

RESOLUTION NO. 2019- 564

A RESOLUTION AUTHORIZING A PROFESSIONAL SERVICE AGREEMENT WITH REMINGTON AND VERNICK, HADDONFIELD, NJ, FOR PHASE FOUR - ENGINEERING SERVICES TO UPDATE ALL CAD AND GIS WATER MAINS.

WHEREAS, the City Council of the City of Vineland has adopted Resolution No. 2019-52, a Resolution pre-qualifying certain firms to submit proposals for as needed Architectural and Engineering Services; and

WHEREAS, the Director of Municipal Utilities received a proposal for Phase Four – Engineering Services to update all CAD and GIS Water Mains, which will include mapping the Water Utility’s existing infrastructure system assets utilizing existing as-builts as required per the New Jersey Water Quality Accountability Act; and

WHEREAS, the Director of Municipal Utilities has recommended that a contract for the required services be awarded to Remington and Vernick, Haddonfield, NJ, based upon the proposal received, pursuant to a fair and open process; and

WHEREAS this contract is awarded in an amount not to exceed \$20,000.00; and

WHEREAS, the availability of funds for said Professional Services Contract to be awarded herein have been certified by the Chief Financial Officer; and

WHEREAS, the Local Public Contract Law (N.J.S.A. 40A:11-1, et seq) requires that the Resolution authorizing the award of contract for Professional Services without competitive bidding and the contract itself must be available for public inspection.

NOW, THEREFORE, BE IT RESOLVED by the City Council of the City of Vineland that said contract for Professional Services for Phase Four – Engineering Services to update all CAD and GIS Water Mains, which will include mapping the Water Utility’s existing infrastructure system assets utilizing existing as-builts as required per the New Jersey Water Quality Accountability Act, be awarded to Remington and Vernick, Haddonfield, NJ, based upon the proposal received, pursuant to a fair and open process, in the amount not to exceed \$20,000.00.

Adopted:

President of Council

ATTEST:

Deputy City Clerk



**REQUEST FOR RESOLUTION FOR CONTRACT AWARDS
UNDER 40A:11-5 EXCEPTIONS
(PROFESSIONAL SERVICES, EUS, SOFTWARE MAINTENANCE, ETC)**

12-6-19
(DATE)

1. Service (detailed description): Engineering Services - update All CAD & GIS with MAINT

2. Amount to be Awarded: \$ 20,000

Encumber Total Award
 Encumber by Supplemental Release

3. Amount Budgeted: \$ _____

4. Budgeted: By Ordinance No. _____
Or Grant: Title & Year _____

5. **Account Number to be Charged: 9-07-55-502-8013-53044

6. Contract Period: _____

7. Date To Be Awarded: 12-23-19

8. Recommended Vendor and Address: Remington + Verwick Engineers
232 Kings Highway East Haddonfield NJ
08033

9. Justification for Vendor Recommendation:(attach additional information for Council review)
Continuation of existing project

Non-Fair & Open (Pay-to-Play documents required)
 Fair & Open: How was RFP advertised? _____

10. Evaluation Performed by: Sharon Lillie

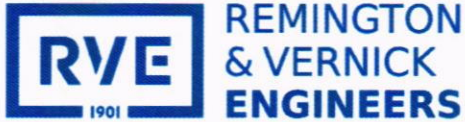
11. Approved by: [Signature]

12. Attachments:

Awarding Proposal
 Other: Scope & Proposal

• Send copies to:
**Purchasing Division
Business Administration**

** If more than one account #, provide break down



RVE HQ:
232 Kings Highway East
Haddonfield, NJ 08033
O: (856) 795-9595
F: (856) 795-1882

December 5, 2019

Sharon Lillie

City of Vineland Municipal Water Utility
330 E. Walnut Road
Vineland, New Jersey 08360

Subj: Phase Four-Professional Engineering Services to Outsource All CAD and GIS Water Main Update work Annually for the City of Vineland Water Utility

Dear Ms. Lillie:

REMINGTON & VERNICK ENGINEERS (RVE) is pleased to present this proposal to provide professional engineering services to update and continue to maintain the City of Vineland Municipal Water Utility's existing water main AutoCAD drawing files and Geographic Information System (GIS) shapefiles on their GIS Water Utility Infrastructure System Mapping for the City's municipal water supply system. RVE's proposed services will include mapping the Water Utility's existing infrastructure system assets utilizing existing as-builts as required per the New Jersey Water Quality Accountability Act (WQAA).

RVE is presently updating and maintaining the current GIS shape file/schema for the City and we will incorporate these as-builts into the City's schema. We will also utilize the provided "Electronic Map Look Up Street Name" and the "Water System CAD Inventory 11-08-19" electronic index Excel spread sheet table to all of the City maps for the water system as a data element in the schema for this project. We will also utilize and reference the provided "2020 Master List of GIS and CAD Updates needed.xlsx" to determine what tasks need to be completed to what file format per the Vineland City MWU.

Scope of Services

RVE's proposed services will update and continue to maintain the City of Vineland Municipal Water Utility's existing water main AutoCAD drawing files and the Geographic Information System (GIS) shapefiles on their GIS Water Utility Infrastructure System Mapping for the City's municipal water supply system. This project will include incorporating the GPS field locate/data collect the City/Private Fire Hydrants and Fire Hydrant Valves assets, mapping and linking the Water Utility's existing infrastructure system assets utilizing existing as-builts to the City's current GIS Enterprise System.

