REQUEST FOR QUALIFICATIONS
CITY OF BEAUFORT
Greenlawn Drive
RFP 2019-103, Addendum No. 2, Jan 17, 2019

This Addendum No. 2 to RFP 2019-103, Greenlawn Drive Streetscape, is issued by the City of Beaufort Finance Department. Except as modified by this Addendum No. 2, all areas of the RFP not specifically mentioned in or affected by this Addendum shall remain unchanged.

The following item has been added:

GHD, Limited Pavement Evaluation Report, dated 8 October 2017

All Bidders shall acknowledge receipt and acceptance of this Addendum No. 2 by signing in the space provided in the RFP Signature Page. Proposals submitted without this Addendum may be considered non-responsive.

October 8, 2017 Reference No. 11146572

Mr. Jared Fralix, P.E.
Infrastructure Consulting & Engineering
26 John Galt Road, Suite A
Beaufort, South Carolina 29906

Dear Mr. Fralix:

Re: Report of Limited Pavement Evaluation
Greenlawn Drive Streetscape
Beaufort, South Carolina

GHD appreciates the opportunity to provide limited pavement evaluation and consulting services for the above-referenced project. Our evaluation was requested to supplement the design of a roadway improvement and streetscape project. Our services were performed in general accordance with the scope of services detailed in our proposal dated August 8, 2017.

1. Project Understanding

We have received project information during telephone and email correspondence with you prior to the submittal of our proposal. We understand that ICE is designing a streetscape project for the City of Beaufort. The project consists of improvements to approximately 1,580 linear feet of Greenlawn Drive, proposed to extend from Boundary Street to Greenlawn Circle in Beaufort, South Carolina. We were requested to perform a limited evaluation of the near-surface soil conditions within the proposed widening areas, to document the existing asphalt pavement section along the referenced roadway, and to provide general pavement design recommendations. We understand that the design intent is to maintain the final grade of the pavement as close as possible to the existing grade, and to minimize demolition and/or repair of the existing pavement to the extent practical. While traffic data for the subject road is not available, we understand that the road will likely see traffic similar to First Street within the City of Beaufort. Based on a previous traffic study for First Street, the anticipated Average Daily Traffic is 2,100, with less than 1% truck traffic.

The existing pavement is exhibiting signs of aging and distress, such as raveling, areas of widespread map cracking, some areas of settlement, and areas of apparent root damage. Based on our observations during our site reconnaissance, it appears that a section of the road was previously improved between the intersections of Pearl Street and Burnside Street (presumably associated with the adjacent commercial development). As such, the magnitude of the observed pavement distress is more severe from Boundary Street to Pearl Street and north of Burnside Street.

GHD
57C Sheridan Park Circle Bluffton South Carolina 29910 USA
T 843 815 5120 F 843 815 5121 W www.ghd.com

2. Field Observations and Testing

2.1 Investigation of Existing Pavement

Our personnel have evaluated the pavement section components at three selected locations (designated C-1 to C-3) along the pavement between Boundary Street and Greenlawn Circle. At each test location, coring of the asphalt was performed. The asphalt cores from each test location were measured for thickness. The thickness measurements of our asphalt cores ranged from 0.30 to 3.02 inches. At each core location, the thickness of the sand asphalt base course was also measured and recorded. The base thickness at our test locations ranged from 3.15 to 4.30 inches.

A hand-auger boring was performed at each core location to evaluate the underlying near-surface subbase soils. The soils at the test locations were evaluated using a Dynamic Cone Penetrometer (DCP) in general conformance with ASTM Special Technical Publication #399. In the DCP test, a 1-½ inch conical point is seated 1-¾ inches to penetrate loose cuttings, then driven two additional 1-¾ inch increments with blows from a 15-pound hammer falling 20 inches. The hammer blows are recorded and provide an index to soil strength and density when properly evaluated. The soils at our test locations typically consisted of loose to dense fine sands with varying silt or clay content to the termination depth of 36 inches below the sand asphalt base course. Groundwater was not encountered at our test locations, to the depths explored. Detailed observations at each of the investigation areas are presented below:

2.1.1 Location C-1

This exploration location was positioned within the area that is presumed to have been previously improved, between Pearl Street and Burnside Street. At this test location, the asphalt surface thickness was 3.02 inches, and the sand asphalt base course measured approximately 3.15 inches in thickness. Beneath the base, we encountered slightly silty fine sand, with consistencies varying from loose to dense to the termination depth of 36 inches below the base.

