ACI/BOLAND, INC. – KANSAS CITY
1421 E 104th Street, Suite 100
Kansas City, Missouri 64131
T. 816.763.9600
F.816.763.9757

February 18, 2014

Camdenton R-III School District
P. O. Box 1409
Camdenton MO 65020

CHANGE ORDER PROPOSAL REQUEST
Additions and Alterations to
Hurricane Deck Elementary School
Arch. Project # 3-13021

Please find attached Change Order Proposal Request dated January 17, 2014, in the amount of $31,460.00. As I'm sure you remember, at the time of the projects' bid date, there was still some question as to how steep the slopes could be economically constructed, as well as whether retaining walls would be a better solution, and the Slope Stabilization study was recommended to analyze the possibilities. This Proposal addresses the preferred Option #4, described in the "Results" section of the report, as well as subsequent sections of the report. A copy of the referenced report is attached, for your convenience.

We have reviewed this additional cost to the project with Engineering Surveys & Services, and Palmerton-Parrish, find it to be reasonable, and recommend its prompt approval, so as to not interfere with the Project Schedule. Should you have any questions or comments, please feel free to contact me.

Sincerely
ACI-BOLAND ARCHITECTS

Ken Keith, Project Architect

cc: Tim Hadfield; Camdenton R-III School District
Guy Augenstein, Bales Construction
Tim O'Connor, Engineering Surveys & Services
Brad Parrish, Palmerton-Parrish
Andy Ratkewicz, Norton & Schmidt
Michael Kautz/file 3-13021, ACI Boland Architects

ACI BOLAND ARCHITECTS

ACI/BOLAND, INC. – KANSAS CITY
1421 E 104th Street, Suite 100
Kansas City, Missouri 64131
T. 816.763.9600
F.816.763.9757

February 18, 2014

Mr. Kerry Dickemann, Director of Maintenance
Camdenton R-III School District
P. O. Box 1409
Camdenton MO 65020

CHANGE ORDER PROPOSAL REQUEST
Additions and Alterations to
Hurricane Deck Elementary School
Arch. Project # 3-13021

Dear Kerry,

Please find attached Change Order Proposal Request dated January 17, 2014, in the amount of $31,460.00. As I'm sure you remember, at the time of the projects' bid date, there was still some question as to how steep the slopes could be economically constructed, as well as whether retaining walls would be a better solution, and the Slope Stabilization study was recommended to analyze the possibilities. This Proposal addresses the preferred Option #4, described in the "Results" section of the report, as well as subsequent sections of the report. A copy of the referenced report is attached, for your convenience.

We have reviewed this additional cost to the project with Engineering Surveys & Services, and Palmerton-Parrish, find it to be reasonable, and recommend its prompt approval, so as to not interfere with the Project Schedule. Should you have any questions or comments, please feel free to contact me.

Sincerely
ACI-BOLAND ARCHITECTS

Ken Keith, Project Architect

cc: Tim Hadfield; Camdenton R-III School District
Guy Augenstein, Bales Construction
Tim O'Connor, Engineering Surveys & Services
Brad Parrish, Palmerton-Parrish
Andy Ratkewicz, Norton & Schmidt
Michael Kautz/file 3-13021, ACI Boland Architects

BALES

SINCE 1939

GENERAL CONTRACTORS

PROPOSAL

Date: 1/17/2014 Revised

Bales Construction Co., Inc.
1901 Historic 66 W
Waynesville, MO 65583

Phone: (573)774-2003
Fax: (573)774-6163
Email: guy.buildbales@gmail.com

PROPOSAL SUBMITTED TO:

Attn: MR. KEN KEITH
ACI BOLAND

Phone #: 816-763-9600

WORK TO BE PERFORMED AT:

HURRICANE DECK ELEMENTARY

We hereby propose to furnish the materials and perform the labor necessary for the completion of:	**Pricing**
Construct Rock Buttress per the detail provided by PPI as part of the Slope Stability Analysis	
dated December 16, 2013 and installed as shown on Drawing C4.1 dated 12/16/2013	
Material (Includes 210 Tons of Rock)	$5,600.00
Labor	$9,900.00
Equipment	$13,100.00
Bales Overhead and Profit	$2,860.00

We will perform the above for the sum of: **Total** $31,460.00

All materials is guaranteed to be as specified and the above work to be performed in accordance with the drawings and specifications submitted for above work and completed in a substantial workmanlike manner.

Upon Approval, please return one signed copy.

Respectfully submitted

Guy Augenstein

Acceptance of Proposal

BLOOMSDALE EXCAVATING
Since 1946

January 9, 2014

Mr. Guy Augenstein
Bales Construction Co.
1901 Historic Route 66
Waynesville, MO 65583

SENT VIA EMAIL: guy.buildbales@gmail.com

RE: Hurricane Deck Elementary School
Sunrise Beach, MO

Dear Mr. Augenstein:

Bloomsdale Excavating Company is pleased to submit the following additional pricing for the above referenced project. Our price is based upon constructing the Rock Buttress per the detail provided by PPI as part of the Slope Stability Analysis dated December 16, 2013 and is to be installed as shown on drawing C4.1 dated 12/16/13.

Lump Sum Price to construct Rock Buttress ***$ 28,600.00***

Please do not hesitate to contact us if you need anything further.

Respectfully,

Daniel J. Latham, PE
Project Engineer

PALMERTON & PARRISH, INC.