The Vineland City MWU will continue to post updates to both fire hydrants and water valves internally and note the action item to be addressed on the 2020 Master List accordingly. RVE will complete the task(s) to the water mains and the CAD work according to this 2020 Master List of pending work in addition to any new updates that may occur during the course of 2020. The summary of RVE's proposed services is shown below. A detailed scope of technical services is outlined in Appendix A.

GIS Document Collection and Mapping

The City of Vineland Municipal Water Utility's (Water Utility) existing Water System Mapping was digitally generated, utilizing AutoCAD and then converted into a GIS geodatabase using Esri software applications in 2000 and last revised in 2019 by the Water Utility. The existing map displays water mains with size labeled,

elevated water storage tank(s) with capacity labeled, wells-pump house, line valves and fire hydrants with valves throughout the Water Utility's water supply and distribution system. All street and as-built information on the map reflect 2019 conditions. This existing Water System Map will be utilized as reference for the newly updated GIS Water Utility Infrastructure System Mapping (see attached).

This data will be exported and utilized in a GIS mapping database layered to display and query water utility infrastructure locations within the City. RVE can also provide options for future data layers for use by the Department of Engineering, including New Jersey Department of Environmental Protection (NJDEP) overlays, such as wetlands, flood prone areas and soil classifications, as well as any available Cumberland County GIS Resources, which can also be exported and utilized, as a layer, in the CADD mapping drawing file, for use by the City.

Any survey field collection services, if applicable, and all GIS utility mapping work needs to be completed under the auspices of a NJ Professional Licensed Land Surveyor and in accordance with the current State regulations and standards for the "Locations of Existing Utilities" statutes, NJSA 45:8-28(e); NJAC 13:40-1.3; NJAC 13:40-5.1(g)4, as well as the NJ Digital Mapping Computer Aided Drafting (CAD) Standards and comply with any of the Vineland Municipal Water Utility applicable standards and requirements.

Cost of Services

The **total cost** to complete the Update of Water Main AutoCAD drawing files and GIS Shapefiles on the GIS Water Utility Infrastructure System Mapping, as outlined above, is as follows:

Task One: Annual GIS/CAD maintenance and specification for digital file submissions to update new improvements to the GIS Water Distribution Infrastructure Mapping. Update of its assets with attribute fields populated with as-built information, based on the scanned existing as-built drawings and GPS field locate/data collect the City/Private Fire Hydrants and Fire Hydrant Valves using the City's existing SDL Utility Layer Schema and Numbering Convention. Complete and deliver utilizing Esri ArcGIS software applications and any existing numbering convention currently in use by the City for utility structures/facilities, if applicable.

To Complete the Compilation, Inventory and Incorporating the City Water Utility As-Built into the GIS System Mapping and Geodatabase for the City of Vineland Water Utility, we will also utilize the provided "Electronic Map Look Up Street Name" and the "Water System CAD Inventory 11-08-19" electronic index Excel spread sheet table to all of the City maps for the water system as a data element in the schema for this project. We will also utilize and reference the provided "2020 Master List of GIS and CAD Updates needed.xlsx" to determine what tasks need to be completed to what file format per the Vineland City MWU.

Cost estimate and estimated completion time to be determined from written authorization to proceed.

The cost estimate and estimated completion time will be completed for each **Phase/Task** from written authorization to proceed. All work will be invoiced at the current Vineland Water Utility contract rates and a dedicated project number will also be established for billing purposes.

The cost breakdown for the completion of the GIS Mapping Services complying with the New Jersey Water Quality Accountability Act, as outlined above, is as follows:

TASK ONE: GIS WATER UTILITY INFRASTRUCTURE SYSTEM MAPPING

The City of Vineland Municipal Water Utility has an existing GIS Geodatabase, using a variety of electronic inputs create an updated AutoCAD drawing files and City Water Main GIS Geo Database and Shapefiles for each size water main to include reviewing the current data and adding the year installed to the attribute water main tables.

RVE, utilizing the latest Autodesk AutoCAD and Esri ArcGIS applications, will create and update the existing AutoCAD drawing files and the ArcGIS file geodatabase with, but not limited to, the following water infrastructure feature classes (and attributes):

- Hydrants (ID)
- Water valves (ID)
- Interconnects (address, description)
- Storage Tanks (address, description)
- Treatment Plants (address, description)
- Wells (address, description)
- Water lines (size, material)

The City currently has its water system mapped in CAD. RVE will update and export each CAD file to GIS and perform quality control and topology on the resulting GIS layers to ensure continuity and identify missing information. RVE will then digitize and update any missing water system asset features and attributes using relevant information from the digitized plans.

Review and Comment

RVE will provide a copy of the updated GIS and CAD mapping in "draft" format to the City of Vineland Municipal Water Utility for final review. The final draft of the GIS and CAD mapping will be based upon the City's review process and will be considered complete and ready for delivery once the requested changes have been made.

Deliverable: GIS file geodatabase and AutoCAD drawing files containing water system infrastructure layers, in NAD 83 NJ State Plane US Foot with FGDC compliant metadata.

