TOWN OF PLYMOUTH CAPITAL IMPROVEMENT PLAN REQUEST
FY25 SPRING ANNUAL TOWN MEETING

Department:	**DPW, Engineering Division**	**Priority #:**	**2**
Project Title and Description:	**Engineering Services for Sandwich Street Culvert Replacement**	**Total Project Cost:**	**$342,000.00**

Department/Division Head: **James Downey, Acting Town Engineer**

Check if project is: New ☒ Resubmitted ☐ **Cost estimate was developed**: Internally ☐ Externally ☒

For project re-submittals, list prior year(s):

List any funding sources and amounts already granted: _____

_____

Basis of Estimated Costs (attach additional information if available)			**If project has impact on 5 Year Plan and future operating budgets, insert estimated amounts.**		
Capital:	**Cost**	**Comments**	**Fiscal Year:**	**Capital**	**Operations & Maintenance**
Planning and Design	**$312,000.00**		***FY26***	**$3,845,000.00**	
Labor and Materials			***FY27***		
Administration			***FY28***		
Land Acquisition			***FY29***		
Equipment			***FY30***		
Other	**$30,000.00**				
Contingency					
Total Capital	**$342,000.00**				

Project Justification and Objective: **The existing corrugated arch metal pipe culvert under Sandwich Street (Route 3A) by Nook Road, is in poor shape and requires replacement and widening for hydraulic capacity. The upstream side of Sandwich Street requires channel realignment and during construction one lane must be kept open on Sandwich Street, this will make the construction slow and time consuming compounded with all the underground and overhead utilities within the project area.**

For Capital Project Requests:
Will this project be phased over more than one fiscal year? If yes, enter it on the 5 Year Plan Yes ☐ No ☒
Can this project be phased over more than one fiscal year? Yes ☐ No ☒

For Capital Equipment Requests:
☐ Check if equipment requested is replacement and enter the year, make & model, VIN and present condition of existing equipment

What is the expected lifespan of this new/replacement equipment: _____
Attach backup information, estimates, or justification to support this request.

Preconstruction Design	$ 312,000.00
Direct Expenses	$ 30,000.00
Engineering Services Total	$ 342,000.00

Estimated Construction Costs	$ 3,610,000.00
Construction Admin & Project Representation	$ 235,000.00
Future Capital Request Total	$ 3,845,000.00

SLR International Corporation
99 Realty Drive, Cheshire, Connecticut, 06410

October 26, 2023

Mr. James Downey
Acting Town Engineer
Town of Plymouth
26 Court Street
Plymouth, MA 02360

SLR Project No.: 141.11982.P0025

RE: Engineering Services for Sandwich Street over Brook Culvert Replacement Plymouth, Massachusetts

Dear James

SLR International Corporation (SLR) is pleased to provide you with this scope of services and fee proposal to provide design-phase engineering services for the Sandwich Street over Brook Culvert Replacement project.

SLR visited the site to perform a visual inspection of the existing culvert. The existing corrugated arch metal pipe culvert over Brook is in poor shape and requires replacement and widening for hydraulic capacity. The upstream side of Sandwich Street requires channel realignment. The existing culvert runs below a driveway along Nook Road which seems like an add on.

During construction one lane must be kept open on Sandwich Street, which will make the construction slow and time consuming with all the underground and overhead utilities within the project area.

Our proposal is predicated on the following assumptions:

- The Town will be conducting its own technical plan reviews.
- The design work shall begin in 2024.
- Milestone submissions shall include two hard copies of the submission (one full-size and one half-size copy of the plan set) to the Town for review along with PDF files; final printing for bidding is excluded as we would encourage the Town to make bid documents available to prospective bidders electronically.
- The proposed bridge structures will have a span less than 20 feet.