GEOTECHNICAL & MATERIALS ENGINEERS
MATERIALS TESTING LABORATORIES
ENVIRONMENTAL SERVICES

4168 W. Kearney St.
Springfield, MO 65803
Ph: (417) 864-6000
www.ppimo.com

December 16, 2013

ACI Boland Architects
1421 East 104th Street, Suite 100
Kansas City, Missouri 64131

Attn: Mr. Ken Keith

Re: Camdenton R-III School District
Hurricane Deck Elementary School – Slope Stability Analysis – Phase I
Sunrise Beach, Missouri
PPI Project Number: 218802

Dear Mr. Keith:

This letter report presents the results of the Slope Stability Analysis performed by Palmerton & Parrish, Inc. (PPI) for slopes at the above referenced project site bordering the Playing Field. This analysis was authorized by a letter proposal dated November 4, 2013 and signed by Mr. Timothy Hadfield.

PROJECT BACKGROUND

As you know, our firm performed a Geotechnical Investigation for this project. Facility design was preliminary at the time of this Geotechnical Investigation and no borings were drilled along the proposed 2H:1V slopes. These slopes bordering the Playing Field are presently designed at 2H:1V with slope heights ranging from approximately 20 to 60 ft.

SCOPE OF SERVICES

In accordance with instructions received from Mr. Tim O'Conner with Engineering Surveys & Services, Inc., (ESS), PPI's scope of services includes:

1. A Global Stability Analysis for the presently designed 2H:1V slope as shown on the project plans bordering the Playing Field.
2. A preliminary Slope Stability Analysis for alternate methods of slope construction which include:
    - Use of vertical segmental block walls (maximum 15 ft. height); and 2:1 earth fill slopes;
    - A combination of 2:1 earth fill and 1.5:1 rock fill slopes; and
    - Other reinforced slopes that may appear to be applicable. These slopes use either an earth fill or rock fill material, or both.

A multi-phase approach was planned to accomplish the scope of services as described above. **This is the final letter report for Phases I and II.**

Phase I – Perform a slope stability analysis for 2H:1V slope as presently designed assuming use of earth materials from on-site cut as new controlled fill. Conservative strength parameters will be assumed for earth materials based upon results of the geotechnical borings and our experience in the site area. Secondly, prepare conceptual cross section models for review by the Project Team, which will incorporate different degree of slopes, slope materials and retaining walls.

Phase II – Perform a site specific slope stability analysis for up to two (2) conceptual cross section models developed during Phase I selected by the project team. A report will be prepared presenting findings, analysis approach, assumptions made in the analysis and results of the analysis will be prepared. Slope stability analysis will be performed using the limit equilibrium slope stability analysis software Slope/W. Slope stability analysis will be performed for both the end of construction and long term drainage conditions. It should be emphasized that only the global stability of the slope/wall system will be analyzed under Phase II. Internal stability of retaining walls will be assumed to be acceptable and will not be analyzed during this phase.

Phase III – Depending upon the results of Phases I and II, final design of a slope/wall combination may be required. It may also be apparent that additional geotechnical investigation is needed to confirm bearing capacity for retaining walls or shear strength parameters assumed during the analysis. PPI will be happy to prepare a proposal for these services, if required, after completion of Phase I and Phase II.

SLOPE STABILITY APPROACH

Selected cross sections incorporating earth fill, rock fill, geogrid reinforcement, and MSE wall (maximum height of 15 ft.) were analyzed using the computer program Slope/W and Spencer's Method. Topographic data for the natural ground surface and finish grades within the Playing Field were provided in the grading plan transmitted electronically by ESS. This topographic data and finish grade were used to develop cross sections for the taller west slope (slope height approximately 60 ft.) and remaining slopes northwest and north of the Playing Field with maximum slope heights on the order of 40 ft. A copy of this topographic survey and finished contours are presented in Attachment A.

Two (2) representative cross sections of the "as designed" earth fill slopes at 2H:1V with 40 and 60 ft. heights were analyzed initially using soil strength and density parameters consistent with the Geotechnical Investigation performed for the project and our firm's past experience in the site area. End of Construction Conditions utilizing undrained soil strength parameters were analyzed, as well as long term Steady State Seepage Condition utilizing drained or effective stress strength parameters. Soil strength and density parameters used in these analyses are summarized in the following table:

Slope Condition	Earth Fill & Natural Overburden Soils			Rock Fill		
	Unit Wt. (pcf)	Cohesion (psf)	Friction Angle (Degrees)	Unit Wt. (pcf)	Cohesion (psf)	Friction Angle (Degrees)
End of Construction	125	750	8	135	50	40
Steady State Seepage Condition	125	150	28	135	50	40

In addition to the above soil strength parameters, the following conditions were assumed in the Stability Analysis:

- Development of a phreatic groundwater surface at a depth of approximately 10 ft. within the Playing Field sloping to near the toe of the embankment;
- Surcharge live load on Playing Field surface of 150 psf;
- Use of Tensar UX 1700 geogrid or equivalent;
- Proper subgrade preparation and benching of fill materials into the sloping hillside as detailed later in this report; and
- Compaction of earth and rock fills in accordance with the Geotechnical Report prepared for the project under controlled conditions including on-site observation and testing by PPI.

After analysis of the 2H:1V simple slopes, differing cross sections were analyzed incorporating rock fill or MSE walls and/or geogrid reinforcement in an attempt to economize slopes and increase the factor of safety.

FACTOR OF SAFETY

Slope stability analysis computations yield a "Factor of Safety" for the slope analyzed. A factor of safety of less than 1.0 predicts slope failure. Factors of safety considered adequate for a project depend upon the reliability of the parameters used (assumed parameters vs. parameters determined by laboratory tests), reliability of assumptions pertaining to depth to bedrock and groundwater conditions, threat to public health, safety and welfare, and tolerance of the Owner to risk.