The estimated completion cost for TASK ONE Services as outlined herein: \$20,000.00

Assumptions/Exclusions:

1. Once the database has been established, ownership will be transferred to the City of Vineland Municipal Water Utility. Maintenance of the database is not included in this scope of services and if required will need to be determined under an additional scope of services.
2. RVE understands that Vineland City MWU has been organizing and collecting all of their existing PDF and CAD Map files and cataloging them into an organized spreadsheet list.
3. The "Electronic Map Look Up Street Name" is the City of Vineland Street Index which links RVE to the PDF image file for the grid or As-built map for that area.
4. The "Water System CAD Inventory 11-08-19" will link RVE to the CAD file (if Vineland City MWU has one) for that particular map.

4. The Vineland City MWU will provide their current fire hydrant layer to RVE. We will also utilize the provided "City of Vineland GIS Data Export Hydrant Valves as of 12-02-19.xlsx" and the "Wachs Valve GIS Import Data field Mappings.xlsx" electronic index Excel spread sheet table to all of the City assets for the water system as a data element in the schema for this project. RVE will build out the Hydrant Valve layer according to this Vineland City MWU schema.

Project Schedule:

As you know, a draft working document plan was required by the NJDEP to be in place by **April 19, 2019**, to be in compliance with the Water Quality Accountability Act. However, this is a living active document that will continually be updated.

Our estimated completion time is a minimum of (2) two to (3) three months from written authorization to proceed and contingent on schedules, weather conditions, traffic control measures needed, etc.

RVE thanks the City of Vineland for the opportunity to propose its services. If you have any questions or concerns regarding this proposal, please contact Kevin Zelinsky, GIS/CADD Department Manager of RVE at (856) 795-9595, ext. 1064 or via email at Kevin.Zelinsky@RVE.com. RVE looks forward to working with you on this important project.

Sincerely,

REMINGTON & VERNICK ENGINEERS

By

Edward Vernick, P.E., C.M.E.
President

EV/KRZ/mts
cc:

**APPENDIX A
DETAILED SCOPE OF SERVICES:**

TASK ONE: LAND SURVEYING GPS DATA COLLECTION

If the City is interested in performing any survey field work, if and where directed, we can complete to survey the City/Private Fire Hydrants and Fire Hydrant Valves as required by the New Jersey Water Quality Accountability Act to collect missing/incomplete infrastructure information for the Water Utility System Mapping project on a location-by-location basis, utilizing GPS technology. This GIS location of any/all missing/incomplete infrastructure information for this GIS mapping project on a location-by-location basis, utilizing GPS technology, which will ultimately enable electronic submittal to the NJDEP, if applicable. A field survey crew will be made available as needed, and additional personnel will be made available during the same period to provide research, office support and computations.

Once the designated water utility infrastructure survey work has been completed, the survey data will need to be added to the GIS infrastructure database to provide a more comprehensive overview of the water utility infrastructure facilities located throughout the City of Vineland Municipal Water Utility and its service areas.

1. USGS/NJSPCS Research Data

RVE will research all available USGS data for the City of Vineland. This will include vertical control sheets, horizontal control sheets, digital orthophotos, quadrangle maps and similar resource materials. We will also utilize the existing manually generated and/or digital infrastructure mapping resources previously outlined in this proposal, as well as Vineland City topographic maps.

2. Global Positioning System (GPS) Control Points

All data will be based on GPS information and will be created on the New Jersey State Plane Coordinate System. The horizontal ground control will be based on North American Datum of 1983 (NAD 83), and vertical ground control will be based on National American Vertical Datum of 1988 (NAVD 88).

North American Datum of 1983 is based on satellite observation of the Earth, and thus provides improved positional accuracy over previous datum originally calculated by hand in the 1800s. National American Vertical Datum of 1988 is based on the averaging of mean sea level.

GIS MAPPING GRADE GPS UNIT

Once the initial horizontal and vertical control points have been established, as outlined in Task One of this proposal, RVE Survey Team, if and where needed, will survey all the water infrastructure asset locations of water main valves and other required infrastructure utilizing a GIS mapping grade GPS unit. This task will be able to locate positions on the ground to a horizontal accuracy of one meter, even in wooded areas. To measure the elevation of any visible structure, data will need to be collected separately, then calculated and applied to the GIS mapping database at a later date. This task will be completed for all visible/known structures found in the field and referenced on the available as-built documents.

A. Field Survey of Water Utility Infrastructure Features- (GIS Mapping Grade GPS Unit)

RVE Survey Team will field locate all known/visible at grade water utility infrastructure asset locations. We will be locating all structures/features by using GIS grade GPS survey methods; a two-man field survey crew will be made available for up to one service day(s) for setting horizontal & vertical control

points; a one-person field survey crew will be made available for up to five (5) service day(s) for locating all surface water utility infrastructure assets, and two person will be made available for a minimum of one service day(s) to provide the necessary research, office support, set-up, downloads and computations for this project.

We anticipate the completion of between approximately forty-five (45) and eighty-five (85) water assets per day, contingent on schedules, weather conditions, traffic control measures needed, etc.

Only those known/visible at grade water main valves and other required infrastructure locations of those assets will be surveyed. The following information will be compiled:

- Location of water main valves (ID)
- Location of fire hydrants (ID)
- Location of fire hydrants valves(ID)
- Location of interconnects, if applicable (address, description)

All Collection of GPS data will need to be compliant with State GPS standards and guidelines.

