MidAtlantic

March 12, 2024
Last revised December 30, 2025

Project# BAR-2301

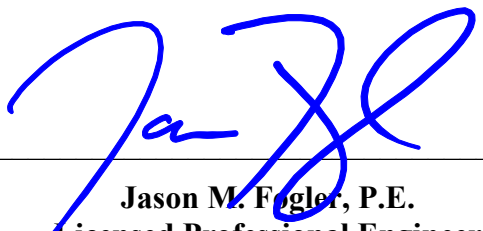
ENGINEER'S REPORT
FOR WATER SERVICE CONNECTION
BEACHWAY AVENUE II REDEVELOPMENT PLAN

BLOCK 184, LOT 1
BOROUGH OF KEANSBURG, MONMOUTH COUNTY, NEW JERSEY

PREPARED FOR:
BEACHWAY AVENUE REALTY, LLC

PREPARED BY:

MidAtlantic Engineering Partners
1971 Highway 34, Suite 201
Wall Township, New Jersey 07719



Jason M. Fogler, P.E.
Licensed Professional Engineer
New Jersey License No. GE05030300

TABLE OF CONTENTS	
I. INTRODUCTION	**1**
II. PROPOSED PROJECT	**1**
III. PROJECT DEMAND	**2**
IV. CONCLUSION	**2**

APPENDICES	
APPENDIX A – USGS MAP	
APPENDIX B – TECHNICAL SPECIFICATIONS	
APPENDIX C – COST ESTIMATE	

I. INTRODUCTION

The subject property is known as Block 184, Lot 1 and contains a total of 2.71 Acres. The site is located between Beachway Avenue and the Raritan Bay in the Borough of Keansburg, Monmouth County.

The existing site is previously developed with existing bituminous pavement and utility infrastructure. All structures and impervious areas will be demolished and removed in the proposed plan. The proposed project will construct three (3) five-story condominium buildings, two of which containing 20 units, and one containing 24 units, for a total of 64 units and associated parking, stormwater management measures, and associated grading. Each building includes individual garages at ground level beneath the structure.

This report analyzes the on-site water system design and establishes the proposed water demand for the project. This report is intended to further support applications for approval of the water system improvements by Keansburg Water & Sewer.

II. PROPOSED PROJECT

The project consists of 4" DIP domestic services and 4" DIP fire services that will connect to the existing water main on Beachway Avenue. Each of the three (3) buildings will connect to the existing water main via one (1) domestic service and one (1) fire service, resulting in a total of approximately 694 LF of 4" DIP. No proposed water main extension is proposed as part of this application. The proposed water service connections will be constructed in compliance with the Standards of the New Jersey Department of Environmental Protection, Bureau of Safe Drinking Water. ("New Jersey Safe Drinking Water Act, N.J.A.C. 7:10-11.1 et seq. – Standards for the Construction of Public Community Water Systems.") and the requirements of Keansburg Water and Sewer. Water service and plumbing shall conform to the requirements of the Plumbing Sub-code of the State of New Jersey Uniform Construction Code, N.J.A.C. 5:23-3.15.

As previously mentioned, fire protection for the proposed buildings will be provided by 4" ductile iron pipes to the proposed building. The service will connect to an internal sprinkler system in accordance with applicable requirements of the Borough fire bureau. One (1) fire hydrant is proposed on the site, which will connect to the existing water main in Beachway Ave via a 6" DIP hydrant extension. The proposed services will provide adequate pressure for domestic service (including peak periods) and during a single fire event.

III. PROJECT DEMAND

The daily residential water demands were based on N.J.A.C. 5:21-5.1 – Table 5.1 with units classified as "Low and mid-rise." The demand is calculated as follows:

Proposed Average Daily Demand:

2-Bedroom Apartment: $Q_{avg.}$ = 140 gpd/unit x 64 units = 8,960 gpd.

Total Proposed Average Daily Demand: 8,960 GPD ≈ 0.0089 MGD

Peak Daily Demand:

Peak Demand: 0.0089 mgd x 3 = 0.0269 mgd

IV. CONCLUSION

Based upon project design and planning, the water distribution system will meet projected peak demands and fire flows imposed by the residential development.

