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DEPARTMENT OF INFRASTRUCTURE ENGINEERING

MEMORANDUM

TO: Leon Goodwin, Town Manager

FROM: Jason L. Mammone, P.E., Director of Engineering

DATE: January 28, 2021

SUBJECT: Update of Engineering Department Projects and Activities

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The following is a brief update on some of the projects that the Engineering Department is currently working on and/or involved with:

- **2020 I/I Inspection Project** – *completed* – This project involved the cleaning & TV inspection of approximately 120,000 linear feet (22.7 miles) of sewer mains, 113 private laterals and 542 sewer manholes. The project was completed in October. The total cost of this project was approximately $260,000.

- **2019 I/I Rehabilitation Project**– *completed* – The project was designed to remove an estimated 142,100 gallons of infiltration per day primarily through trenchless technologies. The project involved the installation of approximately 12,700 linear feet of cured-in-place pipe (CIPP), the installation of approximately 100 linear feet of short liners and approximately 1,500 vertical feet of sewer manholes cementitiously lined and exterior grouted, as well as testing and sealing of associated joints and services and manhole and sewer line root treatment. The total cost of this project was approximately $925,000.

- **Inflow and Infiltration Project** – *ongoing* – The Engineering Department has been working to reduce inflow and infiltration using an in-house approach to inspect, assess, design, and oversee improvements to the sanitary sewer system. Over the last fourteen years the Town has inspected approximately 2,013,500 linear feet (381 miles) of sewer main, performed approximately 6,894 manhole inspections, installed approximately 201,600 linear feet (38 miles) of cured-in-place liners, installed approximately 3,482 feet of short liners, installed approximately 203 full-wrap lateral liners, installed approximately 35 top hat lateral liners, cementitiously lined approximately 11,070 vertical feet of manholes and chemically root treated approximately 319,700 linear feet (57 miles) of sewer main. To date, the project has cost approximately $18.1 million and we estimate that we have conservatively removed 6.2 million gallons per day (MGD) of inflow & infiltration from the system. In addition, the Town's MWRA sewer assessments have remained stable and our sewer rates have remained unchanged since 2008 as a result of our

decreasing flow share. Assuming a no change in flow share scenario, we estimate that Dedham has cumulatively saved $13.5 million over the past thirteen years as a result of these efforts (See Chart 1).

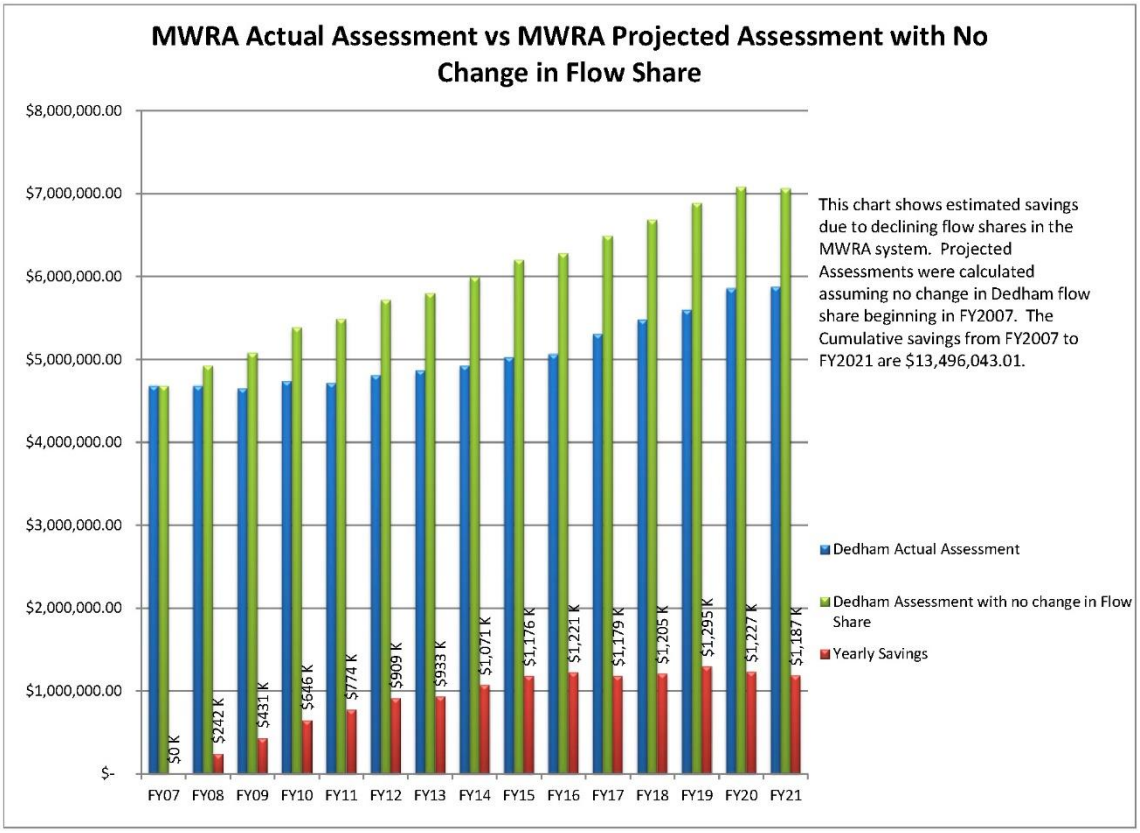

Chart 1

- **Private Infiltration Removal Policy –** *completed* – Over the past fourteen years, the Engineering Department has been removing inflow and infiltration from our public sewer system.

  Based upon the flow data provided by the MWRA, in FY2019 Dedham transported approximately 3.5 million gallons per day (MGD) of wastewater to the MWRA for treatment. Of this flow approximately 52% is actual wastewater, 37% is infiltration and 11% is inflow. That translates to 48% ($2.7 million) of our $5.6 million FY2019 MWRA Assessment being used to treat groundwater and stormwater that should not be in our sewer system.