Scope of Work

Task 1.0 – Kickoff and Coordination Meetings

Throughout the course of this project, the project manager will coordinate project tasks; perform project-related managerial tasks; receive and execute directions from the Town and project partners; schedule work; maintain project records, technical data, drawings, reports, and financial records; and coordinate with the Town and project partners. The following specific tasks are proposed:

3.4 Geotechnical Engineering – Conduct a subsurface exploration program at the bridge crossings to establish subgrade conditions. The principal objective is to provide soils data necessary for bridge foundation, including soil type and consistency, frost susceptibility characteristics, and ledge and/or groundwater depth. The program will include the following:

- 3.4.1 A boring program to undertake four Type B drilled borings at the bridge.
- 3.4.2 Coordination of the services of the boring contractor to execute the program.
- 3.4.3 Collection of continuous split-spoon samples from the borings, extending to bedrock or firm grade 3 times the depth below the bottom of footing.
- 3.4.4 Laboratory testing of the samples for grain size in order to establish frost susceptibility.
- 3.4.5 If bedrock is encountered, coring to a depth of 10 feet and establishing rock quality designation (RQD)
- 3.4.6 Geotechnical analyses and recommendations for bridge support and subgrade drainage
- 3.4.7 Preparation of a geotechnical report summarizing the results of the subsurface exploration, lab testing, and design recommendations for bridge per Massachusetts Department of Transportation (MassDOT) format and criteria

3.5 Contact local utility providers and request available mapping of existing facilities in the vicinity of the structures. Utilities will be depicted on the survey base map based on best available information.

3.6 Sensitive Species Review – A review of the Massachusetts Division of Fisheries and Wildlife Natural Heritage and Endangered Species Program (NHESP) mapping indicates that the project site is not located within mapped Estimated and Priority Habitat for state-listed species. This mapping is updated annually, and SLR will review the mapping during the permitting process to reconfirm our initial findings. This scope of services assumes that the proposed project will not require any Massachusetts Endangered Species Act (MESA) filings and will have no impact to listed species or their habitat. If this is not the case and additional level of effort is required (e.g., MESA applications, surveys, mitigation), an amendment will be provided for these services.

3.7 Sensitive Historical/Archaeological Resources (Section 106) – As the project will require state and federal permits, coordination with the Massachusetts Historical Commission (MHC) and the Tribal Historic Preservation Officer (THPO) will be undertaken to determine potential project impacts to sensitive historical or archaeological sites. A Project Notification Form (PNF) will be submitted to the MHC along with the required accompanying materials, and notification letters will be submitted to the THPOs. It is assumed that each entity will issue a finding of no significant impact to historical/ archaeological resources and that no additional coordination, surveys, or mitigation will be required. If review by any of these entities determines that an additional level of effort is required, an amendment will be provided for these services.

Task 5.0 – Conceptual Design

Under this task, existing and new data will be summarized, and conceptual alternatives will be developed for the bridge replacement.

5.1 Prepare a Bridge Type Study memorandum that will evaluate two cost-effective bridge structure alternatives for the bridge, with options for parapets and railing systems.

- 5.1.1 Prepare a brief memorandum summarizing the project alternatives, impacts, and costs. Embedded within the report will be a structure type study evaluating the design alternatives. The memorandum shall include the following:
  - 5.1.1.1 Schematic plan, elevation, and typical section for each alternative, including railing and parapet treatments
  - 5.1.1.2 Construction cost opinions for each alternative studied
  - 5.1.1.3 Summary of project requirements and impacts for each alternative to address construction cost, constructability, impacts to utilities/necessary relocations, ROW needs, maintenance requirements, regulatory permit requirements, staged construction, and public concerns
  - 5.1.1.4 Recommendation for a preferred alternative

5.2 Recommendations – Recommend a preferred alternative based on considerations of existing conditions, hydraulic assessment, construction feasibility, benefits and impacts, and input from project stakeholders.

5.3 Submit a memorandum to the Town for review and comment. Meet with Town staff to discuss the report and recommendations and solicit design direction.