2.1.2 Location C-2

At this test location, the asphalt surface thickness was 0.30 inches, and the sand asphalt base course measured approximately 4.30 inches in thickness. Beneath the base, we encountered slightly silty fine sand, with consistencies varying from loose to dense to the termination depth of 36 inches below the base.

2.1.3 Location C-3

At this test location, the asphalt surface thickness was 0.41 inches, and the sand asphalt base course measured approximately 3.89 inches in thickness. Beneath the base, we encountered approximately 28 inches of loose to dense slightly silty fine sand, underlain by medium dense slightly clayey fine sand to the termination depth of 36 inches below the base.

2.2 Investigation of Unpaved Areas

Our personnel advanced four hand-auger borings (designated HA-1 to HA-4) outside the paved areas, within the areas proposed for widening, with DCP testing performed at each location. The soils at our test locations typically consisted of very loose to dense fine sands with varying silt or clay content to the termination depth of 48 to 60 inches below the existing ground surface. Groundwater was not encountered at our test locations, except at test location HA-3. At this location, wet soils were encountered at a depth of 42 inches. Detailed observations at each of the investigation areas are presented below:

2.2.1 Location HA-1

At this test location, we encountered approximately 4 inches of surficial grass and topsoil, underlain by approximately 6 inches of loose slightly silty fine sand with some coarse aggregate and shingle debris. Below this layer, we encountered slightly silty fine sand in a dense condition to approximately 24 inches and then in a loose to very loose condition to the ultimate termination depth of 60 inches.

2.2.2 Location HA-2

At this test location, we encountered approximately 4 inches of surficial grass and topsoil, underlain by slightly silty fine sand in a loose to dense condition to approximately 24 inches and then in a loose to very loose condition to the ultimate termination depth of 60 inches.

2.2.3 Location HA-3

At this test location, we encountered approximately 6 inches of topsoil, underlain by medium dense to loose slightly silty fine sand to the termination depth of 48 inches. Wet soils were encountered at a depth of 42 inches.

2.2.4 Location HA-4

At this test location, we encountered dense slightly clayey fine sand to approximately 12 inches, underlain by loose slightly clayey fine sand to approximately 40 inches. Dense clayey fine sand was then encountered to the termination depth of 48 inches.

Attachment A contains logs of our findings at each of our test locations.

3. Laboratory Testing

Selected samples of the soils collected from the explorations were tested in our laboratory to determine their percent fines (ASTM D1140) and natural moisture content (ASTM D2216). The laboratory data was used to aid in the classification of the soils in accordance with ASTM D2487 and to further define their engineering properties. The natural moisture contents of the samples tested ranged from 2.5 to 6.9

percent. The fines (i.e. silt/clay) contents of the samples tested ranged from 4.3 to 12.0 percent by weight. The laboratory test results are presented on the hand-auger logs in **Attachment A**.

4. Conclusions and Recommendations

The following conclusions and recommendations are based on our understanding of the project characteristics as previously described, the data obtained in our field exploration, and our experience with similar subsurface conditions and construction projects. If subsurface conditions different from those disclosed by the hand-borings are encountered during site development, we should be notified so that we might review and possibly modify the following recommendations.

The following pavement design guidelines are made without the benefit of specific traffic information and/or reference to any local minimum section standards, and are intended as a general guide for the design engineer's evaluation. Site design decisions may dictate alterations to certain aspects of these guidelines.

4.1 Suitability of Subgrade Soils – Existing and New Pavement Areas

The near surface soils encountered at our asphalt cores and hand-auger boring locations were typically fine sands with slight to moderate amounts of silt or clay (SP-SM, SP-SC, SM, SC) to at least 4 feet. These soil types are considered to be suitable for support of asphalt pavement areas.