As previously described, strength parameters used in this analysis were determined from the Geotechnical Investigation performed for the project and PPI's past experience in the site area, but not for the specific slope area. Since groundwater and bedrock conditions are not known along the slopes, fairly conservative groundwater and bedrock conditions were assumed in the analysis. It is anticipated that no occupied structures are planned along the crest of the slopes, nor at the toe. Risk of structural damage and to public safety appears to be minimal. **Based upon these considerations, a target Factor of Safety of 1.3 is considered satisfactory for this project.**

RESULTS

A permissible Factor of Safety of 1.3 was determined for a 40 ft. high earth slope under both End of Construction and long term Steady State Seepage Conditions regardless of whether bedrock is deep or shallow. However, for the 60 ft. high slope, factors of safety of only 1.1 and 1.2 were determined for deep and shallow bedrock conditions, respectively and a Factor of Safety of only 1.0 for End of Construction Conditions with deep bedrock.

In an attempt to economize slope construction and/or increase Factor of Safety for slope heights greater than 40 ft., the following slope configurations and geometries were analyzed:

1. **1H:1V Geogrid Reinforced Earth Slope** – This slope cross section requires the least volume of earth material. However, significant geogrid reinforcement will be required to provide satisfactory factors of safety for both shallow surface slides and deep seated slope failures. Preliminary analyses indicate factors of safety of 1.3 or greater can be achieved with this cross section. Final design and location of geogrid reinforcement will be influenced by depth to bedrock conditions. See Attachment B for a schematic of this cross section.

2. **Rock Fill at 1.5H:1V Above 2H:1V Earth Fill** – This cross section yields factors of safety of only 1.0 and 1.1 under End of Construction and Steady State Seepage Conditions even with shallow bedrock and **is not considered a viable option.**

3. **Rock Fill at 1.5H:1V with Geogrid Reinforcement over 2H:1V Earth Fill** – With incorporation of geogrid reinforcement within the rock fill, factors of safety ranging from 1.25 to 1.7 were obtained for the two (2) conditions analyzed under both deep and shallow bedrock. It is believed that a minimum factor of safety of 1.3 can be obtained using this approach. This approach requires less volume of slope material than a simple 2H:1V earth fill, but will require appreciable geogrid reinforcement within the rock fill component. A typical cross section of this slope is shown in Attachment B.

4. **2H:1V Earth Fill with Rock Fill Buttress at Toe** – This approach utilizes the simple earth fill slope at 2H:1V, but incorporates a rock fill buttress at the toe to increase safety factor and improve subsurface drainage. **As described in a later section of this report, placement of a rock fill toe drainage is recommended regardless of the slope configuration selected.** Safety factor of earth fill slopes can be increased by incorporation of a rock fill buttress. A typical cross section of this alternate is also provided in Attachment B. It is believed that safety factors on the order of 1.3 can be achieved with this approach.

5. **2H:1V Earth Fill with MSE Wall at Crest of Slope** – Although this alternate reduces the volume of material required in the slope, this slope geometry produces increased driving forces at the slope crest which reduces the factor of safety. Factors of safety of 1.0 or less were determined for this slope geometry.

However, by increasing the length of geogrid reinforcement well beyond the slope crest, factors of safety on the order of 1.3 or greater can be achieved. Again, see Attachment B for a typical cross section.

SUMMARY

These preliminary cross sections and stability analyses are intended to provide the Design Team and Owner examples of what can be achieved using differing slope materials. **For slopes with a height of 50 ft. or less, a simple earth slope at 2H:1V is the more straight forward and probably the more economical approach, although incorporation of rock fill, MSE walls and geogrid may also be considered for 50 ft. and lower slopes to reduce the quantity of slope fill.**

For slopes ranging from 50 to 60 ft. in height (see attachments), other approaches may be considered and **slope improvements must be performed to achieve an adequate safety factor of 1.3.**

In addition to the above concepts for a slope cross section, the Factor of Safety may be increased by lowering finish grade of the southwest end of the Playing Field. This approach may be considered, as well as the above slope concepts. Shifting location of the Playing Field towards the northeast may also merit consideration.

FINAL SELECTION OF SLOPE CROSS-SECTION

It is understood that the Project Team desires the use of a simple 2H:1V slope section for this project. As described above, use of a simple 2H:1V slope should provide an adequate Factor of Safety for slopes with a height of less than 50 ft. provided slope construction is in accordance with the Geotechnical Report for this project and additional recommendations presented in the following sections of this report.

For simple 2H:1V slopes exceeding 50 ft. in height, it is recommended that a rock fill buttress be added to increase the slope stability Factor of Safety and to reduce erosion at the toe. A detail for this rock fill buttress is shown in Attachment C.

ADDITIONAL SLOPE CONSTRUCTION CONSIDERATIONS

Regardless of the method of slope construction selected, the following recommendations should be implemented in slope construction.

1. The existing hillside is fairly steep. To provide bonding of the new fill and satisfactory compaction of initial fill lifts, new fill should be benched into the sloping hillside. The existing hillside should be benched in a stair stepped fashion to provide a level horizontal surface for placement of fill lifts and a minimum 4 ft. bench into the hillside. All soft subgrade exposed in bench bottoms should be removed. PPI should be notified prior to commencement of fill placement along the natural hillside. **Benching procedures should be observed and approved by PPI personnel prior to fill placement.**

2. Erosion protection for earth fill slopes will be required, but is outside of the scope of this report and should be within the scope of the Civil Designer.