Task 6.0 – Preliminary Design

6.1 Prepare preliminary design plans of the preferred alternative to approximate 60% completion, including bridge replacement and roadway, channel work, area regrading, and landscaping. The plans will depict the site location; plan view of existing conditions showing elevations, physical features, and the extents of regulated areas (i.e., onsite wetlands, ordinary high water, etc.); plan view of proposed conditions in areas to be altered; preliminary planting plan; profile of proposed conditions in the channel; section views of the channel; and typical details. The bridge design will include preliminary horizontal and vertical roadway geometry, storm drainage improvements, utility relocations, and treatment of properties along Sandwich Street and Nook Road. A typical roadway cross section and sections at critical locations will be provided. SLR will evaluate project interface with existing site facilities and operations and conformance to Town, MassDOT, and American Association of State Highway and Transportation Officials guidelines. Develop preliminary design plans to include the following:

- 6.1.1 Title sheet
- 6.1.2 Beginning and end of project and project limit lines
- 6.1.3 Existing conditions, including titles of adjacent roadways and watercourses; location of utilities, drainage facilities, and associated appurtenances; designated wetlands; and property lines and related information compiled from existing maps and records
- 6.1.4 Plan view and longitudinal profile of existing channel and crossings in the project area

history research will be required under this scope of work. This scope of work also assumes that no public hearing will be requested by the municipality or MA DEP.

- Section 404 Permit – USACE – Prepare and submit a Self-Verification Notification Form General Permit No. 10 Linear Transportation Projects and Stream Crossings. For this permit application, the design plan format will be modified as required to meet USACE plan submittal guidelines.

Filing fees and local advertising fee will be required for multiple permit applications, and these fees will be billed directly to the Town. If during design development it is determined by the regulatory agencies that additional permitting other than listed above is required these permit applications will be prepared under a separate contract amendment.

This scope of services assumes that the contractor will prepare and submit a National Pollutant Discharge Elimination System Stormwater Pollution Prevention Plan, Construction Dewatering Permit, and any other construction-related permits that may be required.

7.2 Application Review – Provide application review assistance as necessary based on comments and questions from the regulatory review agencies.

Task 8.0 – Final Design

8.1 Based upon the approved Preliminary Design and agreed revisions, incorporate the review comments and prepare final design (90% Completion) plans and specifications to include the following:

8.1.1 Roadway plan and profile indicating drainage improvements and roadside barriers and utility plans indicating municipal relocation, construction details, and details for treatment of affected properties within the work areas. Incorporate utility relocation plans prepared by private utilities.

8.1.2 Signage plans

8.1.3 Maintenance and protection of traffic plans

8.1.4 Sedimentation and erosion control plans

8.1.5 Structure plans for the bridge, including structure layout plan, elevation, typical cross section, foundation plans, and structure details

8.1.6 Boring logs

8.1.7 Details for stream bank/channel restoration and scour countermeasure

8.1.8 Title Sheet and Miscellaneous Details

8.2 Perform structural calculations.

8.3 Prepare technical specifications suitable for public bidding purposes. The Town will provide front end.

8.4 Prepare final quantity estimate, cost opinion, and calendar day chart.

8.5 Submit 90% Completion plans, special provisions, estimate, and calculations for review by the Town.

8.6 Meet with the Town to discuss the final design. Respond to review comments in writing.

11.4 Respond to the selected contractor's questions concerning clarification of the contract drawings and specifications. Issue clarifications, interpretations, and field orders to the contractor.

11.5 Review special inspection and test results for conformance with the contract documents.

11.6 Render opinions and interpret the Contract Documents relative to disagreements between the Town and the contractor.

11.7 Review contractor's application for payment for conformity to work actually completed and determine if the quality of work is in accordance with the Contract Documents.

11.8 Record changes made during the period of construction, as furnished and recorded by the general contractor, and provide one set of reproducible prints to the client, which will reflect such changes.

11.9 Receive, review, and transmit to the Town inspection and test results, marked-up shop drawings, and other materials that are required to be collected by the contractor prior to final payment.