  Over the past 6 to 7 years, many other MWRA communities have started to implement aggressive sewer rehabilitation programs, similar to Dedham's in an effort to reduce their MWRA sewer assessments by reducing the amount of flow being treated by the MWRA. As these other communities are improving their systems and reducing their flow share, it is now resulting in the Town's flow share to the MWRA to plateau and soon will likely

start increasing resulting in our annual MWRA assessments to increase at a higher rate than typical.

In a continued effort to reduce Dedham's infiltration, stabilize the increase in our annual MWRA assessments and maintain our current flow share to the MWRA, it is important to start looking beyond public sources of infiltration and start identifying private sources of infiltration. The mostly likely source of private infiltration will be groundwater that is leaking into property owner's sewer laterals. During our recent 2018, 2019 and 2020 wet weather investigations, we conducted TV inspections of laterals, that during our mainline inspections, showed indications of infiltration. Based upon the TV inspections, approximately 250,000 gallons per day (GPD) of removable infiltration was observed. This amount shows that private infiltration plays a role in our overall infiltration problem. Therefore, the Engineering Department has been working with our consultant, Town Manager and Select Board since 2018 to develop a Private Infiltration Removal Policy.

Over the past year, we made final revisions to the draft policy based upon the feedback from our several presentations (Select Board & Town-Wide) and our focus group. The final version of the policy was presented and endorsed by the Select Board at their meeting held on 6/18/20 and approved and executed by the Town Manager acting as the Town's Sewer Commissioner on 8/3/20. The policy was included into the current version of the Town's Sewer Use Regulations and was effective starting on 9/1/20. All documents and additional information associated with the Private Infiltration Removal Policy can be found on the Town's website at https://www.dedham-ma.gov/departments/engineering/private-infiltration-removal-policy .

We are currently working with our consultant, Weston & Sampson, to develop specifications to be included in our first contract to go out to bid for Private Infiltration Removal. We are anticipating on the contract be advertised in February with a start date of April 1, 2020. This contract will include the removal of infiltration from private sewer service by means of lining or open cut excavation. The contract will also include additional investigations on laterals previously identified as having infiltration, but due to significant bends in the service, the source was unable to be positively identified.

- **Nobles & Greenough School – Private Infiltration Removal –** *ongoing* – During our 2020 Inflow/Infiltration (I/I) project (described above), we observed that several of the sewer pipe segments and sewer manholes privately owned by Nobles & Greenough School (N&G) that discharge into the Town's sewer system had infiltration. We reviewed all the sewer videos to quantify and locate the sources of infiltration. Based upon our review, N&G has approximately 17,000 gallons per day of removable infiltration entering the Town's sewer system.

  The discharge of infiltration into the Town's sewer system is prohibited and as such a violation letter was sent to N&G making them aware of the amount of their infiltration and its location within their sewer system and their responsibility to remove these sources. There were 3 buried manholes which prevented access to a few of the sewer segments on their property that they are also responsible for uncovering so we can inspect the remainder of their system. N&G has been responsive and cooperative during this process and are currently working with their engineers to develop a plan to eliminate these sources of infiltration. The Town is hopeful that these issues will be corrected in the Spring/Summer of 2021.

- **2018 Rustcraft Road Sewer Improvements –** *ongoing* - At the Fall Town Meeting in November of 2018, Town Meeting approved an appropriation of $270,000 for the design of the Rustcraft Road Sewer Improvements based upon Weston & Sampson study. The Town hired Weston & Sampson to perform the design in December 2018.

  In 2019 at the May Town Meeting, Town Meeting members approved $3.2 million for the construction of this improvement. Timing for this project is critical and needs to be completed by the end of 2020 so as to not interfere or potentially postpone the start of our MassDOT TIP project that is to start in 2021 on Elm Street and Rustcraft Road.

  Weston & Sampson completed the design and specifications for the project in February of 2020. The project was put out to bid and awarded to RJV Construction in April with a bid price of $1,646,302.85. The project consisted of the installation of approximately 4,900 linear feet of 10-inch ductile iron force main, installation of force main cleanout manholes and release valve structures and upgrades to the existing pumps station consisting of the installation of 2 new submersible pumps capable of pumping 1,300 GPM. The project is being managed by the Engineering Department with construction oversight provided by Weston & Sampson. The Engineering Department provide weekly project updates and photos of the project on the Town's website. The project is scheduled to be complete by February 2021. To see detailed information about the project and photos of construction please visit https://www.dedham-ma.gov/departments/engineering/projects-2123 .

- **Transportation Improvement Project (TIP) –** *ongoing* - In the winter of 2013/2014 the Engineering Department presented to the BOS four potential projects that could be considered a viable project for funding through the MPO TIP. The BOS selected moving forward with the sidewalk/corridor improvements for Bussey Street and Rustcraft Road/Elm Street. The Engineering Department hired BETA Group as the design consultants for the project.

  In April 2016, our State Representative, Paul McMurtry, Town Manager, Selectmen Mike Butler, Town Planner, Director of Public Works and I attended an MPO meeting in which prospective project proponents were provided an opportunity to speak on behalf of our project for consideration for funding by the MPO. In June 2016, the MPO voted to approve funding for the Rustcraft Road/Elm Street project and programmed the start of the project for 2021.

  Over the past year, our consultants finished and submitted the 100% designs to MassDOT for the Rustcraft Rd/Elm St project. As part of any TIP project, the municipality is responsible for acquiring all of the temporary and permanent easements required by MassDOT for construction. For this project, the Engineering Department had to acquire 22 temporary easements and 9 permanent easements over 19 properties. We were able to secure easement donations from 6 properties. The other 13 properties requested appraisals and were awarded Just Compensation. The total amount of Just Compensation awarded to all 13 properties was $65,600. MassDOT placed the project out to bid in late December 2020 with an estimated construction start date in the Spring of 2021.

  MassDOT held its 25% Public Design Hearing for the Bussey Street project in December of 2020. We are anticipating submitting the 75% and 100% design submissions to MassDOT this year along with acquiring all necessary environmental permitting. In 2018, the MPO approved funding for the Bussey Street project with construction to start in 2023.