LETTER REPORT LIMITATIONS

This letter report has been prepared in accordance with generally accepted practices of other consultants undertaking similar studies at the same time and in the same geographical area. Palmerton & Parrish, Inc. observed that degree of care and skill generally exercised by other consultants under similar circumstances and conditions. Palmerton & Parrish's findings and conclusions must be considered not as scientific certainties, but as opinions based on our professional judgment concerning the significance of the data gathered during the course of this investigation. Other than this, no warranty is implied or intended.

CLOSURE

Should you have any questions or need additional information please feel free to call our office.

PALMERTON & PARRISH, INC.
By:

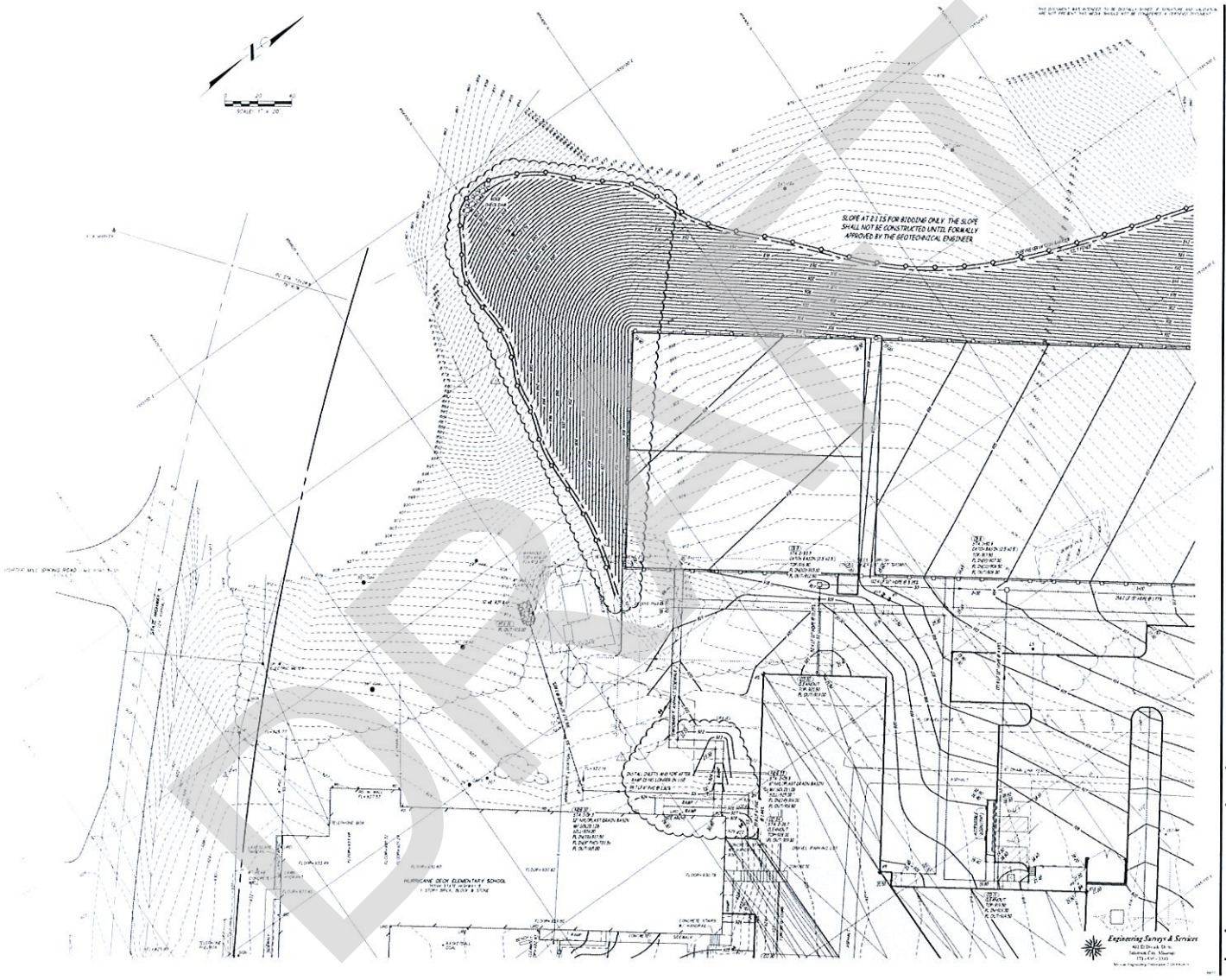
Brad R. Parrish, P.E.

BRP:jrh

Attachment A - Topographic Survey & Finished Contours
Attachment B - Typical Cross Sections
Attachment C - Rock Buttress Detail

