# SUPPLEMENTAL INFORMATION
# ADDENDUM NO. 1

PROJECT: ITB 21-55-001A
Civil/Site Work for Fire Station No. 15 – Hodgeville Road

CONTACT: Alison Bruton, Purchasing Tech.
912-754-2159 abruton@effinghamcounty.org

DATE ISSUED: September 9, 2020

---

ITB 21-55-001A Civil/Site Work for Fire Station No. 15 – Hodgeville Road dated August 12, 2020 is hereby amended as noted herein: BIDDER TO ACKNOWLEDGE RECEIPT OF ADDENDUM BY SIGNING ON THE SIGNATURE LINE BELOW AND INCLUDING A COPY WITH SUBMITTED BID. FAILURE TO DO SO MAY, AT THE OWNER'S DISCRETION, SUBJECT THE BIDDER TO DISQUALIFICATION

1) QUESTION: Can you provide a detail for the (4) bollards in the concrete paving?
ANSWER: Please see attached detail.

2) QUESTION: Can you provide details for the header curb and 3' concrete flumes? ANSWER: Please see attached details.

3) QUESTION: Can you provide a geotechnical report on the project? What are the requirements for the building pad subgrade? How far below finish grade should subgrade be left for the building pad?
ANSWER: See structural details for foundation requirements. See attached geotechnical report. From S1.0 foundation design is based on a maximum allowable soil bearing pressure of 1500 PSF based on the recommendations included in the attached geotechnical report prepared by Whitaker Lab & Engineering.

4) QUESTION: What is the typical section for the building slab? We need to know how far subgrade will be beneath FFE.
ANSWER: The slab at the bays is 8" thick. The slab on the living quarters side is 4". Each have a 4" sand subgrade.

5) QUESTION: Who is responsible for the sidewalk at the rear of the building, site contractor or building contractor?
ANSWER: Site Contractor

6) QUESTION: Who is responsible for the bollards at the roll up doors, site contractor or building contractor. If it is the site contractor could you please provide a detail for the bollards?
ANSWER: site contractor; please see attached detail.

7) QUESTION: Who is responsible for the final stabilization (grassing), site contractor or building contractor?
ANSWER: Site Contractor

8) QUESTION: Who is responsible for maintenance of erosion control devices, site contractor or building contractor?
ANSWER: Site Contractor

9) QUESTION: Who is responsible for providing the water meter, site contractor or county?
ANSWER: Site contractor is responsible for paying the fee for the meter. County Public Works will install

10) QUESTION: There appears to be a roof drain between the roll up doors. Could you please provide a detail for the down spout and who is responsible for this connection to the roof drain system, site contractor or building contractor?
ANSWER: This is a connection (with cleanout) to the floor drains in the garage bay.

11) QUESTION: There is a backflow preventer noted on plan sheet C2.0. Is this to be a DDC or a RPZ?
ANSWER: DDC.

12) QUESTION: Do you intend on incorporating technical specifications into the bid documents?
ANSWER: The County's Standard Civil/Site specifications are provided on the Effingham County website and are to be considered part of these bid documents

13) QUESTION: The ITB indicates a contract completion date of 12/31/20. With the bid date being 9/16/20 what is the intended date of award and Notice to Proceed?
ANSWER: Completion Date for site Civil is hereby amended to 3/31/2021. Site Contractor will be required to complete specific work that relates to the building construction in order to meet the project deadlines of March 31, 2021

14) QUESTION: If you allow a week or two for execution of contracts and issuance of performance and payment bonds that will only leave you approximately 5 weeks to complete the project. Given the time of year and normal weather delays the completion date is unrealistic. Would you consider extending the completion date until the end of March?
ANSWER: see answer to Question 13

15) QUESTION: Has a permit for the proposed septic system already been issued from the state Environmental Health Department, and if so, can we get a copy of it? If not, when do you expect one to be issued?
ANSWER: The permit has been submitted but will not be finalized until award of this contract

# BID FORM

## ARTICLE 1 - BID RECIPIENT

1.01 This Bid is submitted to:

Effingham County Board of Commissioners

1.02 The undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into an Agreement with Owner in the form included in the Bidding Documents to perform all Work as specified or indicated in the Bidding Documents for the prices and within the times indicated in this Bid and in accordance with the other terms and conditions of the Bidding Documents.

## ARTICLE 2 - BIDDER'S ACKNOWLEDGEMENTS

2.01 Bidder accepts all of the terms and conditions of the Instructions to Bidders, including without limitation those dealing with the disposition of Bid security. This Bid will remain subject to acceptance for 60 days after the Bid opening, or for such longer period of time that Bidder may agree to in writing upon request of Owner.

## ARTICLE 3 - BIDDER'S REPRESENTATIONS

3.01 In submitting this Bid, Bidder represents that:

A. Bidder has examined and carefully studied the Bidding Documents, other related data identified in the Bidding Documents, and the following Addenda, receipt of which is hereby acknowledged:

| Addendum No. | Addendum Date |
|---|---|
| | |
| | |
| | |

B. Bidder has visited the Site and become familiar with and is satisfied as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work.

C. Bidder is familiar with and is satisfied as to all Laws and Regulations that may affect cost, progress, and performance of the Work.

D. Bidder has considered the information known to Bidder; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; and the Bidding Documents, with respect to the effect of such information, observations, and documents on (1) the cost, progress, and performance of the Work; (2) the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder, including applying the specific means, methods, techniques, sequences, and procedures of construction expressly required by the Bidding Documents; and (3) Bidder's safety precautions and programs.

E. Based on the information and observations referred to in Paragraph 3.01.D above, Bidder does not consider that further examinations, investigations, explorations, tests, studies, or data are necessary for the determination of this Bid for performance of the Work at the price(s) bid and within the times required, and in accordance with the other terms and conditions of the Bidding Documents.

F. Bidder is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Bidding Documents.

G. Bidder has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder has discovered in the Bidding Documents, and the written resolution thereof by Engineer is acceptable to Bidder.

H. The Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance of the Work for which this Bid is submitted.

## ARTICLE 4 - BIDDER'S CERTIFICATION

4.01 Bidder certifies that:

A. This Bid is genuine and not made in the interest of or on behalf of any undisclosed individual or entity and is not submitted in conformity with any collusive agreement or rules of any group, association, organization, or corporation;

B. Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid;

C. Bidder has not solicited or induced any individual or entity to refrain from bidding; and

D. Bidder has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for the Contract. For the purposes of this Paragraph 4.01.D:

1. "corrupt practice" means the offering, giving, receiving, or soliciting of anything of value likely to influence the action of a public official in the bidding process;

2."fraudulent practice" means an intentional misrepresentation of facts made (a) to influence the bidding process to the detriment of Owner, (b) to establish bid prices at artificial non-competitive levels, or (c) to deprive Owner of the benefits of free and open competition;

3. "collusive practice" means a scheme or arrangement between two or more Bidders, with or without the knowledge of Owner, a purpose of which is to establish bid prices at artificial, non-competitive levels; and

4. "coercive practice" means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the bidding process or affect the execution of the Contract.

# THIS SECTION INTENTIONALLY LEFT BLANK

## ARTICLE 5 – CONTRACT PRICE

5.01 Owner shall pay Contractor for completion of the Work in accordance with the Contract Documents an amount in current funds equal to the sum of the amounts determined pursuant to Paragraphs 5.01.A, below:

For all Unit Price Work, an amount equal to the sum of the established unit price for each separately identified item of Unit Price Work times the actual quantity of that item:

| Civil/Site Work for Fire Station No. 15 - Hodgeville Road – Hodgeville Road | | | | | |
|---|---|---|---|---|---|
| **Item No.** | **Description** | **Unit** | **Estimated Quantity** | **Bid Unit Price** | **Bid Price** |
| 1 | MOBILIZATION | LS | 1 | $ | $ |
| 2 | CLEARING | LS | 1 | $ | $ |
| 3 | SITE GRADING & STORM DRAINAGE SYSTEM | LS | 1 | $ | $ |
| 4 | SEPTIC TANK INSTALLATION | LS | 1 | $ | $ |
| 5 | EROSION CONTROL | LS | 1 | $ | $ |
| 6 | CONCRETE DRIVEWAY | LS | 1 | $ | $ |
| 7 | WATER SYSTEM, COMPLETE | LS | 1 | $ | $ |
| 8 | CONCRETE SIDEWALKS | LS | 1 | $ | $ |
| 9 | ASPHALT PAVEMENT, COMPLETE | LS | 1 | $ | $ |
| 10 | MISCELLANEOUS SITE ITEMS | LS | 1 | $ | $ |
| **Total Bid– Civil/Site Work for Fire Station No. 15 - Hodgeville Road** | | | | | $ |

# THIS SECTION INTENTIONALLY LEFT BLANK

## ARTICLE 6 - TIME OF COMPLETION

6.01 Bidder agrees to commence work within ten (10) days after the Notice to Proceed is issued and to complete all Work by March 31, 2020. Site Contractor will be required to complete specific work that relates to the building construction in order to meet the project deadlines of March 31, 2021.

6.02 Bidder accepts the provisions of the Agreement as to liquidated damages.

## ARTICLE 7 - ATTACHMENTS TO THIS BID

7.01 The following documents are submitted with and made a condition of this Bid:

A. Required Bid security in the form of_____;

**B**. Evidence of authority to do business in the state of the Project;

**C**. Drug Free Workplace Certification (Attachment A);

**D**. Promise of Non Discrimination Statement (Attachment B);

**E**. Disclosure of Responsibility Statement - Bidders Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion (Attachment C);

**F**. Non Collusion Affidavit - (Attachment D);

**G**. Contractor Affidavit and Agreement (E-VERIFY) (Attachment **E**);

**H**. Subcontractor Affidavit if applicable (E-VERIFY) (Attachment **F**);

**I.** List of Proposed Subcontractors (Attachment H);

## ARTICLE 8 - DEFINED TERMS

8.01 The terms used in this Bid with initial capital letters have the meanings stated in the Instructions to Bidders, the General Conditions, and the Supplementary Conditions.