11.10 Prepare a punch list of required work items. Review the work when notified that the punch list items have been completed.

Task 12.0 – Project Representation

The consultant team will provide full-time project representative services during the construction of this project. The project representative will be present at the project site on a full-time basis (anticipated at approximately 40 hours per week) while active construction is in progress in order to provide guidance and determine whether there appear to be any defects or deficiencies in the construction work or materials. Specifically, the project representative will provide the following services:

12.1 Observe progress and review construction work for general compliance with the Contract Documents.

12.2 Record any observed deviations from the materials specified and the methods of construction authorized. Recommend rejection of defective work.

12.3 Report any health or safety concerns or observed violations of Occupational Safety and Health Administration regulations and notify the Town immediately if any are observed during site visits.

12.4 Accompany inspectors of regulatory agencies having jurisdiction and report results to the Town.

12.5 Verify that required tests are conducted and maintain a record thereof.

12.6 Verbally report observations at progress meetings as required.

12.7 Prepare special reports and recommendations during construction whenever the project representative believes that the contractor's work is unsatisfactory, faulty, defective, or does not conform to the Contract Documents.

12.8 After inspection by the project representative and the Town, and if appropriate, issue a Certificate of Substantial Completion in a form suitable to the Town.

12.9 Conduct a final review of the project and prepare a punch list of items to be corrected and/or completed by the contractor prior to acceptance by the Town. The project representative will conduct additional site visits as necessary to review and update the

Direct expenses will be invoiced at cost with no markup or based on the attached rate schedule. Any such reimbursable or out-of-pocket costs shall be substantiated by receipt, vendor invoice, or other form of supporting detail. We recommend the Town budget the following amount for direct expenses:

13.0 Direct Expenses	$30,000
ESTIMATED PROJECT TOTAL	**$577,000**

Standard Terms and Conditions

This proposal is subject to our Standard Terms and Conditions, which are attached hereto and incorporated herein.

Exclusions and Limitations

In submitting this proposal, we make no representation that the project will receive all necessary regulatory approvals.

The following work items are not included in this scope of work at this time:

1. Payment of permit application fees
2. Historic and/or archaeological surveys
3. Hazardous waste testing, studies, or abatement plans
4. Boundary or ROW survey and easement maps
5. Utility design, other than water and drainage
6. Traffic studies or preparation of traffic control plans
7. Natural Diversity Data Base studies

Should any of the above items or any additional services be required, they can be provided under supplemental agreement.

Note that on the basis of site observations performed SLR will keep the Town informed as to the progress and quality of the work and shall endeavor to guard the Town against defects and deficiencies in the work and confirm that the work is proceeding in accordance with the contract documents. It is understood that SLR shall not have control over or charge of and shall not be responsible for construction means, methods, techniques, sequences, or procedures or have safety precautions and programs in connection with the work since these are the contractor's responsibility.