ATTACHMENT A

TOPOGRAPHIC SURVEY & FINISHED CONTOURS



CIVIL CONSULTANT

STRUCTURAL CONSULTA

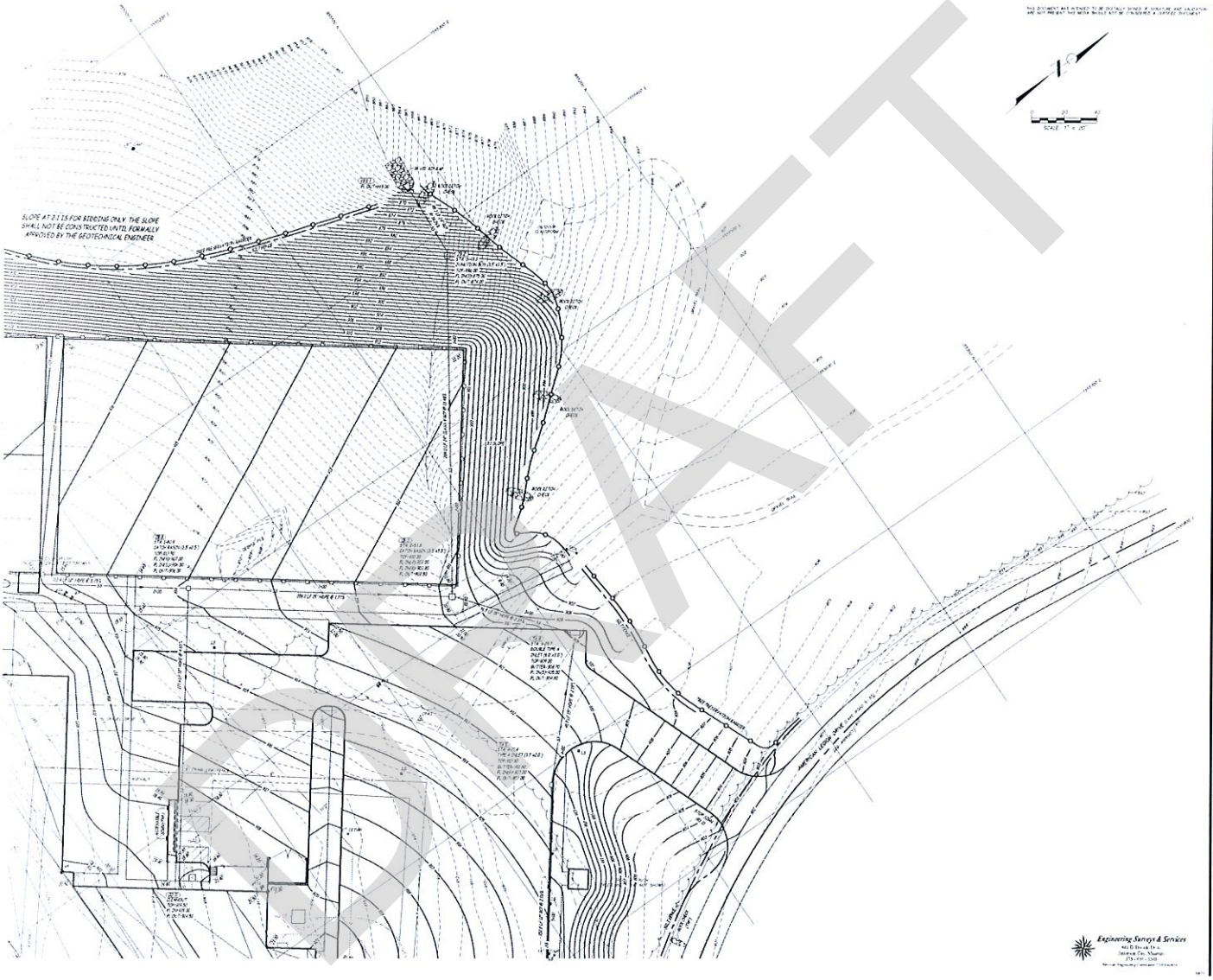
MEP CONSULTANT

FOOD SERVICE CONSULT

HURRICANE DECK
ELEMENTARY SCHOOL
Camdenton R-III School District
16594 N. STATE HWY 5

C4

GRADING & DRAINAGE
PLAN - PHASE 1



DAVID A. BENNETT
REGISTERED PROFESSIONAL ENGINEER

CIVIL CONSULTANT

STRUCTURAL CONSULTA

MEP CONSULTANT

FOOD SERVICE CONSULT

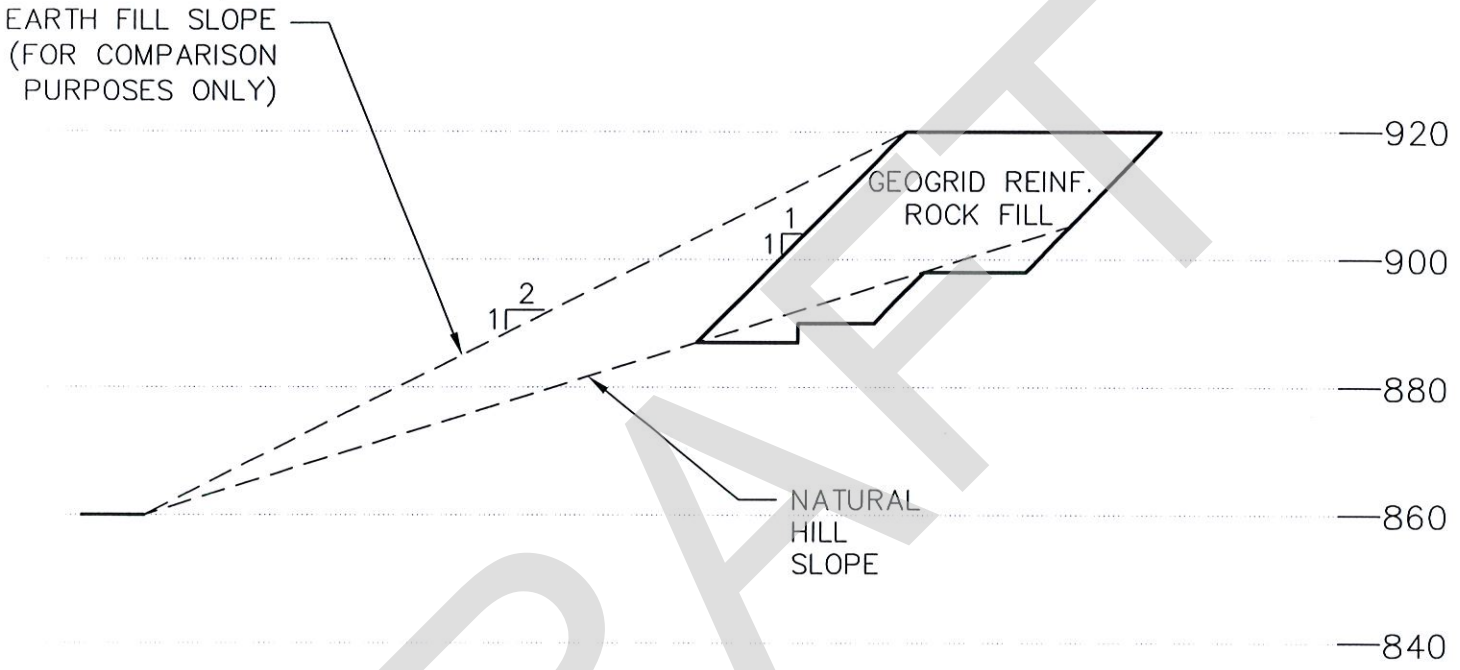
HURRICANE DECK
ELEMENTARY SCHOOL
Camdenton R-III School District
16594 N. STATE HWY 5