APPENDIX A
USGS MAP

MidAtlantic
Engineering Partners, llc

Certificate of Authorization No. 24GA28184000

Louis L. Zuegner IV P.E. PE No. GE04226500
William J. Parkhill II P.E. PE No. GE04753800

2026B Briggs Road, Suite 300
Mount Laurel, NJ 08054
856-234-0800

BEACHWAY AVENUE WATERFRONT REDEVELOPMENT
BLOCK 184, LOT 1
USGS QUAD MAP

SITUATED IN
BOROUGH OF KEANSBURG, MONMOUTH COUNTY, NEW JERSEY

DRAWN BY:	CHECKED BY:	RELEASED BY:	PROJECT No.:
SMN	JMF	JMF	BAR-2301
DATE:	**HORIZONTAL SCALE:**	**VERTICAL SCALE:**	**DRAWING NAME:**
09/21/23	1"=1000'	AS SHOWN	01-Title.dwg

Name: G:\Beachway Avenue Realty\JOBS\BAR-2301 Beachway Ave - Keansburg\Civil\DWG\01-Title.dwg
Plot time: Sep 18, 2023 - 4:08pm

APPENDIX B
TECHNICAL SPECIFICATIONS

TECHNICAL SPECIFICATIONS

1.0 MATERIALS

1.01 Pipe and Fittings

Pipe material to be used in construction of water mains shall be Class 52, cement lined ductile iron pipe manufactured in accordance with ANSI A21.5 AWWA C151 and installed in accordance with manufacturer's recommendation.

Ductile iron pipe shall be centrifugally cast in metal or sand molds in accordance with the latest ANSI Specification A21.51(AWWA C-101), thickness Class 52, unless otherwise required. The joint shall conform with the requirements of ANSI A.21.11 (AWWA C-111) and shall be of a type that employs a single elongated grooved gasket to effect a joint seal, such as United States Cast Iron Pipe Company's "Tyton" joint, James B. Clow and Sons, Inc. "Bell-tite" or approved equal.

The outside of all pipe and fittings shall be coated with a uniform thickness of a bituminous coating and the inside of the pipe shall be lined with a double thickness of cement mortar and bituminous seal in accordance with the American Standard Specifications for cement mortar lining for cast iron pipe fittings, ANSI A21.4 (AWWA C-104).

All fittings shall be ductile iron Class 350, suitable for use with DIP and conforming to ANSI A21.10 (AWWA C-110). Fittings shall be mechanical joint; end plugs shall be set screw type.

1.02 Gate Valves

Gate valves shall be AWWA non-rising stem type with valve box, M&H metropolitan mechanical joint gate valves as manufactured by Dresser Company or approved equal, conforming to the latest AWWA Standard for Gate Valves - 3 in. through 48 in. - for Water and Other Liquids, AWWA Designation C-500. Sizes up to and including 12" shall be 200 p.s.i. working pressure; 16" shall be 150 p.s.i. working pressure with bypass provisions. The valves must have "O" ring seals, inside screw and parallel seats and be so constructed that they will give an unobstructed passage of at least the full pipe area. They shall be perfectly tight when closed. The ends of the valves shall correspond in type and dimension with those of the pipe. All valves shall be arranged to open left and close right direction unless otherwise indicated on the Plans and operating nuts shall be 2" square. The valves shall be tested to a pressure of not less than 400 lbs. per

square inch. All valves shall be 100% solid heat cure epoxy coated and holiday free within the waterway and shall be suitable for locations intended.

1.03 Service Loop

A house service connection shall be comprised of a corporation stop at the main, a curb stop located two feet (2') on the street side of the property line, and an inside compression stop; in that order.

House service connection pipe shall be not less than 4' deep and a minimum of 3/4" in diameter, Type K copper.

1.04 Tapping Sleeves & Valves

Tapping sleeves shall be ductile iron or cast iron dual compression type and extra heavy pattern of the sizes suitable for use on the pipe on which the respective sleeve is to be installed and for use with the tapping valves. They shall be designed for a working pressure of 200 p.s.i. and the same manufacturer as the tapping valves. Cast iron tapping sleeves shall be as manufactured by Mueller Company or an approved equal.

Tapping valves shall conform to the applicable requirements of AWWA C507. Tapping valves shall have flanged inlet with mechanical joint outlets, enclosed bevel gears, bypass valve, rollers, tracks and scrapers.

