERAL CLEANOUT - SUITABLE BACKFILL	20	L.F.	$ 525.00	$ 10,500.00
20	CONNECTION TO EXISTING MANHOLE	2	EA.	$ 1,350.00	$ 2,700.00
21	CLAY DIKE	4	EA.	$ 350.00	$ 1,400.00
MANHOLE					
22	MANHOLE - 4 FT DIAMETER	12	EA.	$ 5,000.00	$ 60,000.00
23	MANHOLE FRAME AND COVER	12	EA.	$ 500.00	$ 6,000.00
24	MANHOLE PROTECTIVE LINING	4	EA.	$ 2,500.00	$ 10,000.00
CROSSING					
25	PENNDOT CROSSING	2	L.S.	$ 30,000.00	$ 60,000.00
26	STREAM CROSSING	6	L.S.	$ 9,000.00	$ 54,000.00
PUMP STATION					
27	PUMP STATION	0	L.S.	$ 300,000.00	$ -
FORCE MAIN					
28	4" HDPE FORCE MAIN - AGGREGATE BACKFILL	0	L.F.	$ 75.00	$ -
29	4" HDPE FORCE MAIN - SUITABLE BACKFILL	0	L.F.	$ 70.00	$ -
SURFACING					
30	TEMPORARY PAVING	12,147	L.F.	$ 10.00	$ 121,470.00
31	PENNDOT PAVING RESTORATION (BASE)	5,777	L.F.	$ 35.00	$ 202,202.19
32	PENNDOT PAVING RESTORATION (MILL AND OVERLAY)	6,419	S.Y.	$ 20.00	$ 128,382.34
33	MUNICIPAL PAVING RESTORATION	6,370	L.F.	$ 55.00	$ 350,338.70
34	VEGETATIVE RESTORATION	24,558	L.F.	$ 5.00	$ 122,790.00
				ESTIMATED CONSTRUCTION COSTS	$ 6,846,300.00
				CONSTRUCTION CONTINGENCY @ 15%	$ 1,027,000.00
				ENGINEERING, ADMIN, & LEGAL FEES @ 25%	$ 1,968,400.00
				TOTAL ESTIMATED PROJECT COSTS	$ 9,841,700.00
				ESTIMATED NUMBER OF EDUs TO BE SERVED	347
				ESTIMATED CAPITAL COST PER EDU	$ 28,400.00

Table 5-2 Cost Opinion for Matamoras, Route 147 & 225, and Triangle & Lenker Estates Areas Alternative 1B

OPINION OF PROBABLE PROJECT COST
FOR
HALIFAX TOWNSHIP ACT 537 SEWAGE FACILITIES PLAN
SEWER DISTRICT NO. 1 - MATAMORAS, TRIANGLE & LENKER ESTATES, ROUTES 147 & 225
ALTERNATIVE 1B: COMBINATION OF PUMP STATION AND FORCE MAIN, GRAVITY SEWER, AND LOW PRESSURE SEWER SEWER EXTENSION

ITEM NO.	DESCRIPTION	EST. QUANTITY	UNIT	UNIT PRICE	EXTENSION
GENERAL					
1	MOBILIZATION @ 5%	1	L.S.	$ 465,400.00	$ 465,400.00
2	TRAFFIC MAINTENANCE & PROTECTION @ 2.5%	1	L.S.	$ 232,700.00	$ 232,700.00
3	EROSION AND SEDIMENTATION CONTROL @ 2.5%	1	L.S.	$ 232,700.00	$ 232,700.00
LOW PRESSURE SEWER					
4	2" HDPE LOW PRESSURE SEWER - AGGREGATE BACKFILL	684	L.F.	$ 60.00	$ 41,025.00
5	2" HDPE LOW PRESSURE SEWER - SUITABLE BACKFILL	3,151	L.F.	$ 55.00	$ 173,318.75
6	1.25" HDPE LOW PRESSURE LATERAL - AGGREGATE BACKFILL	270	L.F.	$ 50.00	$ 13,500.00
7	1.25" HDPE LOW PRESSURE LATERAL - SUITABLE BACKFILL	270	L.F.	$ 40.00	$ 10,800.00
8	LOW PRESSURE LATERAL CONNECTION	27	EA.	$ 1,500.00	$ 40,500.00
9	AIR/VACUUM RELEASE VALVES	1	EA.	$ 7,750.00	$ 7,750.00
10	INLINE CLEANOUT	8	EA.	$ 2,700.00	$ 21,600.00
11	TERMINAL CLEANOUT	3	EA.	$ 2,500.00	$ 7,500.00
12	GRINDER PUMP - SIMPLEX	27	EA.	$ 6,500.00	$ 175,500.00
13	CONNECTION TO EXISTING MANHOLE	0	EA.	$ 1,250.00	$ -
GRAVITY SEWER					
14	8" PVC MAIN - AGGREGATE BACKFILL	20,112	L.F.	$ 160.00	$ 3,217,920.00
15	8" PVC MAIN - SUITABLE BACKFILL	6,318	L.F.	$ 120.00	$ 758,160.00
16	8" X 6" WYE	320	L.F.	$ 250.00	$ 80,000.00
17	6" SERVICE LATERAL - AGGREGATE BACKFILL	3,200	L.F.	$ 75.00	$ 240,000.00
18	6" SERVICE LATERAL - SUITABLE BACKFILL	3,200	L.F.	$ 55.00	$ 176,000.00
19	6" SERVICE LATERAL CLEANOUT - SUITABLE BACKFILL	320	L.F.	$ 525.00	$ 168,000.00
20	CONNECTION TO EXISTING MANHOLE	4	EA.	$ 1,350.00	$ 5,400.00
21	CLAY DIKE	39	EA.	$ 350.00	$ 13,650.00
MANHOLE					
22	MANHOLE - 4 FT DIAMETER	95	EA.	$ 5,000.00	$ 475,000.00
23	MANHOLE FRAME AND COVER	95	EA.	$ 500.00	$ 47,500.00
24	MANHOLE PROTECTIVE LINING	4	EA.	$ 2,500.00	$ 10,000.00
CROSSING					
25	PENNDOT CROSSING	2	L.S.	$ 30,000.00	$ 60,000.00
26	STREAM CROSSING	7	L.S.	$ 9,000.00	$ 63,000.00
PUMP STATION					
27	PUMP STATION	3	L.S.	$ 300,000.00	$ 900,000.00
FORCE MAIN					
28	4" HDPE FORCE MAIN - AGGREGATE BACKFILL	5,444	L.F.	$ 75.00	$ 408,300.00
29	4" HDPE FORCE MAIN - SUITABLE BACKFILL	2,106	L.F.	$ 70.00	$ 147,420.00
SURFACING					
30	TEMPORARY PAVING	29,710	L.F.	$ 10.00	$ 297,097.50
31	PENNDOT PAVING RESTORATION (BASE)	17,271	L.F.	$ 35.00	$ 604,475.19
32	PENNDOT PAVING RESTORATION (MILL AND OVERLAY)	19,190	S.Y.	$ 20.00	$ 383,793.77
33	MUNICIPAL PAVING RESTORATION	12,439	L.F.	$ 55.00	$ 684,146.67
34	VEGETATIVE RESTORATION	15,045	L.F.	$ 5.00	$ 75,226.25

ESTIMATED CONSTRUCTION COSTS	$	10,237,400.00
CONSTRUCTION CONTINGENCY @ 15%	$	1,535,700.00
ENGINEERING, ADMIN, & LEGAL FEES @ 25%	$	2,943,300.00
TOTAL ESTIMATED PROJECT COSTS	$	14,716,400.00
ESTIMATED NUMBER OF EDUs TO BE SERVED		347
ESTIMATED CAPITAL COST PER EDU	$	42,500.00

Table 5-3 Cost Opinion for Matamoras, Route 147 & 225, and Triangle & Lenker Estates Areas Alternative 1C

OPINION OF PROBABLE PROJECT COST
FOR
HALIFAX TOWNSHIP ACT 537 SEWAGE FACILITIES PLAN
SEWER DISTRICT NO. 1 - MATAMORAS, TRIANGLE & LENKER ESTATES, ROUTES 147 & 225
ALTERNATIVE 1C: COMBINATION OF PUMP STATION AND FORCE MAIN, GRAVITY SEWER, AND LOW PRESSURE SEWER SEWER EXTENSION

ITEM NO.	DESCRIPTION	EST. QUANTITY	UNIT	UNIT PRICE	EXTENSION
GENERAL					
1	MOBILIZATION @ 5%	1	L.S.	$ 394,800.00	$ 394,800.00
2	TRAFFIC MAINTENANCE & PROTECTION @ 2.5%	1	L.S.	$ 197,400.00	$ 197,400.00
3	EROSION AND SEDIMENTATION CONTROL @ 2.5%	1	L.S.	$ 197,400.00	$ 197,400.00
LOW PRESSURE SEWER					
4	2" HDPE LOW PRESSURE SEWER - AGGREGATE BACKFILL	2,494	L.F.	$ 60.00	$ 149,625.00
5	2" HDPE LOW PRESSURE SEWER - SUITABLE BACKFILL	9,321	L.F.	$ 55.00	$ 512,668.75
6	1.25" HDPE LOW PRESSURE LATERAL - AGGREGATE BACKFILL	1,540	L.F.	$ 50.00	$ 77,000.00
7	1.25" HDPE LOW PRESSURE LATERAL - SUITABLE BACKFILL	1,540	L.F.	$ 40.00	$ 61,600.00
8	LOW PRESSURE LATERAL CONNECTION	154	EA.	$ 1,500.00	$ 231,000.00
9	AIR/VACUUM RELEASE VALVES	2	EA.	$ 7,750.00	$ 15,500.00
10	INLINE CLEANOUT	24	EA.	$ 2,700.00	$ 64,800.00
11	TERMINAL CLEANOUT	4	EA.	$ 2,500.00	$ 10,000.00
12	GRINDER PUMP - SIMPLEX	154	EA.	$ 6,500.00	$ 1,001,000.00
13	CONNECTION TO EXISTING MANHOLE	2	EA.	$ 1,250.00	$ 2,500.00
GRAVITY SEWER					
14	8" PVC MAIN - AGGREGATE BACKFILL	12,160	L.F.	$ 160.00	$ 1,945,600.00
15	8" PVC MAIN - SUITABLE BACKFILL	3,585	L.F.	$ 120.00	$ 430,200.00
16	8" X 6" WYE	193	L.F.	$ 250.00	$ 48,250.00
17	6" SERVICE LATERAL - AGGREGATE BACKFILL	1,930	L.F.	$ 75.00	$ 144,750.00
18	6" SERVICE LATERAL - SUITABLE BACKFILL	1,930	L.F.	$ 55.00	$ 106,150.00
19	6" SERVICE LATERAL CLEANOUT - SUITABLE BACKFILL	193	L.F.	$ 525.00	$ 101,325.00
20	CONNECTION TO EXISTING MANHOLE	2	EA.	$ 1,350.00	$ 2,700.00
21	CLAY DIKE	24	EA.	$ 350.00	$ 8,400.00
MANHOLE					
22	MANHOLE - 4 FT DIAMETER	55	EA.	$ 5,000.00	$ 275,000.00
23	MANHOLE FRAME AND COVER	55	EA.	$ 500.00	$ 27,500.00
24	MANHOLE PROTECTIVE LINING	4	EA.	$ 2,500.00	$ 10,000.00
CROSSING					
25	PENNDOT CROSSING	2	L.S.	$ 30,000.00	$ 60,000.00
26	STREAM CROSSING	7	L.S.	$ 9,000.00	$ 63,000.00
PUMP STATION					
27	PUMP STATION	1	L.S.	$ 300,000.00	$ 300,000.00
FORCE MAIN					
28	4" HDPE FORCE MAIN - AGGREGATE BACKFILL	5,968	L.F.	$ 75.00	$ 447,600.00
29	4" HDPE FORCE MAIN - SUITABLE BACKFILL	1,612	L.F.	$ 70.00	$ 112,840.00
SURFACING					
30	TEMPORARY PAVING	24,092	L.F.	$ 10.00	$ 240,917.50
31	PENNDOT PAVING RESTORATION (BASE)	13,236	L.F.	$ 35.00	$ 463,268.81
32	PENNDOT PAVING RESTORATION (MILL AND OVERLAY)	14,707	S.Y.	$ 20.00	$ 294,138.93
33	MUNICIPAL PAVING RESTORATION	10,855	L.F.	$ 55.00	$ 597,052.40
34	VEGETATIVE RESTORATION	17,988	L.F.	$ 5.00	$ 89,941.25
				ESTIMATED CONSTRUCTION COSTS	$ 8,684,000.00
				CONSTRUCTION CONTINGENCY @ 15%	$ 1,302,600.00
				ENGINEERING, ADMIN, & LEGAL FEES @ 25%	$ 2,496,700.00
				TOTAL ESTIMATED PROJECT COSTS	$ 12,483,300.00
				ESTIMATED NUMBER OF EDUs TO BE SERVED	347
				ESTIMATED CAPITAL COST PER EDU	$ 36,000.00