OPINION OF PROBABLE CONSTRUCTION COSTS

Based Upon Field Visit

Replacement Of Sandwich Street Culvert Over Unnamed Brook

District 5

Plymouth, Massachusetts

#11982.00025

October 26, 2023

Item No	Description	Unit of Measure	Unit Price	Total Quantity	Total
1	SITE PREPARATION	LUMP SUM	$83,000.00	1	$83,000.00
2	TRAFFIC MANAGEMENT	LUMP SUM	$247,000.00	1	$247,000.00
3	DEMOLITION AND REMOVALS	LUMP SUM	$165,000.00	1	$165,000.00
4	SITE IMPROVEMENTS AND RESTORATION	LUMP SUM	$140,000.00	1	$140,000.00
5	CHANNEL AND BANK SLOPE TREATMENTS	LUMP SUM	$66,000.00	1	$66,000.00
6	CHANNEL BED MATERIAL	TON	$250.00	85	$21,250.00
115.1	DEMOLITION OFEXISTING BRIDGE	LUMP SUM	$ 25,000.00	1	$25,000.00
120	EARTH EXCAVATION	LUMP SUM	$ 25,000.00	1	$25,000.00
140	BRIDGE EXCAVATION	CUBIC YARD	$ 67.00	400	$26,800.00
141.1	TEST PIT FOR EXPLORATION	CUBIC YARD	$ 250.00	10	$2,500.00
151	GRAVEL BORROW	CUBIC YARD	$ 63.00	100	$6,300.00
151.01	GRAVEL BORROW - TYPE C	CUBIC YARD	$ 65.00	100	$6,500.00
151.2	GRAVEL BORROW FOR BACKFILLING STRUCTURES AND PIPES	CUBIC YARD	$ 65.00	200	$13,000.00
156.1	CRUSHED STONE FOR BRIDGE FOUNDATIONS	TON	$ 65.00	105	$6,825.00
170	FINE GRADING AND COMPACTING	SQUARE YARD	$ 20.00	1100	$22,000.00
201.5	CATCH BASIN - MUNICIPAL STANDARD w/ 4' SUMP	EACH	$ 5,500.00	2	$11,000.00
222.3	FRAME AND GRATE (OR COVER) MUNICIPAL STANDARD	EACH	$ 1,250.00	2	$2,500.00
241.15	15 INCH REINFORCED CONCRETE PIPE	LINEAR FEET	$ 200.00	50	$10,000.00
402.	DENSE GRADED CRUSHED STONE FOR SUB-BASE	CUBIC YARD	$ 90.00	105	$9,450.00
460.23	SUPERPAVE SURFACE COURSE - 12.5 (SSC - 12.5)	TON	$ 230.00	200	$46,000.00
460.42	SUPERPAVE BASE COURSE - 37.5 (SBC - 37.5)	TON	$ 300.00	200	$60,000.00
482.3	SAWING ASPHALT PAVEMENT	FOOT	$ 10.00	60	$600.00

OPINION OF PROBABLE CONSTRUCTION COSTS

Based Upon Field Visit

Replacement Of Sandwich Strret Culvert Over Unnamed Brook

District 5

Plymouth, Massachusetts

#11982.00025

October 26, 2023

Item No	Description	Unit of Measure	Unit Price	Total Quantity	Total
570.1	HOT MIX ASPHALT CURB - TYPE 1	FOOT	$ 25.00	50	$1,250.00
701.	CEMENT CONCRETE SIDEWALK	SQUARE YARD	$ 130.00	60	$7,800.00
701.1	CEMENT CONCRETE SIDEWALK AT DRIVEWAYS	SQUARE YARD	$ 140.00	10	$1,400.00
702	HOT MIX ASPHALT SIDEWALK OR DRIVEWAY	TON	$ 385.00	10	$3,850.00
748.	MOBILIZATION	LUMP SUM	$165,000.00	1	$165,000.00
	TEMPORARY EARTH RETAINING SYSTEM	LUMP SUM	$ 150,000.00	1	$150,000.00
	RIPRAP	CUBIC YARD	$ 100.00	50	$5,000.00
991.1	CONTROL OF WATER	LUMP SUM	$ 100,000.00	1	$100,000.00
995.011	CULVERT STRUCTURE	LUMP SUM	$900,000.00	1	$900,000.00
1000.1	PERMANENT GAS MAIN RELOCATION	LUMP SUM	$ 40,000.00	1	$40,000.00
1000.2	TEMPORARY GAS MAIN RELOCATION	LUMP SUM	$ 25,000.00	1	$25,000.00
1000.1	PERMANENT SEWER MAIN RELOCATION	LUMP SUM	$ 15,000.00	1	$15,000.00
1000.2	TEMPORARY SEWER MAIN RELOCATION	LUMP SUM	$ 35,000.00	1	$35,000.00
1000.1	PERMANENT WATER MAIN RELOCATION	LUMP SUM	$ 15,000.00	1	$15,000.00
1000.2	TEMPORARY WATER MAIN RELOCATION	LUMP SUM	$ 50,000.00	1	$50,000.00
1000.2	Minor Items (10%)	LUMP SUM	$165,000.00	1	$165,000.00