Installation of the tapping sleeves, tapping saddle, and tapping valve is to be in accordance with the manufacturers instructions. The tapping procedure is to be in accordance with the tapping machine manufacturer's instructions. After installation of the tapping sleeve and valve assembly but prior to making the tap the assembly shall be pressure tested hydrostatically to the test pressure specified in Section 3.07 with no allowable pressure prop.

1.05 Valve Boxes

Valve boxes shall be Keansburg standard as manufactured by Bingham and Taylor, or approved equal. Boxes shall have a minimum of 5-1/4 inch diameter and shall be an adjustable screw type with the box extending from the surface to three (3") inches above the valve bonnet base. Valve box shall be cast iron with a standard coal tar foundry dip with cast iron water drop cover and the word "water" cast in cover. Valve box cover shall be installed flush with the existing grade elevation.

1.06 Broken Stone

Unless otherwise approved by the engineer, broken stone shall be installed as bedding for all piping, valves and hydrants. Broken stone shall be nominal 3/4" size and shall be installed a minimum or 6" thick under ductile iron piping and minimum to spring line of polyvinyl chloride pipe.

1.07 Backfill Material

Material for backfill may consist of run of the bank sand and gravel containing not more than two percent (2%) elutriable clay.

1.08 Road Material

1.08.1 Stone and Gravel

Stone for base course shall conform to New Jersey Department of Transportation Standards for Broken Stone and be of the size known commercially as 1-1/2" Quarry Blend, of which 100% shall pass a 2-1/4" screen with round openings. Not less than 20% nor more than 30% shall pass a #4 sieve, and not more than 10% shall pass #200 sieve.

Gravel for base course shall be placed at the grade and contour shown on the plan. Gravel shall be Type 2, Class A or Class B.

1.08.2 Bituminous Concrete

For temporary surfacing, the commercial mixtures of Bituminous Concrete known as Cold Patch may be used only as approved by Engineer. The final surfacing shall be done with Bituminous concrete Type FABC, mixed in accordance with applicable standards of the New Jersey Department of Transportation.

1.08.3 Concrete

Concrete for gutter, curb, sidewalk, and drives shall have a 28 day strength of 4,500 psi, shall match the color of the existing concrete as nearly as possible and shall be finished so that the surface texture matches the original.

1.09 Polyethylene Encasement

Piping shall be encased in polyethylene to prevent contact with surrounding backfill and bedding material in areas shown or designated by the Engineer. Polyethylene material shall be installed in accordance with ANSI/AWWA C105/A21.5 Standards.

Polyethylene material will deteriorate rapidly when exposed to direct sunlight. Store all polyethylene encasement out of the sunlight. If during the installation period it is anticipated that the polyethylene encasement will be exposed to sunlight for more than two weeks (i.e., an open trench) Type C (black) polyethylene material must be used.

Service taps for polyethylene encased pipe shall follow the procedure described in AWWA Standard C600-87 Section 7.1.

2.0 EXISTING UTILITIES AND STRUCTURES

2.01 Scope Of Work

Attention to the Contractor is directed to the fact that the approximate locations of known utility structures and facilities (including but not limited to sanitary sewers, storm sewers, potable water lines and appurtenances, natural gas lines, electric, telephone and CATV lines and underground storage tanks) that may be encountered with and adjacent to the limits of the work are shown on the plans. The accuracy and completeness of this information is not guaranteed by the Engineer, and the Contractor is advised that he shall verify in the field all the facts concerning the location of these utilities or other construction obstacles prior to construction. The Contractor shall notify the Engineer, in writing, prior to construction, of any discrepancies which may affect the project design.

2.02 Notifications Of Utilities

Contractor shall notify all utility companies through, the NJ One Call System, that construction of the work under this Contract will pass through the areas where their services exist. Notification to the utilities must be made in a sufficient amount of time in advance (min. 72 hours) prior to start of any construction work in the affected areas.

2.03 Materials

Materials for temporary support, adequate protection, and maintenance for all underground and surface utility structures, drains, sewers and other obstructions encountered in the progress of the work shall be furnished by the Contractor at his own expense.