## ARTICLE 9 - BID SUBMITTAL

9.01 This Bid is submitted by:

If Bidder is:

An Individual

Name (typed or printed): _____

By: _____
(Individual's signature)

Doing business as: _____

A Partnership

Partnership Name: _____

By: _____
(Signature of general partner -- attach evidence of authority to sign)

Name (typed or printed): _____

A Corporation

Corporation Name: _____ (SEAL)

State of Incorporation: _____
Type (General Business, Professional, Service, Limited Liability):_____

By: _____
(Signature -- attach evidence of authority to sign)

Name (typed or printed): _____

Title: _____
(CORPORATE SEAL)

Attest _____

Date of Qualification to do business in Georgia is ____/____/____.

A Joint Venture

Name of Joint Venture: _____

First Joint Venturer Name: _____ (SEAL)

By: _____
(Signature of first joint venture partner -- attach evidence of authority to sign)

Name (typed or printed): _____

Title: _____

Second Joint Venturer Name: _____(SEAL)

By: _____
(Signature of second joint venture partner -- attach evidence of authority to sign)

Name (typed or printed): _____

Title: _____

(Each joint venturer must sign. The manner of signing for each individual, partnership, and corporation that is a party to the joint venture should be in the manner indicated above.)

Bidder's Business Address _____

_____

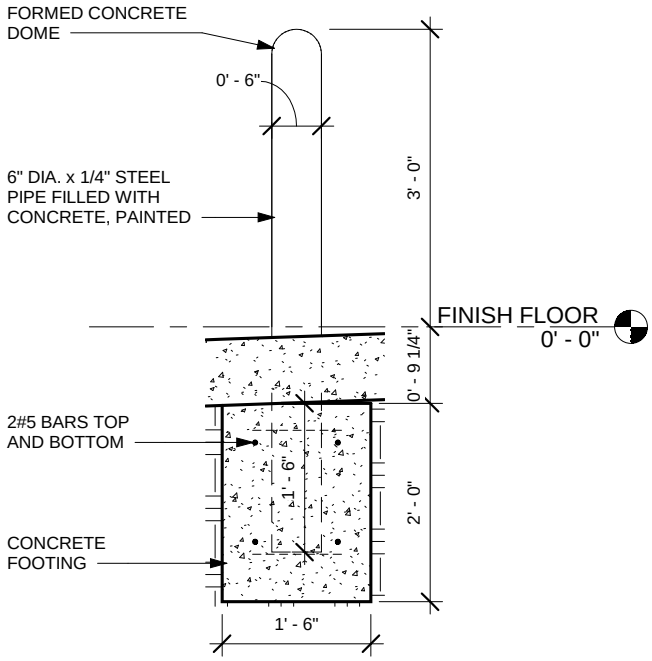
Phone No. _____ Fax No. _____

E-mail _____ _____

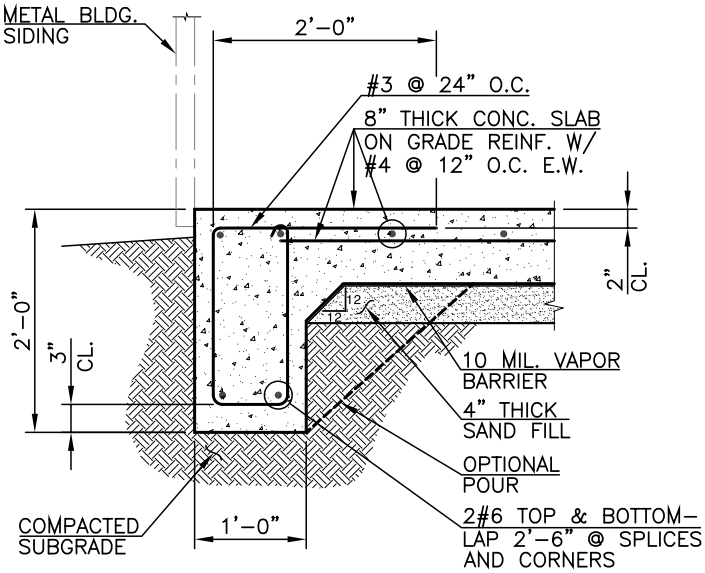
SUBMITTED on _____, 20____.

State Contractor License No. _____.

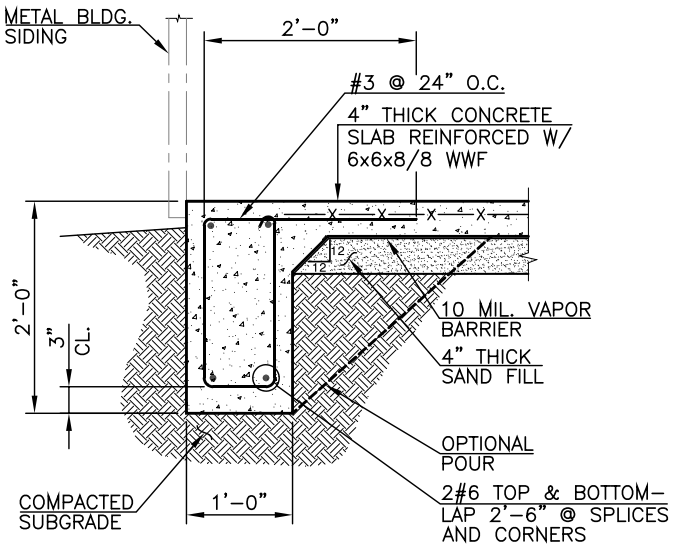
# THIS SECTION INTENTIONALLY LEFT BLANK




| 8 | BOLLARD DETAIL |
|---|---|
| A3.3 | 3/4" = 1'-0" |

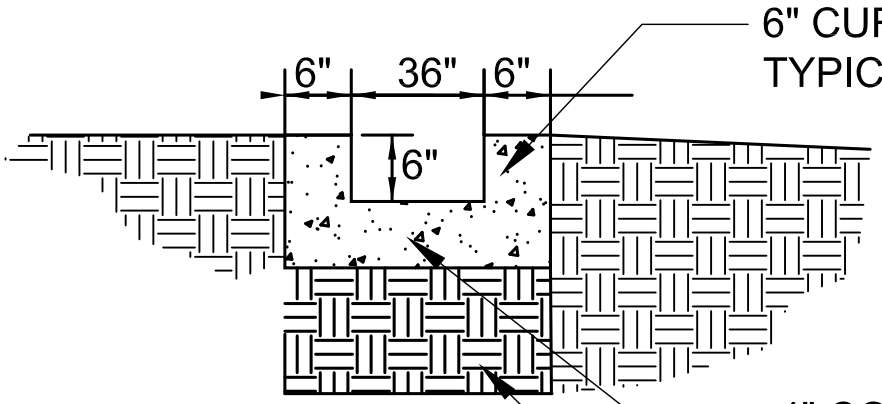



SECTION A S1.2




SECTION D S1.2

NOT TO SCALE
SEE ARCHITECTURAL PLANS
FOR COMPLETE DETAILS




6" CURB,
TYPICAL EACH SIDE

4" CONCRETE (MIN 3000 PSI)

12" SUBGRADE COMPACTED TO
100% STANDARD PROCTOR MAXIMUM
DRY WEIGHT DENSITY

NOTE: 1. EXPANSION JOINTS LOCATED AT 20' O.C.
2. TOOLED JOINTS LOCATED AT 5' O.C.

# DRAINAGE FLUME DETAIL

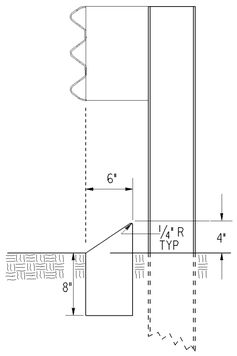
NTS

12/12/2011 9:04:54 AM \\GDOT-DSN1\GOPLOT\QCF\GO_K1p8000.qcf tcox M:\TPC\9032B\Approved_9032B.pdf GO-RD6

11/17/2011 8:14:31 AM \\GDOT-DSN1\GOPLOT\QCF\GO_K1p8000.qcf tcox M:\GARY\revised 9032B\9032B.prf

| STATE | PROJECT NUMBER | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| GA. | | | |

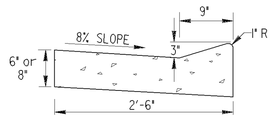
FACE OF CURB MUST ALIGN WITH BACK EDGE OF GUARDRAIL AND THE FACE OF THE OFFSET BLOCK.




## TYPE 8

TYPE 8 CURB IS USED IN CONJUNCTION WITH GUARDRAIL CONNECTIONS TO CONCRETE BARRIER AS NOTED ON GA. STD. 401 2C.

## RAISED EDGE WITH CONCRETE GUTTER



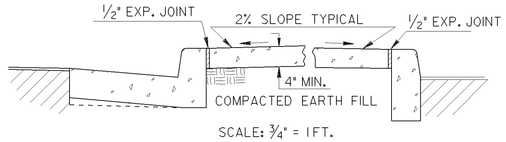

SCALE: 1" = 1FT.

RAISED EDGE TO BE CONSTRUCTED WITH SAME CONCRETE MIX AS THE GUTTER AND SHALL BE FORMED MONOLITHIC WITH GUTTER. JOINTS IN RAISED EDGE SHALL MATCH THOSE IN THE GUTTER.

NOTE:
IF CONCRETE MEDIAN INTERCEPTS PEDESTRIAN CROSSWALKS, WHEELCHAIR RAMPS (CONSTRUCTION DETAIL A-3 AND A-4) WILL BE REQUIRED.

## CONCRETE MEDIAN (Between Curbs)

NOTE: CURB TYPES SHOWN ARE TYPICAL. OTHER TYPES MAY BE SPECIFIED.



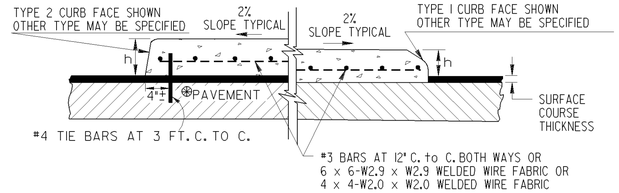

SCALE: 3/4" = 1FT.