- **106 Washington Street Sewer Extension –** *completed* – In 2016, the Town was approached by the property owner of 106 Washington Street. The property owner had a failed septic system and was under a consent order from MassDEP to connect to the Town's sewerage system. To connect to the Town's sewerage system would involve the installation of approximately 300 feet of new 8" sewer main within Washington Street along with the installation of approximately 50 feet of 6" PVC sewer pipe for the building connection and all other pertinent sewer infrastructure.

  Due to the cost estimate received by the property owner's engineer, the property owner did not have the financial means to pay for it. Therefore, the property owner requested if the Town could install the sewer utility and assess the property through a sewer betterment for the work. With a sewer betterment in place, the property owner would be able to make payments to the Town over a 20-year period. The Town is protected by the fact if the owner tries to sell the property, the betterment would have to be paid in full before the sale could be finalized.

  The Engineering Department was the project manager for this sewer project and began working with the Town Manager's Office, Treasurer's Office, Finance Department and Town Counsel to prepare an article for the 2016 Fall Town Meeting for the borrowing of funds from the Sewer Enterprise Fund and the assessment of a betterment to the property owner for the construction of the necessary sewer facilities to connect the property to the Town's sewerage system. The Engineering Department developed a cost estimate of $277,000 needed to perform the necessary work. Town Meeting approved the funding at the Fall Town Meeting.

  In 2018, the Town executed the Grant of Sewer Easement between the Town and the property owner. The Engineering Department hired consultant Weston & Sampson to design the sewer extension and connection for this project. The consultant also assisted the Town in generating the plans and specifications for bidding and construction services. The contract went out for bid in 2019 and was awarded to Blue Diamond Construction Company. The contractor began work in July 2019 and completed the work in November 2019. The total cost of the project including resident engineering and police details was $285,677.06.

- **Sewer Fats, Oils, and Grease (FOG) Issues** – *ongoing* – As part of our overall inspection program the Engineering Department also has an aggressive FOG program to help eliminate back-ups and maintenance issues related to excessive grease in the sanitary sewer system. The Engineering Department has implemented a biological dosing program at key locations to help digest grease at known trouble spots.

  - **Legacy Place** – *ongoing* – The Engineering Department, in conjunction with the DPW and Health Department, has been monitoring the grease traps at Legacy Place. These grease traps have been improperly maintained to date and have been causing multiple problems at our Rustcraft Road Pump Station. We have been conducting random sampling of the grease traps throughout the year to determine if the establishments have been properly cleaning their grease traps according to their mandated cleaning schedule. When it is determined that an establishment is not cleaning their grease traps properly, the information is provided to the Health Department for their intervention. Our department will continue to monitor the

grease traps to determine if the establishments are complying with the Board of Health's cleaning schedule.

- **Gonzalez Field Sewer Design –** *completed* – The Engineering Department was approached by the Parks & Recreation Commission to assist in the design and permitting for the sewer service for the future concession stand to be located at Gonzalez Field. The Parks & Recreation Commission were able to save money on the overall project by having our department handle this aspect of the overall project. All work associated with the design and permitting was done in house. We had to collect additional survey data to supplement what was collected for the Gonzalez Field Project since the proposed connection is located outside the project's limits of work. With assistance from the Department of Public Works we also performed test pits within East Street, where the proposed sewer service is to be connected to the Town's sanitary sewer system, to verify the location and depth of all utilities, especially the MWRA's 36" water line. The data collected was utilized to design the sewer connection for the future concession stand (constructed in 2019) and for the required 8M permit to the MWRA. The sewer service was installed by the DPW in the summer of 2020 with oversight by our department.

- **NPDES Phase II MS4 Permit –** *ongoing* - The Environmental Protection Agency (EPA) and Massachusetts Department of Environmental Protection (MassDEP) issued the new National Pollutant Discharge Elimination System (NPDES) Phase II Stormwater General Permit for Small Municipal Separate Storm Sewer Systems (MS4) for the Commonwealth on April 13, 2016 and became effective on July 1, 2018. This new permit has a significant amount of requirements that the Town will be responsible for annually reporting on.

  Most of the new requirements affecting the Engineering Department pertain to Illicit Discharge Detection & Elimination (IDDE). IDDE involves the inspection and testing of our stormwater infrastructure for the presence of pollutants (i.e. ammonia, phosphorus, fecal coliform, surfactants, nitrogen, etc.). If any pollutants discovered exceed tolerable levels in our waterways, the source of the pollutant must be discovered and eliminated.

  In our Year 3 submission (due 9/30/21) the Engineering Department will be responsible for providing information and/or confirmation on the following:

  - Update as necessary our Inventory of all Town owned outfalls/interconnections with required pertinent information. Based upon our existing data we have 176 outfalls/interconnections that will require inspection and testing before the end of Year 3.
  - Complete dry weather inspections for our Town owned outfalls/interconnections
  - Prepare a report summarizing our dry weather inspections.
  - Begin wet weather outfall inspections for High Priority outfalls
  - Begin catchment investigation for High Priority catchments
  - Update as necessary our Inventory of all Town owned stormwater utilities
  - Update as necessary all of the catchment areas responsible by the Town.
  - Assist in the development of a written Operation & Maintenance procedure manual for all municipal activities.
  - Annual IDDE training for all Engineering and DPW Staff

- Inspect all 87 Town owned Best management Practices (BMPs). Some BMPs require monthly inspections.

The Engineering Department is also responsible for obtaining the services of a consultant to assist the Town in its compliance with our permit. The Engineering Department also acts as the Town's MS4 coordinator for all the other departments that must perform work and activities that fall under their departments (DPW, Conservation, Environmental, Planning, Facilities and Parks & Rec).