CITY OF VINELAND MUNICIPAL WATER UTILITY RESPONSIBILITY:

1. RVE has assumed that the Vineland Water Utility will field verify and paint mark the location of all known water assets prior to the start of our survey field work data collection. We understand that the Vineland City MWU is unable to commit personnel to paint mark the hydrant valve locations at this time. In order to maximize our efforts in the field, RVE will, to the extent possible, GPS collect those hydrant valves where it is physically visible and obvious to the survey field crew where the valve is found, and data collect the location of as many as possible. Once the GIS database is updated, we will be able to display and identify what is missing/obscured and proceed accordingly, if and where directed by Vineland City MWU, at that time. Our cost estimate for the land surveying GPS data collection services scope of work is based on this assumption as required by the WQAA.

Additional field survey work may be required and/or requested by the City beyond the scope of services presented herein. Any additional survey crew field work will be performed solely at the direction of the City for an additional per diem fee of \$1,780.00, including coordination at start-up, necessary research, office support, set-up, downloads and computations for this project.

B. Numbering Convention and Alpha-Numeric Grid

Currently the water mains in GIS are simply numbered with a sequential number with the size – 10-1, 12-1, 4-1, etc. This method works; however, they do not correlate to anything currently.

Our Survey/GIS Department will apply an alpha-numeric grid to the Digital Parcel Base Map of Vineland Water Utility to help facilitate the location of the water utility infrastructure facilities on the new map.

If the Vineland Water Utility does not already have an alpha-numeric grid in place for water utility structures and facilities, RVE can create one based on the existing numbering convention. A grid-based numbering convention for the Vineland Water Utility's fire hydrants, valves and other required assets will allow for growth and change within the infrastructure system, and will facilitate quick location of

fire hydrants, valves, etc. on the completed maps. In addition, if new water utility structures or other infrastructure features are added in the future, the grid system provides flexibility for expansion and eliminates the need to renumber and/or number out of sequence, as would be the case with other numbering conventions.

The alpha-numeric grid will divide the Vineland Water Utility into sectors of identical shape and size based on the existing Street Map for the Vineland Water Utility. Each sector will be numbered in alpha-numeric fashion, such as F-1, A-3, etc. The fire hydrants, valves, etc. will reference the appropriate sector number in which they appear as part of our proposed numbering convention.

The fire hydrants will also be referenced by designation/type, which will allow Vineland Water Utility to add additional infrastructure features to the same Digital Parcel Base Map in the future, if desired, by simply changing the infrastructure reference in the designation field.

For example, a fire hydrant in alpha-numeric grid sector A-2 may be assigned a unique identification number as follows:

- **Alpha-Numeric Grid Sector Field** **A-2**
- **Infrastructure Designation Field (Fire Hydrant, Valve, Etc.)** **FH**
- **ID Number Field** **03**

Therefore, the third fire hydrant in sector A-2 in the Vineland Water Utility would have this unique identifier:

- **A-2_FH_03**

As part of a possible future mapping project, the Vineland Water Utility may want to consider adding sanitary sewer infrastructure features to the same Digital Parcel Base Map using a similar unique identifier, as follows:

- **A-2_SAN_03**

The Vineland Water Utility may also choose to add Storm Sewer and/or transportation infrastructure information in the future using the same identifier system.

This is the approach RVE would like to utilize to organize and breakdown the Vineland Water Utility into these sectors for efficient deployment and scheduling of survey field crew workdays and the processing of the collected data assets to be applied to the GIS mapping. We would propose a four (4) grid "pilot area" to be designated and agreed to at our kick-off meeting to test this approach for the Vineland Water Utility. We have applied this municipal-wide sector grid approach for many other authorities, agencies and public work departments and it has proven to be very efficient, thorough, accurate and effective.

C. Review and Comment

RVE will provide a draft copy of the new Water System Infrastructure Map in "draft" form to the Vineland Water Utility for final review. Any minor changes or revisions requested by the Vineland Water Utility will be applied to the GIS database at that time. The final draft of the new map will be

based upon this review process and will be considered complete and ready for delivery once any requested changes have been made.

D. Final Deliverables

The new maps will be generated utilizing the latest Autodesk AutoCAD and Esri ArcGIS software applications.