2.04 Obstructions By Other Utility Structures

Where the grade or alignment of the pipe is obstructed by existing utility structures such as conduits, ducts, pipes, branch connections to main sewers, or drains, the obstruction shall be permanently supported, relocated, removed or reconstructed by the Contractor in cooperation with the owners of such utility structures. Before proceeding the Contractor must reach an agreement with the Engineer on method to avoid obstruction.

No deviation shall be made form the required line or depth except with the consent of the Engineer.

2.05 Repairs

Existing pipes or conduits crossing the trench, or otherwise exposed, shall be adequately braced and supported to prevent trench settlement from disrupting the line or grade of the pipe or conduit, all in accordance with the direction of the Engineer. Utility services broken or damaged shall be repaired at once to avoid inconvenience to customers. Storm sewers shall not be interrupted overnight. Temporary arrangements, as approved by the Engineer, may be used until any damaged items can be permanently repaired. All items damaged or destroyed by construction and subsequently repaired must be properly maintained by the Contractor.

2.06 Relocation

Where it is necessary to relocate an existing utility or structure, the work shall be done in such a manner as is necessary to restore it to a condition equal to that of the original facility. No such relocation shall be done until approval is received form the owner of the utility or structure being changed.

2.07 Separation Of Water Mains, Sanitary Sewer And Storm Sewers

A. General

The following factors should be considered in providing adequate separation:

(1) Materials and type of joints for water and sewer pipes,

(2) Soil conditions,

(3) Service and branch connections into the water main and sewer line,

(4) Compensating variations in horizontal and vertical separations,

(5) Space for repair and alterations of water and sewer pipes,

(6) Off-setting of pipes around manholes.

B. Parallel Installation

Water mains shall be laid at least 10 feet horizontally form any existing or proposed sewer. The distance shall be measured edge to edge. In cases where it is not practical to maintain a 10 foot separation, the New Jersey Department of Environmental Protection may allow deviation on a case-by-case basis, if

supported by data from the Engineer. Such deviation may allow installation of the water main closer to a sewer, provided that the water main is laid in a separate trench or on an undisturbed earth shelf located on one side of the sewer at such an elevation that the bottom of the water main is at least 18 inches above the top of the sewer.

C. Crossings

Whenever water mains must cross building drains, storm drains, or sanitary sewers, the water main shall be laid at such an elevation that the bottom of the water main is 18 inches above the top of the drain or sewer. this vertical separation shall be maintained for the portion of the water main located within 10 feet horizontally of any sewer or drain it crosses. The 10 feet is to be measured as a perpendicular distance from the drain or sewer line to the water line.

D. Exception

When it is impossible to obtain the proper horizontal and vertical separation as stipulated above the Engineer is to be notified. If directed by the Engineer both the water main and sewer line shall be constructed of cast iron, ductile iron, galvanized steel or protected steel pipe having mechanical joints. Other types of joints of equal or greater integrity may be used at the discretion of the Engineer after consultation with the New Jersey Department of Environmental Protection. Thermoplastic pipe may be used provided mechanical or solvent weld pipe joints are used. These shall be pressure-tested to assure water tightness before backfilling. Where water mains must cross under a sewer, additional protection shall be provided by:

(1) A vertical separation of at least 18 inches between the bottom of the sewer and the top of the water line.

(2) Adequate structural support for the sewers to prevent excessive deflection of the joints and the settling on and breaking of the water line.

(3) That the length of the water line be centered at the point of the crossing so that the joints shall be equidistant and as far as possible from the sewer.

Through the Engineer the New Jersey Department of Environmental Protection shall be consulted when any of the above conditions cannot be met to discuss the use of double casing or concrete encasement of sewer and/or water lines as possible alternatives.

3.0 CONSTRUCTION

3.01 Piling of Materials

All materials shall be neatly piled, and the excavated material shall be banked on one side of the trench and stabilized to leave a clear footway of two feet between the bank and the trench to create as little inconvenience to owners of neighboring properties and to the public as possible. Gutters, driveways and street crossings must be kept clear, except when the latter are unavoidably obstructed by the open trench.

3.02 Precautions

All excavations, embankments, materials, rubbish and heaps of other obstacles incident to the work must be enclosed with barricades and well-lit to prevent accidents. Special precautions must be taken to secure buildings and property near the excavation. All ordinances relating to such precautions and the safeguards must be faithfully observed by the Contractor, as he shall be held personally amenable for any disregard or violation of them by his employees or agent.