- **Crane Street Stormwater Design –** *completed* – We received a call from a resident of Crane Street (at the intersection of Crane Street and Savin Street) that had experienced flooding on his property as a result of a high intensity/short duration storm event in the Spring of 2020. The DPW had the drainage pipes and structures in this area cleaned and inspected to determine if there was a structural issue that caused the flooding issue. We reviewed the inspection and determined that configuration of the utility was not as efficient as it could be coupled with changes in pipe sizes that restricted flow within the system. We performed a hydraulic analysis to determine what storm event the existing system could handle without flooding. Stormwater utilities are designed to accommodate at a minimum, the 10 year/24-hour storm event. It was determined that the existing configuration did not meet the needs of a 10-year/24-hour storm event and needed to be redesigned to accommodate that storm event. We redesigned the system to increase the pipe sizes to the required diameter for that storm event and also revised the direction of flow through the pipes to improve its efficiency. It should be noted that the storm event in the Spring was a more significant event than the 10-year/24-hour storm, but in order to properly contain that type of storm event the pipe sizes needed would have been too large to fit underground and would have interfered with the other underground utilities. The design was completed in 2 phases to keep costs down. The hope is that the first phase will mitigate the flooding experienced in this location and if not, the second phase could be implemented.

  The DPW performed the Phase 1 upgrades to the stormwater system with its own personnel in the Fall. We have observed a few storm events since the Phase 1 upgrades and the collection of stormwater at this location has improved. The DPW will continue to monitor this location to determine if the second phase of upgrades is warranted.

- **Pavement Management** – *ongoing* – The Engineering Department, in conjunction with the Department of Public Works, has continued the pavement management program which began in 2007. Through fourteen years of the program, the Town completed approximately $25.5 million worth of repairs and maintenance to approximately 76 miles of roads and 23 miles of sidewalks. During this time the pavement condition index has risen from 70 to 81.

  In September of 2020, the Engineering & DPW department presented our next 2-year Town-wide road program to the SB. As part of our presentation, we discussed our switch in the Town's Pavement Management Program (PMP) from consultant's Vanasse Hangen Brustlin, Inc. (VHB) program to BETA's program. The reason for the switch is that BETA's PMP will be able to provide the Town with the ability to develop a more comprehensive program that will allow the Town to prioritize our rehab efforts on all of our existing roadway assets including roads, sidewalks and access ramps based upon their condition and their compliance with the American Disability Acts (ADA).

Back in 1992 the United States Department of Justice and Department of Transportation mandated that any public agency with more than 50 employees develop and submit a 504 Transition Plan before 1995. The 504 Transition Plan requires public agencies to assess its existing Right-Of-Way infrastructure specifically utilized by those with disabilities (sidewalks and access ramps) for compliance with ADA requirements. The agencies must then develop a 3-year ongoing plan to repair non-compliant sidewalks and access ramps to be in compliance with ADA.

The Town of Dedham developed and submitted a 504 Transition Plan in 1993 but was more geared towards addressing accessibility issues with our publicly owned properties/building rather than our sidewalks and access ramps.

Although this plan was approved by the State a strategy for addressing our non-compliant sidewalks and access ramps was never addressed and developed to make these required improvements. It imperative that the Town correct this and develop a comprehensive plan that can be incorporated into our ongoing 3-year PMP that would be updated yearly. Every year we receive emails and phone calls from those with disabilities pointing out areas in Town where our sidewalks and access ramps are non-compliant and asking when we plan to repair these deficiencies. By combining sidewalks and access ramps into our roadway PMP, it will provide the residents of Dedham the ability to view our 3-year PMP on the Town's website and see exactly where improvements are being made and when they are anticipated to be completed. Having a comprehensive 504 Plan will also allow Dedham to apply for various ADA grants in the future.

We should be able to include our sidewalks and access ramps into our 3-year PMP for consideration by the SB in the Summer/Fall 2021. In the Spring of 2021, BETA will inspect all our sidewalks and access ramps for ADA compliance and develop an inventory of these assets to be utilized in the PMP. Until then, we propose to finish out years 2 and 3 of the Road Program approved by the Select Board last year 2019. To view the most recent approved 2-year road program visit:

Approved CY2021 & CY2022 Road Program

- **Dedham Square Pedestrian Signal Evaluation –** *completed* - The Engineering Department in conjunction with consultant BETA Group was directed by the BOS to re-evaluate pedestrian safety in Dedham Square. The evaluation was specific to the pedestrian signals for the intersections of High Street at Eastern Avenue and High Street at Washington Street.

  BETA Group evaluated the existing pedestrian signal phasing for the pedestrian signals at those two intersections and also performed traffic and pedestrian counts to obtain current data relating to the average daily flow.

  Based upon the data collected and reviewed, BETA Group presented 4 alternatives to the BOS at their November 2018 meeting that would improve pedestrian safety at both intersections. The 4 alterations were:

  1. "No Turn on Red" signage on all approaches for both intersections.
  2. Combined Exclusive Pedestrian Phase for both intersections.
  3. Separate Exclusive Pedestrian Phases for both intersections.

3a. Separate Exclusive Pedestrian Phases for both intersections and "No Turn on Red" signage on all approaches for both intersections.

All alternatives improve pedestrian safety but result in different levels of improved safety along with varying levels of impact to traffic flow through the Square. Of the 4 alternatives, #3a was recommended by BETA as it provides the best combination of pedestrian safety with minimal impacts to traffic flow.

The Select Board voted to go with BETA's recommended option #3a. The DPW installed the "No Turn On Red" signage in January 2020 and BETA also updated the traffic signals to operate under their recommended separate exclusive pedestrian phases.

- **Traffic Calming** – *ongoing* – In 2012, The SB approved the traffic calming policy created by the Engineering Department. The Engineering Department will continue to work with the SB and the Town Manager to refine and revise the policy, as needed, in order to give clear guidance to residents wishing to implement traffic calming strategies in their neighborhoods through the submission of Traffic Calming Request Forms to the Transportation Advisory Committee (TAC). The Engineering Department sits as an ex-officio member of the TAC responsible for general oversight of the committee and performing preliminary investigations consisting of traffic counts, intersection turning movement counts, and speed surveys using in-house equipment and labor.