Table 5-4 Cost Opinion for Matamoras, Route 147 & 225, and Triangle & Lenker Estates Areas Alternative 1D

OPINION OF PROBABLE PROJECT COST
FOR
HALIFAX TOWNSHIP ACT 537 SEWAGE FACILITIES PLAN
SEWER DISTRICT NO. 1 - MATAMORAS, TRIANGLE & LENKER ESTATES, ROUTES 147 & 225
ALTERNATIVE 1D: COMBINATION OF PUMP STATION AND FORCE MAIN, GRAVITY SEWER, AND LOW PRESSURE SEWER SEWER EXTENSION

ITEM NO.	DESCRIPTION	EST. QUANTITY	UNIT	UNIT PRICE	EXTENSION
GENERAL					
1	MOBILIZATION @ 5%	1	L.S.	$ 403,100.00	$ 403,100.00
2	TRAFFIC MAINTENANCE & PROTECTION @ 2.5%	1	L.S.	$ 201,600.00	$ 201,600.00
3	EROSION AND SEDIMENTATION CONTROL @ 2.5%	1	L.S.	$ 201,600.00	$ 201,600.00
LOW PRESSURE SEWER					
4	2" HDPE LOW PRESSURE SEWER - AGGREGATE BACKFILL	2,039	L.F.	$ 60.00	$ 122,325.00
5	2" HDPE LOW PRESSURE SEWER - SUITABLE BACKFILL	7,956	L.F.	$ 55.00	$ 437,593.75
6	1.25" HDPE LOW PRESSURE LATERAL - AGGREGATE BACKFILL	1,410	L.F.	$ 50.00	$ 70,500.00
7	1.25" HDPE LOW PRESSURE LATERAL - SUITABLE BACKFILL	1,410	L.F.	$ 40.00	$ 56,400.00
8	LOW PRESSURE LATERAL CONNECTION	141	EA.	$ 1,500.00	$ 211,500.00
9	AIR/VACUUM RELEASE VALVES	1	EA.	$ 7,750.00	$ 7,750.00
10	INLINE CLEANOUT	20	EA.	$ 2,700.00	$ 54,000.00
11	TERMINAL CLEANOUT	4	EA.	$ 2,500.00	$ 10,000.00
12	GRINDER PUMP - SIMPLEX	141	EA.	$ 6,500.00	$ 916,500.00
13	CONNECTION TO EXISTING MANHOLE	0	EA.	$ 1,250.00	$ -
GRAVITY SEWER					
14	8" PVC MAIN - AGGREGATE BACKFILL	13,544	L.F.	$ 160.00	$ 2,167,040.00
15	8" PVC MAIN - SUITABLE BACKFILL	4,021	L.F.	$ 120.00	$ 482,520.00
16	8" X 6" WYE	206	L.F.	$ 250.00	$ 51,500.00
17	6" SERVICE LATERAL - AGGREGATE BACKFILL	2,060	L.F.	$ 75.00	$ 154,500.00
18	6" SERVICE LATERAL - SUITABLE BACKFILL	2,060	L.F.	$ 55.00	$ 113,300.00
19	6" SERVICE LATERAL CLEANOUT - SUITABLE BACKFILL	206	L.F.	$ 525.00	$ 108,150.00
20	CONNECTION TO EXISTING MANHOLE	4	EA.	$ 1,350.00	$ 5,400.00
21	CLAY DIKE	29	EA.	$ 350.00	$ 10,150.00
MANHOLE					
22	MANHOLE - 4 FT DIAMETER	63	EA.	$ 5,000.00	$ 315,000.00
23	MANHOLE FRAME AND COVER	63	EA.	$ 500.00	$ 31,500.00
24	MANHOLE PROTECTIVE LINING	4	EA.	$ 2,500.00	$ 10,000.00
CROSSING					
25	PENNDOT CROSSING	2	L.S.	$ 30,000.00	$ 60,000.00
26	STREAM CROSSING	7	L.S.	$ 9,000.00	$ 63,000.00
PUMP STATION					
27	PUMP STATION	1	L.S.	$ 300,000.00	$ 300,000.00
FORCE MAIN					
28	4" HDPE FORCE MAIN - AGGREGATE BACKFILL	5,968	L.F.	$ 75.00	$ 447,600.00
29	4" HDPE FORCE MAIN - SUITABLE BACKFILL	1,612	L.F.	$ 70.00	$ 112,840.00
SURFACING					
30	TEMPORARY PAVING	25,021	L.F.	$ 10.00	$ 250,207.50
31	PENNDOT PAVING RESTORATION (BASE)	13,785	L.F.	$ 35.00	$ 482,463.41
32	PENNDOT PAVING RESTORATION (MILL AND OVERLAY)	15,316	S.Y.	$ 20.00	$ 306,325.97
33	MUNICIPAL PAVING RESTORATION	11,236	L.F.	$ 55.00	$ 617,984.46
34	VEGETATIVE RESTORATION	17,059	L.F.	$ 5.00	$ 85,296.25
				ESTIMATED CONSTRUCTION COSTS	$ 8,867,700.00
				CONSTRUCTION CONTINGENCY @ 15%	$ 1,330,200.00
				ENGINEERING, ADMIN, & LEGAL FEES @ 25%	$ 2,549,500.00
				TOTAL ESTIMATED PROJECT COSTS	$ 12,747,400.00
				ESTIMATED NUMBER OF EDUs TO BE SERVED	347
				ESTIMATED CAPITAL COST PER EDU	$ 36,800.00

Table 5-5 Cost Opinion for Tourist Park Area Alternative 2A

OPINION OF PROBABLE PROJECT COST
FOR
HALIFAX TOWNSHIP ACT 537 SEWAGE FACILITIES PLAN
SEWER DISTRICT NO. 2 - TOUREST PARK AND ALEX ACRES MOBILE HOME PARK
ALTERNATIVE 2A
LOW PRESSURE SEWER
SEWER EXTENSION

ITEM NO.	DESCRIPTION	EST. QUANTITY	UNIT	UNIT PRICE	EXTENSION
GENERAL					
1	MOBILIZATION @ 5%	1	L.S.	$ 109,300.00	$ 109,300.00
2	TRAFFIC MAINTENANCE & PROTECTION @ 2.5%	1	L.S.	$ 54,700.00	$ 54,700.00
3	EROSION AND SEDIMENTATION CONTROL @ 2.5%	1	L.S.	$ 54,700.00	$ 54,700.00
LOW PRESSURE SEWER					
4	2" HDPE LOW PRESSURE SEWER - AGGREGATE BACKFILL	3,179	L.F.	$ 60.00	$ 190,725.00
5	2" HDPE LOW PRESSURE SEWER - SUITABLE BACKFILL	9,536	L.F.	$ 55.00	$ 524,493.75
6	1.25" HDPE LOW PRESSURE LATERAL - AGGREGATE BACKFILL	1,110	L.F.	$ 50.00	$ 55,500.00
7	1.25" HDPE LOW PRESSURE LATERAL - SUITABLE BACKFILL	1,110	L.F.	$ 40.00	$ 44,400.00
8	LOW PRESSURE LATERAL CONNECTION	111	EA.	$ 1,500.00	$ 166,500.00
9	AIR/VACUUM RELEASE VALVES	1	EA.	$ 7,750.00	$ 7,750.00
10	INLINE CLEANOUT	26	EA.	$ 2,700.00	$ 70,200.00
11	TERMINAL CLEANOUT	2	EA.	$ 2,500.00	$ 5,000.00
12	GRINDER PUMP - SIMPLEX	111	EA.	$ 6,500.00	$ 721,500.00
13	CONNECTION TO EXISTING MANHOLE	1	EA.	$ 1,250.00	$ 1,250.00
CROSSING					
14	PENNDOT CROSSING	1	L.S.	$ 30,000.00	$ 30,000.00
15	STREAM CROSSING	3	L.S.	$ 9,000.00	$ 27,000.00
SURFACING					
16	TEMPORARY PAVING	4,289	L.F.	$ 10.00	$ 42,887.50
17	PENNDOT PAVING RESTORATION (BASE)	3,710	L.F.	$ 35.00	$ 129,859.91
18	PENNDOT PAVING RESTORATION (MILL AND OVERLAY)	4,123	S.Y.	$ 20.00	$ 82,450.74
19	MUNICIPAL PAVING RESTORATION	578	L.F.	$ 55.00	$ 31,815.68
20	VEGETATIVE RESTORATION	10,646	L.F.	$ 5.00	$ 53,231.25
				ESTIMATED CONSTRUCTION COSTS	$ 2,403,300.00
				CONSTRUCTION CONTINGENCY @ 15%	$ 360,500.00
				ENGINEERING, ADMIN, & LEGAL FEES @ 25%	$ 691,000.00
				TOTAL ESTIMATED PROJECT COSTS	$ 3,454,800.00
				ESTIMATED NUMBER OF EDUs TO BE SERVED	125
				ESTIMATED CAPITAL COST PER EDU	$ 27,700.00

Table 5-6 Cost Opinion for Tourist Park Area Alternative 2B

OPINION OF PROBABLE PROJECT COST
FOR
HALIFAX TOWNSHIP ACT 537 SEWAGE FACILITIES PLAN
SEWER DISTRICT NO. 2 - TOUREST PARK AND ALEX ACRES MOBILE HOME PARK
ALTERNATIVE 2B
COMBINATION OF PUMP STATION AND FORCE MAIN, GRAVITY SEWER, AND LOW PRESSURE SEWER
SEWER EXTENSION