The Contractor shall specifically comply with the OSHA Standards for Excavations (29 CFR Part 1926, Subpart P), "OSHA Standards". As such, the Contractor shall be responsible for providing a "competent person" as defined in the OSHA Standards and as required by the standards. The Contractor shall be solely responsible for the selection, design, installation, and implementation of all "protective systems" as defined in the OSHA standards. The pipeline design by the Engineer does not include the design of the "protective systems" since the design of the "protective systems" is the responsibility of the Contractor.

3.03 Dewatering

The dewatering of all areas where work must be performed under this Contract is the responsibility of the Contractor and no additional sum will be allowed for any dewatering operation, overtime, equipment rental or any other expense incurred due to the occurrence of groundwater, surface water or water from possible leakage of existing buildings, structures and piping in the vicinity of the CONTRACTOR'S operations.

Should water be encountered, the Contractor shall furnish and operate suitable pumping equipment of such capacity adequate to dewater the trench. The trench shall be sufficiently dewatered so that the laying and joining of the pipe is made in the dry. the Contractor shall convey all trench water to a natural drainage channel

or storm sewer without causing any property damage and in strict accordance with state and/or local requirement.

Disposal of silt and debris which accumulates during construction shall be performed in strict accordance with state and/or local requirements.

3.04 Permits

The Contractor shall be responsible for obtaining and paying for any permits required for dewatering and disposal.

3.05 Pipe Bedding and Trenching

The minimum depth of cover shall be four feet (4") from the top of the pipe to the finished grade.

The trench shall be dug to the required depth and alignment shown on the plans. The trench shall be braced and drained when necessary so that workmen may work therein safely and efficiently in compliance with current OSHA requirements.

The trench width at the ground surface may vary with and depend upon its depth and the nature of the ground encountered. Unless otherwise authorized by the Engineer in writing, the trench width shall be ample to permit proper installation of the pipe or accessories and proper placing and compacting of backfill. Unless otherwise authorized by the Engineer, the minimum clear width of sheeted or unsheeted trench shall be 18 inches (18") or one foot greater than the outside diameter of the barrel of the pipe, whichever is greater, and maximum width of trench at the top of the pipe shall not be greater than the outside diameter of the barrel of the pipe plus two feet.

In cases where use of special equipment designed to cut narrow trenches is permitted in writing by the Engineer, precaution shall be exercised to insure bearing for the full length of the barrel of the pipe. When ordered by the Engineer, the backfill shall be compacted by puddling with water.

The trench, unless otherwise specified, shall have a flat bottom conforming to the grade to which the pipe is to be laid. The pipe shall be laid upon sound soil cut true and even, so that the barrel of the pipe will have a bearing for its full length. When any part of the trench is excavated below grade by the Contractor's inadvertence or where, in the opinion of the Engineer, the use of a machine excavator has rendered unfit an otherwise suitable bottom, the trench shall be corrected with approved material, thoroughly compacted. When the bottom material uncovered at subgrade is soft and in the opinion of the Engineer, cannot support the pipe, further depth and/or width shall be excavated and refilled to pipe foundation grade as required.

Ledge rock, boulders and large stones shall be removed to provide a clearance of at least six inches below all parts of the pipe, valves or fittings. Excavations below grade in rock or in boulders shall be refilled to grade with choked stone no larger than one inch in size, thoroughly compacted to provide support for the pipe.

Wherever necessary to prevent caving, the trench shall be adequately sheeted and braced. The sheeting shall remain in place until the pipe has been laid and the earth around it compacted to a minimum depth of two feet (2') over the top of the pipe. All pipe and accessories shall be carefully lowered into the trench pieces by

piece in such a manner as to prevent damage. Under no circumstances shall the pipe and accessories be dropped or dumped into the trench.

Every precaution shall be taken to prevent foreign material from entering the pipe. During laying operations no debris, tools, clothing or other material shall be placed in the pipe.

At times when pipe laying is not in progress, the open ends of pipe shall be closed by a watertight plug or other means satisfactory to Engineer.

Whenever it is necessary to deflect pipe from a straight line either in a vertical or horizontal plane, the amount of deflection in each joint shall not exceed four degrees.