  To date, the TAC has received and decided on seventeen (17) traffic calming requests. The majority of the requests were determined not to require traditional traffic calming measures based upon the initial traffic evaluations performed by our department (i.e. speed tables, speed humps, road narrowing). However, for those requests that did not warrant traditional traffic calming measures, the TAC does provide low-cost traffic calming alternatives that the concerned neighborhood could implement on their own (i.e. staggered parking, step 2 kid alert). Of the seventeen requests, only two (Lower East Street & Upland Road) were determined to require traditional traffic calming based upon the results of the initial traffic evaluation. The Engineering Department generated a Traffic Calming Needs Assessment report for both of these roadways to determine what traffic calming measures would be appropriate. Lower East Street was discussed in detail in last year's report. For Upland Road we recommended temporary speed humps be installed on Upland Road and Tophill Avenue. The SB approved the installation of the temporary speed humps which will be installed in April 2021. The Engineering Department will evaluate the speed humps effectiveness until they are removed before the winter. If proved to be effective, the TAC will generate a ballot for the neighborhood to vote on the proposed permanent traffic calming measure.

  All meeting, minutes, evaluations and decisions are posted on the Town's website at the following link:

  https://www.dedham-ma.gov/government/transportation-advisory-committee

- **Private Ways** – *ongoing* – The Town By-laws for acceptance of private ways as public ways were updated and accepted at the 2014 Annual Town Meeting. The Engineering Department worked with the private ways subcommittee that developed the updated policy/standard by which the residents of a private way would have to adhere to in order to become a public way. The policy also includes the construction standards/specifications by which a private way must be reconstructed. There are 3 phases that must be completed

and approved by the BOS in order for a Private Way to be presented at Town Meeting for acceptance as a Public Way. Those phases include the "Public Way Layout Petition Form"(Phase 1), "Acceptance of Conceptual Overlay Plan Form"(Phase 2), and Design and Layout (Phase 3). Since 2015, The Engineering Department has received 17 Public Way Layout Petitions. Of those 17 petitions, only 2 (Birch St & Quarry Rd) have been through the entire process and became Public Ways.

Below is a summary, of the last 3 years, of those Private Ways that have requested Public Way Petition Forms from the Engineering Department and their to date progress. Please refer to previous reports for past year petitions:

- **2018**
  - Coventry Road – Phase 1 ongoing
  - Hyde Park Street – Phase 2 ongoing
  - Park Street – Phase 1 ongoing
- **2019**
  - Grant Avenue – Phase 1 ongoing
- **2020**
  - Wiggin Avenue – Phase 2 ongoing

All of these Private Ways that are ongoing in a particular phase have either stalled due to 100% of the abutters to the Private Way not agreeing to have their way become Public or the applicant is still acquiring signatures from all abutters required to move forward in the acceptance process.

- **Fox Meadow Lane Crosswalk Design –** *completed* – A concerned resident in the Greenlodge area of Town approached the SB about the potential to add a crosswalk on Fox Meadow Lane at the intersection with Intervale Road. The SB requested the Engineering Department to evaluate the intersection and determine if a crosswalk could be installed.

  The Engineering Department performed a traffic study including sight line distance calculations. This section of Fox Meadow Lane has an "S" curve with several large diameter trees and landscaping at the back of the existing sidewalk on either side of the road which restricts the ability for a motorist to adequately see a pedestrian wanting to use a crosswalk. It took many site visits manually checking the required sight line distances to determine if there was any location that would be safe to utilize as a crosswalk. We were fortunate enough to find a location that would provide just enough sight distance for motorists and pedestrians to adequately see each other. The crosswalk was then designed in-house along with new accessible access ramps on either side of the road for ADA compliance. As part of the design the existing Yield sign on Intervale Road at the intersection was changed toa Stop sign and multiple advance warning signs are to be installed alerting motorists that they are approaching a crosswalk and should drive cautiously. The DPW constructed the crosswalk and installed the signage in 2020.

- **Whiting Avenue Restriping and Signage Plan –** *completed* – Following the gas main replacement project by Eversource on Whiting Avenue (Walnut St to Mt. Vernon St.), this section was repaved by Eversource. The Engineering Department designed the restriping and signage plan for this section of Whiting Avenue that included shared use markings for bicycles and motorists called "sharrows", on-street parking lane directly in front of the

High School and the associated signage for the limits of the shared use travel way. The DPW was responsible for coordinating with Eversource to install the pavement markings and the DPW installed the signage in-house.

- **East Street Bike Lane Redesign –** *ongoing* – In 2011, the section of East Street from the Dedham/Westwood Town Line to the Endicott Roundabout was restriped follow our repaving of that roadway. Dedicated bike lanes, using the current guidelines of 2011, were designed for along this section of East Street by our department and installed by the DPW. Since 2011, the guidelines for designing bicycle accommodations have improved making our current bike lane out of date. The pavement marking along this roadway has also deteriorated significantly that it is also due for a new application of pavement markings. This made for a perfect opportunity to redesign the bike lane using current guidelines. Improvements included creating a "No Parking" restriction on both sides of East Street with associated signage, dashed bike lane marking through intersecting streets and increased bike lane signage along the corridor. The installation of the pavement markings and signage is anticipated to be completed by the DPW in the Spring/Summer of 2021. The Engineering Department will also be reviewing the bike lane design for the section of East Street from the Endicott Roundabout to High Street as designed by our consultants Environmental Partners as part of our approved MassDOT Complete Street project for Eastern Avenue. This section is also to be completed in 2021.

- **MWRA's Southern Extra High Pipeline Project** – *ongoing* – The MWRA's project will be conducted in two phases (North and South Phase). Construction of the North Phase of the project started in December of 2017 and includes the installation of a 36-inch water line from the Town line on Dedham Boulevard to East Street. During construction, our department will be providing daily inspectional services to ensure that our sewer and drainage infrastructure remains intact. We will also be involved in attending construction meetings to stay up to date on construction activities and to address any issues to our infrastructure. The North Phase was completed in 2020. The South Phase started construction in 2019 and our department provides the same inspectional services as in the North Phase. The South Phase will go from East Street, down Rustcraft Road to the train station then under the track towards Route 128 where it will enter Westwood. The South Phase is scheduled o be completed in 2021.

