

Memorandum

Date: April 22, 2022

Project: 4th Avenue Pedestrian Bridge and Connection SRTS

To: Tracy Sanders, Project Manager
Town of Lyons

From: Chris Jain, Joel Price

Re: Additional Design Services Request

Background

Murraysmith was contracted in February 2021 to provide engineering design services for a pedestrian bridge and approach over the St Vrain Creek. The improvements also include multi-use path and sidewalk improvements, connecting Bohn Park on the south to the Lyons Elementary School on the north. All path and bridge improvements are being designed as ADA compliant.

The design services scope includes project management, surveying, geotechnical investigation, permitting, civil and structural design services, and the development of final plans, specifications, and probable construction cost estimate for bidding and construction.

Scope of Additional Services

During construction, a proposed change to the abutment location due to a conflict between one of the south abutment caissons and the existing rock retaining wall was identified. In addition, a change to the proposed retaining walls for the south bridge approach has been proposed because of the extremely long lead time for the proposed wall blocks due to the current construction climate of high demands and product shortages. The proposed changes will require additional design and evaluation but will maintain or increase the quality of the finished project.

The additional services include:

- Evaluating and incorporating the as-built survey data of the caissons into the design files
- Revising the design of the north abutment to accommodate the proposed location shift
- Evaluating the geotechnical parameters for the shifted north abutment
- Revising the structural calculations for the south abutment to account for a revised caisson location to replace the caisson that failed to meet the design specifications
- Prepare retaining wall layout plans and geotechnical recommendations for a cast-in-place retaining wall to replace the proposed block wall

- Revising the construction plans to reflect the design changes

A detailed description of the proposed structural and geotechnical design services is included with this memorandum.

The attached fee estimate includes a breakdown of the additional hours required to make the proposed design changes and construction plan revisions. We are requesting additional project funding of \$20,988, resulting in a new contract total of \$224,286.

STRUCTURAL SCOPE OF WORK – SUPPLEMENT 2 - 2022

4th Avenue Pedestrian Bridge, Trail Connections, and Street Improvements

Lyons, Colorado

Prepared by RockSol, April 13, 2022, revised April 21, 2022

Structural Scope – Supplement 2:

Revise the bridge General Layout CAD file and plan sheet to reflect bridge shift south approximately 3', maintaining the same superstructure length, but shifting the superstructure south, and shifting both abutments south by the same magnitude. The decision to shift the superstructure and abutments south was made by the Town and the prime consultant. Revise the profile to maintain the same elevations at each shifted abutment.

Revise the bridge Construction Layout and Foundation Layout CAD files and plan sheet to reflect bridge shift south approximately 3', maintaining the same superstructure length, but shifting the superstructure south, and shifting both abutments south by the same magnitude.

Revise the bridge Abutment 1 Details and Abutment 2 Details CAD files and plan sheets to reflect bridge shift south approximately 3', maintaining the same superstructure length, but shifting the superstructure south, and shifting both abutments south by the same magnitude. Coordinate with prime consultant regarding refined proposed ground at shifted Abutment 2 location. Evaluate Abutment 2 vertical height and wingwall lengths for the Abutment 2 location closer to the top-of-bank, adjust Abutment 2 wingwall lengths as necessary. Revise structural calculations of Abutment 2 stem, wingwalls, Abutment 2 footing to reflect revised heights and wingwall lengths. Compile revised calculations, and apply PE stamp to revised calculations. Revise quantities, resolve record set quantities with check set quantities, and apply PE stamp to revised quantities.

Evaluate geotechnical parameters for the shifted Abutment 2 location closer to top-of-bank. Present revised geotechnical parameters if different from the previous geotechnical parameters. Conduct slope stability analysis for the shifted Abutment 2 location closer to top-of-bank. Revise Engineering Geology CAD file and plan sheet to reflect bridge shift south approximately 3'.

Prepare revised General Layout CAD file, and transmit to hydraulics engineer for their revision of Bridge Hydraulic Information plans sheet.