NOTE: WIDTH OF CONCRETE MEDIAN WILL BE AS SHOWN IN PLANS

## CONCRETE MEDIANS (Integral)

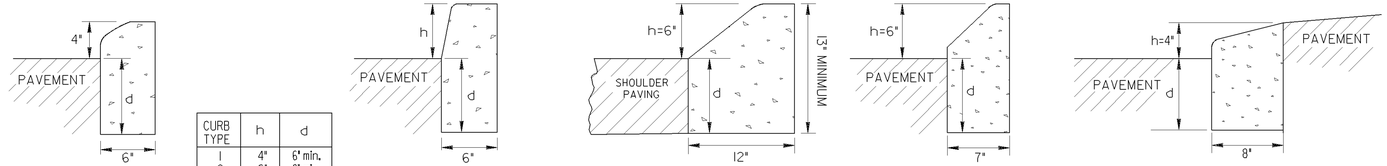
SCALE: 1"=1FT.

-WITH TIE BARS- -WITHOUT TIE BARS-




NOTE:
IF FINAL SURFACE COURSE IN PRESENT OR MUST BE INSTALLED BEFORE THE CONCRETE MEDIAN CAN BE INSTALLED, THEN DOWELED IN CONCRETE MEDIAN IS REQUIRED.

## CONCRETE HEADER CURBS



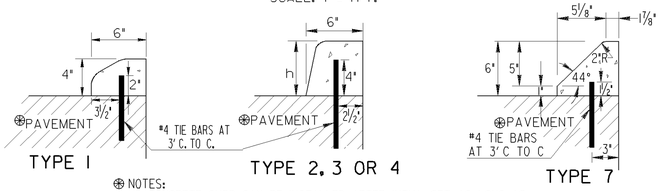

| CURB TYPE | h | d |
|---|---|---|
| 1 | 4" | 6" min. |
| 2 | 6" | 8" min. |
| 3 | 8" | 10" min. |
| 4 | 10" | 12" min. |
| 6 | 6" | 7" min. |
| 7 | 6" | 8" min. |
| 9 | 4" | 8" min. |

THE DIMENSION d MAY BE INCREASED AT CONTRACTOR'S OPTION SO BOTTOM OF HEADER CURB WILL ALIGN WITH BOTTOM OF PAVEMENT TYPICAL SECTION.

SCALE: 1 1/2" = 1FT.

## CONCRETE DOWELED INTEGRAL CURBS

SCALE: 1" = 1FT.




⊕ NOTES:
1. CONCRETE CURB CAN BE INSTALLED AFTER INTIAL SET AS LONG AS TIE BARS ARE DRILLED INTO UNDERLAYING CONCRETE PAVEMENT.
2. CONCRETE CURB CAN BE INSTALLED BEFORE INITIAL SET WITH DOWELS THAT ARE DRIVEN INTO UNDERLYING CONCRETE PAVMENT.
3. JOINTS IN CURB AND CONCRETE MEDIAN WILL MATCH THOSE IN THE CONCRETE PAVEMENT.
4. ALL TYPES OF CONCRETE CURB CAN BE PLACED ON ASPHALT PAVEMENTS WHERE TIE BARS MAY BE EITHER DRIVEN OR DRILLED INTO THE UNDERLYING PAVEMENT. CONTRACTION JOINTS SHALL BE CONSTRUCTED IN CURB OR CONCRETE MEDAIN AT 20 FT. SPACING.

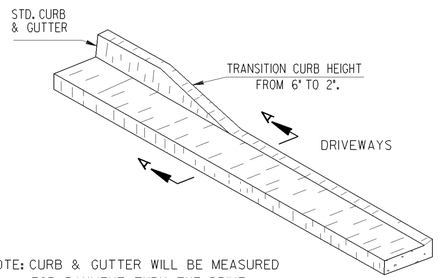
| MINIMUM TIE BAR LENGTHS (FOR CONC. DOWELED CURBS OR CONC. MEDIAN) | | |
|---|---|---|
| CURB TYPE | P.C. CONC. PAV. | ASPHALT PAV. |
| 1 | 6" | 8" |
| 2, 3 or 4 | 8" | 12" |
| 7 | 6" | 8" |

NOTE:
TIE BARS FOR DOWELED CURBS MAY BE UNCOATED PLAIN OR DEFORMED BILLET-STEEL BARS (GRADE 40) AS USED FOR CONCRETE REINFORCEMENT. (AASHTO M-31)

## DETAILS OF RECESSED CURB FOR DRIVEWAYS

NO SCALE

PICTORIAL VIEW

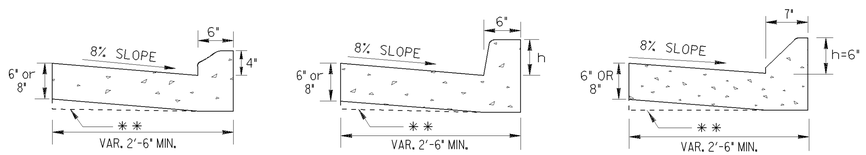



NOTE: CURB & GUTTER WILL BE MEASURED FOR PAYMENT THRU THE DRIVE


SECTIONAL VIEW
SECTION A-A

(SEE SEPARATE CONSTRUCTION DETAILS FOR DRIVEWAYS)

## CONCRETE CURB & GUTTER

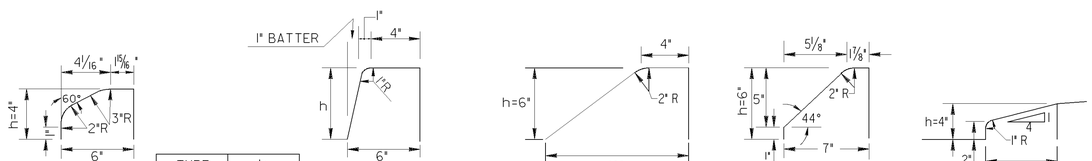



SCALE: 1"= 1FT.

TYPE 1 TYPE 2, 3 OR 4 TYPE 7

** AT CONTRACTOR'S OPTION THE GUTTER THICKNESS MAY BE INCREASED AT EDGE OF PAVEMENT TO MAKE BOTTOM OF GUTTER PARALLEL WITH PAVING OF BASE COURSE, BUT THE GUTTER THICKNESS MUST NOT BE LESS THAN THE SPECIFIED 6" OR 8" AT ANY POINT.

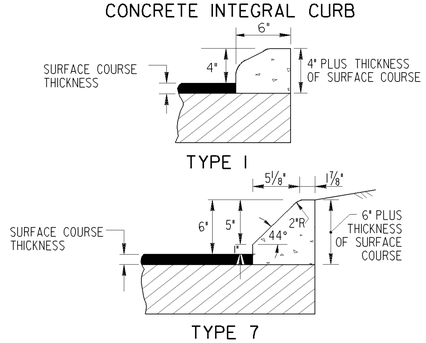
## CURB FACE DESIGN




| TYPE | h |
|---|---|
| 1 | 4" |
| 2 | 6" |
| 3 | 8" |
| 4 | 10" |
| 5 | 6" |
| 7 | 6" |
| 9 | 4" |

SCALE: 2"=1FT.

## CONCRETE INTEGRAL CURB




SCALE: 1 1/2" = 1FT.

| REVISION | DATE | BY |
|---|---|---|
| REV. TYPE 9 CURB DETAIL & REV. OVERALL LAYOUT | 11-15-11 | TC |
| REV. MEDIAN NOTE AND ADDED TYPE 9 CURB DETAIL | 1-27-11 | GLO |
| ADDED TYPE 9 DETAIL | 3-03 | |

DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA

STANDARD

CONCRETE CURB & GUTTER
CONCRETE CURBS, CONCRETE MEDIANS

SCALE: AS SHOWN REVISED AND REDRAWN OCT. 2011

DES. DRW. TRA. CHK.

(SUBMITTED) STATE DESIGN POLICY ENGINEER

(APPROVED) CHIEF ENGINEER

NUMBER 9032B



12/12/2011 9:04:54 AM \\GDOT-DSN1\GOPLOT\QCF\GO_K1p8000.qcf tcox M:\TPC\9032B\Approved_9032B.pdf

WHITAKER
LAB & ENGINEERING

# Geotechnical Engineering Report

**Proposed Fire Station # 15**
**Hodgeville Road**
**Effingham County, Georgia**
June 10, 2020
Project No. 6-10-20-5

## Prepared For:

DPH Architecture
Statesboro, GA

## Prepared By:

Whitaker Laboratory, Inc.
Savannah, Georgia

WHITAKER
LAB & ENGINEERING

2500 Tremont Road • Savannah, Georgia 31405
912.234.0696 • www.whitakerlab.net

June 10, 2020

DPR Architecture
12-A East Grady Street
Statesboro, GA 30458

Attention: Kevin Palmer
kevin@dprarch.com

Referencing: Report of Geotechnical Evaluation Services for
Proposed Fire Station # 5
Hodgeville Road, Effingham County, Georgia
Project No. 6-10-20-5

Dear Mr. Palmer:

As requested, WHITAKER LABORATORY, INC. has conducted a geotechnical investigation at the above referenced site. Authorization to perform this investigation was provided by your acceptance of our proposal dated March 12, 2020. Our findings and recommendations for design and construction are attached and it is important that you read the report in its entirety.

It is a pleasure to provide our services to you and we look forward to further opportunities to assist you on this and other projects.

Respectfully submitted,
WHITAKER LABORATORY, INC.

GEORGIA REGISTERED No. 31031 PROFESSIONAL 6/10/2020 ENGINEER JASON H. FOLLO

GEORGIA REGISTERED No. PE044657 PROFESSIONAL 6/10/2020 ENGINEER BLAKE L. JONES

Jason H. Follo, P.E.
GA Registered Engineer
#31031

Blake L. Jones, P.E.
GA Registered Engineer
#44657

# TABLE OF CONTENTS

# REPORT OF GEOTECHNICAL EVALUATION
Proposed Fire Station # 15
Hodgeville Road, Effingham County, Georgia

## I. INTRODUCTION / SCOPE

WHITAKER LABORATORY, INC. has completed this field investigation of the surface and subsurface conditions at this site. The preliminary conditions found, and how those conditions could affect the design and construction of foundations for the structures planned, form the basis for this report. Regardless of the thoroughness of any geotechnical investigation, there are limitations, and deviations from the conditions found in this investigation could be subsequently disclosed. We recommend that this report be provided to all parties involved in the planned development to include but not necessarily limited to the Owner, Architect, Design Engineers, General Contractor and sub-contractors. Unanticipated circumstances often arise during sitework, earthwork and foundation construction. Accordingly, we recommend that our firm be retained to provide the construction surveillance, inspection, and testing on the project, thereby being readily available to assist in the evaluation of any conditions encountered that differ from those anticipated.