ITEM NO.	DESCRIPTION		UNIT	UNIT PRICE	EXTENSION
GENERAL					
1	MOBILIZATION @ 5%	1	L.S.	$ 147,600.00	$ 147,600.00
2	TRAFFIC MAINTENANCE & PROTECTION @ 2.5%	1	L.S.	$ 73,800.00	$ 73,800.00
3	EROSION AND SEDIMENTATION CONTROL @ 2.5%	1	L.S.	$ 73,800.00	$ 73,800.00
LOW PRESSURE SEWER					
4	2" HDPE LOW PRESSURE SEWER - AGGREGATE BACKFILL	1,461	L.F.	$ 60.00	$ 87,675.00
5	2" HDPE LOW PRESSURE SEWER - SUITABLE BACKFILL	4,384	L.F.	$ 55.00	$ 241,106.25
6	1.25" HDPE LOW PRESSURE LATERAL - AGGREGATE BACKFILL	780	L.F.	$ 50.00	$ 39,000.00
7	1.25" HDPE LOW PRESSURE LATERAL - SUITABLE BACKFILL	780	L.F.	$ 40.00	$ 31,200.00
8	LOW PRESSURE LATERAL CONNECTION	78	EA.	$ 1,500.00	$ 117,000.00
9	AIR/VACUUM RELEASE VALVES	1	EA.	$ 7,750.00	$ 7,750.00
10	INLINE CLEANOUT	12	EA.	$ 2,700.00	$ 32,400.00
11	TERMINAL CLEANOUT	2	EA.	$ 2,500.00	$ 5,000.00
12	GRINDER PUMP - SIMPLEX	78	EA.	$ 6,500.00	$ 507,000.00
13	CONNECTION TO EXISTING MANHOLE	0	EA.	$ 1,250.00	$ -
GRAVITY SEWER					
14	8" PVC MAIN - AGGREGATE BACKFILL	2,440	L.F.	$ 160.00	$ 390,400.00
15	8" PVC MAIN - SUITABLE BACKFILL	740	L.F.	$ 120.00	$ 88,800.00
16	8" X 6" WYE	33	L.F.	$ 250.00	$ 8,250.00
17	6" SERVICE LATERAL - AGGREGATE BACKFILL	330	L.F.	$ 75.00	$ 24,750.00
18	6" SERVICE LATERAL - SUITABLE BACKFILL	330	L.F.	$ 55.00	$ 18,150.00
19	6" SERVICE LATERAL CLEANOUT - SUITABLE BACKFILL	33	L.F.	$ 525.00	$ 17,325.00
20	CONNECTION TO EXISTING MANHOLE	1	EA.	$ 1,350.00	$ 1,350.00
21	CLAY DIKE	0	EA.	$ 350.00	$ -
MANHOLE					
22	MANHOLE - 4 FT DIAMETER	11	EA.	$ 5,000.00	$ 55,000.00
23	MANHOLE FRAME AND COVER	11	EA.	$ 500.00	$ 5,500.00
24	MANHOLE PROTECTIVE LINING	1	EA.	$ 2,500.00	$ 2,500.00
CROSSING					
25	PENNDOT CROSSING	1	L.S.	$ 30,000.00	$ 30,000.00
26	STREAM CROSSING	3	L.S.	$ 9,000.00	$ 27,000.00
PUMP STATION					
27	PUMP STATION	1	L.S.	$ 300,000.00	$ 300,000.00
FORCE MAIN					
28	4" HDPE FORCE MAIN - AGGREGATE BACKFILL	3,056	L.F.	$ 75.00	$ 229,200.00
29	4" HDPE FORCE MAIN - SUITABLE BACKFILL	1,509	L.F.	$ 70.00	$ 105,630.00
SURFACING					
30	TEMPORARY PAVING	8,067	L.F.	$ 10.00	$ 80,672.50
31	PENNDOT PAVING RESTORATION (BASE)	6,979	L.F.	$ 35.00	$ 244,269.86
32	PENNDOT PAVING RESTORATION (MILL AND OVERLAY)	7,755	S.Y.	$ 20.00	$ 155,091.97
33	MUNICIPAL PAVING RESTORATION	1,088	L.F.	$ 55.00	$ 59,846.12
34	VEGETATIVE RESTORATION	7,743	L.F.	$ 5.00	$ 38,713.75
				ESTIMATED CONSTRUCTION COSTS	$ 3,245,800.00
				CONSTRUCTION CONTINGENCY @ 15%	$ 486,900.00
				ENGINEERING, ADMIN, & LEGAL FEES @ 25%	$ 933,200.00
				TOTAL ESTIMATED PROJECT COSTS	$ 4,665,900.00
				ESTIMATED NUMBER OF EDUs TO BE SERVED	125
				ESTIMATED CAPITAL COST PER EDU	$ 37,400.00

Table 5-7 Cost Opinion for Fetterhoff Church Area Alternative 3

OPINION OF PROBABLE PROJECT COST
FOR
HALIFAX TOWNSHIP ACT 537 SEWAGE FACILITIES PLAN
SEWER DISTRICT NO. 3 - FETTERHOFF CHURCH
ALTERNATIVE 3
COMBINATION OF PUMP STATION AND FORCE MAIN, GRAVITY SEWER, AND LOW PRESSURE SEWER
SEWER EXTENSION

ITEM NO.	DESCRIPTION		UNIT	UNIT PRICE	EXTENSION
GENERAL					
1	MOBILIZATION @ 5%	1	L.S.	$ 150,000.00	$ 150,000.00
2	TRAFFIC MAINTENANCE & PROTECTION @ 2.5%	1	L.S.	$ 75,000.00	$ 75,000.00
3	EROSION AND SEDIMENTATION CONTROL @ 2.5%	1	L.S.	$ 75,000.00	$ 75,000.00
LOW PRESSURE SEWER					
4	2" HDPE LOW PRESSURE SEWER - AGGREGATE BACKFILL	190	L.F.	$ 60.00	$ 11,415.00
5	2" HDPE LOW PRESSURE SEWER - SUITABLE BACKFILL	571	L.F.	$ 55.00	$ 31,391.25
6	1.25" HDPE LOW PRESSURE LATERAL - AGGREGATE BACKFILL	100	L.F.	$ 50.00	$ 5,000.00
7	1.25" HDPE LOW PRESSURE LATERAL - SUITABLE BACKFILL	100	L.F.	$ 40.00	$ 4,000.00
8	LOW PRESSURE LATERAL CONNECTION	10	EA.	$ 1,500.00	$ 15,000.00
9	AIR/VACUUM RELEASE VALVES	0	EA.	$ 7,750.00	$ -
10	INLINE CLEANOUT	2	EA.	$ 2,700.00	$ 5,400.00
11	TERMINAL CLEANOUT	1	EA.	$ 2,500.00	$ 2,500.00
12	GRINDER PUMP - SIMPLEX	10	EA.	$ 6,500.00	$ 65,000.00
13	CONNECTION TO EXISTING MANHOLE	0	EA.	$ 1,250.00	$ -
GRAVITY SEWER					
14	8" PVC MAIN - AGGREGATE BACKFILL	7,904	L.F.	$ 160.00	$ 1,264,640.00
15	8" PVC MAIN - SUITABLE BACKFILL	2,026	L.F.	$ 120.00	$ 243,120.00
16	8" X 6" WYE	40	L.F.	$ 250.00	$ 10,000.00
17	6" SERVICE LATERAL - AGGREGATE BACKFILL	400	L.F.	$ 75.00	$ 30,000.00
18	6" SERVICE LATERAL - SUITABLE BACKFILL	400	L.F.	$ 55.00	$ 22,000.00
19	6" SERVICE LATERAL CLEANOUT - SUITABLE BACKFILL	40	L.F.	$ 525.00	$ 21,000.00
20	CONNECTION TO EXISTING MANHOLE	1	EA.	$ 1,350.00	$ 1,350.00
21	CLAY DIKE	2	EA.	$ 350.00	$ 700.00
MANHOLE					
22	MANHOLE - 4 FT DIAMETER	31	EA.	$ 5,000.00	$ 155,000.00
23	MANHOLE FRAME AND COVER	31	EA.	$ 500.00	$ 15,500.00
24	MANHOLE PROTECTIVE LINING	1	EA.	$ 2,500.00	$ 2,500.00
CROSSING					
25	PENNDOT CROSSING	1	L.S.	$ 30,000.00	$ 30,000.00
26	STREAM CROSSING	1	L.S.	$ 9,000.00	$ 9,000.00
PUMP STATION					
27	PUMP STATION	1	L.S.	$ 300,000.00	$ 300,000.00
FORCE MAIN					
28	4" HDPE FORCE MAIN - AGGREGATE BACKFILL	992	L.F.	$ 75.00	$ 74,400.00
29	4" HDPE FORCE MAIN - SUITABLE BACKFILL	298	L.F.	$ 70.00	$ 20,860.00
SURFACING					
30	TEMPORARY PAVING	9,586	L.F.	$ 10.00	$ 95,862.50
31	PENNDOT PAVING RESTORATION (BASE)	9,054	L.F.	$ 35.00	$ 316,880.39
32	PENNDOT PAVING RESTORATION (MILL AND OVERLAY)	10,060	S.Y.	$ 20.00	$ 201,193.90
33	MUNICIPAL PAVING RESTORATION	533	L.F.	$ 55.00	$ 29,288.85
34	VEGETATIVE RESTORATION	3,395	L.F.	$ 5.00	$ 16,973.75
				ESTIMATED CONSTRUCTION COSTS	$ 3,300,000.00
				CONSTRUCTION CONTINGENCY @ 15%	$ 495,000.00
				ENGINEERING, ADMIN, & LEGAL FEES @ 25%	$ 948,800.00
				TOTAL ESTIMATED PROJECT COSTS	$ 4,743,800.00
				ESTIMATED NUMBER OF EDUs TO BE SERVED	50
				ESTIMATED CAPITAL COST PER EDU	$ 94,900.00

Table 5-8 Cost Opinion for Matamoras, Route 147 & 225, and Triangle & Lenker Estates Areas Alternative 4A

OPINION OF PROBABLE PROJECT COST
FOR
HALIFAX TOWNSHIP ACT 537 SEWAGE FACILITIES PLAN
SEWER DISTRICT NO. 1 - MATAMORAS, TRIANGLE & LENKER ESTATES, ROUTES 147 & 225
ALTERNATIVE 4A: COMBINATION OF GRAVITY SEWER AND LOW PRESSURE SEWER PLUS LENKER ESTATES SEWER EXTENSION