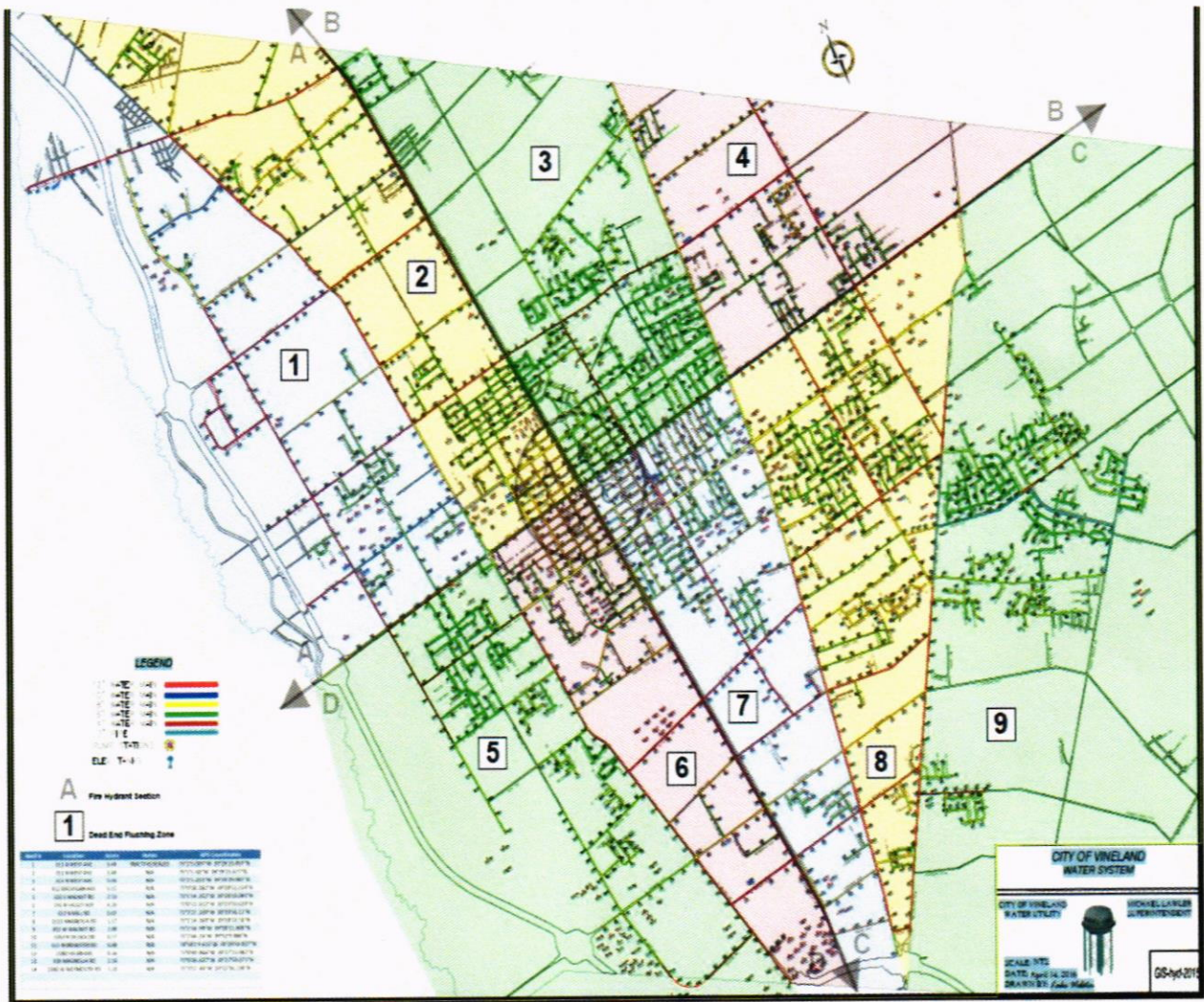
The following deliverables will be delivered electronically:

GIS Geodatabase

- a. Updated Esri ArcGIS Geodatabase and shapefiles for each water main group by main size with:

Water Main Maps

- a. CAD & PDF files of the water main map system to print /update maps – similar to the example below for hydrants.



All hardcopy and/or digital mapping products will be compliant with State GIS mapping standards and guidelines.

5. The "2020 Master List of GIS and CAD Updates needed.xlsx" is the City of Vineland list to determine what tasks need to be completed to what file format per the Vineland City MWU.

The following is a detailed breakdown of the estimated costs for completing Task One

Phase No.	Existing Available As-Built Drawings	Sheets	Time/Week or Day	GIS Cost
1.	Vineland City Water Main GIS Geodatabase and AutoCAD drawing files (Water_Main_2-12)	N/A	4 Weeks	\$20,000.00
2.	WaterMain2 (Excel Spreadsheet)	N/A	N/A	N/A
3.	WaterMain4 (Excel Spreadsheet)	N/A	N/A	N/A
4.	WaterMain6 (Excel Spreadsheet)	N/A	N/A	N/A
5.	WaterMain8 (Excel Spreadsheet)	N/A	N/A	N/A
6.	WaterMain10 (Excel Spreadsheet)	N/A	N/A	N/A
7.	WaterMain12 (Excel Spreadsheet)	N/A	N/A	N/A
Total		N/A	4	\$20,000.00

Exclusions: All work required not specifically described herein or in the attached Appendix A is excluded and will be provided separately, if required.

Project Schedule:

As you know, a draft working document plan was required by the NJDEP s to be in place by **April 19, 2019**, to be in compliance with the Water Quality Accountability Act. However, this is a living active document that will continually be updated.

Our estimated completion time is a minimum of (1) one to (2) two months from written authorization to proceed and contingent on schedules, weather conditions, traffic control measures needed, etc.

RVE thanks the City of Vineland for the opportunity to propose its services. If you have any questions or concerns regarding this proposal, please contact Kevin Zelinsky, GIS/CADD Department Manager of RVE at (856) 795-9595, ext. 1064 or via email at Kevin.Zelinsky@RVE.com. RVE looks forward to working with you on this important project.