C4.

GRADING & DRAINAGE PLAN - PHASE 1

ATTACHMENT B

TYPICAL CROSS SECTIONS



Case 1 - Geogrid Reinforced 1:1 Rock Fill

Project: Hurricane Deck Elementary School
Client: ACI Boland Architects

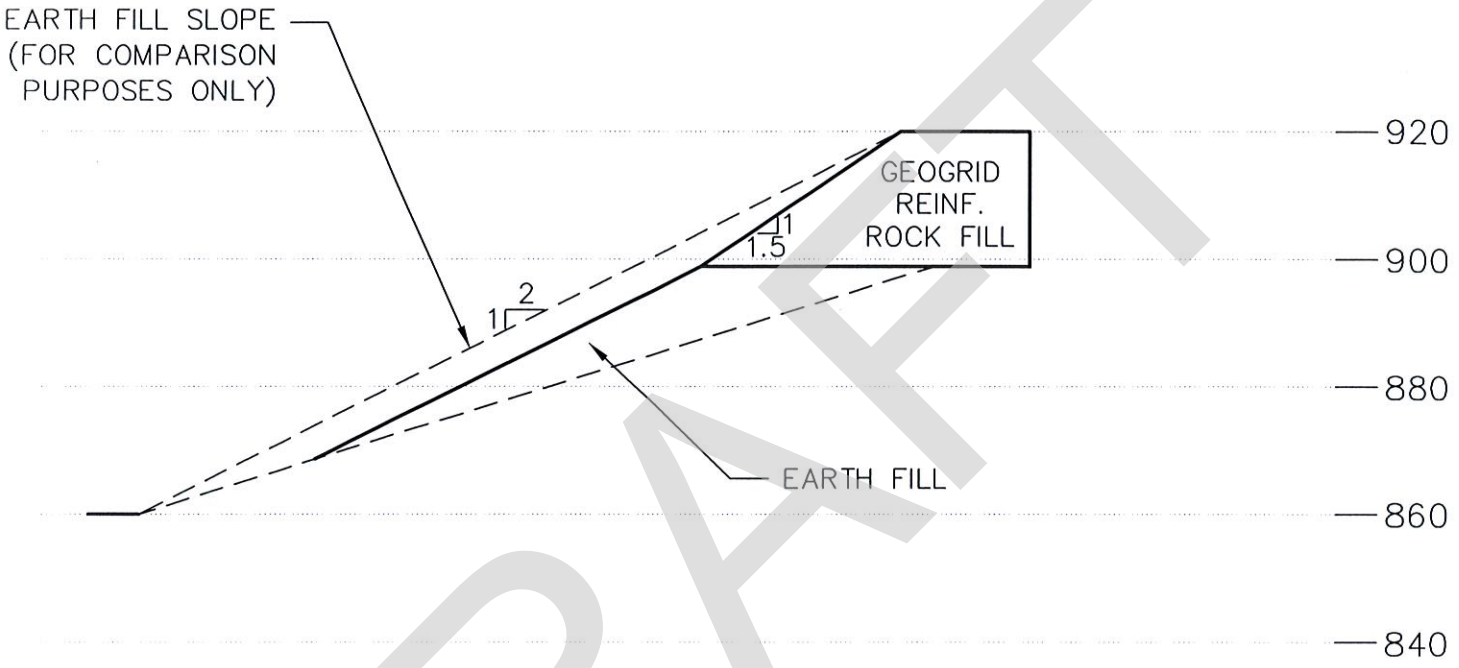
Slope Stability Analysis - Case 1

DATE: November 26, 2013 Project Number: 218802

SCALE
1"=30'