The site is located on Hodgeville Road in Effingham County, Georgia. We understand construction will consist of a new Fire Station facility incorporating a building structure and associated pavements. In an effort to evaluate subsurface soil conditions and their impact on the design and construction of the planned structure and pavements, a total of six standard penetration test (SPT) borings were performed. The borings were advanced within the planned building pad and pavement areas extending to depths ranging from 4 to 35 feet below the ground surface.

Please note that this evaluation only applies to the foundations and pavements planned for construction. This evaluation does not apply to any future improvements, which may be made to the site. In particular, if at any time should additional fill be placed, adjacent to or nearby the structures referenced in this report, additional geotechnical borings and a follow up geotechnical analysis will be required. Standard billing rates will apply for this work.

## II. EXECUTIVE SUMMARY

The following recommendations shall be considered a summary of the recommendations contained within this report and utilized as such. This report shall be read in its entirety.

- The encountered surface soils can be made suitable for support of the structure utilizing shallow spread pier and/or strip footing foundations with slab-on-grade flooring if liquefaction induced settlements are not of concern to the owner and/or structural design, our foundation loading assumptions are not exceeded and the recommendations contained within this report are performed and verified during construction.

- Due to very loose and loose sands encountered at the near ground surface, compaction efforts on exposed subgrade soils after stripping shall be made with a large vibratory smooth drum roller (Cat CS 74 or equivalent - centrifugal force range of 37,300 – 74,600 lb). In addition, exposed subgrade soils within bottom of footing excavations shall be compacted utilizing mechanical jumping tamps.

- Site grades should be established on this site by setting bottom of pavement section elevations residing no deeper than 12 inches below existing grade elevations.

At any time, we will be glad to discuss the contents of this report. This includes insuring that you fully consider potential problems for design and construction procedures in respect to interpretations of the data.

## III. PROJECT INFORMATION & DESCRIPTION

We have not been provided foundation loads for the building, however for the purpose of this report we will assume that foundation loads will not exceed 75 kips for columns and/or 3.5 kips per linear foot for walls. We will further assume that site grades will not be raised more than 36 inches above existing ground surface elevations to achieve finished grade elevations for the ground surface or slabs-on-grade.

| Item | Description |
|---|---|
| Proposed Improvements | Fire Station # 15 |
| Finished grade elevation for ground surface and/or slabs-on-grade | Assume maximum 36 inches above existing grade |
| Maximum Foundation loads | Assume 75 kips for columns and 3.5 kips for walls |
| Maximum Floor Loads for slabs-on-grade | Assume 150 pounds per square foot |
| Maximum allowable settlement | Assume 1 inch overall and ½ inch differential |
| Above information was assumed by Whitaker Laboratory, Inc. | |

If our assumptions are incorrect, we should be contacted immediately, provided the correct information and allowed an opportunity to change and/or modify the recommendations contained within this report if necessary.

## IV. SITE LOCATION & DESCRIPTION

| Item | Description |
|---|---|
| Location | Hodgeville Road, Effingham County, Georgia |
| Existing Structures | None |
| Current ground cover | Heavily Wooded |
| Existing topography | Generally flat |

At the time of our site visit, the site was heavily wooded. Pathway clearing was required to gain access to the boring locations. After pathway clearing, boring locations were accessible and the near surface soils were stable to our truck mounted drilling equipment within the cleared pathways. Ground surface topography was generally flat.

## V. AREA GEOLOGY

This project is located in Effingham County, Georgia. This overall project area resides along the eastern edge of the South Atlantic Coastal Plain. In South Carolina and Georgia, this broad, gently sloping region extends southeastward from the Fall Line (Chesterfield - Columbia - Augusta - Macon - Columbus) to the Atlantic Ocean. The soils encountered are sedimentary in origin, and consist of layered marine deposits of sands, silts, and clays. These deposits have since been subjected to successive erosion and re-deposition, by fluctuations of sea levels, storm tides, and winds. Many of the surface sands are the result of depositional forces along ancient beaches, which formed during the changing shoreline and river conditions. Intermittent deposits of shells occur within the strata at irregular intervals. The surface soils in a majority of this Coastal Plain area were deposited during the Pleistocene Era, however surface soils near the coast are likely of the Holocene Era.

## VI. TEST BORINGS AND SUBSURFACE CONDITIONS

The field exploration to determine the characteristics of the subsurface materials included a reconnaissance of the project site, and the drilling of exploratory borings. Standard penetration test borings are performed using rotary head drilling equipment and advancing hollow stem augers. Sampling and Standard Penetration Testing, (SPT), was performed in accordance with ASTM D-1586. SPT samples were taken at 2.5 foot intervals of depth for the first 10 feet, and at 5.0 foot intervals thereafter. Standard Penetration testing is done with a 140 pound hammer falling 30 inches and a two inch diameter sampling spoon. Results of Standard Penetration Testing (SPT N values) provide an indication of the relative consistency, density and in-situ strengths of the tested soils.

Soil samples from SPT testing and from the auger cuttings have been used for identification and visual classification. The subsurface stratification and the profile as presented in the boring logs, represent approximate boundary lines between the strata and materials encountered. These boundary lines are usually gradual and not clearly defined, and it is sometimes difficult to record changes in stratification precisely. It should be noted that underlying soil conditions can, and do, vary considerably within short lateral distances. It is possible that conditions may be revealed outside the boring location that are different from those found by our boring and used for our analysis.

The approximate locations of the borings are shown on the attached BORING LOCATION PLAN. Our drilling crews, based on landmarks and features available at the time of drilling, have estimated the location of the boring in the field. If the precise location of the boreholes is critical, this can be determined by employing a land-surveying firm to plot the true locations. Such survey should be completed promptly and before any disturbance to the area has occurred. If desired, Whitaker Laboratory, Inc. will be glad to coordinate surveying arrangements for an additional fee.

Below approximately 5 to 9 inches of organic topsoil, the subsurface soils on this site predominately consist of very loose to dense sands (SP-SM) extending to depths reaching 3 ½ to 6 feet below the existing ground surface elevation. Below these sands, firm to very stiff clays and sand clays (SC and CH) were encountered to depths reaching 17 to 22 feet below the existing ground surface elevation. Below 22 feet, very loose to very firm gravely sands and silty sands (GP-GM and SM) were encountered and extended to the termination depth of the deeper boring at 35 feet below the ground surface.

The above description of the subsurface profile should be considered a general description intended to highlight the major strata encountered. More detailed profiles can be observed within the attached boring logs. Please note that boring logs are only representative of their location. Stratification transitions should be expected to occur outside and between boring locations. Taking into account that sampling was not performed on a continuous basis within SPT borings, lines drawn representing elevations of stratification changes shown on the SPT boring log were estimated.

## VII. GROUNDWATER TABLE

The apparent groundwater table was measured for each boring location at the time of boring. Groundwater levels were measured to reside 3 to 4 feet below the ground surface at the time of boring. The groundwater elevation can be expected to fluctuate with the season of the year, surrounding ground surface conditions, and with recent rainfall amounts. Thus, groundwater elevations shown on the boring logs should be considered valid only for the time and date of observation.

WHITAKER LABORATORY, INC. recommends that the contractor determine a groundwater level just prior to site work begins. If groundwater remains at the observed levels (3 to 4 feet below the ground surface), it may impact construction. We have addressed the high groundwater concerns within the EARTHWORK AND FOUNDATION DESIGN CONSIDERATIONS section of this report.

## VIII. SEISMIC SITE CLASSIFICATION AND COEFFICIENTS

Liquefaction Potential:

Whitaker Laboratory, Inc. performed a liquefaction analysis on the soils encountered within soil test boring B-1. Liquefaction typically occurs when very loose to loose non-cohesive soils encountered below the groundwater table experience a significant loss of shear strength due to the increase in porewater pressure resulting from seismic vibrations.

The design earthquake utilized in our analysis (Charleston, SC earthquake with magnitude 7.3 and a 2% probability of exceedance in 50 years) yielded peak horizontal ground surface accelerations of 0.24g on this site. Based upon the design earthquake and characteristics of subsurface soils, the liquefaction analysis indicated that the encountered sand stratifications present below the groundwater table have potential to liquefy during the design seismic event. The amount of settlement estimated during and shortly after a seismic event of this magnitude approximated 1 ¾ inches.

Although settlement due to liquefaction estimated 1 ¾ inches throughout the depth of boring B-1, the majority of the liquefaction induced settlement occurs below the confining stiff clay layer that brackets elevations 8 ½ to 17 feet below the existing ground surface elevations. Soils below this confining stiff clay layer are unlikely to contribute to the ground surface subsidence, therefore, the risk of settlement (due to liquefaction) to the building should be considered minimum and liquefaction induced settlement should not be of concern in the design of the structure.

International Building Code:

Assuming the structure has a period of vibration under 0.5 second and disregarding liquefaction potential, this site would be defined as a Site Class "D". The classification is determined by average soil properties in the top 100 feet of the soil profile, including standard penetration test N values, shear wave velocities, in-situ shear strengths and moisture contents, as specified by IBC 2018 / ASCE 7-16.

$S_s = 0.306$
$S_1 = 0.112$
$S_{MS} = 0.476$
$S_{M1} = 0.267$
$S_{DS} = 0.317$
$S_{D1} = 0.178$

A summary report is attached in Appendix III of this report. If the period of vibration for the planned structure is in excess of 0.5 second or the size and design of this structure justifies additional investigation, a Site Specific Geotechnical Investigation and dynamic site response analysis shall be performed. Our firm has the ability to provide our clients such testing and evaluation, and we will be available to discuss the cost, and potential benefit, if any, of such if you desire.

## IX. EARTHWORK AND FOUNDATION DESIGN CONSIDERATIONS

The encountered surface soils can be made suitable for support of the structure utilizing shallow spread pier and/or strip footing foundations with slab-on-grade flooring if liquefaction induced settlements are not of concern to the owner and/or structural design, our foundation loading assumptions are not exceeded and the recommendations contained within this report are performed and verified during construction.