ITEM NO.	DESCRIPTION		UNIT	UNIT PRICE	EXTENSION
GENERAL					
1	MOBILIZATION @ 5%	1	L.S.	$ 311,200.00	$ 311,200.00
2	TRAFFIC MAINTENANCE & PROTECTION @ 2.5%	1	L.S.	$ 155,600.00	$ 155,600.00
3	EROSION AND SEDIMENTATION CONTROL @ 2.5%	1	L.S.	$ 155,600.00	$ 155,600.00
LOW PRESSURE SEWER					
4	2" HDPE LOW PRESSURE SEWER - AGGREGATE BACKFILL	6,305	L.F.	$ 60.00	$ 378,300.00
5	2" HDPE LOW PRESSURE SEWER - SUITABLE BACKFILL	20,495	L.F.	$ 55.00	$ 1,127,225.00
6	1.25" HDPE LOW PRESSURE LATERAL - AGGREGATE BACKFILL	3,270	L.F.	$ 50.00	$ 163,500.00
7	1.25" HDPE LOW PRESSURE LATERAL - SUITABLE BACKFILL	3,270	L.F.	$ 40.00	$ 130,800.00
8	LOW PRESSURE LATERAL CONNECTION	327	EA.	$ 1,500.00	$ 490,500.00
9	AIR/VACUUM RELEASE VALVES	3	EA.	$ 7,750.00	$ 23,250.00
10	INLINE CLEANOUT	54	EA.	$ 2,700.00	$ 145,800.00
11	TERMINAL CLEANOUT	10	EA.	$ 2,500.00	$ 25,000.00
12	GRINDER PUMP - SIMPLEX	327	EA.	$ 6,500.00	$ 2,125,500.00
13	CONNECTION TO EXISTING MANHOLE	2	EA.	$ 1,250.00	$ 2,500.00
GRAVITY SEWER					
14	8" PVC MAIN - AGGREGATE BACKFILL	2,372	L.F.	$ 160.00	$ 379,520.00
15	8" PVC MAIN - SUITABLE BACKFILL	593	L.F.	$ 120.00	$ 71,160.00
16	8" X 6" WYE	20	L.F.	$ 250.00	$ 5,000.00
17	6" SERVICE LATERAL - AGGREGATE BACKFILL	200	L.F.	$ 75.00	$ 15,000.00
18	6" SERVICE LATERAL - SUITABLE BACKFILL	200	L.F.	$ 55.00	$ 11,000.00
19	6" SERVICE LATERAL CLEANOUT - SUITABLE BACKFILL	20	L.F.	$ 525.00	$ 10,500.00
20	CONNECTION TO EXISTING MANHOLE	2	EA.	$ 1,350.00	$ 2,700.00
21	CLAY DIKE	4	EA.	$ 350.00	$ 1,400.00
MANHOLE					
22	MANHOLE - 4 FT DIAMETER	12	EA.	$ 5,000.00	$ 60,000.00
23	MANHOLE FRAME AND COVER	12	EA.	$ 500.00	$ 6,000.00
24	MANHOLE PROTECTIVE LINING	4	EA.	$ 2,500.00	$ 10,000.00
CROSSING					
25	PENNDOT CROSSING	2	L.S.	$ 30,000.00	$ 60,000.00
26	STREAM CROSSING	6	L.S.	$ 9,000.00	$ 54,000.00
PUMP STATION					
27	PUMP STATION	0	L.S.	$ 300,000.00	$ -
FORCE MAIN					
28	4" HDPE FORCE MAIN - AGGREGATE BACKFILL	0	L.F.	$ 75.00	$ -
29	4" HDPE FORCE MAIN - SUITABLE BACKFILL	0	L.F.	$ 70.00	$ -
SURFACING					
30	TEMPORARY PAVING	12,147	L.F.	$ 10.00	$ 121,470.00
31	PENNDOT PAVING RESTORATION (BASE)	5,777	L.F.	$ 35.00	$ 202,202.19
32	PENNDOT PAVING RESTORATION (MILL AND OVERLAY)	6,419	S.Y.	$ 20.00	$ 128,382.34
33	MUNICIPAL PAVING RESTORATION	6,370	L.F.	$ 55.00	$ 350,338.70
34	VEGETATIVE RESTORATION	24,558	L.F.	$ 5.00	$ 122,790.00

ESTIMATED CONSTRUCTION COSTS	$ 6,846,300.00
CONSTRUCTION CONTINGENCY @ 15%	$ 1,027,000.00
ENGINEERING, ADMIN, & LEGAL FEES @ 25%	$ 1,968,400.00
TOTAL ESTIMATED PROJECT COSTS	$ 9,841,700.00
ESTIMATED NUMBER OF EDUs TO BE SERVED	507
ESTIMATED CAPITAL COST PER EDU	$ 19,500.00

Table 5-9 Cost Opinion for Matamoras, Route 147 & 225, and Triangle & Lenker Estates Areas Alternative 4B

OPINION OF PROBABLE PROJECT COST
FOR
HALIFAX TOWNSHIP ACT 537 SEWAGE FACILITIES PLAN
SEWER DISTRICT NO. 1 - MATAMORAS, TRIANGLE & LENKER ESTATES, ROUTES 147 & 225
ALTERNATIVE 4B
COMBINATION OF PUMP STATION AND FORCE MAIN, GRAVITY SEWER, AND LOW PRESSURE SEWER PLUS LENKER ESTATES SEWER EXTENSION

ITEM NO.	DESCRIPTION		UNIT	UNIT PRICE	EXTENSION
GENERAL					
1	MOBILIZATION @ 5%	1	L.S.	$ 465,400.00	$ 465,400.00
2	TRAFFIC MAINTENANCE & PROTECTION @ 2.5%	1	L.S.	$ 232,700.00	$ 232,700.00
3	EROSION AND SEDIMENTATION CONTROL @ 2.5%	1	L.S.	$ 232,700.00	$ 232,700.00
LOW PRESSURE SEWER					
4	2" HDPE LOW PRESSURE SEWER - AGGREGATE BACKFILL	684	L.F.	$ 60.00	$ 41,025.00
5	2" HDPE LOW PRESSURE SEWER - SUITABLE BACKFILL	3,151	L.F.	$ 55.00	$ 173,318.75
6	1.25" HDPE LOW PRESSURE LATERAL - AGGREGATE BACKFILL	270	L.F.	$ 50.00	$ 13,500.00
7	1.25" HDPE LOW PRESSURE LATERAL - SUITABLE BACKFILL	270	L.F.	$ 40.00	$ 10,800.00
8	LOW PRESSURE LATERAL CONNECTION	27	EA.	$ 1,500.00	$ 40,500.00
9	AIR/VACUUM RELEASE VALVES	1	EA.	$ 7,750.00	$ 7,750.00
10	INLINE CLEANOUT	8	EA.	$ 2,700.00	$ 21,600.00
11	TERMINAL CLEANOUT	3	EA.	$ 2,500.00	$ 7,500.00
12	GRINDER PUMP - SIMPLEX	27	EA.	$ 6,500.00	$ 175,500.00
13	CONNECTION TO EXISTING MANHOLE	0	EA.	$ 1,250.00	$ -
GRAVITY SEWER					
14	8" PVC MAIN - AGGREGATE BACKFILL	20,112	L.F.	$ 160.00	$ 3,217,920.00
15	8" PVC MAIN - SUITABLE BACKFILL	6,318	L.F.	$ 120.00	$ 758,160.00
16	8" X 6" WYE	320	L.F.	$ 250.00	$ 80,000.00
17	6" SERVICE LATERAL - AGGREGATE BACKFILL	3,200	L.F.	$ 75.00	$ 240,000.00
18	6" SERVICE LATERAL - SUITABLE BACKFILL	3,200	L.F.	$ 55.00	$ 176,000.00
19	6" SERVICE LATERAL CLEANOUT - SUITABLE BACKFILL	320	L.F.	$ 525.00	$ 168,000.00
20	CONNECTION TO EXISTING MANHOLE	4	EA.	$ 1,350.00	$ 5,400.00
21	CLAY DIKE	39	EA.	$ 350.00	$ 13,650.00
MANHOLE					
22	MANHOLE - 4 FT DIAMETER	95	EA.	$ 5,000.00	$ 475,000.00
23	MANHOLE FRAME AND COVER	95	EA.	$ 500.00	$ 47,500.00
24	MANHOLE PROTECTIVE LINING	4	EA.	$ 2,500.00	$ 10,000.00
CROSSING					
25	PENNDOT CROSSING	2	L.S.	$ 30,000.00	$ 60,000.00
26	STREAM CROSSING	7	L.S.	$ 9,000.00	$ 63,000.00
PUMP STATION					
27	PUMP STATION	3	L.S.	$ 300,000.00	$ 900,000.00
FORCE MAIN					
28	4" HDPE FORCE MAIN - AGGREGATE BACKFILL	5,444	L.F.	$ 75.00	$ 408,300.00
29	4" HDPE FORCE MAIN - SUITABLE BACKFILL	2,106	L.F.	$ 70.00	$ 147,420.00
SURFACING					
30	TEMPORARY PAVING	29,710	L.F.	$ 10.00	$ 297,097.50
31	PENNDOT PAVING RESTORATION (BASE)	17,271	L.F.	$ 35.00	$ 604,475.19
32	PENNDOT PAVING RESTORATION (MILL AND OVERLAY)	19,190	S.Y.	$ 20.00	$ 383,793.77
33	MUNICIPAL PAVING RESTORATION	12,439	L.F.	$ 55.00	$ 684,146.67
34	VEGETATIVE RESTORATION	15,045	L.F.	$ 5.00	$ 75,226.25
				ESTIMATED CONSTRUCTION COSTS	$ 10,237,400.00
				CONSTRUCTION CONTINGENCY @ 15%	$ 1,535,700.00
				ENGINEERING, ADMIN, & LEGAL FEES @ 25%	$ 2,943,300.00
				TOTAL ESTIMATED PROJECT COSTS	$ 14,716,400.00
				ESTIMATED NUMBER OF EDUs TO BE SERVED	507
				ESTIMATED CAPITAL COST PER EDU	$ 29,100.00

Table 5-10 Cost Opinion for Matamoras, Route 147 & 225, and Triangle & Lenker Estates Areas Alternative 4C

OPINION OF PROBABLE PROJECT COST
FOR
HALIFAX TOWNSHIP ACT 537 SEWAGE FACILITIES PLAN
SEWER DISTRICT NO. 1 - MATAMORAS, TRIANGLE & LENKER ESTATES, ROUTES 147 & 225
ALTERNATIVE 4C
COMBINATION OF PUMP STATION AND FORCE MAIN, GRAVITY SEWER, AND LOW PRESSURE SEWER PLUS LENKER ESTATES SEWER EXTENSION

ITEM NO.	DESCRIPTION		UNIT	UNIT PRICE	EXTENSION
GENERAL					
1	MOBILIZATION @ 5%	1	L.S.	$ 394,800.00	$ 394,800.00
2	TRAFFIC MAINTENANCE & PROTECTION @ 2.5%	1	L.S.	$ 197,400.00	$ 197,400.00
3	EROSION AND SEDIMENTATION CONTROL @ 2.5%	1	L.S.	$ 197,400.00	$ 197,400.00
LOW PRESSURE SEWER					
4	2" HDPE LOW PRESSURE SEWER - AGGREGATE BACKFILL	2,494	L.F.	$ 60.00	$ 149,625.00
5	2" HDPE LOW PRESSURE SEWER - SUITABLE BACKFILL	9,321	L.F.	$ 55.00	$ 512,668.75
6	1.25" HDPE LOW PRESSURE LATERAL - AGGREGATE BACKFILL	1,540	L.F.	$ 50.00	$ 77,000.00
7	1.25" HDPE LOW PRESSURE LATERAL - SUITABLE BACKFILL	1,540	L.F.	$ 40.00	$ 61,600.00
8	LOW PRESSURE LATERAL CONNECTION	154	EA.	$ 1,500.00	$ 231,000.00
9	AIR/VACUUM RELEASE VALVES	2	EA.	$ 7,750.00	$ 15,500.00
10	INLINE CLEANOUT	24	EA.	$ 2,700.00	$ 64,800.00
11	TERMINAL CLEANOUT	4	EA.	$ 2,500.00	$ 10,000.00
12	GRINDER PUMP - SIMPLEX	154	EA.	$ 6,500.00	$ 1,001,000.00
13	CONNECTION TO EXISTING MANHOLE	2	EA.	$ 1,250.00	$ 2,500.00
GRAVITY SEWER					
14	8" PVC MAIN - AGGREGATE BACKFILL	12,160	L.F.	$ 160.00	$ 1,945,600.00
15	8" PVC MAIN - SUITABLE BACKFILL	3,585	L.F.	$ 120.00	$ 430,200.00
16	8" X 6" WYE	193	L.F.	$ 250.00	$ 48,250.00
17	6" SERVICE LATERAL - AGGREGATE BACKFILL	1,930	L.F.	$ 75.00	$ 144,750.00
18	6" SERVICE LATERAL - SUITABLE BACKFILL	1,930	L.F.	$ 55.00	$ 106,150.00
19	6" SERVICE LATERAL CLEANOUT - SUITABLE BACKFILL	193	L.F.	$ 525.00	$ 101,325.00
20	CONNECTION TO EXISTING MANHOLE	2	EA.	$ 1,350.00	$ 2,700.00
21	CLAY DIKE	24	EA.	$ 350.00	$ 8,400.00
MANHOLE					
22	MANHOLE - 4 FT DIAMETER	55	EA.	$ 5,000.00	$ 275,000.00
23	MANHOLE FRAME AND COVER	55	EA.	$ 500.00	$ 27,500.00
24	MANHOLE PROTECTIVE LINING	4	EA.	$ 2,500.00	$ 10,000.00
CROSSING					
25	PENNDOT CROSSING	2	L.S.	$ 30,000.00	$ 60,000.00
26	STREAM CROSSING	7	L.S.	$ 9,000.00	$ 63,000.00
PUMP STATION					
27	PUMP STATION	1	L.S.	$ 300,000.00	$ 300,000.00
FORCE MAIN					
28	4" HDPE FORCE MAIN - AGGREGATE BACKFILL	5,968	L.F.	$ 75.00	$ 447,600.00
29	4" HDPE FORCE MAIN - SUITABLE BACKFILL	1,612	L.F.	$ 70.00	$ 112,840.00
SURFACING					
30	TEMPORARY PAVING	24,092	L.F.	$ 10.00	$ 240,917.50
31	PENNDOT PAVING RESTORATION (BASE)	13,236	L.F.	$ 35.00	$ 463,268.81
32	PENNDOT PAVING RESTORATION (MILL AND OVERLAY)	14,707	S.Y.	$ 20.00	$ 294,138.93
33	MUNICIPAL PAVING RESTORATION	10,855	L.F.	$ 55.00	$ 597,052.40
34	VEGETATIVE RESTORATION	17,988	L.F.	$ 5.00	$ 89,941.25
				ESTIMATED CONSTRUCTION COSTS	$ 8,684,000.00
				CONSTRUCTION CONTINGENCY @ 15%	$ 1,302,600.00
				ENGINEERING, ADMIN, & LEGAL FEES @ 25%	$ 2,496,700.00
				TOTAL ESTIMATED PROJECT COSTS	$ 12,483,300.00
				ESTIMATED NUMBER OF EDUs TO BE SERVED	507
				ESTIMATED CAPITAL COST PER EDU	$ 24,700.00