PALMERTON & PARRISH, INC.
GEOTECHNICAL AND MATERIALS ENGINEERS/MATERIALS TESTING LABORATORIES/ENVIRONMENTAL SERVICES

FIGURE 1



Case 3 - Geogrid Reinforced 1.5 H:1 V Rock Fill
Over 2 H:1 V Earth Fill

Project: Hurricane Deck Elementary School
Client: ACI Boland Architects

Slope Stability Analysis - Case 3

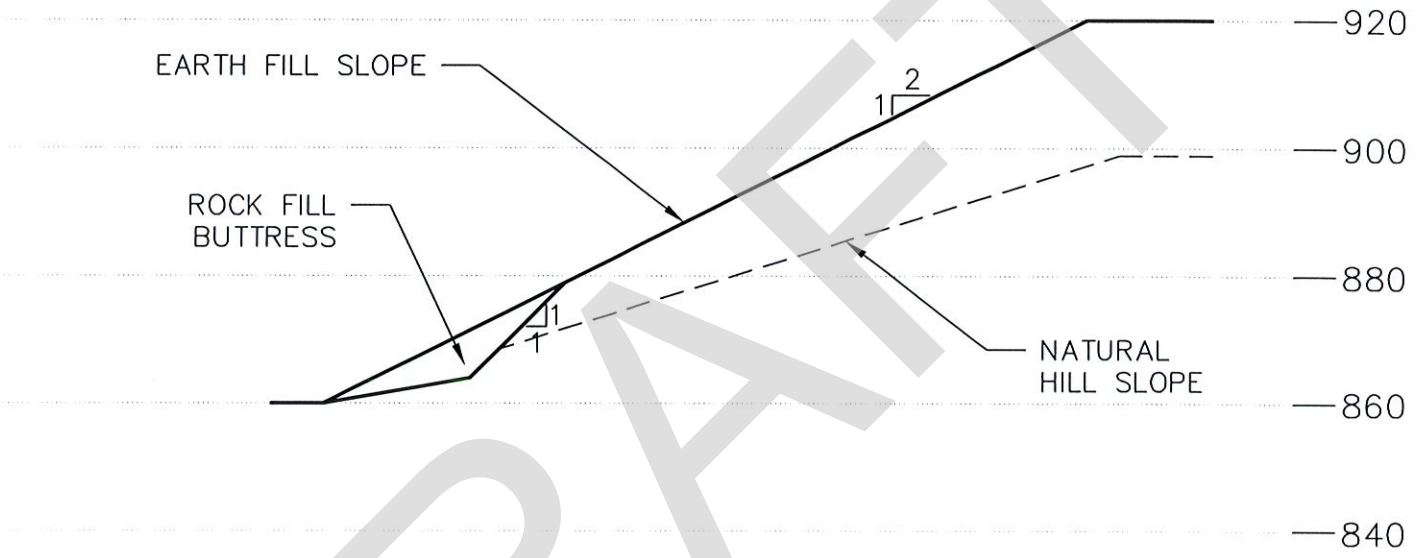
DATE: November 26, 2013 Project Number: 218802

SCALE
1"=30'

PALMERTON & PARRISH, INC.
GEOTECHNICAL AND MATERIALS ENGINEERS/MATERIALS TESTING LABORATORIES/ENVIRONMENTAL SERVICES

FIGURE 2

S:\Geotech-Environmental\Hurricane Deck\218802 - Hurricane Deck.dwg



Case 4 - 2 H:1 V Earth Fill With Rock Fill Buttress At Toe

Project: Hurricane Deck Elementary School
Client: ACI Boland Architects

Slope Stability Analysis - Case 4

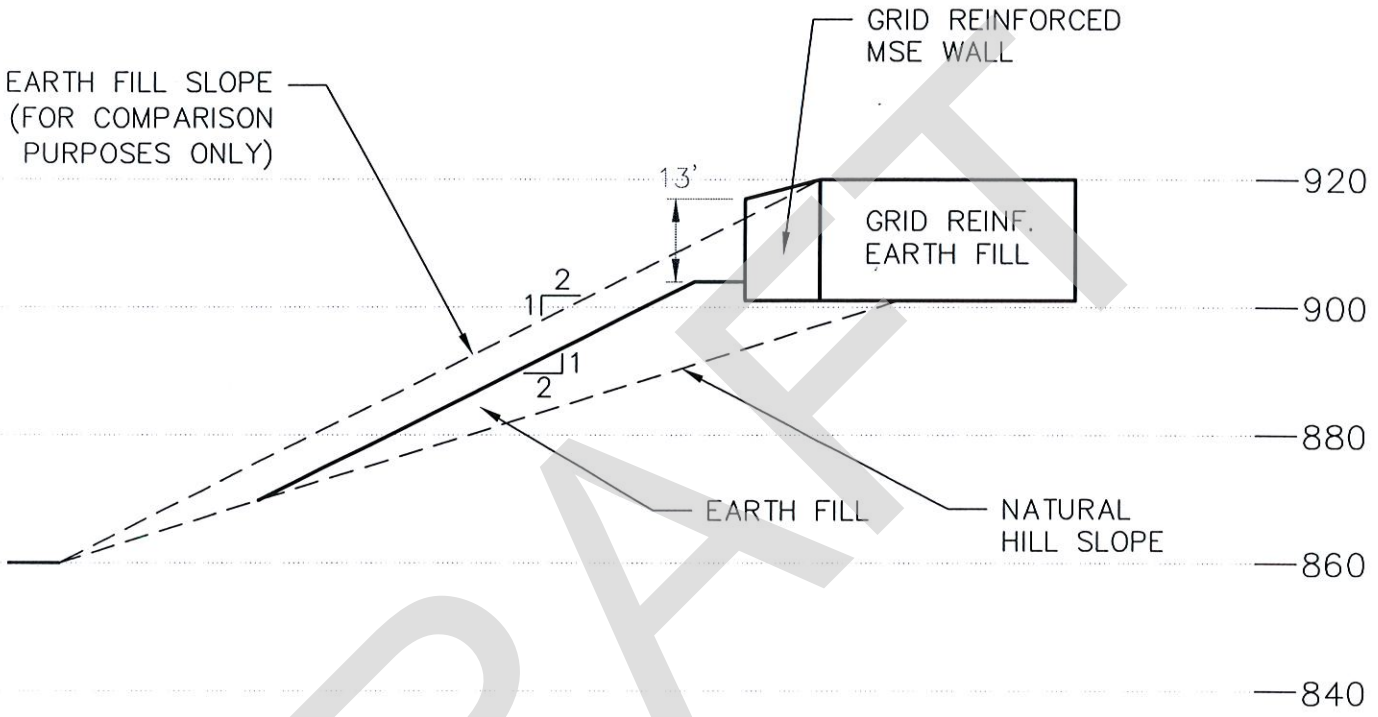
DATE: November 26, 2013 Project Number: 218802