OPINION OF PROBABLE CONSTRUCTION COSTS

Based Upon Field Visit

Replacement Of Sandwich Strret Culvert Over Unnamed Brook

District 5

Plymouth, Massachusetts

#11982.00025

October 26, 2023

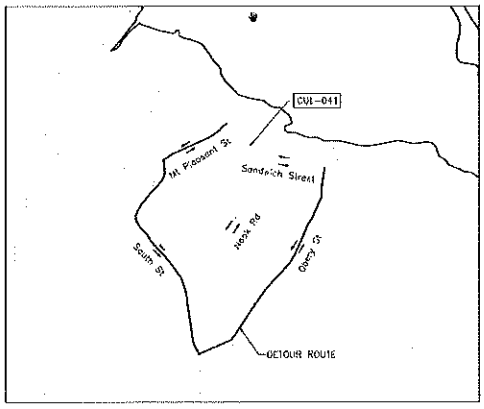
Item No	Description	Unit of Measure	Unit Price	Total Quantity	Total

PROJECT COST SUBTOTAL =	$2,675,025.00
CONTINGENCIES 10% =	$ 267,502.50
INCEDENTIALS 10% =	$ 267,502.50
MARKET UNCERTAINTY (inflation) 15% =	$ 401,253.75

TOTAL PROJECT COST (ROUNDED) = $3,610,000.00

Critical Culvert Structure
C-041

Address: 171 Sandwich Street
Length: ± 105'
Materials:
60" Elliptical Corrugated Metal Pipe, concrete headwall with stacked stone wingwall (inlet), mortared stone headwall (outlet)
Waterway:
Wellingsley Brook



Detour Route

Summary

Culvert C-041 carries an unnamed tributary parallel with Nook Road and under Sandwich Street (3A), through a 60-inch Elliptical Corrugated Metal Pipe. The inlet is located on private property and continues under the abutters driveway adjacent to the building before rung below Sandwich Street. According to stream stats, this crossing has a drainage area of 0.75 miles. Structure C-041 has an RPS score of 3 and is considered a Critical Culvert due to the pipe and inlet wingwall condition, and the high risk it poses to town via roadway undermining and traffic disruption, as well as abutting property damage if a failure would occur.

Existing Conditions

Inlet (Poor): The inlet is located on private property and was observed to be a 60-inch corrugated metal pipe. The pipe appeared to have been previously rehabilitated with a lining, and was separating from the headwall. A dry laid stone wing wall retaining the abutting property was noted to be in failing condition, with severe bank erosion and overturning stones. A drainage outlet was observed immediately up gradient of the inlet.

Outlet (Poor): The culvert's outlet was located below a 5' wide sidewalk running along Sandwich Street, with a chain-link fence at the top of the embankment. The headwall was noted to have cracking between the mortar and stones, and a drainage outlet adjacent to the culvert in the headwall. Evidence of a previous rehabilitation lining was also observed at the outlet.

Additional Notes, Recommendations, and Cost

Overhead wires, a water line and drainage structures were observed near the culvert. The estimated remaining service life for this culvert is 5 to 10 years, however it is recommended the inlet side embankment should be reinforced as soon as possible, as further erosion may damage the abutting property at 171 Sandwich Street. Ownership should also be confirmed for the inlet especially. TEC recommends a full culvert replacement with a 10' 3 sided box culvert, with engineering controls along the shoulder of both Sandwich Street and Nook Rod for roadway runoff. The estimated 2023 construction cost of a full replacement is approximately $2.2 to $2.6 Million, depending on the results of the field survey, hydraulic study, and geotechnical investigations. This number is largely due to the impacts construction would have to both Sandwich Street and Nook Road, as well as the abutting property.