4.2 Design Recommendations for Existing Asphalt Pavements

4.2.1 Rehabilitation of Existing Pavement Areas

Areas exhibiting fatigue (raveling, cracking, settlement etc.) will require, at a minimum, sealing of the cracks and the installation of a leveling course prior to the installation of an asphalt overlay. These methodologies will assist in minimizing reflection of the existing cracks through the new asphalt surface. The thickness of the leveling course can vary based on the design finished grade. After repair of the distressed areas, the existing pavement section can be utilized as the base course for the new asphalt pavement.

4.2.2 Pavement Overlays

To extend the life of the existing pavement areas, we recommend the installation of 3 inches of new Type C surface course (to be placed in two 1-½ inch lifts).

4.3 Design Recommendations for New Asphalt Pavement Areas

The following recommendations assume that site preparation procedures, including removal and replacement of unsuitable near surface soils/debris and upper in situ soil densification, have been

completed where necessary. The data generated is preliminary and may need to be augmented with additional data as the design process proceeds.

All asphalt pavements and base courses should be constructed in accordance with the guidelines of the latest applicable South Carolina Department of Transportation Specifications. Following completion of the site preparation procedures detailed herein, we anticipate that a pavement section consisting of one of the combinations in **Tables 4.1 and 4.2** should be sufficient.

Table 4.1 Pavement Section Options - New Asphalt Paved Road

	Surface Course, Type C	Intermediate Course, Type C	Graded Aggregate Base Course	Asphalt Base Course, Type B
Option 1	2 - 1½ inch lifts	- - -	6 inches	- - -
Option 2	2 - 1½ inch lifts	- - -	- - -	3.5

Table 4.2 Pavement Section Options - New Asphalt Paved Parking Areas

	Surface Course, Type C	Intermediate Course, Type C	Graded Aggregate Base Course	Asphalt Base Course, Type B
Option 1	1 - 2 inch lift	- - -	6 inches	- - -

Aggregate base course materials should comply with the SCDOT Standard Specifications Section 305. The material should be compacted to at least 100 percent of the maximum dry density as determined by the Modified Proctor test (ASTM D1557).

4.4 Site Preparation – Proposed Widening Areas

4.4.1 Stripping and Grubbing

Site preparation should include the removal of organic debris, including major root systems (roots larger than finger size), and other deleterious materials and/or debris from within the proposed new pavement areas. During earthwork operations, the exposed soils should be carefully observed for the presence of organic and/or deleterious materials and debris that could result in unstable areas in the roadways.

4.4.2 Subgrade Densification

After the initial stripping and grubbing, the exposed subgrade should be inspected throughout the proposed pavement areas. The disturbed near surface in situ soils and any excavation backfill soils should be moisture adjusted if necessary and densified to a minimum of 98 percent of the soil's Modified Proctor maximum dry density as determined by ASTM D1557.

4.4.3 Fill/Backfill Placement and Compaction

In the upper 24 inches of new pavement areas, fill/backfill should be placed in level lifts not to exceed 12 inches loose thickness, and should be inorganic sand or slightly silty/clayey sand with a maximum of 20 percent silt and/or clay content (SP, SP-SM, SP-SC, SM, SC) compacted to a minimum of 98 percent of the soil's Modified Proctor maximum dry density as determined by ASTM D1557.

In-place density tests should be performed on each fill lift by an experienced engineering technician working under the direction of a licensed geotechnical engineer to verify that the recommended degree of compaction has been achieved.

5. Closure

We have prepared this report exclusively for Infrastructure Consulting & Engineering for the current project. We appreciate the opportunity to work with you on this project. We trust that the information provided in the report is clear and complete. Should it require any clarification or amplification, please contact us at (843) 815-5120.

Sincerely,

GHD

Sean M. McCubbins, LEED® AP

Robin M. Moutray, P.E.

SM/rm/admin

Encl.