3.06 Setting Fittings

Reaction or thrust backing shall be placed at bends and tees, and where changes in pipe diameter occur at reducer or in fittings. The size and shape of concrete thrust backing shall be as indicated on the appended detail sheet.

Reaction or thrust backing shall be placed at plugs and caps unless another method of restraint shall be directed by the Engineer.

Reaction or thrust backing shall be or a concrete mix not leaner than 1 cement, 2-1/2 sand, 5 stone, having compressive strength of not less than 4,000 psi at 28 days when using standard cement. Backing shall be placed between solid ground and the fitting. The backing shall be placed so that the pipe and fitting joints will be accessible for repair unless otherwise directed by the Engineer.

Valve boxes shall be firmly supported and maintained centered and plumb over the operating nut or the valve, with box cover flush with the surface of the finished pavement or at such other level as may be directed by the Engineer.

Hydrants shall be placed in locations designated on the plans. When placed behind curbs the hydrant shall be set so that no portion of the hydrant on the street side is less than six inches (6") or more than twelve inches (12") from the vertical faces of the curb, unless otherwise directed by the Engineer.

Whenever directed by the Engineer, a drainage pit two feet (2') in diameter and two feet (2') deep shall be excavated below each hydrant. The pit shall be filled compactly with coarse gravel or broken stone mixed with coarse sand, under and around the base of the hydrant to a level six inches (6") above the waste opening. No hydrant drainage pit shall be connected to a sewer.

A reaction or thrust backing shall be provided at the base of each hydrant and shall be provided at the base of each hydrant and shall not obstruct the drainage outlet of the hydrant, or the base of the hydrant shall be tied to the pipe line as directed by the Engineer.

3.07 Inspection of Water System

All construction of water systems shall be under the jurisdiction of the owner's Engineer and the Engineer for the Keansburg Water Department, either directly or through inspectors under his supervision. He shall enforce compliance with the approved plans and specifications. He shall have the authority to stop work in the event of non-compliance.

The Contractor shall give 48 hours notice to the Owner and the Keansburg Water Department prior to construction of water systems at all times during the construction period for the project. Should any water construction be performed wherein a qualified inspector is absent due to the Contractor's failure to provide the proper notification, the Owner may require said work to be uncovered at the Contractor's expense. Failure to do so may result in non-acceptance of the work.

3.08 Testing of Completed Water System

All pipe lines shall be pressure and leakage tested prior to construction of permanent pavement repair, a minimum of seven days after the last concrete thrust block has been cast if constructed with normal Portland cement. All materials and equipment required for testing shall be supplied by the Contractor.

Hydrostatic of the testing of ductile iron pipe shall conform to AWWA Standard C-600 Section 13.

The pressure test shall be performed by increasing the hydrostatic pressure to a specified value and maintaining the pressure for a period of one hour. Any pipe, fittings, or valves found defective shall be replaced. Prior to performing the test, all air pockets and bubbles must be eliminated. Hydrostatic test pressure shall be 250 psi for ductile iron and polyvinyl chloride pipe.

The leakage test shall be performed after the pressure test has been satisfactorily completed and shall be accomplished by increasing the hydrostatic pressure to a specified value and maintaining that pressure for a period of two hours. Leakage is the quantity of water that must be supplied into the newly laid pipe, or any valued section thereof, to maintain the specified leakage test pressure after the air in the pipeline has been expelled. The hydrostatic pressure for the leakage test shall be 150 psi. The leakage from each portion of the pipeline being tested shall not exceed 25 gallons per inch of internal diameter per mile of pipe per day for ductile iron or polyvinyl chloride pipe. If any test of pipe laid discloses a greater leakage than specified, the Contractor shall , at his own expense, locate and repair the defective joints until the leakage is within the specified allowance.

3.09 Disinfection

All pipelines shall be disinfected in conformance with AWWA Standard C-601 for disinfection water mains prior to being put into service. Hypochlorite and liquid for use in disinfection shall conform to AWWA Standards B-300 and B-301, respectively.

All pipelines shall be thoroughly flushed before introduction of chlorinating materials which shall be done in an approved manner. The amount of chlorine shall be such as to provide a dosage of not less than 50 parts per million. the chlorinated water shall be retained in the main for at least 24 hours during which time all hydrants and valves in the section treated shall contain no less than 25 parts per million chlorine throughout the length of the main.