Earthwork:

- We recommend that the building site plus a minimum of 10 feet beyond the perimeter of all structural areas be stripped of any organics, stumps, roots and unsuitable surface soils. Stripping depths should be anticipated to extend 5 to 9 inches or more to effectively remove all unsuitable surface organic materials.

- After stripping, all exposed subgrade soils shall be thoroughly compacted in-place to 95% of ASTM-D-1557 and pass proof-rolling inspections prior to backfilling/filling operations begin. Areas found to pump or deflect should be undercut to a competent material and backfilled with an approved compacted material.

- Please note that due to loose sands being encountered at the near ground surface, compaction efforts on exposed subgrade soils after stripping shall be made with a large vibratory smooth drum roller (Cat CS 74 or equivalent - centrifugal force range of 37,300 – 74,600 lb).

- The exposed subgrade soils within all structural areas shall be inspected, tested and approved by Whitaker Laboratory personnel prior to backfilling/filling placement begins.

- Backfill and fill material required to replace the stripped areas and to raise the pad and pavement areas to achieve finished subgrade elevations, should consist of granular soils and meet the requirements for material type and placement as outlined within the SITE WORK RECOMMENDATIONS section of this report.

Foundations:

Once the above is accomplished, footings can be excavated. Bottom of footing excavations should be thoroughly compacted to meet or exceed 95% of the soils modified proctor maximum dry density in accordance with ASTM-D-1557.

Due to very loose to loose sands encountered at the near ground surface, exposed subgrade soils within bottom of footing excavations shall be compacted utilizing mechanical jumping tamps. Footing inspections should also be conducted by performing dynamic cone penetrometer testing within bottom of footing excavations extending to depths reaching 4 feet below the existing ground surface elevation to verify adequate bearing material is present. Subsurface bearing soils deemed unsuitable based upon dynamic cone penetrometer testing should be undercut to a competent material and backfilled with an approved material.

After the above is completed and verified by Whitaker personnel during construction, footings may be designed for safe soil bearing pressures of 1500 PSF. Our technicians, prior to placing steel and concrete, should approve all footing excavations. All footings should have minimum plan dimensions of 24 inches. Bearing edges of slabs-on-grade should be a minimum of 18 inches wide. All footings, and bearing edges should reside at least 12 inches below finished grade and above the groundwater table. Overall settlements on the order of one inch should be anticipated. Differential settlement is anticipated to be on the order of ½ the overall settlement. Floor slabs can be designed utilizing a modulus of subgrade reaction "k" value of 150 pci.

Lateral loads can be resisted by passive earth pressure due to compacted structural fill placed against the sides of the footings. The upper 1-foot of resistance should be neglected unless the fill is confined by a pavement or floor slab. A soil unit weight of 110 pcf and passive earth pressure coefficient of 3.0 can be utilized in the analysis. Additionally, a friction coefficient of 0.35 between the concrete footings and underlying soil can be used in combination with passive earth pressures to resist lateral loads.

The coefficient of friction should be applied to dead normal loads only.

## X. SITE WORK RECOMMENDATIONS

We will be pleased to discuss these recommendations with the owner and the site work contractor selected to do the work. We believe it will be beneficial to the project, for the owner and the contractor to have a clear understanding of our recommendations.

1. Prior to construction, all building areas, plus at least 10 feet on each side and all areas to be paved, should be stripped of all vegetation, topsoil and root systems. Site drainage during construction should be considered prior to this clearing and stripping. Preventing the ponding of storm water is of particular importance.

2. Topsoil, organics, root-mat and other surface materials will likely vary across the site. Individual test borings may not accurately reflect the presence of, or the thickness of such materials due to site variability and/or surfacing clearing to facilitate access for drilling equipment. Site clearing and grubbing, when unsupervised, and particularly in areas of wet soils and times of wet weather, may push organic debris into otherwise stable soils. Undercutting and clearing with a track hoe in lieu of bulldozers can minimize this.

3. Any stump holes or other depressions should be cleared of loose material and debris, and should then be back-filled with approved fill. The backfill should be placed in 6-inch thick lifts and compacted to 95% density in accordance with ASTM D-1557.

4. Any existing utilities that underlie the site should be relocated and their trenches back-filled with approved soil. The backfill should be placed in 6-inch lifts and compacted to 95% density according to ASTM D-1557.

5. Prior to fill placement, the subgrade should be proof rolled with a loaded dump truck to locate unstable or soft areas. Any unstable areas should then be investigated to determine the cause of the instability. If due to unsuitable soils, such as highly organic soils or soft clays, the areas should be undercut to firm soil and replaced with approved fill compacted in 6-inch lifts to minimum density of 95% in accordance with ASTM D-1557. If the instability is due to excess moisture in otherwise stable soil, the area should be drained and compacted to 95% density.

6. Any fill or backfill required to level or raise the site should be placed in 8 to 10 inch thick, loose lifts and compacted by appropriate compaction equipment to 95% density in accordance with ASTM D-1557.

7. All of the fill and backfill (including utility line backfill) for this project should consist of clean, free draining granular soils. The fill should be free of objectionable roots, clay lumps, organics and other debris. The fill should be readily compactable during placement. Soils classified as SW, SP, SP-SM or SM with a maximum of 15% passing a #200 sieve may be acceptable. Soils with the minus #200 fraction classified as MH, CH, OH, ML, CL or SC may be rejected. Soils with a maximum plasticity index of 25 and a maximum liquid limit 40 may be acceptable for use only beneath building pads which are situated well above the groundwater table with approval from the geotechnical engineer. Soils classified as SC or CL, exhibiting moisture sensitivity, soils with excessive clay content, or excessive moisture should not be used without approval from the geotechnical engineer. Approved sands will also need to be moisture conditioned as necessary to facilitate proper compaction throughout its entire depth. If utility trenches cannot be sufficiently dewatered to readily allow compaction of the specified pipe bedding material, then a class I (ASTM-D-2321) gravel or gravel mixture will be required.

8. To assist in reducing moisture beneath the structure, and to reduce the potential for mold growth, the site shall be graded and filled as necessary to direct drainage away from the structure. If sub drains are installed, these alone may not prevent moisture vapor beneath the structure that can cause mold growth. (Also refer to paragraph 10 below). Care must be taken to not place concrete on top of wet soils. For example, if fill or natural soils experience heavy rain, the soils should be properly drained and dried, prior to placement of concrete. Otherwise moisture migration through the slab will occur.

9. Compact all footing excavations and slab subgrades to a minimum density of 95% in accordance with ASTM-D-1557, prior to placement on concrete. The footing excavations, and all prepared slab subgrade, should be maintained in a dry and compacted condition until the concrete is placed. Areas that are softened by water or that are disturbed by construction activity should be re-worked, re-compacted, or appropriately repaired to the required bearing and density. If necessary, stone backfill or other corrective measures may be implemented to stabilize footings.

10. All slabs-on-grade should be supported on a minimum of 4-inches of granular, free-draining gravel or coarse sand to reduce moisture migration by capillarity. A vapor retarding membrane, overlying this granular base, is recommended to further reduce moisture migration into finished areas of the structure. Note that the use of these measures will not totally prevent moisture under or on top of slabs or beneath structures. (Also refer to paragraph 8 above).

11. Any footing excavations that are directly adjacent to the existing foundations should be done in small increments to avoid undermining them and causing a loss of support to the existing structure. If necessary, the excavations should be sheeted and braced or grouting should stabilize the soil in the immediate area.

## XI. PAVEMENT RECOMMENDATIONS

Subgrade for driveways and parking areas should consist of a minimum of 24-inches of clean sand subgrade compacted to a density of 95% of its maximum dry density as determined by ASTM-D-1557. Pavement designs should also provide a minimum of 24-inches separation between the bottom of the base course material and the seasonal high ground water table. Undercutting, re-compacting, and/or replacing of existing surface soils will be required unless subgrade consists of organic free, virgin sandy soils that are proven to be a minimum of 24-inches thick, 24-inches above the seasonal high ground water table, compacted to 95% of ASTM D-1557 and passes a proof-roll. Final grades and elevations will determine the extent of any filling, undercutting and backfilling that may be required.

The pavement design must provide for the pavement subgrade soils to drain and not ever become saturated by surface water, perched groundwater or groundwater table.

Site grades should be established on this site by setting bottom of pavement section elevations residing no deeper than 12 inches below existing grade elevations.

Assuming site grades are established as recommended above, groundwater would reside 2 feet below bottom of pavement section elevations and under drains would not be required in the pavement design. In addition, the near surface soil conditions will consist of sandy type soils, which can be made suitable for use as pavement subgrade material as long as the in-place sandy soils are compacted for a full 24-inch depth below bottom of pavement section elevations. As recommended above, compaction efforts on exposed subgrade soils shall be made with a large vibratory smooth drum roller (Cat CS 74 or equivalent - centrifugal force range of 37,300 – 74,600 lb).

All proof rolling, construction observations, compaction testing of paved areas must be in accordance with the SITE WORK section above. If a rain event of 0.5 inches or more, occurs after initial proof rolling and prior to subsequent placement of base or surface wearing course, the proof roll testing must be repeated just prior to additional work.

The below recommended pavement sections should be considered standard and typical for the area. We have not been provided traffic data and/or been instructed to perform CBR testing on subgrade soils, therefore these pavement sections should not be considered a pavement design. The below recommended pavement sections are based upon the assumption that the sandy subgrade soils will yield a minimum CBR value of 8 if compacted to 95% ASTM D-1557 for a full 24-inch depth. In addition, the below recommended light duty pavement sections should be considered for car traffic areas only. Below recommended heavy duty sections should be utilized for all areas receiving truck traffic (delivery trucks and garbage trucks with 18-kip axle loads). In addition the heavy duty sections recommended below are for low volume truck traffic (15 to 20 trucks per day).

## LIGHT DUTY PAVEMENT (CARS & LIGHT TRUCKS)

| | |
|---|---|
| SUBGRADE: | Minimum – 24-inches of drained, compacted, coarse grained soil |
| BASE COURSE: | Minimum - 6-inches of Graded Aggregate Construction |
| SURFACE COURSE: | Minimum - 2-inches of 12.5 mm Superpave |

## HEAVY DUTY PAVEMENT (LOADED TRUCKS WITH 18+ kip AXLE LOADS)

| | |
|---|---|
| SUBGRADE: | Minimum – 24 inches of drained, compacted, coarse grained soil |
| BASE COURSE: | Minimum - 8-inches of Graded Aggregate Construction |
| BINDER COURSE: | Minimum - 2-inches of 19 mm Superpave |
| SURFACE COURSE: | Minimum - 2.0-inches of 9.5 mm Type II Superpave, or<br>Minimum - 2.0-inches of 12.5 mm Superpave |

In all projects, a minimum mat temperature of 185° F must be maintained through final roller pass.