Attachment A
Hand-Auger Boring Logs

Attachment A Log of Hand-Auger Borings

Technicians: J. DeSimas, R. Jackson

Reference No: 11146572

Date: 9-18-2017

Location	Soil Description	Depth	Blow Counts (blows/increment)			
			1st	2nd	3rd	Avg.
C-1	Asphalt Surface – 3.02"		---	---	---	---
	Sand Asphalt Base – 3.15"		---	---	---	---
	0 – 36" Brown slightly silty fine SAND (SP-SM)	Subgrade	9	12	19	15.5
		-1'	25+			25+
		-2'	11	12	14	13
		-3'	8	8	9	8.5
C-2	Asphalt Surface – 0.30"		---	---	---	
	Sand Asphalt Base – 4.30"		---	---	---	
	0 – 36" Brown slightly silty fine SAND (SP-SM) <MC=2.5%; -200=5.6%>	Subgrade	12	15	19	17
		-1'	20	25+		25+
		-2'	8	12	14	13
		-3'	7	10	11	10.5
C-3	Asphalt Surface – 0.41"		---	---	---	---
	Sand Asphalt Base – 3.89"		---	---	---	---
	0 – 28" Brown slightly silty fine SAND (SP-SM)	Subgrade	8	9	11	10
		-1'	25+			25+
		-2'	16	20	25+	25+
	28" – 36" Brown slightly clayey fine SAND (SP-SC)	-3'	11	12	13	12.5

Note: MC = Moisture Content; -200 = percentage of fines (silt/clay) by weight

Attachment A Log of Hand-Auger Borings

Technicians: J. DeSimas, R. Jackson

Reference No: 11146572

Date: 9-18-2017

Location	Soil Description	Depth	Blow Counts (blows/increment)			
			1st	2nd	3rd	Avg.
HA-1	0 – 4" Grass cover, Topsoil	Subgrade	7	7	8	7.5
	4" – 10" Brown and gray slightly silty fine SAND (SP-SM) with aggregate and shingle debris	-1'	20	25+		25+
	10" – 60" Tan and brown fine SAND (SP) <MC=6.7%, -200=4.3%>	-2'	9	8	8	8
		-3'	**4**	**4**	**3**	**3.5**
		-4'	**2**	**3**	**3**	**3**
		-5'	5	6	6	6
HA-2	0 – 4" Grass cover, Topsoil	Subgrade	6	7	8	7.5
	4" – 60" Brown slightly silty fine SAND (SP-SM) <MC=6.2%, -200=7.7%>	-1'	15	20	25+	25+
		-2'	7	7	6	6.5
		-3'	**3**	**4**	**4**	**4**
		-4'	**3**	**4**	**4**	**4**
		-5'	5	5	6	5.5
HA-3	0 – 6" Topsoil	Subgrade	10	12	12	12
	6" – 10" Gray and brown slightly silty fine SAND (SP-SM) <MC=5.1%, -200=6.1%>	-1'	12	15	20	17.5
	10" – 48" Brown slightly silty fine SAND (SP-SM) <MC=5.0%, -200=6.1%> <*Wet Soils Encountered at 42"*>	-2'	10	11	10	10.5
		-3'	6	6	6	6
		-4'	6	6	6	6