Sincerely,

REMINGTON & VERNICK ENGINEERS

By

Edward Vernick, P.E., C.M.E.
President

EV/KRZ/mts
cc:

**APPENDIX A
DETAILED SCOPE OF SERVICES:**

TASK ONE: GIS WATER UTILITY INFRASTRUCTURE SYSTEM MAPPING

Remington & Vernick Engineers understands that The City of Vineland, New Jersey (City) requests a quote to undertake a project to create/update the existing AutoCAD drawing files and Esri ArcGIS shapefile attributes for water system mains for the City's water distribution footprint. All deliverables must be completed using Autodesk's AutoCAD and Esri ArcGIS software applications compatible with the City's existing GIS/CAD applications.

RVE must be able to have large amounts of data files exchanged electronically by a secure Drop Box or other such facility site. RVE proposes to utilize our ShareFile Account and/or OneDrive Portal system to securely exchange these GIS/CAD mapping layer datasets.

A. Inventory and Compilation of Existing Data

The project will be based on the following current data to be provided/collected for the City of Vineland prior to the commencement of this project:

- Copies of the water infrastructure as-built drawings from 2019 and 2020 hardcopy formats.

Phase No.	Existing Available As-Built Drawings	Sheets
1.	Vineland City Water Main GIS Geodatabase (Water_Main_2-12) and AutoCAD drawing files	N/A
2.	WaterMain2 (Excel Spreadsheet)	N/A
3.	WaterMain4 (Excel Spreadsheet)	N/A
4.	WaterMain6 (Excel Spreadsheet)	N/A
5.	WaterMain8 (Excel Spreadsheet)	N/A
6.	WaterMain10 (Excel Spreadsheet)	N/A
7.	WaterMain12 (Excel Spreadsheet)	N/A
Total		N/A

In addition to any available digital map data already provided, we will require any/all available electronic and/or hard copies of the following information from the City of Vineland:

- Any existing numbering convention currently in use by the City for utility structures/facilities, if applicable
- Section grids that could be used for designating ID's throughout the City (i.e. Grid Maps, etc.)
- Existing SDL Utility Layers Schema
- Locations of known Water Utility Infrastructure within the Vineland Water Utility and its service region

The Vineland Water Utility is interested in creating a GIS Water Utility Infrastructure System Mapping using the latest Esri ArcGIS software applications, which will ultimately enable electronic submittal to the NJDEP.

RVE understands that the current AutoCAD drawing files and Esri ArcGIS shapefiles were built from as-built plans and GPS field locate/data collect the City/Private Fire Hydrants and Fire Hydrant Valves. Analysis will need to be completed to correlate the spreadsheet data to the water main sections in the GIS to label them with the year of installation and populate the attribute table accordingly.

Currently the City is using Autodesk AutoCAD 19 and ArcMap 10.6.1, however, the latest version is 10.7.1. The City can read ArcMap files 10.6.1 and later. If possible, the City can work with 10.7.1 files, but it is easier if the City of Vineland can get the datasets in a version close to what the City is currently using.

A parcel-based foundation for the Vineland Water Utility GIS Water Infrastructure Mapping Database will be based solely on the current digital parcel map(s) and any resource data outlined and created in a GIS format utilizing the latest Autodesk AutoCAD and Esri ArcGIS software applications. The existing parcel data will reflect the current conditions (2020) and linked to the associated PIN tabular tax assessment data on a property by property basis.

To georeferenced, or link, each infrastructure feature to its geographical location on the GIS Base Map, unique identification numbers must be assigned on a feature by feature basis. The unique identification numbers will also tie any associated tabular data to its appropriate infrastructure feature and location on the new map. The unique identification numbers will be based on the Township's existing numbering convention(s) for water utility system infrastructure features.

B. Utility As-Built Updates

All street right-of-way lines, railroads, waterways, street names and adjoining municipality names will be shown on the new maps. All information will be layered for ease of inventory and maintenance. We will utilize surveying and cadastral mapping experience to manipulate and process the digitized infrastructure features to ensure an accurate fit to the parcel foundation.

No survey work or field verification will be provided as part of our proposed mapping services, unless requested and authorized to propose and proceed. All GIS infrastructure mapping will be based on available resource data from 2019 through 2020 only in order to keep costs to a minimum. RVE will need to work closely with the City of Vineland to collect and compile the most current information possible for inclusion in this project.

C. GIS Features and Mapping Layers

Any updated AutoCAD drawing files will be exported and converted into the Esri ArcGIS shapefile format suitable for GIS use and all overlays for the utility system infrastructure mapping will be included on the GIS system.

RVE, utilizing the latest Autodesk AutoCAD and Esri ArcGIS applications, will ultimately create and update the ArcGIS file geodatabase with, but not limited to, the following water infrastructure feature classes (and attributes):

- Water distribution features to be displayed on the updated map include pipe sizes, flow directions (where available), fire hydrants (located in KLM format with longitude and latitudes), water tanks, valves and nodes

Also, using a variety of electronic inputs create an updated City Water Main GIS Geo Database and Shapefiles for each size water main to include reviewing the current data and adding the year installed to the attribute water main tables. This project is in preparation for a second project to use the outputs of this as an input into the development of an asset management and capital improvement plan required by the State of New Jersey Water Quality Accountability Act.

The City will provide electronically for this project the artifacts below. Due to the size of the data files, RVE will be able to provide a secure Drop Box like file sharing site for the exchange.