Revise Abutment 1 calculations and plans for the likely scenario that one deficient drilled shaft will require replacement due to inadequate concrete placement shown by cross-hole sonic logging results. Or if the contractor provides design calculations for the revised Abutment 1, conduct an independent design check of the revised Abutment 1 plans.

Compile and transmit revised bridge plans and revised quantities to prime consultant. Set up and route plans to professional engineers for application of PE stamp-signature-date.

Prepare retaining wall layout plans, geotechnical recommendations, and quantities for replacing block landscape walls with reinforced concrete retaining walls shown in CDOT Standard Plan M-601-20. Structural design of the retaining walls is not needed, since structural details will follow CDOT Standard Plan M-601-20. Layout plans will identify horizontal alignments; height dimensions k, m, h; profiles; typical section; footing elevations for frost protection.

4TH AVE PEDESTRIAN BRIDGE, TRAIL CONNECTIONS, AND STREET IMPROVEMENTS
TOWN OF LYONS
PROPOSED FEE ESTIMATE
ADDITIONAL SERVICES REQUEST

Staff Name	Estimated Fees														
	Principal Engineer I	Professional Engineer VII	Professional Engineer III	Engineering Designer II	Technician II	Hours	Labor	Subconsultants					Subconsultant Multiplier % Markup	Subconsultant Total with Markup	Total
								TLS and GPRS Survey and Utility Locates	Rocksol Geotechnical	S2O Hydraulic Modelling	Rocksol Environmental Permitting	Rocksol Structural Engineering			
Price	Jain	Walmsley	Angelos	McFaddin											
Task 1 - Project Management and Administration						0	\$ -								
<i>Task 1 Subtotal</i>	25	41	19	16	0	101	\$ 18,652	\$ -	\$ -	\$ -	\$ -	\$ -		\$ -	\$ 18,652
Task 2 - Permitting, Survey and Utility Identification															
<i>Task 2 Subtotal</i>	6	7	0	10	8	31	\$ 5,059	\$ 15,900	\$ 19,100	\$ 7,500	\$ 22,800	\$ -		\$ 71,830	\$ 76,889
Task 3 - Design Services															
<i>Task 3 Subtotal</i>	23	38	76	78	52	267	\$ 41,690	\$ -	\$ -	\$ -	\$ -	\$ 24,511		\$ 26,962	\$ 68,652
Task 4 - Bidding and Construction Administration Services															
<i>Task 4 Subtotal</i>	7	26	26	42	12	113	\$ 18,048	\$ -	\$ -	\$ -	\$ -	\$ -		\$ -	\$ 18,048
Task 5 - Additional Services (11/2021)															
<i>Task 5 Subtotal</i>	9	32	34	0	0	75	\$ 13,448	\$ 900	\$ -	\$ -	\$ 1,605	\$ 4,412		\$ 7,609	\$ 21,057
Additional Services (04/2022)															
Task 6 - Revised Abutment Location															
Task 6.1 - Evaluate and incorporate asbuilt survey data into the design and CAD files		2	4			6	\$ 1,010						1.1	\$ -	\$ 1,010
Task 6.2 - Revise design and plans for abutment 2 and north slope; evaluate geotechnical parameters for the revised abutment location	1	4	12			17	\$ 2,870		\$ 2,000			\$ 3,850	1.1	\$ 6,435	\$ 9,305
Task 6.3 - Revise design and plans for abutment 1 (south) caisson redrill		1	2			3	\$ 505					\$ 4,350	1.1	\$ 4,785	\$ 5,290
Task 6.4 - Retaining wall layout plans, geotechnical recommendations.	1	3	4			8	\$ 1,423		\$ 950			\$ 2,650	1.1	\$ 3,960	\$ 5,383
<i>Task 6 Subtotal</i>	2	10	22	0	0	34	\$ 5,808	\$ -	\$ 2,950	\$ -	\$ -	\$ 10,850		\$ 15,180	\$ 20,988
TOTAL - ALL TASKS	72	154	177	146	72	621	\$ 102,705	\$ 16,800	\$ 22,050	\$ 7,500	\$ 24,405	\$ 39,773		\$ 121,581	\$ 224,286