Table 5-11 Cost Opinion for Matamoras, Route 147 & 225, and Triangle & Lenker Estates Areas Alternative 4D

OPINION OF PROBABLE PROJECT COST
FOR
HALIFAX TOWNSHIP ACT 537 SEWAGE FACILITIES PLAN
SEWER DISTRICT NO. 1 - MATAMORAS, TRIANGLE & LENKER ESTATES, ROUTES 147 & 225
ALTERNATIVE 4D
COMBINATION OF PUMP STATION AND FORCE MAIN, GRAVITY SEWER, AND LOW PRESSURE SEWER PLUS LENKER ESTATES SEWER EXTENSION

ITEM NO.	DESCRIPTION		UNIT	UNIT PRICE	EXTENSION
GENERAL					
1	MOBILIZATION @ 5%	1	L.S.	$ 403,100.00	$ 403,100.00
2	TRAFFIC MAINTENANCE & PROTECTION @ 2.5%	1	L.S.	$ 201,600.00	$ 201,600.00
3	EROSION AND SEDIMENTATION CONTROL @ 2.5%	1	L.S.	$ 201,600.00	$ 201,600.00
LOW PRESSURE SEWER					
4	2" HDPE LOW PRESSURE SEWER - AGGREGATE BACKFILL	2,039	L.F.	$ 60.00	$ 122,325.00
5	2" HDPE LOW PRESSURE SEWER - SUITABLE BACKFILL	7,956	L.F.	$ 55.00	$ 437,593.75
6	1.25" HDPE LOW PRESSURE LATERAL - AGGREGATE BACKFILL	1,410	L.F.	$ 50.00	$ 70,500.00
7	1.25" HDPE LOW PRESSURE LATERAL - SUITABLE BACKFILL	1,410	L.F.	$ 40.00	$ 56,400.00
8	LOW PRESSURE LATERAL CONNECTION	141	EA.	$ 1,500.00	$ 211,500.00
9	AIR/VACUUM RELEASE VALVES	1	EA.	$ 7,750.00	$ 7,750.00
10	INLINE CLEANOUT	20	EA.	$ 2,700.00	$ 54,000.00
11	TERMINAL CLEANOUT	4	EA.	$ 2,500.00	$ 10,000.00
12	GRINDER PUMP - SIMPLEX	141	EA.	$ 6,500.00	$ 916,500.00
13	CONNECTION TO EXISTING MANHOLE	0	EA.	$ 1,250.00	$ -
GRAVITY SEWER					
14	8" PVC MAIN - AGGREGATE BACKFILL	13,544	L.F.	$ 160.00	$ 2,167,040.00
15	8" PVC MAIN - SUITABLE BACKFILL	4,021	L.F.	$ 120.00	$ 482,520.00
16	8" X 6" WYE	206	L.F.	$ 250.00	$ 51,500.00
17	6" SERVICE LATERAL - AGGREGATE BACKFILL	2,060	L.F.	$ 75.00	$ 154,500.00
18	6" SERVICE LATERAL - SUITABLE BACKFILL	2,060	L.F.	$ 55.00	$ 113,300.00
19	6" SERVICE LATERAL CLEANOUT - SUITABLE BACKFILL	206	L.F.	$ 525.00	$ 108,150.00
20	CONNECTION TO EXISTING MANHOLE	4	EA.	$ 1,350.00	$ 5,400.00
21	CLAY DIKE	29	EA.	$ 350.00	$ 10,150.00
MANHOLE					
22	MANHOLE - 4 FT DIAMETER	63	EA.	$ 5,000.00	$ 315,000.00
23	MANHOLE FRAME AND COVER	63	EA.	$ 500.00	$ 31,500.00
24	MANHOLE PROTECTIVE LINING	4	EA.	$ 2,500.00	$ 10,000.00
CROSSING					
25	PENNDOT CROSSING	2	L.S.	$ 30,000.00	$ 60,000.00
26	STREAM CROSSING	7	L.S.	$ 9,000.00	$ 63,000.00
PUMP STATION					
27	PUMP STATION	1	L.S.	$ 300,000.00	$ 300,000.00
FORCE MAIN					
28	4" HDPE FORCE MAIN - AGGREGATE BACKFILL	5,968	L.F.	$ 75.00	$ 447,600.00
29	4" HDPE FORCE MAIN - SUITABLE BACKFILL	1,612	L.F.	$ 70.00	$ 112,840.00
SURFACING					
30	TEMPORARY PAVING	25,021	L.F.	$ 10.00	$ 250,207.50
31	PENNDOT PAVING RESTORATION (BASE)	13,785	L.F.	$ 35.00	$ 482,463.41
32	PENNDOT PAVING RESTORATION (MILL AND OVERLAY)	15,316	S.Y.	$ 20.00	$ 306,325.97
33	MUNICIPAL PAVING RESTORATION	11,236	L.F.	$ 55.00	$ 617,984.46
34	VEGETATIVE RESTORATION	17,059	L.F.	$ 5.00	$ 85,296.25
				ESTIMATED CONSTRUCTION COSTS	$ 8,867,700.00
				CONSTRUCTION CONTINGENCY @ 15%	$ 1,330,200.00
				ENGINEERING, ADMIN, & LEGAL FEES @ 25%	$ 2,549,500.00
				TOTAL ESTIMATED PROJECT COSTS	$ 12,747,400.00
				ESTIMATED NUMBER OF EDUs TO BE SERVED	507
				ESTIMATED CAPITAL COST PER EDU	$ 25,200.00

Table 5-12 Cost Opinion for Matamoras, Route 147 & 225, and Triangle & Lenker Estates Areas Alternative 4E

OPINION OF PROBABLE PROJECT COST
FOR
HALIFAX TOWNSHIP ACT 537 SEWAGE FACILITIES PLAN
SEWER DISTRICT NO. 1 - MATAMORAS, TRIANGLE & LENKER ESTATES, ROUTES 147 & 225
ALTERNATIVE 4E
COMBINATION OF PUMP STATION AND FORCE MAIN, GRAVITY SEWER, AND LOW PRESSURE SEWER PLUS LENKER ESTATES (SHARED) SEWER EXTENSION

ITEM NO.	DESCRIPTION		UNIT	UNIT PRICE	EXTENSION
GENERAL					
1	MOBILIZATION @ 5%	1	L.S.	$ 423,300.00	$ 423,300.00
2	TRAFFIC MAINTENANCE & PROTECTION @ 2.5%	1	L.S.	$ 211,700.00	$ 211,700.00
3	EROSION AND SEDIMENTATION CONTROL @ 2.5%	1	L.S.	$ 211,700.00	$ 211,700.00
LOW PRESSURE SEWER					
4	2" HDPE LOW PRESSURE SEWER - AGGREGATE BACKFILL	2,039	L.F.	$ 60.00	$ 122,325.00
5	2" HDPE LOW PRESSURE SEWER - SUITABLE BACKFILL	7,956	L.F.	$ 55.00	$ 437,593.75
6	1.25" HDPE LOW PRESSURE LATERAL - AGGREGATE BACKFILL	1,410	L.F.	$ 50.00	$ 70,500.00
7	1.25" HDPE LOW PRESSURE LATERAL - SUITABLE BACKFILL	1,410	L.F.	$ 40.00	$ 56,400.00
8	LOW PRESSURE LATERAL CONNECTION	141	EA.	$ 1,500.00	$ 211,500.00
9	AIR/VACUUM RELEASE VALVES	1	EA.	$ 7,750.00	$ 7,750.00
10	INLINE CLEANOUT	20	EA.	$ 2,700.00	$ 54,000.00
11	TERMINAL CLEANOUT	4	EA.	$ 2,500.00	$ 10,000.00
12	GRINDER PUMP - SIMPLEX	141	EA.	$ 6,500.00	$ 916,500.00
13	CONNECTION TO EXISTING MANHOLE	0	EA.	$ 1,250.00	$ -
GRAVITY SEWER					
14	8" PVC MAIN - AGGREGATE BACKFILL	13,688	L.F.	$ 160.00	$ 2,190,080.00
15	8" PVC MAIN - SUITABLE BACKFILL	4,487	L.F.	$ 120.00	$ 538,440.00
16	8" X 6" WYE	206	L.F.	$ 250.00	$ 51,500.00
17	6" SERVICE LATERAL - AGGREGATE BACKFILL	2,060	L.F.	$ 75.00	$ 154,500.00
18	6" SERVICE LATERAL - SUITABLE BACKFILL	2,060	L.F.	$ 55.00	$ 113,300.00
19	6" SERVICE LATERAL CLEANOUT - SUITABLE BACKFILL	206	L.F.	$ 525.00	$ 108,150.00
20	CONNECTION TO EXISTING MANHOLE	5	EA.	$ 1,350.00	$ 6,750.00
21	CLAY DIKE	30	EA.	$ 350.00	$ 10,500.00
MANHOLE					
22	MANHOLE - 4 FT DIAMETER	64	EA.	$ 5,000.00	$ 320,000.00
23	MANHOLE FRAME AND COVER	64	EA.	$ 500.00	$ 32,000.00
24	MANHOLE PROTECTIVE LINING	5	EA.	$ 2,500.00	$ 12,500.00
CROSSING					
25	PENNDOT CROSSING	2	L.S.	$ 30,000.00	$ 60,000.00
26	STREAM CROSSING	7	L.S.	$ 9,000.00	$ 63,000.00
PUMP STATION					
27	PUMP STATION	1	L.S.	$ 300,000.00	$ 300,000.00
FORCE MAIN					
28	4" HDPE FORCE MAIN - AGGREGATE BACKFILL	5,968	L.F.	$ 75.00	$ 447,600.00
29	4" HDPE FORCE MAIN - SUITABLE BACKFILL	1,612	L.F.	$ 70.00	$ 112,840.00
SURFACING					
30	TEMPORARY PAVING	25,165	L.F.	$ 10.00	$ 251,647.50
31	PENNDOT PAVING RESTORATION (BASE)	13,788	L.F.	$ 35.00	$ 482,571.09
32	PENNDOT PAVING RESTORATION (MILL AND OVERLAY)	15,320	S.Y.	$ 20.00	$ 306,394.34
33	MUNICIPAL PAVING RESTORATION	11,377	L.F.	$ 55.00	$ 625,735.25
34	VEGETATIVE RESTORATION	17,525	L.F.	$ 5.00	$ 87,626.25
PUMP STATION (SHARED WITH LENKER ESTATES)					
35	PUMP STATION	1	L.S.	$ 300,000.00	$ 300,000.00
FORCE MAIN (SHARED WITH LENKER ESTATES)					
36	4" HDPE FORCE MAIN - AGGREGATE BACKFILL	1,830	L.F.	$ 75.00	$ 137,250.00
37	4" HDPE FORCE MAIN - SUITABLE BACKFILL	230	L.F.	$ 70.00	$ 16,100.00
SURFACING (SHARED WITH LENKER ESTATES)					
38	TEMPORARY PAVING	1,830	L.F.	$ 10.00	$ 18,300.00
39	MUNICIPAL PAVING RESTORATION	827	L.F.	$ 55.00	$ 45,503.95
40	VEGETATIVE RESTORATION	1,830	L.F.	$ 5.00	$ 9,150.00
			Subtotal of Costs Shared with Lenker Estates		$ 526,304.00
			Subtotal of Costs Assumed for Township (57.45%)		$ 302,350.00
			ESTIMATED CONSTRUCTION COSTS		$ 9,310,800.00
			CONSTRUCTION CONTINGENCY @ 15%		$ 1,396,700.00
			ENGINEERING, ADMIN, & LEGAL FEES @ 25%		$ 2,676,900.00
			TOTAL ESTIMATED PROJECT COSTS		$ 13,384,400.00
			ESTIMATED NUMBER OF EDUs TO BE SERVED		507
			ESTIMATED CAPITAL COST PER EDU		$ 26,400.00