- All Grid Maps and As Built PDF/CAD plan drawings for reference
- The master Map Index spreadsheet that contains all of the city street indexes referenced back to either the grid map number or the As Built plan number.
- Existing Excel Spreadsheet “Electronic Map Look Up Street Name” and the “Water System CAD Inventory 11-08-19” electronic index table to all of the City maps for the water system.
- Provided “2020 Master List of GIS and CAD Updates needed.xlsx” to determine what tasks need to be completed to what file format per the Vineland City MWU.
- Existing Water Main Geo Database Schema and water main shapefiles.
- A list of known corrections that need to be made to the GIS water main shapefile for incorrect sizes that was discovered through a recent valve review of the entire water system.

The City will also provide a contact for answering questions and information gathering, in addition to that any GIS related questions for existing information or deliverables.

A	B	C	D	E	F	G	H	I	J
Map Ref	CAD FILE	Comments Markup file	CAD Work Needed?	GIS Work Needed?	Comments	Sent Out?	PDF Move Completed	DWG Move Completed	Print Completed
D-5	D-5	D-5 CAD JMD Comments 11-27-18			all updates made to CAD file		YES	YES	YES
D-6	D-6	D-6 CAD JMD Comments 11-30-18	Yes		Most Dimension Comments not made to CAD file				
D-7	D-7 11-2-18	D-7 CAD revisions	Yes		all updates made to CAD file		YES	YES	YES
D-8	D8 - Revised	D-8 CAD revisions	Yes	Maybe near streets	Valve to lower left side and below the word "Oak" on north side of map is missing measurement noted on comments of 24.33. Rainbow Ln name not shown in CAD file on Left hand side of map. On left hand side of map, water main type size not drawn in CAD file on Broadway, Oxford and Rainbow. All water main comments made if water main along RR tracks missing off CAD file. Comments in CAD file regarding Hydrant removal at Oxford actually apply to Spruce st. per pencilled comments. all other updates made				
E-2	E-2 CAD	compared to Current E-2	Yes		The map joins comments are missing for each side of the map.				
E-3	E-3 CAD	compared to Current E-3	Yes		The pipe material and size is missing from Orchard and Enduro Rds. The map joins comments are missing for each side of the map. The intersection detail for Almond and Mill is missing.				
E-4	E-4 CAD	compared to Current E-4	Yes		The map joins comments are missing for each side of the map. Detail A insert is not complete.				
E-5	E-5 - Revised	E-5 CAD Revisions	Yes		The name AMOS Avenue was not changed to West Ave.				
E-6	E-6	E-6 CAD Revisions	Yes		all updates made to CAD file		YES	YES	YES
E-7	E-7	E-7 CAD Revisions	Yes		The name Hendee Ave was not changed. All other updates made.				
E-9	E-9 - Revised	E-9 CAD Revision			all updates made to CAD file		YES	YES	YES
F-9	F-9 - Revised	F-9 CAD - revisions	Yes		The word Sleeve is misspelled at top right of drawing. All updates made to CAD file				
F-11	F-11 - Revised	F-11 CAD Revisions	Yes		Two minor updates on Corner of Meadow & Jay Terrace and hydrant measurement from curb not updated from comments file. All other updates made				
G-6	G-6 Revisions	G-6 Revisions	Yes		One Electronic comment made can't be seen on paper it says "I'm confused about these two dimension. It's 20.3 in total and its 43 from water main on West Ave. to the side of street."				
G-7	G-7 Revisions	G-7 Revisions			all updates made to CAD file		YES	YES	YES
G-8	G-8 Revisions	G-8 CAD Revisions			all updates made to CAD file		YES	YES	YES
G-9	G-9 - Revised	G-9 CAD Revisions			all updates made to CAD file		YES	YES	YES
G-11	G-11 - Revision	G-11 CAD Revisions			all updates made to CAD file		YES	YES	YES

Inset: City of Vineland 2020 Master List of GIS and CAD Updates needed

The continuing problem for the City is the data the spreadsheet contains does not match how the GIS water main shape files were built. When the shape files were built, the as-built maps were used, and water mains were depicted in segments. The spreadsheet and as-built documents are the main source of what year the water main was installed and has the age of the water main labeled on it. This spreadsheet, and the challenge, has the mains not broken down by segments, but by total feet length of that size of water main installed on that street – not by segment size.

Therefore, the GIS has to be reviewed and updated measuring the water main in it and then using the spreadsheet and as-built documents for that location to determine what the segments in the GIS should be and assigned the correct installation by year in the GIS shapefile and ultimately the geodatabase. All of the work has to be done in Esri ArcGIS. For the most part the water main GIS geodatabase is being verified and updated to be recreated and returned to the City of Vineland.

In order to create the final product, all of the as built, original GRID maps and spreadsheets need to be used to achieve this end result.

RVE also understands that this entire project is to update and validate the current GIS files for water mains by using the provided dataset(s) to update the year installed for a water main sizes. In preparation for an upcoming valve exercising project, the City of Vineland recently added valve name identifiers to all inline distribution valves in the system in the GIS with the water main shape layers turned on for 4, 6, 8 10 and 12 in valves. As the City was going through adding and removing valves that had been missed or were placed in error, incorrect water main depictions were captured – that is the second spreadsheet the City of Vineland provided. The City believes they accounted for all of the errors but that will need to be validated through this rebuild process.