- **Liana Estates Subdivision** – *completed* – In recent history, most newly proposed subdivisions that are reviewed by the Planning Board seek waivers and propose to be developed as private ways. The developer for the Liana Estates subdivision located off of East Street proposed to construct a roadway that meets Town Standards in hopes that it would be accepted by the Town as a Public Way. The major obstacle in doing so was the cost associated with hiring a third-party engineer to perform the required inspections of all earthwork operations within the right-of-way to verify that the work was performed to Town Standards. Realizing the importance of having this roadway constructed to Town Standards and accepted as a Public Way, the Engineering Department along with the Public Works Department offered to perform all of the required inspections, with in-house staff, of earthwork activities within the right-of-way with the exception of the asphalt testing of the roadway. This cost savings to the developer allowed them to move forward as proposed. The right-of-way construction is 100% complete and was done meeting Town standards. The Engineering Department acquired waivers of appraisals and damages from all property owner and placed an article in the August 2020 Town Meeting for acceptance of Liana Lane as Public Way. That article was accepted and then the Order of Taking was executed

by the Select Board and recorded at the Registry of Deeds and officially became a public way on October 10, 2020.

- **Trenton Road Playground –** *ongoing* – At the request of the Select Board and Town Manager, the Engineering Department was tasked with assisting the Manor Neighborhood Association (MNA) in applying for a Notice of Intent with the Town's Conservation Commission. The property located at 96 Trenton Road was purchased by the Town in 1999 following a foreclosure. The property has become overgrown, unsightly, and unused over the past 21 years. The MNA had a vision to turn this piece of land into a neighborhood playground and began to secure donations to secure the funds necessary for design and permitting.

  A portion of the property contains wetlands and is located within the flood zone.A significant portion of the property lies within the 100' wetland buffer which also consists of a 40' Undisturbed Buffer Area. Due to the sensitive wetland and flood zone issues, the Engineering Department hired consultant Activitas with extensive experience with environmental permitting and playground design. We are currently working together along with the MNA to determine if a playground is viable considering all of the environmental issues that need to be accounted for. Over the next year we will work with the MNA and our consultant to hopefully design a playground that will meet the needs of the neighborhood and Conservation Commission that will allow for construction to take place in the summer of 2021. The majority of the funds being used for the design and permitting have come from the donations raised and then gifted to the Town of Dedham by the MNA.

- **Sewer Billing Project** – *ongoing* – The Engineering Department has been working with the Collectors Office to identify properties which were likely on sewer but not receiving bills using billing data and GIS information. To date 156 properties have been added to the sewer billing system. Of the 156 properties, 24 are properties located in Westwood and 3 are properties located in Boston. We are currently utilizing our sewer TV inspection data and GIS to plot locations where active sewer connections are made to the Town's system to identify additional properties that are likely connected but not receiving bills. We are hopeful in 2021 to develop another round of lettering, similar to the letters sent in 2010 & 2011 to residents believed to be connected to sewer but not receiving bills. We will be working again with the Collector's Office, Town Manager and Select Board with this effort.

- **Pump Station Operation** – *ongoing* – The Engineering Department, in conjunction with the DPW, oversees the operation of the three sanitary sewer pumping stations, including the weekly maintenance, routine and emergency repairs, and upgrades of various components. The Engineering Department and DPW monitors alarms at all stations 24 hours a day and responds as needed.

- **Sewer Connection, Extension, and Repair Inspections** – *ongoing* - The Engineering Department reviews, issues, and inspects permits for the installation and satisfactory testing of sewer lines and manholes on a daily basis. We spend a great deal of time responding to questions from residents and builders and we provide them with locations of existing facilities from record plans or television inspections. Over the past year, the Department reviewed, issued and/or inspected 51 permits. In addition to sewer permits, our department administered Drainlayer Licenses to 33 bonded and insured sewer contractors.

- **Storm Drainage Improvements/Inspections** – *ongoing* – The Engineering Department routinely responds to complaints and flooding issues throughout Town. As part of our evaluations of drain lines we have cleaned and inspected approximately 27.2 miles of pipe. In addition, we design improvements as needed. Over the past year the Town has installed 4 new deep sump catch basins.

- **Neponset Stormwater Partnership** – *ongoing* - The Engineering Department sits as one of the representatives from Dedham as part of the regional stormwater collaborative with 14 other Neponset Valley Communities. This partnership was formed through the Community Innovation Challenge Grant awarded to the MAPC and Neponset River Watershed Association. The collaborative is working together to prepare the communities for the challenges that are anticipated to arise from the new MS4 permit to be issued to the Commonwealth from the EPA.

- **Charles River Watershed Association –** *ongoing* – The Town of Dedham is 1 of 23 communities the reside in the Charles River Watershed. The Engineering Department is currently working with the CRWA to develop a strategy to remove sources of Phosphorus pollution from the Charles River. The Charles River has a Phosphorus Impairment and the EPA (as part of our NPDES Permit) is requiring us to lower the load (lbs) of Phosphorus that exists within the river to acceptable levels.

- **Subdivision and Site Plan Review** – *ongoing* - The Engineering Department reviews numerous site plans and subdivisions for consistency with Town regulations and acceptable design standards. We provide written comments to the respective boards on the adequacy of those plans and calculations.

- **Town of Dedham Construction & Design Standards** – *ongoing* – The Engineering Department is responsible for updating the Town's Design and Construction Standards. Every few years we review all the standards and update and/or revise those standards to meet local and state requirements. Our last update/revision of the standards took place in 2018.

Geographic Information System (GIS) Division:

The GIS Division, led by its GIS Manager, manages the administration of the GIS for the Town. The role of the GIS Division within the Engineering Department is to respond directly to the various needs of the Town's various departments, as they relate to GIS. Some of the responsibilities of the GIS Division include database administration, software application development, generating reports, creating maps and updating the Town's geospatial data. Below is a listing of some of the projects that the GIS division has been involved with:

  - **Addressing** – *ongoing* – The GIS Division is responsible for maintaining an up-to-date Master Street List and Master Address File (MAF), and for carrying out the duties contained within its regulations. This data is crucial for the First Responders, all departments, residents and the general public. The GIS division continues to add new addresses, modify and update existing addresses and solve conflicts.
  - **Aerial Imagery (Spring 2020)** – *Complete* **–** Prepared the specification, contracted and acquired 3" pixel resolution suitable for producing 1"= 40' scale planimetric data Aerial Photographs/Images for the Town of Dedham. The new

aerial imagery was flown in mid-April of 2020 is to be utilized for updating the Town's planimetric data. New aerial imagery is recommended every 2 to 5 years. Aerial imagery is vital in providing vast amount of data at low cost. The consultant has delivered the Town-wide 4-band (color and CIR) orthophotograph with 3 inch pixels or better in June of 2020.