*Please note that specifications for the above mentioned base course and surface course can be found under Sections 310, 400, 815 and 828 of the Georgia Department of Transportation State of Georgia Standard Specifications Construction of Transportation Systems, 2001 Edition. The mix design must include "lime".*

All testing procedures, pavement densities, void ratios, and all criteria for final pavement approval must be agreed upon by the parties after completion of a rolling pattern or test strip segment. It must also be agreed that the reference to Georgia DOT Specifications shall mean the entirety of the specification. Portions of such Standard State pavement specifications are not stand alone provisions, and must be considered as mutually complementary provisions, to be used in their entirety. Selected portions of the Standard State specifications may be included, only after completion of a rolling pattern or test strip segment, and the agreement of the parties.

Several studies have shown that recycled concrete aggregates may have suitable physical and geotechnical properties for road construction; however, the studies related to leaching behavior and potential clogging have not been investigated in depth. Whitaker Laboratory recommends that recycled concrete aggregate and/or recycled masonry materials should not be used in project designs and construction where geotechnical fabrics are part of a drainage filter design. Such recycled materials have the potential for precipitating calcium-based compounds and causing clogging of the fabric filter materials

PORTLAND CEMENT CONCRETE PAVEMENT

| | |
|---|---|
| HEAVY DUTY: | 8-inches of Portland cement concrete with minimum compressive strength of 4000 PSI. |
| LIGHT DUTY: | 5-inches of Portland cement concrete with minimum compressive strength of 4000 PSI. |

Whitaker Laboratory recommends incorporating a minimum of 4-inches of graded aggregate base course below the above concrete pavement sections for maintaining a smooth and level surface during placement of the pavement section.

Joints must be placed a MAXIMUM spacing in FEET of 2.5 times the pavement thickness in inches, and in no case more distant apart than 15 feet.

Pavement Design should include:

- Requirements to seal all pavement joints to prevent surface water entry into base / subgrade. Such provision should minimize pumping failures at joints.
- Requirements that pavement sections and panels subject to repetitive braking and/or acceleration should be designed with lug anchors or tie-bars to minimize separation or misalignment at the joints.
- Provisions for load transfer across construction joints by dowels or other acceptable means.
- In general, the design should follow the recommendations and practices for all components as described in ACI 330.1 and/or ACI 330R as applicable.

## XII. QUALITY CONTROL AND TESTING

Documented inspections and/or testing performed by Whitaker Laboratory personnel, at the following critical milestones during construction, will be required for the recommendations contained within this report to be validated:

Earthwork:

- After stripping and prior to backfill/fill placement: Perform density testing and proofrolling on exposed subgrade soil to verify exposed subgrade soils are compacted and stable enough to begin receiving fill.
- Collect sample of proposed fill material, perform laboratory testing and determine suitability for use (approve or disapprove).

- During backfill/fill placement: Perform density testing on each lift of backfill and/or fill soil.

Footings:

- Once footings are excavated: Perform inspection on bearing subgrade soils within bottom of footing excavations extending to depths reaching 4 feet below existing grades prior to placement of reinforcing steel or concrete. Provide recommendations for undercutting and replacement if deemed necessary.

At the appropriate time, please contact Whitaker Laboratory, Inc. for budgetary and scheduling purposes for the performance of the above required inspection and testing services.

We further offer concrete, asphalt, masonry, and structural steel inspections and testing. Whitaker Laboratory, Inc. also performs observational services for mold mitigation, including observation of installation of vapor retarding membranes, subdrains, overall site drainage, and regularly scheduled observations after construction of site and landscape drainage, and monitoring of humidity and moisture in slabs and basement walls.

## XIII. QUALIFICATIONS OF REPORT

Any recommendations or opinions offered in this report are based on our interpretation of the data obtained from this investigation. It should be noted that underlying subsurface and soil conditions can, and do, vary considerably within short lateral distances. Regardless of the thoroughness of any subsurface investigation, it is possible that conditions may be revealed between boring locations that are different from those found by our borings and used for our analysis. For this reason, we recommend that the site preparation and foundation construction for this project be monitored closely. If deviations of the soil conditions from those presented in this report appear, we will be glad to furnish any additional analyses and recommendations that may be required.

This report was made to investigate subsurface properties of the site and is not intended to serve as a wetlands survey, toxic mold assessment, or environmental site assessment. No effort has been made to define, delineate, or designate any area as wetlands or an area of environmental concern or contamination. Any references to low areas, poorly drained areas, etc. are related to geotechnical applications. Any recommendations regarding drainage and earthwork are made on the basis that such work can be permitted and performed in accordance with the current laws pertaining to wetlands, storm water runoff, and environmental contamination.

This report does not attempt to define or represent any FEMA, or otherwise designated, flood, erosion, scour, or other hazardous zones; nor does it presume to reflect that governmental or other authorities will grant approval of the project and issue appropriate permits.

WARRANT: WHITAKER LABORATORY, INC. and its professional engineers strive to perform all services in a manner consistent with that level of care and skill ordinarily exercised by members of the engineering profession practicing in the same locality and under similar conditions. No other warranty or representation, expressed or implied, is included or intended in this agreement, in any report, opinion, document, or otherwise. We carry commercial general liability insurance, including completed operations, and professional liability insurance in aggregate amounts deemed adequate, and we comply with the statutory requirements for workmen's compensation insurance. Accordingly, by accepting and relying on the contents of this report, the liability of WHITAKER LABORATORY, INC. and its professional engineers, to the client, owner, or any other party, for any loss or damage, resulting from any cause, including professional acts, errors, omissions, negligence, toxic mold and other environmental claims, breach of warranty or breach of contract, shall not exceed the total compensation received by us for services related to this project; and client will defend, settle, and discharge any claims or allegations of liability for same against us by others. If client desires higher monetary limits of our liability, we will be pleased to discuss such higher limits and the impact on liability and fees. In the event the client makes a claim against us, at law or otherwise, for any alleged act, error, omission, negligence, breach of warranty or breach of contract, arising from the performance of our services, it is mutually agreed that initially, the client and Whitaker Laboratory, Inc. will attempt to resolve such dispute through direct negotiations between the appropriate representatives of each party. Secondly, if such negotiations are not fully successful, the parties agree to resolve any remaining disputes by formal nonbinding arbitration mediation in accordance with the rules and procedures to be agreed upon by the parties. Mediation is a pre-condition to litigation. The exclusive venue for any disputes relating to Whitaker Laboratory's service shall be in Chatham County, GA. Furthermore, if the client fails to prove such claim, then client shall pay all costs accrued by us in defending ourselves.

TITLE: The ownership of opinions, technical ideas, methods and means, drawings, calculations, and other data developed by us during the course of preparing proposals or rendering engineering services remains exclusively with us. It is a condition of this report or proposal that the client agrees not to use the opinions, technical ideas, methods and means, drawings, calculations or any other data for projects or locations, other than those specifically addressed in the report, and that no one other than the client may use this report, without the written permission of WHITAKER LABORATORY, INC.

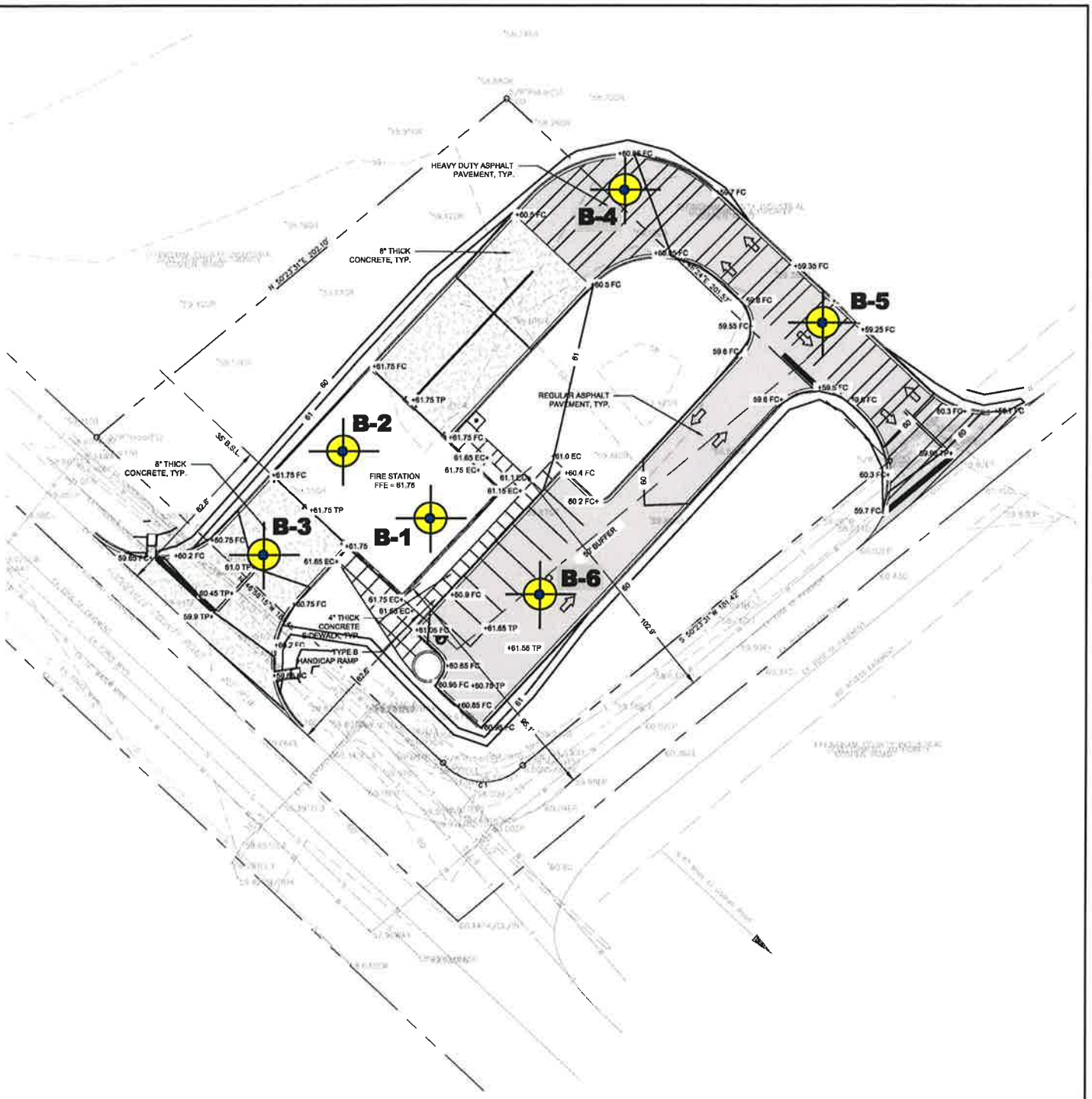
# APPENDIX I

## SITE VICINITY & BORING LOCATION PLANS


# Site Vicinity Map

Fire Station #15
Hodgeville Road
Effingham County, Georgia

N




# Boring Location Plan

Fire Station #15
Hodgeville Road
Effingham County, Georgia

N

ALL BORING LOCATIONS ARE APPROXIMATE, & ARE BASED ONLY ON FIELD ESTIMATES.