Table 5-13 Summary of PENNVEST Financing (2.063%, 20 yrs)

Summary of Cost Opinions for Structural Alternatives - PENNVEST Financing (2.063%, 20yrs)														
Study Area	Alternative	Estimated Project Cost	Estimated Annual Debt Service	Estimated Annual O&M Cost	Estimated Annual Cost	Present Worth of Annual O&M	Total Present Worth	Number of EDUs	Number of Projected EDUs	Estimated Present Worth Per EDU	Estimated Annual Cost Per EDU	Estimated Annual Cost Per Projected EDU	Estimated Monthly Cost Per EDU	Estimated Monthly Cost Per Projected EDU
Matamoras, Route 147 & 225, and Triangle & Lenker Estates	Alternative 1A	$8,124,700	$496,132	$133,000	$629,132	$1,768,151	$9,892,851	347	417	$28,509.66	$1,813.06	$1,508.71	$151	$126
	Alternative 1B	$12,999,400	$793,804	$47,900	$841,704	$636,800	$13,636,200	347	417	$39,297	$2,426	$2,018	$202	$168
	Altternative 1C	$10,766,300	$657,441	$78,600	$736,041	$1,044,937	$11,811,237	347	417	$34,038	$2,121	$1,765	$177	$147
	Alternative 1D	$11,030,400	$673,568	$74,400	$747,968	$989,101	$12,019,501	347	417	$34,638	$2,156	$1,794	$180	$149
Tourist Park	Alternative 2A	$2,836,300	$173,198	$46,500	$219,698	$618,188	$3,454,488	125	150	$27,636	$1,758	$1,465	$146	$122
	Alternative 2B	$4,047,400	$247,153	$38,400	$285,553	$510,504	$4,557,904	125	150	$36,463	$2,284	$1,904	$190	$159
Fetterhoff Church	Alternative 3	$4,496,400	$274,571	$17,000	$291,571	$226,004	$4,722,404	50	60	$94,448	$5,831	$4,860	$486	$405
Matamoras, Route 147 & 225, and Triangle & Lenker Estates	Alternative 4A	$7,333,100	$447,793	$133,000	$580,793	$1,768,151	$9,101,251	507	588	$17,951	$1,146	$988	$95	$82
	Alternative 4B	$12,207,800	$745,465	$47,900	$793,365	$636,800	$12,844,600	507	588	$25,335	$1,565	$1,349	$130	$112
	Altternative 4C	$9,974,700	$609,102	$78,600	$687,702	$1,044,937	$11,019,637	507	588	$21,735	$1,356	$1,170	$113	$97
	Alternative 4D	$10,238,800	$625,229	$74,400	$699,629	$989,101	$11,227,901	507	588	$22,146	$1,380	$1,190	$115	$99
	Alternative 4E	$10,875,800	$664,127	$79,900	$744,027	$1,062,220	$11,938,020	507	588	$23,546	$1,468	$1,265	$122	$105
Notes:														
1. Annual Debt Service Calculations Assume PENNVEST Financing of 2.063% for 20 Years														
2. Tapping Fees have been subtracted from Estimated Project Cost based on the existing HAWASA tapping fee of $4,948.02/EDU and the number of EDUs presented in Column 9														
3. Present Worth Calculations Assume 4.25% for 20 Years														
4. Annual O&M Estimated based on typical common useage														

Table 5-14 Summary of PENNVEST Financing (25% Grant, 75% Loan @ 2.063%, 20 yrs)

Summary of Cost Opinions for Structural Alternatives - PENNVEST Financing (25% Grant; 75% Loan @2.063%, 20yrs)														
Study Area	Alternative	Estimated Project Cost Less Grant	Estimated Annual Debt Service	Estimated Annual O&M Cost	Estimated Annual Cost	Present Worth of Annual O&M	Total Present Worth	Number of EDUs	Number of Projected EDUs	Estimated Present Worth Per EDU	Estimated Annual Cost Per EDU	Estimated Annual Cost Per Projected EDU	Estimated Monthly Cost Per EDU	Estimated Monthly Cost Per Projected EDU
Matamoras, Route 147 & 225, and Triangle & Lenker Estates	Alternative 1A	$6,093,525	$372,099	$133,000	$505,099	$1,768,151	$7,861,676	347	417	$22,656	$1,456	$1,211	$121	$101
	Alternative 1B	$9,749,550	$595,353	$47,900	$643,253	$636,800	$10,386,350	347	417	$29,932	$1,854	$1,543	$154	$129
	Altternative 1C	$8,074,725	$493,081	$78,600	$571,681	$1,044,937	$9,119,662	347	417	$26,281	$1,647	$1,371	$137	$114
	Alternative 1D	$8,272,800	$505,176	$74,400	$579,576	$989,101	$9,261,901	347	417	$26,691	$1,670	$1,390	$139	$116
Tourist Park	Alternative 2A	$2,127,225	$129,898	$46,500	$176,398	$618,188	$2,745,413	125	150	$21,963	$1,411	$1,176	$118	$98
	Alternative 2B	$3,035,550	$185,365	$38,400	$223,765	$510,504	$3,546,054	125	150	$28,368	$1,790	$1,492	$149	$124
Fetterhoff Church	Alternative 3	$3,372,300	$205,928	$17,000	$222,928	$226,004	$3,598,304	50	60	$71,966	$4,459	$3,715	$372	$310
Matamoras, Route 147 & 225, and Triangle & Lenker Estates	Alternative 4A	$5,499,825	$335,845	$133,000	$468,845	$1,768,151	$7,267,976	507	588	$14,335	$925	$797	$77	$66
	Alternative 4B	$9,155,850	$559,099	$47,900	$606,999	$636,800	$9,792,650	507	588	$19,315	$1,197	$1,032	$100	$86
	Altternative 4C	$7,481,025	$456,826	$78,600	$535,426	$1,044,937	$8,525,962	507	588	$16,816	$1,056	$911	$88	$76
	Alternative 4D	$7,679,100	$468,922	$74,400	$543,322	$989,101	$8,668,201	507	588	$17,097	$1,072	$924	$89	$77
	Alternative 4E	$8,156,850	$498,095	$79,900	$577,995	$1,062,220	$9,219,070	507	588	$18,184	$1,140	$983	$95	$82

Notes:

1. Annual Debt Service Calculations Assume PENNVEST Financing of 2.063% for 20 Years
2. Tapping Fees have been subtracted from Estimated Project Cost based on the existing HAWASA tapping fee of $4,948.02/EDU and the number of EDUs presented in Column 9
3. Present Worth Calculations Assume 4.25% for 20 Years
4. Annual O&M Estimated based on typical common useage

Table 5-15 Summary of PENNVEST Financing (50% Grant 50% Loan @ 2.063%, @ 2.063%, 20 yrs)

Summary of Cost Opinions for Structural Alternatives - PENNVEST Financing (50% Grant; 50% Loan @2.063%, 20yrs)														
Study Area	Alternative	Estimated Project Cost Less Grant	Estimated Annual Debt Service	Estimated Annual O&M Cost	Estimated Annual Cost	Present Worth of Annual O&M	Total Present Worth	Number of EDUs	Number of Projected EDUs	Estimated Present Worth Per EDU	Estimated Annual Cost Per EDU	Estimated Annual Cost Per Projected EDU	Estimated Monthly Cost Per EDU	Estimated Monthly Cost Per Projected EDU
Matamoras, Route 147 & 225, and Triangle & Lenker Estates	Alternative 1A	$4,062,350	$248,066	$133,000	$381,066	$1,768,151	$5,830,501	347	417	$16,803	$1,098	$914	$92	$76
	Alternative 1B	$6,499,700	$396,902	$47,900	$444,802	$636,800	$7,136,500	347	417	$20,566	$1,282	$1,067	$107	$89
	Altternative 1C	$5,383,150	$328,720	$78,600	$407,320	$1,044,937	$6,428,087	347	417	$18,525	$1,174	$977	$98	$81
	Alternative 1D	$5,515,200	$336,784	$74,400	$411,184	$989,101	$6,504,301	347	417	$18,744	$1,185	$986	$99	$82
Tourist Park	Alternative 2A	$1,418,150	$86,599	$46,500	$133,099	$618,188	$2,036,338	125	150	$16,291	$1,065	$887	$89	$74
	Alternative 2B	$2,023,700	$123,577	$38,400	$161,977	$510,504	$2,534,204	125	150	$20,274	$1,296	$1,080	$108	$90
Fetterhoff Church	Alternative 3	$2,248,200	$137,286	$17,000	$154,286	$226,004	$2,474,204	50	60	$49,484	$3,086	$2,571	$257	$214
Matamoras, Route 147 & 225, and Triangle & Lenker Estates	Alternative 4A	$3,666,550	$223,897	$133,000	$356,897	$1,768,151	$5,434,701	507	588	$10,719	$704	$607	$59	$51
	Alternative 4B	$6,103,900	$372,733	$47,900	$420,633	$636,800	$6,740,700	507	588	$13,295	$830	$715	$69	$60
	Altternative 4C	$4,987,350	$304,551	$78,600	$383,151	$1,044,937	$6,032,287	507	588	$11,898	$756	$652	$63	$54
	Alternative 4D	$5,119,400	$312,615	$74,400	$387,015	$989,101	$6,108,501	507	588	$12,048	$763	$658	$64	$55
	Alternative 4E	$5,437,900	$332,064	$79,900	$411,964	$1,062,220	$6,500,120	507	588	$12,821	$813	$701	$68	$58