After the applicable retention period, heavily chlorinated water should not remain in contact with pipe for more than 48 hours. In order to prevent damage to the pipe lining or corrosion damage to the pipe itself, the heavily chlorinated water shall be flushed from the main until chlorine measurements show that the concentration in the water leaving the main is no higher than that generally prevailing in the system or is acceptable for domestic use. Contractor shall contact the local sewer department to arrange for disposal of the heavily chlorinated water to he sanitary sewer.

The chlorine residual of water being disposed shall be neutralized by treating with one of the chemicals listed in the Table below. If a sanitary sewer system is unavailable for disposal of the chlorinated water an alternative disposal site must be selected.

The proposed alternative disposal site to which the chlorinated water is to be discharged shall be inspected and approved by the Engineer. A reducing agent shall be applied to the chlorinated water to be wasted to completely neutralize the chlorine residual remaining in the water. (See Table 5 for neutralizing chemicals). Where necessary, federal, state and local regulatory agencies should be contacted to determine special provisions for the disposal of heavily chlorinated water.

TABLE

Pounds of chemical required to neutralize various residual chlorine concentrations in 100,000 gallons of water.

Residual Chlorine Concentration mg/L	**Sulfur Dioxide ($S0_2$)**	**Sodium Bisulfate ($NaHS0_3$)**	**Sodium Sulfite ($NaS0_3$)**	**Sodium Thiosulfate ($Na_2S_20_3.5H_20$)**
1	0.8	1.2	1.4	1.2
2	1.7	2.5	2.9	2.4
10	8.3	12.5	14.6	12.0
50	41.7	62.6	73.0	60.0

After flushing, the Contractor shall then have samples taken by an approved testing laboratory and bacteriological analysis made. Should the initial treatment prove ineffective, disinfection shall be repeated until satisfactory samples have been obtained.

3.10 Backfilling and Cleaning Up

Selected backfill material approved by the Engineer, unfrozen and free from rock, large stones, boulders or other unsuitable substances, shall be deposited in the trench uniformly on both sides of the pipe for the full width of the trench. This backfill material shall be tamped in four inch (4") layers and shall be sufficiently damp to permit thorough compaction under and on each side of the pipe to provide support free from voids to a cover of twelve inches (12") over the barrel of the pipe. After the pipe barrel has a twelve inch (12") cover fully compacted, the backfill shall be placed in layers not exceeding eight inches (8') until the entire trench is backfilled. No layer shall be placed until the prior layer is thoroughly and fully compacted.

The Contractor shall restore and /or replace paving, curbing, sidewalks, gutters, shrubbery, fences, sod or other disturbed surfaces or structures to a condition equal to that before the work began and the satisfaction of the Engineer.

In paved streets or roads, the edges of the paved areas to be excavated shall be cut vertically with an approved cutting tool prior to the excavation of the trench. At the end of each work day temporary paving shall be installed on all trenches excavated during the day in all residential, commercial and industrial areas, as well as any main thoroughfares, as required by governmental regulations, as necessary to protect persons and property and to the satisfaction of the Engineer.

All existing lawn areas shall be restored with sod unless otherwise specified by the Engineer.

Tools, temporary structures, and rubbish shall be removed by the Contractor and the construction site shall be left clean to the satisfaction of the Engineer. Any excess dirt shall be swept up and removed from the developed areas, and the construction site shall be left with a neat and clean appearance to the satisfaction of the Engineer.

4.0 Traffic Protection

4.01 General

The Contractor shall provide and install any and all traffic barricades, markers, signage and controls and furnish flagmen, traffic police, and other facilities required by the federal, state or other local government authorities and the Engineer to protect the general public and maintain the existing roads, streets and highways.

Competent uniformed traffic directors shall be required at every location where the Contractor's equipment is working immediately adjacent to, entering, leaving, and or is crossing active traffic lanes. The traffic directors shall be continuously employed for the entire time such conditions exist.

Special attention shall be given to the protection of pedestrians, especially children going to and coming from school. A means of ingress and egress shall be maintained for all properties abutting the worksite at all times.

The Contractor shall notify the Federal, State and Local Police, fire departments, and ambulance services of any and all traffic diversions.

The Owner or Engineer makes no guarantee or representation that the Contractor will be permitted to divert traffic and the Contractor shall be fully responsible to comply with all obligations of the Contract regardless of any restrictions which may be imposed by Federal, State, of Local Authorities.