# APPENDIX II

## BORING RECORDS

**Client:** DPR Architecture

**Project:** Fire Station 15 - Hodgeville Road

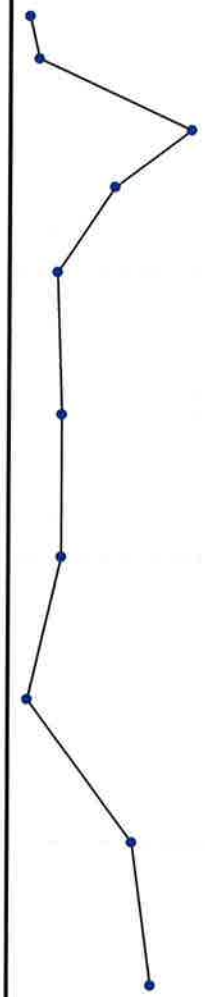
**Location:** Effingham County, GA

# Boring No. B-1

**Date:** 6/5/20

**Engineer:** Follo

| SUBSURFACE PROFILE | | Sample | | | Standard Penetration Test blows/ft.(Corrected to N60) 10 20 30 40 50 60 70 80 90 | Water Table | Remarks |
|---|---|---|---|---|---|---|---|
| Depth | Description | Depth | Number | Blows/ft | | | |
| 0 | Ground Surface | 0 | | | | | |
| | **SM-PT** Topsoil | | 1 | 4 | | | |
| | **SP-SM** Loose, brown fine sand | | 2 | 6 | | | |
| 5 | **SP-SM** Dense, brown fine sand | 5 | 3 | 38 | | | |
| | **SC** Very stiff, tan fine sand clay | | 4 | 22 | | | |
| 10 | **CH** Stiff, tan clay | 10 | 5 | 10 | | | |
| | **CH** Stiff, tan-green clay | | | | | | |
| 15 | | 15 | 6 | 11 | | | |
| | **SM** Firm, orange-tan medium to fine silty sand | | | | | | |
| 20 | | 20 | 7 | 11 | | | |
| | **SM** Very loose, orange-tan medium to fine silty sand | | | | | | |
| 25 | | 25 | 8 | 4 | | | |
| | **GP-GM** Very firm, tan-gray gravel sand | | | | | | |
| 30 | | 30 | 9 | 26 | | | |
| 35 | End of Borehole | 35 | 10 | 30 | | | |
| 40 | | 40 | | | | | |



**Drilled By:** Wilkerson (B48)

**Drill Method:** H. S. Auger

**Drill Date:** 6/5/20

WHITAKER LABORATORY, INC.
2500 Tremont Road
Savannah, GA 31405

**Hole Size:** 6.5"

**Datum:**

**Sheet:** 1 of 1

**Client:** DPR Architecture

**Project:** Fire Station 15 - Hodgeville Road

**Location:** Effingham County, GA

# Boring No. B-2

**Date:** 6/5/20

**Engineer:** Follo

| SUBSURFACE PROFILE | | Sample | | | Standard Penetration Test blows/ft.(Corrected to N60) 10 20 30 40 50 60 70 80 90 | Water Table | Remarks |
|---|---|---|---|---|---|---|---|
| Depth | Description | Depth | Number | Blows/ft | | | |
| 0 | Ground Surface | 0 | | | | | |
| | **SP-SM** Very loose, brown fine sand | | 1 | 3 | | | |
| | | | 2 | 4 | | | |
| | **SC** Very stiff, brown fine sand clay | 5 | 3 | 20 | | | |
| | **SC** Stiff, tan fine sand clay | | 4 | 13 | | | |
| | **CH** Firm, gray-orange clay | 10 | 5 | 6 | | | |
| | **CH** Stiff, green-orange clay | 15 | 6 | 10 | | | |
| | **SC** Stiff, orange-gray fine sand clay | 20 | 7 | 11 | | | |
| | **SM** Very loose, gray fine silty sand | 25 | 8 | 4 | | | |
| 25 | End of Borehole | | | | | | |
| 30 | | 30 | | | | | |

**Drilled By:** Wilkerson (B48)

**Drill Method:** H. S. Auger

**Drill Date:** 6/5/20

WHITAKER LABORATORY, INC.
2500 Tremont Road
Savannah, GA 31405

**Hole Size:** 6.5"

**Datum:**

**Sheet:** 1 of 1

**WHITAKER LABORATORY, INC.**
**P.O. BOX 7078**
**SAVANNAH, GEORGIA 31418**

**Project Name** Hodgeville Road Fire Station **Date** 6/5/2020

**Project Location** Effingham County, GA

**Boring Number** _____ **Field Engineer** Ron Wilkerson (B-48)

**Ground Surface Elevation** _____ **Ground Water Elevation** _____

| Sample No. | Sample | | Stratum | | Visual Field Classification | N-Count |
|---|---|---|---|---|---|---|
| | From | To | From | To | | |
| B-3 | | | 0 | 7" | Brown Topsoil | |
| | | | 7" | 2.5' | Loose Tan Fine Sand (SP-SM) | -1' –5 |
| | | | 2.5' | 4' | Loose Tan/Brown Silty Sand (SM) | -3' – 9 |
| | | | | | Groundwater Encountered at 4 feet | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| B-4 | | | 0 | 9" | Brown Topsoil | |
| | | | 9" | 2' | Loose Tan Fine Sand (SP-SM) | -1' –5 |
| | | | 2' | 4' | Firm Tan/Brown Silty Sand (SM) | -3' – 15 |
| | | | | | Groundwater Encountered at 4 feet | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| B-5 | | | 0 | 8" | Brown Topsoil | |
| | | | 8" | 2.5' | Loose Tan Fine Sand (SP-SM) | -1' –5 |
| | | | 2.5' | 4' | Loose Tan/Brown Silty Sand (SM) | -3' – 9 |
| | | | | | Groundwater Encountered at 4 feet | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| B-6 | | | 0 | 9" | Brown Topsoil | |
| | | | 9" | 2' | Loose Tan Fine Sand (SP-SM) | -1' –5 |
| | | | 2' | 4' | Loose Tan/Brown Silty Sand (SM) | -3' – 8 |
| | | | | | Groundwater Encountered at 4 feet | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