Note: MC = Moisture Content; -200 = percentage of fines (silt/clay) by weight

Attachment A Log of Hand-Auger Borings

Technicians: J. DeSimas, R. Jackson

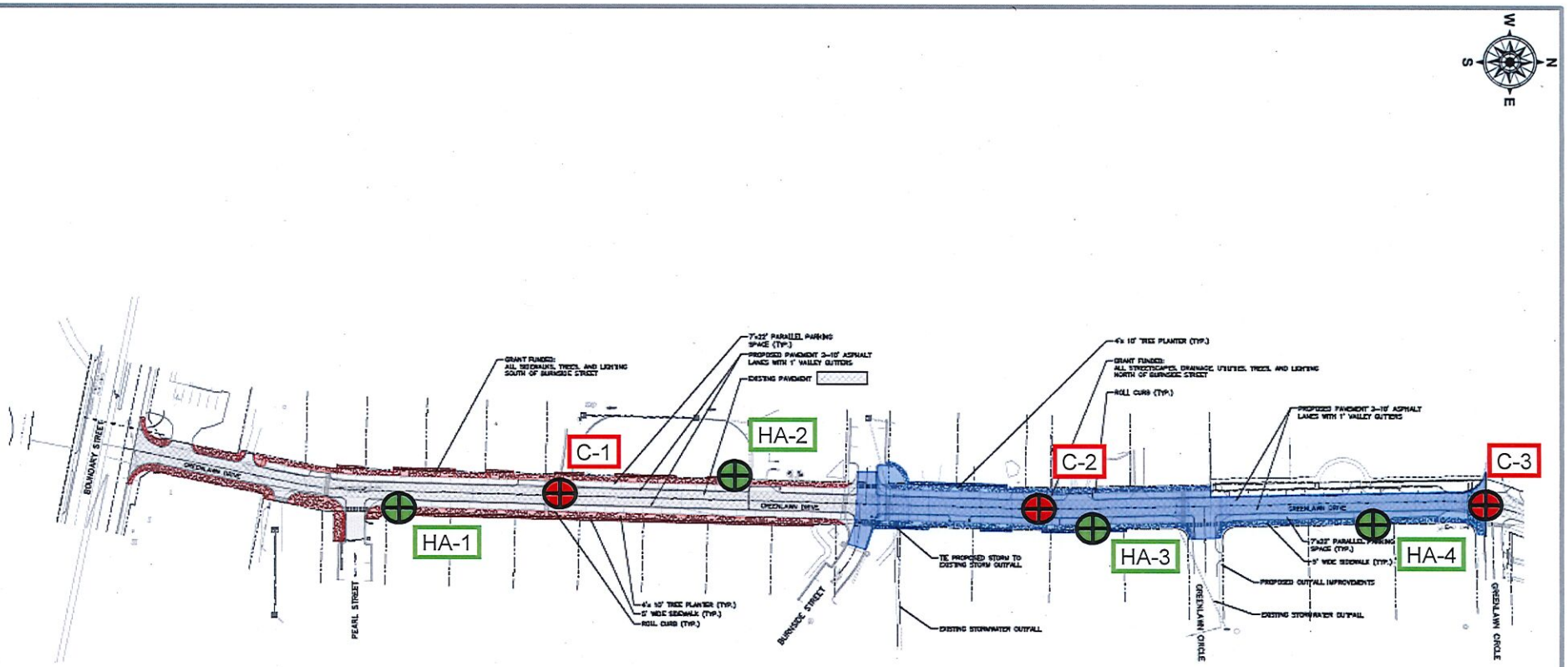
Reference No: 11146572

Date: 9-18-2017

Location	Soil Description	Depth	Blow Counts (blows/increment)			
			1st	2nd	3rd	Avg.
HA-4	0 – 8" Gray and brown slightly clayey fine SAND (SP-SC)	Subgrade	20	25+		25+
	8" – 40" Tan slightly clayey fine SAND (SP-SC) <MC=2.5%, -200=5.6%>	-1'	11	11	10	10.5
		-2'	7	5	6	5.5
		-3'	6	4	7	5.5
	40" – 48" Orange and tan clayey fine SAND (SC)	-4'	20	25+		25+

Note: MC = Moisture Content; -200 = percentage of fines (silt/clay) by weight

Figure



NOTE: This drawing utilizes a copy of Sheet C104 of a document titled 'Greenlawn Drive Streetscape' prepared by Ward Edwards Engineering and dated January 14, 2015. The boring locations were added by GHD for the purpose of denoting our test locations, only.

C-1 Denotes approximate location of Asphalt Core and Hand-Auger Boring

HA-1 Denotes approximate location of Hand-Auger Boring

Figure 1: Location Plan

Greenlawn Drive Streetscape
Beaufort, Beaufort County, South Carolina

Prepared By: SMM
Date: 10-8-2017

Checked By:
Date:

Reference No. 11146572