Notes:

1. Annual Debt Service Calculations Assume PENNVEST Financing of 2.063% for 20 Years
2. Tapping Fees have been subtracted from Estimated Project Cost based on the existing HAWASA tapping fee of $4,948.02/EDU and the number of EDUs presented in Column 9
3. Present Worth Calculations Assume 4.25% for 20 Years
4. Annual O&M Estimated based on typical common useage

Table 5-16 Summary of PENNVEST Financing (75% Grant 25% Loan @ 2.063%, 20 yrs)

Summary of Cost Opinions for Structural Alternatives - PENNVEST Financing (75% Grant; 25% Loan @2.063%, 20yrs)														
Study Area	Alternative	Estimated Project Cost Less Grant	Estimated Annual Debt Service	Estimated Annual O&M Cost	Estimated Annual Cost	Present Worth of Annual O&M	Total Present Worth	Number of EDUs	Number of Projected EDUs	Estimated Present Worth Per EDU	Estimated Annual Cost Per EDU	Estimated Annual Cost Per Projected EDU	Estimated Monthly Cost Per EDU	Estimated Monthly Cost Per Projected EDU
Matamoras, Route 147 & 225, and Triangle & Lenker Estates	Alternative 1A	$2,031,175	$124,033	$133,000	$257,033	$1,768,151	$3,799,326	347	417	$10,949	$741	$616	$62	$51
	Alternative 1B	$3,249,850	$198,451	$47,900	$246,351	$636,800	$3,886,650	347	417	$11,201	$710	$591	$59	$49
	Altternative 1C	$2,691,575	$164,360	$78,600	$242,960	$1,044,937	$3,736,512	347	417	$10,768	$700	$583	$58	$49
	Alternative 1D	$2,757,600	$168,392	$74,400	$242,792	$989,101	$3,746,701	347	417	$10,797	$700	$582	$58	$49
Tourist Park	Alternative 2A	$709,075	$43,299	$46,500	$89,799	$618,188	$1,327,263	125	150	$10,618	$718	$599	$60	$50
	Alternative 2B	$1,011,850	$61,788	$38,400	$100,188	$510,504	$1,522,354	125	150	$12,179	$802	$668	$67	$56
Fetterhoff Church	Alternative 3	$1,124,100	$68,643	$17,000	$85,643	$226,004	$1,350,104	50	60	$27,002	$1,713	$1,427	$143	$119
Matamoras, Route 147 & 225, and Triangle & Lenker Estates	Alternative 4A	$1,833,275	$111,948	$133,000	$244,948	$1,768,151	$3,601,426	507	588	$7,103	$483	$417	$40	$35
	Alternative 4B	$3,051,950	$186,366	$47,900	$234,266	$636,800	$3,688,750	507	588	$7,276	$462	$398	$39	$33
	Altternative 4C	$2,493,675	$152,275	$78,600	$230,875	$1,044,937	$3,538,612	507	588	$6,980	$455	$393	$38	$33
	Alternative 4D	$2,559,700	$156,307	$74,400	$230,707	$989,101	$3,548,801	507	588	$7,000	$455	$392	$38	$33
	Alternative 4E	$2,718,950	$166,032	$79,900	$245,932	$1,062,220	$3,781,170	507	588	$7,458	$485	$418	$40	$35

Notes:

1. Annual Debt Service Calculations Assume PENNVEST Financing of 2.063% for 20 Years
2. Tapping Fees have been subtracted from Estimated Project Cost based on the existing HAWASA tapping fee of $4,948.02/EDU and the number of EDUs presented in Column 9
3. Present Worth Calculations Assume 4.25% for 20 Years
4. Annual O&M Estimated based on typical common useage

Table 5-17 Summary of USDA RUS Financing (3.25%, 40 yrs)

Summary of Cost Opinions for Structural Alternatives - USDA RUS Financing (3.25%, 40yrs)														
Study Area	Alternative	Estimated Project Cost	Estimated Annual Debt Service	Estimated Annual O&M Cost	Estimated Annual Cost	Present Worth of Annual O&M	Total Present Worth	Number of EDUs	Number of Projected EDUs	Estimated Present Worth Per EDU	Estimated Annual Cost Per EDU	Estimated Annual Cost Per Projected EDU	Estimated Monthly Cost Per EDU	Estimated Monthly Cost Per Projected EDU
Matamoras, Route 147 & 225, and Triangle & Lenker Estates	Alternative 1A	$8,124,700	$363,214	$133,000	$496,214	$1,768,151	$9,892,851	347	417	$28,510	$1,430	$1,190	$119	$99
	Alternative 1B	$12,999,400	$581,137	$47,900	$629,037	$636,800	$13,636,200	347	417	$39,297	$1,813	$1,508	$151	$126
	Altternative 1C	$10,766,300	$481,307	$78,600	$559,907	$1,044,937	$11,811,237	347	417	$34,038	$1,614	$1,343	$134	$112
	Alternative 1D	$11,030,400	$493,113	$74,400	$567,513	$989,101	$12,019,501	347	417	$34,638	$1,635	$1,361	$136	$113
Tourist Park	Alternative 2A	$2,836,300	$126,797	$46,500	$173,297	$618,188	$3,454,488	125	150	$27,636	$1,386	$1,155	$116	$96
	Alternative 2B	$4,047,400	$180,939	$38,400	$219,339	$510,504	$4,557,904	125	150	$36,463	$1,755	$1,462	$146	$122
Fetterhoff Church	Alternative 3	$4,496,400	$201,011	$17,000	$218,011	$226,004	$4,722,404	50	60	$94,448	$4,360	$3,634	$363	$303
Matamoras, Route 147 & 225, and Triangle & Lenker Estates	Alternative 4A	$7,333,100	$327,826	$133,000	$460,826	$1,768,151	$9,101,251	507	588	$17,951	$909	$784	$76	$65
	Alternative 4B	$12,207,800	$545,749	$47,900	$593,649	$636,800	$12,844,600	507	588	$25,335	$1,171	$1,010	$98	$84
	Altternative 4C	$9,974,700	$445,918	$78,600	$524,518	$1,044,937	$11,019,637	507	588	$21,735	$1,035	$892	$86	$74
	Alternative 4D	$10,238,800	$457,725	$74,400	$532,125	$989,101	$11,227,901	507	588	$22,146	$1,050	$905	$87	$75
	Alternative 4E	$10,875,800	$486,202	$79,900	$566,102	$1,062,220	$11,938,020	507	588	$23,546	$1,117	$963	$93	$80

Notes:

1. Annual Debt Service Calculations Assume USDA RUS Financing of 3.25% for 40 Years
2. Tapping Fees have been subtracted from Estimated Project Cost based on the existing HAWASA tapping fee of $4,948.02/EDU and the number of EDUs presented in Column 9
3. Present Worth Calculations Assume 4.25% for 20 Years
4. Annual O&M Estimated based on typical common useage

Table 5-18 Summary of USDA RUS Financing (25% Grant, 75% Loan @ 3.25%, 40 yrs)

Summary of Cost Opinions for Structural Alternatives - USDA RUS Financing (25% Grant; 75% Loan @ 3.25%, 40yrs)														
Study Area	Alternative	Estimated Project Cost Less Grant	Estimated Annual Debt Service	Estimated Annual O&M Cost	Estimated Annual Cost	Present Worth of Annual O&M	Total Present Worth	Number of EDUs	Number of Projected EDUs	Estimated Present Worth Per EDU	Estimated Annual Cost Per EDU	Estimated Annual Cost Per Projected EDU	Estimated Monthly Cost Per EDU	Estimated Monthly Cost Per Projected EDU
Matamoras, Route 147 & 225, and Triangle & Lenker Estates	Alternative 1A	$6,093,525	$272,411	$133,000	$405,411	$1,768,151	$7,861,676	347	417	$22,656	$1,168	$972	$97	$81
	Alternative 1B	$9,749,550	$435,853	$47,900	$483,753	$636,800	$10,386,350	347	417	$29,932	$1,394	$1,160	$116	$97
	Altternative 1C	$8,074,725	$360,980	$78,600	$439,580	$1,044,937	$9,119,662	347	417	$26,281	$1,267	$1,054	$106	$88
	Alternative 1D	$8,272,800	$369,835	$74,400	$444,235	$989,101	$9,261,901	347	417	$26,691	$1,280	$1,065	$107	$89
Tourist Park	Alternative 2A	$2,127,225	$95,097	$46,500	$141,597	$618,188	$2,745,413	125	150	$21,963	$1,133	$944	$94	$79
	Alternative 2B	$3,035,550	$135,704	$38,400	$174,104	$510,504	$3,546,054	125	150	$28,368	$1,393	$1,161	$116	$97
Fetterhoff Church	Alternative 3	$3,372,300	$150,758	$17,000	$167,758	$226,004	$3,598,304	50	60	$71,966	$3,355	$2,796	$280	$233
Matamoras, Route 147 & 225, and Triangle & Lenker Estates	Alternative 4A	$5,499,825	$245,869	$133,000	$378,869	$1,768,151	$7,267,976	507	588	$14,335	$747	$644	$62	$54
	Alternative 4B	$9,155,850	$409,312	$47,900	$457,212	$636,800	$9,792,650	507	588	$19,315	$902	$778	$75	$65
	Altternative 4C	$7,481,025	$334,439	$78,600	$413,039	$1,044,937	$8,525,962	507	588	$16,816	$815	$702	$68	$59
	Alternative 4D	$7,679,100	$343,294	$74,400	$417,694	$989,101	$8,668,201	507	588	$17,097	$824	$710	$69	$59
	Alternative 4E	$8,156,850	$364,652	$79,900	$444,552	$1,062,220	$9,219,070	507	588	$18,184	$877	$756	$73	$63

Notes:

1. Annual Debt Service Calculations Assume USDA RUS Financing of 3.25% for 40 Years
2. Tapping Fees have been subtracted from Estimated Project Cost based on the existing HAWASA tapping fee of $4,948.02/EDU and the number of EDUs presented in Column 9
3. Present Worth Calculations Assume 4.25% for 20 Years
4. Annual O&M Estimated based on typical common useage

Table 5-19 Summary of USDA RUS Financing (50% Grant, 50% Loan @ 3.25%, 40 yrs)