4.02 Maintaining Traffic

Whenever it becomes necessary to divert traffic from its design flow channel into another channel, such diversion shall be clearly marked out with the use of cones, drums, barricades, signage or the use of temporary guardrail. If the diversion is to remain into the evening hours, suitable lighting shall be provided and maintained.

Whenever one way traffic is established, at least two flagmen shall be employed.

When and where permitted by jurisdictional agencies, the Contractor may close streets for minimal periods of time. The Contractor must notify and acquire the permission of local police and fire departments, local public authorities, and if so require by any law, regulation or ordinance, occupants or owners of all premises bordering the streets. The Contractor must provide adequate notice to all occupants and owners with respect to the closing of any street, in whole or in part, even when not required by any law, ordinance, or regulation. The Contractor shall

schedule his work to keep the duration of the street closing to a minimum, and wherever possible, during off peak hours. The Contractor shall provide access for police, fire, ambulance, and emergency vehicles at all times. Fire hydrants and other public utility valves shall remain accessible at all times.

4.03 Traffic Controls and Signals

The installation of all traffic control devices shall conform to the requirements of all federal, state and local government highway departments.

To protect persons from injury and to avoid potential property damage, adequate barricades and guards as required will be placed and maintained during the course of the construction work and until it is safe for traffic and pedestrians to use the trenched area.

When the Contractor is permitted to close a street or road to traffic, the Contractor shall furnish, erect, maintain and remove barricades, lights, and other traffic diversion devices at the limits of the project, where side streets intersect, and at other points of public access to the project site.

The Contractor provide and maintain advanced warning and barricades on side streets at the first street intersection beyond the one closed by construction stating " Street Closed. One Block Ahead". In addition, the Contractor shall remove detour signs on temporary routes when appropriate.

Before the completion of each day's work, in traveled areas, the pipe trench shall be completely backfilled and tamped, and a necessary temporary paving installed. 3/4/ inch stone base will be used in the sidewalk and walkways and blacktop in driveways. These areas are not to be left open, impassable or unsafe through the night. In the event the trench can not be completely backfilled and tamped, temporary bridges and crossings shall be used to accommodate the general publics need for through traffic. The job site will be left in a neat and satisfactory condition at the end of each day. These requirements are in conjunction with and federal, state or local laws, rules, regulations, or ordinances or any requirements found elsewhere in the Contract Documents.

Any and all equipment stored on the site shall be clearly marked at all times. In the evening, any such material and equipment to be stored between side ditches or between the lines five feet behind raise curbs, must be outlined or clearly marked with an appropriate warning device and be approved by the Engineer. The Contractor shall also provide and maintain any and all lighting, barricades, signage, or other necessary devices that may be needed for the protection of pedestrian traffic.

4.04 Additional Requirements

If the regulation of traffic controls and devices are not being provided in accordance with these specifications, and the public is being inconvenienced or its welfare is being endangered, in the judgment of the Engineer, the Owner may take such steps as he/she deems advisable to provide such services and all costs in providing such services will be deducted from any payment which may be due of may thereafter become due to the Contractor.

APPENDIX C
COST ESTIMATE

MidAtlantic

Cost Estimate of Water Improvements

Beachway Avenue II Redevelopment Plan - Block 184, Lot 1

Bourough of Keansburg, Monmouth County, New Jersey

Job Number: BAR-2301 **Date: 12/30/25**

Ref.	Description	Units	Qty.	Cost	Total
1	Connection to Existing Main, 4"X8" Wet Tap	Unit	6	$4,000.00	$ 24,000.00
2	Connection to Existing Main, 6"X8" Wet Tap	Unit	1	$4,000.00	$ 4,000.00
3	Fire Hydrant Assembly (w/valves)	Unit	1	$5,000.00	$ 5,000.00
4	6" DIP Hydrant Service	LF	35	$30.00	$ 1,050.00
5	FDC (building mounted)	Unit	3	$1,000.00	$ 3,000.00
6	4" Fire Service DIP (w/conn & valves)	LF	347	$25.00	$ 8,675.00
7	4" Domestic Service (w/conn & valves)	LF	347	$25.00	$ 8,675.00

Total **$54,400.00**