- **Planimetric Update (phase II)** – *ongoing* – Working with the consultant on Phase II of The Town of Dedham, MA Spring 2020 Aerial Photography and Mapping Services Project which will consist of:
  - New DTM to support creation of accurate Orthorectification
  - Set of 1-foot contours and spot elevations
  - New 40 scale Planimetric mapping features from stereo
  - Add new, modify, delete, migrate and consolidate the existing data with the newly collected data while maintaining integrity
- **Data Integrity –** *ongoing* – The criticality of having and providing accurate data is imperative, and data integrity is key in facilitating that. Therefore, The GIS Division continues to not only conduct deep and thorough evaluation, modification and maintenance of the existing and newly created data, but also continue to embrace and adopt the standard recommended structures by the GIS community.
- **Data Update –** *ongoing* – The GIS Division continues to update the underlying data such as parcels, road centerline, street regulation, and right of way…etc. to better represent/replicate the real world.
- **Partnership with ESRI** – *ongoing* –The Town's GIS Division has recently partnered and collaborated with a GIS consultant (ESRI) to work together to draft a plan to not only leverage ESRI's latest technologies and available services, but also taking into consideration migrating the current Town wide GIS system to be in alignment with the current industry wide path going forward. The contract will end of March 2021. This project has been divided into 4 phases:
  - **System migration (Phase I)** – *complete* – Migrating all the infrastructure, GIS software, data and all supporting software needed to bring the Town with up to date technology.
  - **Application Migration (Phase II) –** *ongoing* – In this phase each existing application is being examined carefully and either migrated to the new system or was replaced with a newly developed application.
  - **New Application (Phase III) –** *ongoing* – New application and functionality are being developed to provide both citizen and employees with tailored functionally for their specific area of need.
- **Mapillary** – *Ongoing* – The Town's GIS Division has collaborated with Mapillary to provide a street level images for the whole Town that is captured by the Town and to the Towns preferred accuracy. This technology allows the Town to capture its own georeferenced high resolution images and geographically attach it the street allowing for a 3D view, this capability allows the Town to check features such as asset type, sign syntax, and visibility of structures from street which enable the Town to update its assets and data in the office instead of a site visit, which saves time and effort. First set of images capture for the Town was completed in September 2019. Second set of images was captured in August and September of 2020.
  (Please click on the **link** to access the application)
- **Department Outreach –** *ongoing* – The GIS Division continues to conduct informational sessions with individuals and/or small groups of departments' representatives to have a focused discussion and better understand their needs.

- **Department Training –** *ongoing* – The GIS Division continues to train individuals and/or small groups of departments on utilizing the GIS technology to meet their needs.
- **Departments' Special Projects –** *ongoing* – The GIS Division continues to work closely with many departments to create, and produce data, and maps that can facilitate and support their needs and decision making by migrating, modifying, evaluating and analyzing the available information.
- **Web GIS for Town staff –** *ongoing* **–** The GIS division has been implementing cloud and web-based GIS technology called ArcGIS Online. This technology provides GIS capabilities to departments and staff that do not otherwise have GIS. These tools allow sharing and collaboration of information between departments. The GIS Division continues to develop new content on ArcGIS Online to enhance the Town's GIS.
- **Public Web/Mobile GIS –** *ongoing* – The GIS Division continues to maintain, enhance, update and publish mapping content through the Town of Dedham Maps Online application. Information is available as downloadable PDF files, web maps, and applications.
- **Infrastructure Engineering Operations** – *maintenance* – As part of the MS4 Permit the Town is required to inspect, test and monitor its outfall. The GIS Division worked closely with The Engineering Department to analyze the need, propose solutions, create data, design, test and implement a web based application that enables the Town Engineer to report the inspected outfall in the field using any mobile device. The application allows the Engineers to report findings and monitor the inspection status on the fly. The application is designed to maintain a historical record of the activities associated with each outfall allowing the Engineers to analyze the data and generate the needed reports and information required for the Permit.
- **Sewer Billing Project** – *ongoing* – The GIS Division has been working with the Engineering Department, Collectors Office, Department of Public Works, Dedham Westwood Water District, and Boston Water and Sewer Commission to identify properties which were likely on sewer but not receiving bills. Properties determined to be severed will be notified and billed, which will allow the Town to collect money for the services provided. In order to get to this goal, data from various departments and agencies were collected, compared, field verified in some cases, and a new set of data was generated and is being maintained.
- **Stormwater Outfall Catchment area** – *ongoing* – As part of the MS4 Permit the Engineering Department is required to submit a detailed geo-analytical report for each outfall catchment area. The GIS Division performed several data manipulation and analysis to create the outfall network, assign the related structures a unique identifier, and factor in data (geographically and tabular) gathered from other departments to generate the catchment delineation statistics.
- **Work Order and Asset Management for Public Works –** *ongoing* **–** The GIS Division surveyed and analyzed the Department of Public Work needs and is working with the consultant to implement a new work order and asset management solution allowing Public Works staff to create, assign and track service requests and work orders to completion. The implementation allows DPW to track maintenance history on specific assets (e.g. sign, sidewalk, Drain Manhole, etc.).
- **Citizen Access Service Requests –** *ongoing* - The GIS Division is working with DPW and its consultant to implement new applications for the public to be able to report issues and for the Department Public Works to receive, categorize, assign, resolve and manage all reported issues in a timely manner. The solution will have

both a web interface and mobile application. Applications will integrate directly into the new Public Works work order management system, allowing staff to access all service requests.