SCALE
1"=30'

PALMERTON & PARRISH, INC.
GEOTECHNICAL AND MATERIALS ENGINEERS/MATERIALS TESTING LABORATORIES/ENVIRONMENTAL SERVICES

FIGURE 3

J:\Geotech-Environmental\Utility\218002 - Hurricane Deck.dwg



Case 5 - 2 H:1 V Earth Fill With MSE Wall And Reinforced Earth Fill At Crest

Project: Hurricane Deck Elementary School
Client: ACI Boland Architects

Slope Stability Analysis - Case 5

DATE: November 26, 2013 Project Number: 218802

SCALE
1"=30'

PALMERTON & PARRISH, INC.
GEOTECHNICAL AND MATERIALS ENGINEERS/MATERIALS TESTING LABORATORIES/ENVIRONMENTAL SERVICES

FIGURE 4

S:\Geotech-Environmental\Boland\218802 - Hurricane Deck.dwg

ATTACHMENT C

ROCK BUTTRESS DETAIL

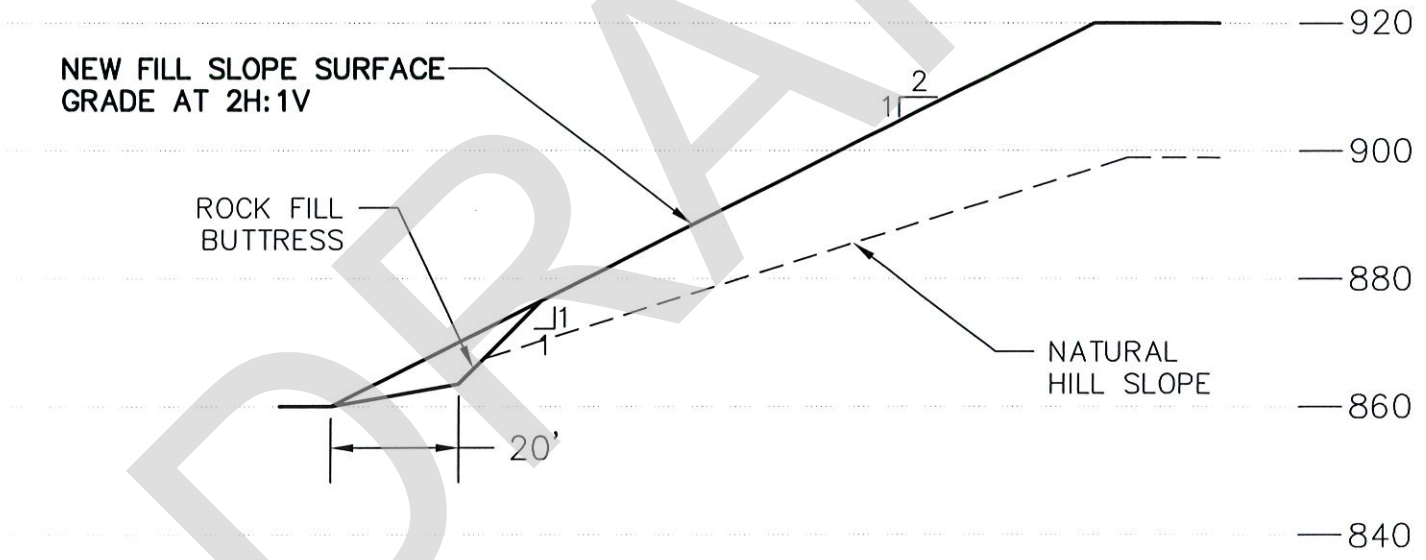
NOTES:

1. TOE ROCK BUTTRESS TO HAVE HORIZONTAL WIDTH OF 20 FT AND BACKSLOPE OF 1H:1V TO INTERSECT WITH NEW SLOPE FACE.

2. ROCK FILL GRADATION AND PLACEMENT IN ACCORDANCE WITH MoDOT 203.4.17 ROCK EMBANKMENT.

3. FILTER FABRIC MAY BE REQUIRED IF ROCK FILL GRADATION IS OPEN WITH CONSPICUOUS VOIDS.

4. FOR SLOPE HEIGHTS EXCEEDING 50 FT.



Project: Hurricane Deck Elementary School
Client: ACI Boland Architects

Rock Buttress Detail

DATE: December 13, 2013 Project Number: 218802

SCALE
1"=30'

PALMERTON & PARRISH, INC.
GEOTECHNICAL AND MATERIALS ENGINEERS/MATERIALS TESTING LABORATORIES/ENVIRONMENTAL SERVICES

J:\Geotech-Environmental\County\218802 - Hurricane Deck\dwg - rock toe buttress.dwg