Summary of Cost Opinions for Structural Alternatives - USDA Financing (50% Grant; 50% Loan @3.25%, 40yrs)														
Study Area	Alternative	Estimated Project Cost Less Grant	Estimated Annual Debt Service	Estimated Annual O&M Cost	Estimated Annual Cost	Present Worth of Annual O&M	Total Present Worth	Number of EDUs	Number of Projected EDUs	Estimated Present Worth Per EDU	Estimated Annual Cost Per EDU	Estimated Annual Cost Per Projected EDU	Estimated Monthly Cost Per EDU	Estimated Monthly Cost Per Projected EDU
Matamoras, Route 147 & 225, and Triangle & Lenker Estates	Alternative 1A	$4,062,350	$181,607	$133,000	$314,607	$1,768,151	$5,830,501	347	417	$16,803	$907	$754	$76	$63
	Alternative 1B	$6,499,700	$290,569	$47,900	$338,469	$636,800	$7,136,500	347	417	$20,566	$975	$812	$81	$68
	Altternative 1C	$5,383,150	$240,653	$78,600	$319,253	$1,044,937	$6,428,087	347	417	$18,525	$920	$766	$77	$64
	Alternative 1D	$5,515,200	$246,557	$74,400	$320,957	$989,101	$6,504,301	347	417	$18,744	$925	$770	$77	$64
Tourist Park	Alternative 2A	$1,418,150	$63,398	$46,500	$109,898	$618,188	$2,036,338	125	150	$16,291	$879	$733	$73	$61
	Alternative 2B	$2,023,700	$90,469	$38,400	$128,869	$510,504	$2,534,204	125	150	$20,274	$1,031	$859	$86	$72
Fetterhoff Church	Alternative 3	$2,248,200	$100,506	$17,000	$117,506	$226,004	$2,474,204	50	60	$49,484	$2,350	$1,958	$196	$163
Matamoras, Route 147 & 225, and Triangle & Lenker Estates	Alternative 4A	$3,666,550	$163,913	$133,000	$296,913	$1,768,151	$5,434,701	507	588	$10,719	$586	$505	$49	$42
	Alternative 4B	$6,103,900	$272,875	$47,900	$320,775	$636,800	$6,740,700	507	588	$13,295	$633	$546	$53	$45
	Altternative 4C	$4,987,350	$222,959	$78,600	$301,559	$1,044,937	$6,032,287	507	588	$11,898	$595	$513	$50	$43
	Alternative 4D	$5,119,400	$228,863	$74,400	$303,263	$989,101	$6,108,501	507	588	$12,048	$598	$516	$50	$43
	Alternative 4E	$5,437,900	$243,101	$79,900	$323,001	$1,062,220	$6,500,120	507	588	$12,821	$637	$549	$53	$46

Notes:

1. Annual Debt Service Calculations Assume USDA RUS Financing of 3.25% for 40 Years
2. Tapping Fees have been subtracted from Estimated Project Cost based on the existing HAWASA tapping fee of $4,948.02/EDU and the number of EDUs presented in Column 9
3. Present Worth Calculations Assume 4.25% for 20 Years
4. Annual O&M Estimated based on typical common useage

Table 5-20 Summary of USDA RUS Financing (75% Grant, 25% Loan @ 3.25%, 40 yrs)

Summary of Cost Opinions for Structural Alternatives - USDA Financing (75% Grant; 25% Loan @3.25%, 40yrs)														
Study Area	Alternative	Estimated Project Cost Less Grant	Estimated Annual Debt Service	Estimated Annual O&M Cost	Estimated Annual Cost	Present Worth of Annual O&M	Total Present Worth	Number of EDUs	Number of Projected EDUs	Estimated Present Worth Per EDU	Estimated Annual Cost Per EDU	Estimated Annual Cost Per Projected EDU	Estimated Monthly Cost Per EDU	Estimated Monthly Cost Per Projected EDU
Matamoras, Route 147 & 225, and Triangle & Lenker Estates	Alternative 1A	$2,031,175	$90,804	$133,000	$223,804	$1,768,151	$3,799,326	347	417	$10,949	$645	$537	$54	$45
	Alternative 1B	$3,249,850	$145,284	$47,900	$193,184	$636,800	$3,886,650	347	417	$11,201	$557	$463	$46	$39
	Altternative 1C	$2,691,575	$120,327	$78,600	$198,927	$1,044,937	$3,736,512	347	417	$10,768	$573	$477	$48	$40
	Alternative 1D	$2,757,600	$123,278	$74,400	$197,678	$989,101	$3,746,701	347	417	$10,797	$570	$474	$47	$40
Tourist Park	Alternative 2A	$709,075	$31,699	$46,500	$78,199	$618,188	$1,327,263	125	150	$10,618	$626	$521	$52	$43
	Alternative 2B	$1,011,850	$45,235	$38,400	$83,635	$510,504	$1,522,354	125	150	$12,179	$669	$558	$56	$46
Fetterhoff Church	Alternative 3	$1,124,100	$50,253	$17,000	$67,253	$226,004	$1,350,104	50	60	$27,002	$1,345	$1,121	$112	$93
Matamoras, Route 147 & 225, and Triangle & Lenker Estates	Alternative 4A	$1,833,275	$81,956	$133,000	$214,956	$1,768,151	$3,601,426	507	588	$7,103	$424	$366	$35	$30
	Alternative 4B	$3,051,950	$136,437	$47,900	$184,337	$636,800	$3,688,750	507	588	$7,276	$364	$313	$30	$26
	Altternative 4C	$2,493,675	$111,480	$78,600	$190,080	$1,044,937	$3,538,612	507	588	$6,980	$375	$323	$31	$27
	Alternative 4D	$2,559,700	$114,431	$74,400	$188,831	$989,101	$3,548,801	507	588	$7,000	$372	$321	$31	$27
	Alternative 4E	$2,718,950	$121,551	$79,900	$201,451	$1,062,220	$3,781,170	507	588	$7,458	$397	$343	$33	$29

Notes:

1. Annual Debt Service Calculations Assume USDA RUS Financing of 3.25% for 40 Years
2. Tapping Fees have been subtracted from Estimated Project Cost based on the existing HAWASA tapping fee of $4,948.02/EDU and the number of EDUs presented in Column 9
3. Present Worth Calculations Assume 4.25% for 20 Years
4. Annual O&M Estimated based on typical common useage

Table 5-21 Summary of Bond Financing (4.5%, 20yrs)

Summary of Cost Opinions for Structural Alternatives - Bond Financing (4.5%, 20yrs)														
Study Area	Alternative	Estimated Project Cost	Estimated Annual Debt Service	Estimated Annual O&M Cost	Estimated Annual Cost	Present Worth of Annual O&M	Total Present Worth	Number of EDUs	Number of Projected EDUs	Estimated Present Worth Per EDU	Estimated Annual Cost Per EDU	Estimated Annual Cost Per Projected EDU	Estimated Monthly Cost Per EDU	Estimated Monthly Cost Per Projected EDU
Matamoras, Route 147 & 225, and Triangle & Lenker Estates	Alternative 1A	$8,124,700	$616,810	$133,000	$749,810	$1,768,151	$9,892,851	347	417	$28,510	$2,160.84	$1,798.11	$180	$150
	Alternative 1B	$12,999,400	$986,887	$47,900	$1,034,787	$636,800	$13,636,200	347	417	$39,297	$2,982	$2,481.50	$249	$207
	Altternative 1C	$10,766,300	$817,355	$78,600	$895,955	$1,044,937	$11,811,237	347	417	$34,038	$2,582	$2,148.57	$215	$179.05
	Alternative 1D	$11,030,400	$837,405	$74,400	$911,805	$989,101	$12,019,501	347	417	$34,638	$2,628	$2,186.58	$219	$182
Tourist Park	Alternative 2A	$2,836,300	$215,326	$46,500	$261,826	$618,188	$3,454,488	125	150	$27,636	$2,095	$1,745.51	$175	$145
	Alternative 2B	$4,047,400	$307,270	$38,400	$345,670	$510,504	$4,557,904	125	150	$36,463	$2,765	$2,304	$230	$192
Fetterhoff Church	Alternative 3	$4,496,400	$341,357	$17,000	$358,357	$226,004	$4,722,404	50	60	$94,448	$7,167	$5,973	$597	$498
Matamoras, Route 147 & 225, and Triangle & Lenker Estates	Alternative 4A	$7,333,100	$556,714	$133,000	$689,714	$1,768,151	$9,101,251	507	588	$17,951	$1,360	$1,173	$113	$98
	Alternative 4B	$12,207,800	$926,791	$47,900	$974,691	$636,800	$12,844,600	507	588	$25,335	$1,922	$1,658	$160	$138
	Altternative 4C	$9,974,700	$757,259	$78,600	$835,859	$1,044,937	$11,019,637	507	588	$21,735	$1,649	$1,422	$137	$118
	Alternative 4D	$10,238,800	$777,308	$74,400	$851,708	$989,101	$11,227,901	507	588	$22,146	$1,680	$1,448	$140	$121
	Alternative 4E	$10,875,800	$825,668	$79,900	$905,568	$1,062,220	$11,938,020	507	588	$23,546	$1,786	$1,540	$149	$128

Notes:

1. Annual Debt Service Calculations Assume Bond Financing of 4.5% for 20 Years
2. Tapping Fees have been subtracted from Estimated Project Cost based on the existing HAWASA tapping fee of $4,948.02/EDU and the number of EDUs presented in Column 9
3. Present Worth Calculations Assume 4.25% for 20 Years
4. Annual O&M Estimated based on typical common useage

5.11 CONCLUSIONS

Based on the discussion above, the following are recommendations for the wastewater planning needs enumerated in Chapter 4.

1. Halifax Township shall develop and adopt an Ordinance governing the management of on-lot disposal systems (OLDS) within the Township.

As mentioned above, through further development, evaluation, and public education, an OLDS Management Ordinance should be developed and adopted by the Township to ensure that proper operation and maintenance of OLDS is conducted by the Township's residents. Repairs to the malfunctioning systems should be made a priority as part of this Plan development to protect the existing OLDS against future failure by the fourth year after this Plan's adoption.

This Ordinance should provide requirements for the permitting, inspection, operation, maintenance, and rehabilitation of OLDS within the Township. Recommended periodic pumping of OLDS should be included within the Ordinance. Successful implementation of such an Ordinance is expected to have a positive impact on surface water and drinking water supplies in areas of the Township where OLDS systems are utilized. Periodic pumping of the tanks will provide for improved operation of the systems and will help to eliminate the occurrence of OLDS malfunctions. Currently, Halifax Township does not have any ordinances or regulations requiring mandatory OLDS pumping. The implementation of an OLDS Management Ordinance will allow the Township to further evaluate the need for improved sewage facilities after tank pumping activities have commenced for some period of time.

2. Public sewer service should be provided for the Matamoras, Route 147 & 225, Triangle & Lenker Estates Areas.

As shown in the cost analyses of the proposed structural alternatives presented above, the provision of public sewer service to the Matamoras, Route 147 & 225, Triangle & Lenker Estates Areas is not economically feasible as a standalone project. However, the provision of public sewer to these areas becomes more feasible when including additional EDUs and with favorable funding and/or additional contributions.

The structural alternatives evaluated in this Act 537 Plan to provide public sewer service to the Matamoras, Route 147 & 225, Triangle & Lenker Estates Areas represent technically feasible solutions for wastewater management in these areas, but not all of the solutions are cost effective as presented. Of the alternatives evaluated for these areas, it is recommended that the Township pursue Alternative 4D. This alternative provides the lowest estimated amount of low pressure sewer (and grinders) for these areas without utilizing multiple pump stations, this alternative makes it feasible for future growth and collection of future flows, and this alternative has the lowest estimated cost per user (excluding a full low-pressure system) based on projected EDUs and assumptions.

This alternative should be implemented when an updated inter-municipal agreement is negotiated with the Halifax Area Water and Sewer Authority (HAWASA) and funding is secured. Without an updated inter-municipal agreement, development agreements, and favorable funding (public and private) this alternative is not feasible and should not be implemented. This

alternative is environmentally favorable, resulting in the abandonment of malfunctioning OLDS in the study area, and the potential abandonment of an existing packaged wastewater treatment facility that had some issues as noted by PADEP. This alternative also provides proper planning for potential future growth in the Township.

Alternatives formulated to provide public sewer service to the Tourist Park and Fetterhoff Church Areas are some of the most costly structural alternatives per user identified in this Plan due to the amount of infrastructure that must be built to serve the small number of properties currently located in these areas of the Township. It is recommended that public sewer service not be provided to the Tourist Park and Fetterhoff Church Areas at this time; however, the Township may consider providing public sewer service in these areas if the projected user base increases to a point where the project would become economically feasible, when upgrades to the Main Pumping Station upgrades are completed, and/or if funding becomes available through developers or private entities.