RVE is updating and maintaining the individual water mains that currently exist in the GIS map as follows:

- 2" = 32
- 4" = 934
- 6" = 3358
- 8" = 2751
- 10" = 416
- 12" = 1625

The location of each fire hydrant, valve and required infrastructure water asset will need to be documented as GIS feature data collected from any existing hard copy construction/as-built plans. All data will be based on this hard copy/digital information and will be created on the New Jersey State Plane Coordinate System in feet units. The New Jersey State Plane Coordinate System serves as the common denominator for all data covering the same geographic areas, which makes it easier to share GIS data from a variety of State and local sources. The horizontal locations will be based on North American Datum of 1983 (NAD 83).

The updated Utility System Mapping will be drafted in color with ink on bond paper with corresponding color-coded legends for the water utility system.

D. Review and Comment

RVE will provide a draft copy of the new Water System Infrastructure Map in "draft" form to the Vineland Water Utility for final review. Any minor changes or revisions requested by the Vineland Water Utility will be applied to the GIS database at that time. The final draft of the new map will be based upon this review process and will be considered complete and ready for delivery once any requested changes have been made.

E. Final Deliverables

The new maps will be generated utilizing the latest Autodesk AutoCAD and Esri ArcGIS software applications.

The following deliverables will be delivered electronically:

GIS Database

- a. Updated Esri ArcGIS Geodatabase and shapefiles for each water main group by main size with:

Attribute Table Changes:

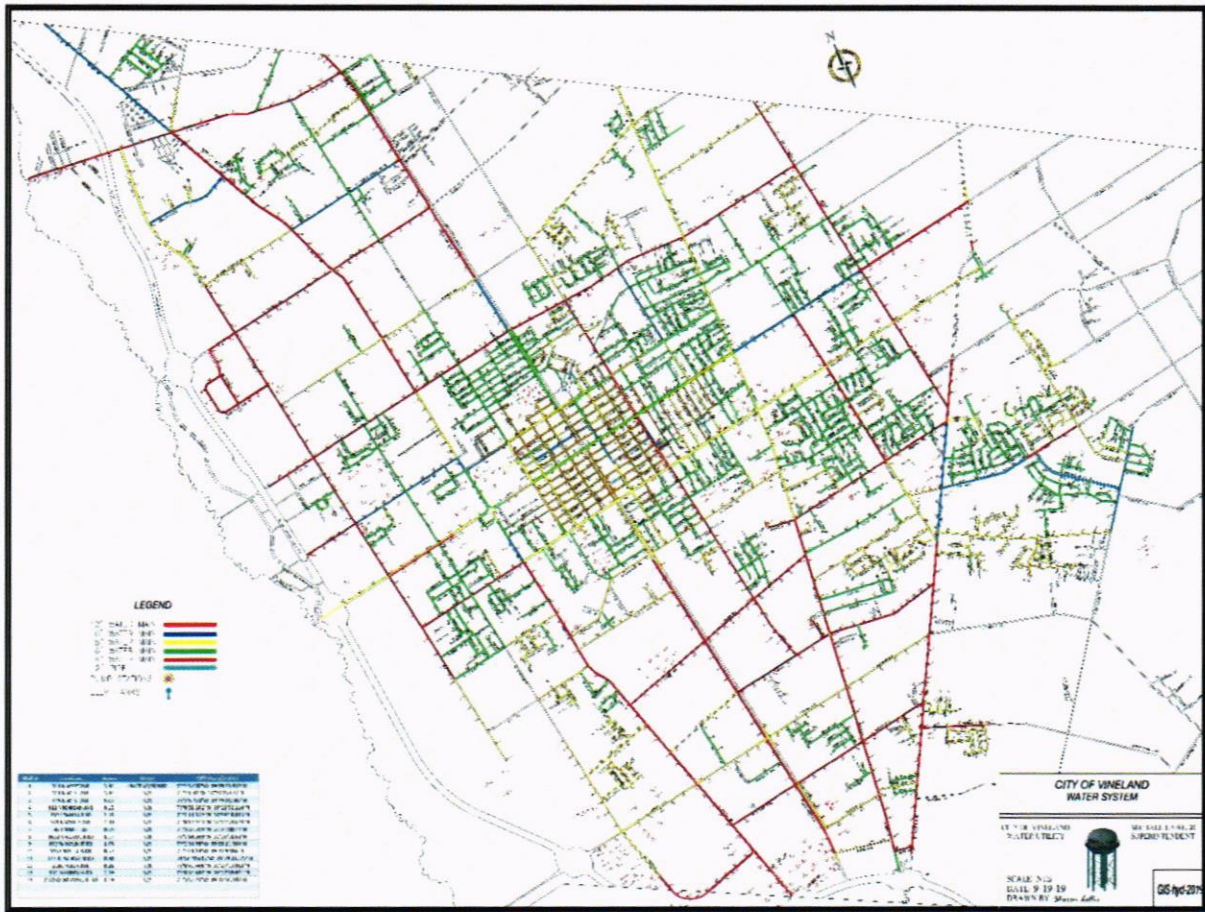
- a. Rename the existing Date_Seg field to "Segment From To" – retain the existing contents
- b. Add a new field named Year Installed

Data Updates:

- a. The year installed updated in the attribute table.
- b. The material the main is main out of updated (this is sparse data now)

Water Main Maps

- a. CAD & PDF files of the water main map system to print /update maps – similar to the example below for hydrants.



All hardcopy and/or digital mapping products will be compliant with State GIS mapping standards and guidelines.