# APPENDIX III

## SEISMIC PARAMETERS

# LIQUEFACTION ANALYSIS

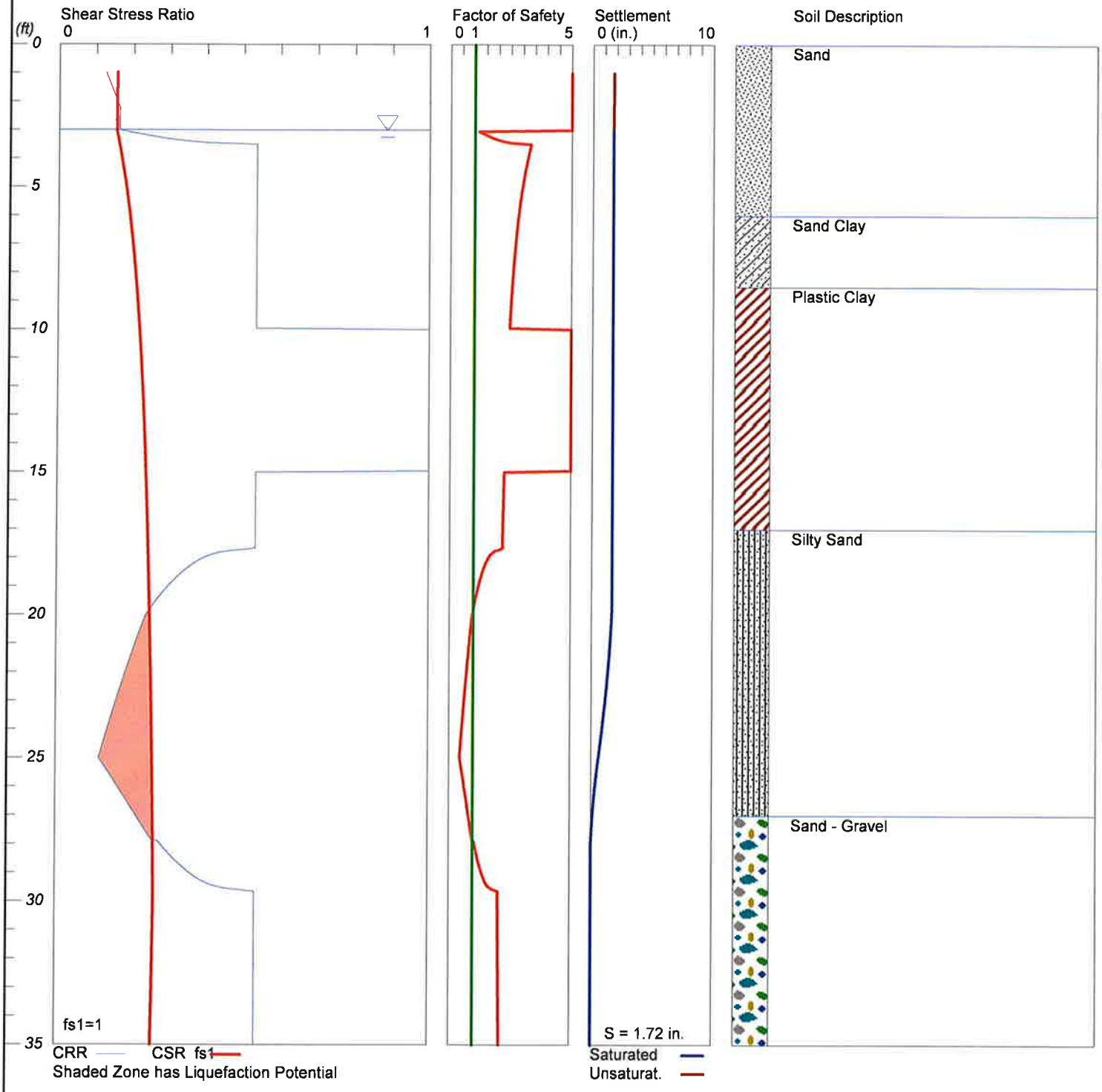
## Fire Station #15 - Hodgeville Road

***Hole No.=B-1  Water Depth=3 ft***

***Ground Improvement of Fill=2 ft***

***Magnitude=7.3***

***Acceleration=0.24g***

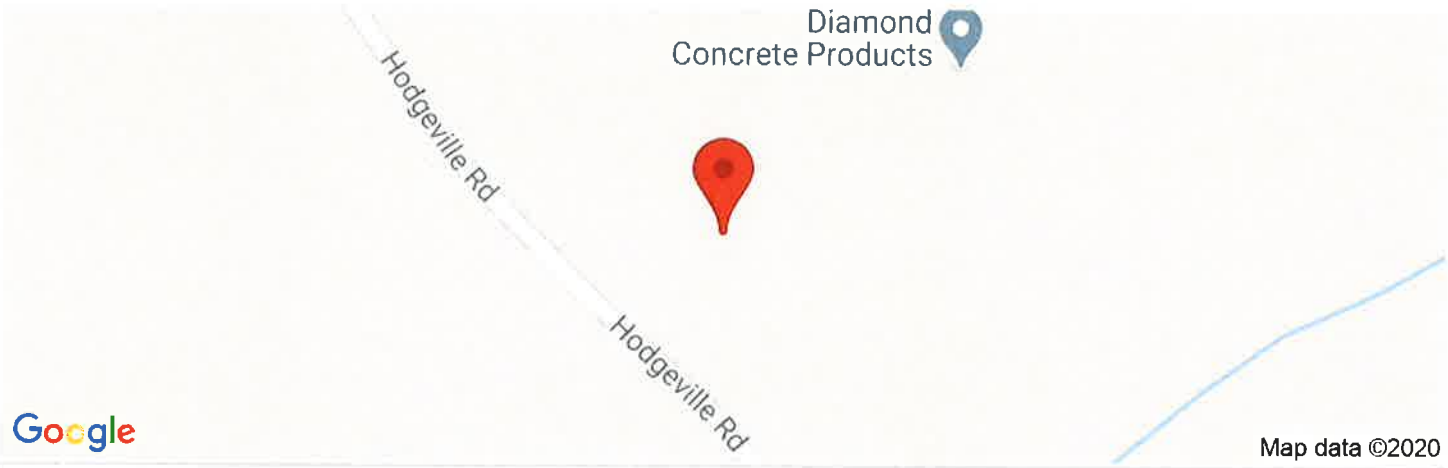



LiquefyPro CivilTech Software USA www.civiltech.com

OSHPD

# Hodgeville Road Fire Station, Effingham County, GA

**Latitude, Longitude: 32.2348, -81.2724**




| | |
|---|---|
| **Date** | 6/10/2020, 2:29:23 PM |
| **Design Code Reference Document** | ASCE7-16 |
| **Risk Category** | II |
| **Site Class** | D - Stiff Soil |

| Type | Value | Description |
|---|---|---|
| $S_S$ | 0.306 | $MCE_R$ ground motion. (for 0.2 second period) |
| $S_1$ | 0.112 | $MCE_R$ ground motion. (for 1.0s period) |
| $S_{MS}$ | 0.476 | Site-modified spectral acceleration value |
| $S_{M1}$ | 0.267 | Site-modified spectral acceleration value |
| $S_{DS}$ | 0.317 | Numeric seismic design value at 0.2 second SA |
| $S_{D1}$ | 0.178 | Numeric seismic design value at 1.0 second SA |

| Type | Value | Description |
|---|---|---|
| SDC | C | Seismic design category |
| $F_a$ | 1.555 | Site amplification factor at 0.2 second |
| $F_v$ | 2.375 | Site amplification factor at 1.0 second |
| PGA | 0.166 | $MCE_G$ peak ground acceleration |
| $F_{PGA}$ | 1.468 | Site amplification factor at PGA |
| $PGA_M$ | 0.244 | Site modified peak ground acceleration |
| $T_L$ | 8 | Long-period transition period in seconds |
| SsRT | 0.306 | Probabilistic risk-targeted ground motion. (0.2 second) |
| SsUH | 0.347 | Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration |
| SsD | 1.5 | Factored deterministic acceleration value. (0.2 second) |
| S1RT | 0.112 | Probabilistic risk-targeted ground motion. (1.0 second) |
| S1UH | 0.128 | Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration. |
| S1D | 0.6 | Factored deterministic acceleration value. (1.0 second) |
| PGAd | 0.5 | Factored deterministic acceleration value. (Peak Ground Acceleration) |
| $C_{RS}$ | 0.881 | Mapped value of the risk coefficient at short periods |
| $C_{R1}$ | 0.88 | Mapped value of the risk coefficient at a period of 1 s |

DISCLAIMER

While the information presented on this website is believed to be correct, SEAOC /OSHPD and its sponsors and contributors assume no responsibility or liability for its accuracy. The material presented in this web application should not be used or relied upon for any specific application without competent examination and verification of its accuracy, suitability and applicability by engineers or other licensed professionals. SEAOC / OSHPD do not intend that the use of this information replace the sound judgment of such competent professionals, having experience and knowledge in the field of practice, nor to substitute for the standard of care required of such professionals in interpreting and applying the results of the seismic data provided by this website. Users of the information from this website assume all liability arising from such use. Use of the output of this website does not imply approval by the governing building code bodies responsible for building code approval and interpretation for the building site described by latitude/longitude location in the search results of this website.

# APPENDIX IV

## IMPORTANT GENERAL NOTES

## GENERAL NOTES

The "standard" penetration resistance is an indication of the density of cohesion less soils and of the strength of cohesive soils. The "standard" penetration test is measured with a 1.4 inch I.D., 2 inch O.D., sampler driven one (1) foot with a 140 pound hammer falling 30 inches.

RELATIVE DENSITY OF SOIL THAT IS PRIMARILY SAND

| Number of Blows | Relative Density |
|---|---|
| 0 - 4 | Very loose |
| 5 - 10 | Loose |
| 11 - 20 | Firm |
| 21 - 30 | Very firm |
| 31 - 50 | Dense |
| Over 51 | Very dense |

CONSISTENCY OF SOIL THAT IS PRIMARILY SILT OR CLAY

| Number of Blows | Consistency |
|---|---|
| 0 - 2 | Very soft |
| 3 - 4 | Soft |
| 5 - 8 | Firm |
| 9 - 15 | Stiff |
| 16 - 30 | Very stiff |
| Over 31 | Hard |

While individual test boring records are considered to be representative of subsurface conditions at the respective boring locations on the dates shown, it is not warranted that they are representative of subsurface conditions at other locations and times.

The subsoil stratification shown on these profiles is not warranted but is estimated based on accepted soil engineering principles and practices and reasonable engineering judgment.

Unless notified, samples will be disposed of after 60 days.

| GROUP | | |
|---|---|---|
| MAJOR DIVISIONS | SYMBOLS | TYPICAL NAMES |
| **COARSE-GRAINED SOILS** | | |
| **More than 50% retained on No. 200 Sieve*** | | |
| **GRAVELS** | | |
| 50% or more of coarse fraction retained on No. 4 sieve | | |
| CLEAN GRAVELS | GW | Well-graded gravels and gravel-sand mixtures, little or no fines |
| | GP | Poorly graded gravels and gravel-sand mixtures, little or no fines |
| GRAVELS WITH FINES | GM | Silty gravels, gravel-sand-silty mixtures |
| | GC | Clayey gravels, gravel sand clay mixtures |
| **SANDS** | | |
| More than 50% of coarse fraction passes No. 4 sieve | | |
| CLEAN SANDS | SW | Well graded sand and gravelly sands, little or no fines |
| | SP | Poor graded sands and gravelly sands, little or no fines |
| SANDS WITH FINES | SM | Silty sands, sand-silt mixtures |
| | SC | Clayey sands, sand clay mixtures |
| **FINE GRAINED SOILS** | | |
| **50% or more passes No. 200 Sieve*** | | |
| **SILTS AND CLAYS** | | |
| Liquid Limit 50% or less | | |
| | ML | Inorganic silts, very fine sands, rock flour, silty or clayey fine sands |
| | CL | Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays |
| | OL | Organic silts and organic silty clays of low plasticity |
| **SILTS AND CLAYS** | | |
| Liquid Limit greater than 50% | | |
| | MH | Inorganic silts, micaceous or diatomaceous fine sands or silts, elastic silts |
| | CH | Inorganic clays of high plasticity, fat clays |
| | OH | Organic clays of medium to high plasticity |
| **HIGHLY** ORGANIC SOILS | PT | Peat, muck and other highly organic soils |

*Based on the material passing the 3 in. (75 mm) sieve.

All other terms and conditions in ITB 21-55-001A - Civil/Site Work for Fire Station No. 15 – Hodgeville Road remain unchanged.

Effingham County reserves the right to reject any and all proposals, to waive any technicalities or irregularities and to award the offer based upon the most responsive, responsible submission.

Please sign receipt of this Addendum No. 1 below:

| _____ | _____ | _____ |
|---|---|---|
| Print Name | Signature | Date |

**END OF ADDENDUM NO. 1**