- **Catch Basin Cleaning for Public Works –** *maintenance* **–** Working closely with the Department of Public Works, the GIS Division was able to analyze the need, create data, design, test and implement a web based application that empower DPW staff and contractor to inspect, collect and report Catch Basin information in real time, such as whether it was cleaned or not, by whom and when, type of pollutant (if existed), number of scoops collected, condition…etc.
- **Cemetery** – *ongoing* – Continue to maintain and enhance the data and web application for the Brookdale Cemetery. The Brookdale Cemetery web application was redesigned for better support on various tablet and mobile devices. This allows the Cemetery Division to access burial record information from the field. The same application was repackaged for the Village Cemetery.
- **Clerk –** *ongoing* – Verify and update the Town Precinct and Street List Voting data and Map. Data from Census, State voting list, Town active street name list and active addresses is being used to generate an up to date Street voting list and map.
- **Fire** – *ongoing* – Working with the Symposium Technologies to automate updating the Fire database with the most recent GIS data.
- **Police** – *ongoing* – Automated mapping of incident information from the police database. The process provides the police with a secured web map of incident data updated every six hours. The data is also made available to other GIS users for mapping of accident or other relevant police incident information
- **Drug and Zoning Violation** – *ongoing* – To fully enforce the law, evidence must be provided. In some cases, location-based analysis and maps can be one of the essential proofs of violation. The GIS Division works with Police to generate and produce these specific kinds of maps that gets submitted to the court.
- **Police Sectors** – *Complete* – Police depend on maps to identify and assign police to different sectors. Street name list and key facility locations along with police sectors were updated to produce an accurate map for the Police to use.
- **Safety - School safety** – *ongoing* – In an effort to protect against the threats that Dedham schools may encounter, and to ensure safety for all students, teachers, parents and other individuals involved in the education system, the Police department took proactive and precautionary measures to generate safe escape routes and plans for quick and effective response. The GIS Division is working closely with the Police department to generate these plans that will be used in various scenarios for all Dedham schools. A set of plans has been produced for the escape routes for all Dedham public schools. A set of control plans for Dedham public schools has been completed and is currently working to expand the solution to the private schools and major malls in the Town.
- **Economic Development** – *ongoing* – Working closely with the departments on various projects to collect, extract, link and analyze data, and produce maps to better assist in decision making.
- **Providence Highway - Create Better Corridor** – *ongoing* – When the Town is well informed about its resident opinion, it can take the right decision that will affect the Town future, that is why the Providence Highway - Create Better Corridor crowdsource application was implemented to gather not only ideas for improving but points of shortage, categorized in well-defined groups that will be the foundation for the next step of the project.

- **Planning and Zoning** – *Complete* –Firearms regulation, adult use overlay district and housing study are some of the many projects that needed the data to be collected, extracted, linked and analyzed to better assist the department and the board in the decision making process.
- **Town's Trail Inventory** – *ongoing* – Collecting, modifying and validating the Town's Trail Inventory to better serve the resident and be able to evaluate the different areas' needs along with other projects.
- **Conservation Department** – *ongoing* – Protecting our nature is important, therefore the GIS Division is working with the Conservation Department to generate an inventory of Potential Vernal Pool, and implement an application that will allow Conservation Department to collect and maintain the data and for the public to view.
- **Information Technology** – *ongoing* – Supporting and solving IT related issues during the transition period to minimize the impact on the GIS database and the availability of GIS applications and data to all of its customers.
- **State/Regional Collaboration –** *ongoing* –
    - **MassGIS** – *ongoing* - Working with MassGIS staff to provide updated standardized structure data for the Town of Dedham to the state. Standardized parcel and structure information are critical data layers for creating statewide address information to support E911 services.

- **Other notable completed projects**:

    - McDonald Square Sidewalk Improvements Project (2019)
    - Colburn Street Dam Project (2017)
    - Needham Street Bridge (2017)
    - Dedham Mother Brook BMP Implementation Project (2017)
    - Greenlodge School Parking Lot Expansion (2017)
    - Dedham Square Improvement Project (2016)
    - Town-Wide Flow Monitoring Project (2016)
    - Sewer System Hydraulic Flow Model Project (2016)
    - Vincent Road – Illicit Connection Detection & Elimination (2016)
    - Massachusetts Avenue Stormwater Utility Design (2016)
    - Lancaster Road/Kennsington Road Sewer Design (2016)
    - 2015 Inflow Investigations (2015)
    - Violet Avenue at Pine Street Intersection Realignment (2015)
    - 2014 Inflow Investigations (2015)
    - Striar Property (2015)
    - Private Building Inspections (2014)
    - Violet Avenue Drainage Study (2014)
    - Gonzalez Field – Accessible Parking Design (2014)
    - 2013 Inflow Investigations (2014)
    - Washington Street Discontinuance (2013)
    - Municipal Building Inspections (2012)
    - Town Wide Inflow & Investigation & Rehabilitation Program (2012)
    - Lowder Street at Highland Street Intersection Realignment (2012)
    - Town-Wide Flow Monitoring Project (2011)
    - Highland Street Sidewalk Design (2011)
    - High/Lowder/Westfield Street Traffic Calming (2011)
    - Stormwater BMP Retrofit Grant (2012)

- Lowder Street Culvert Replacement (2011)
- Cedar Street Culvert Replacement (2011)
- Colburn Street Reconstruction (2011)
- Pacella Drive Illicit Discharge Removal (2010)
- Traffic Regulations Update (2010)
- East Street Reconstruction – Phase II (2009)
- East Street Reconstruction – Lowe's Money (2009)
- Condon Park Parking Lot Design (2009)
- Bussey Street Culvert Abandonment (2009)
- Maverick Street Wall Replacement (2009)
- Zoar Avenue Sewer Replacement (2009)
- Rustcraft Road Sewer Replacement (2009)
- Gaffney Road Sewer Improvements (2009)
- Brookdale Cemetery Expansion (2008)
- Flanagan Place/Orphan Line Drainage (2008)
- Bridge Inspections (2008)
- Intersection Redesign, Greenlodge Street at Sprague Street (2008)
- East Street and Washington Street Sewer Replacement (2007)
- Street Opening Regulations Update (2006)
- Sewer Regulations Update (2006)
- Salt Shed (2006)

Cc: Board of Selectmen
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