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APPLICATION:

THE CAESAR 12 STANDARD RETAINING WALL SYSTEM IS A REINFORCED SOIL STRUCTURE COMBINING AN ARCHITECTURALLY ATTRACTIVE CONCRETE FACING BLOCK WITH GEOGRID REINFORCEMENT. THE GEOGRID REINFORCEMENT INTERLOCKS WITH THE CAESAR BLOCK UNITS AND FILL SOIL TO CREATE A STABLE GRAVITY RETAINING WALL. DESIGN OF THESE REINFORCED SOIL STRUCTURES USES WELL ESTABLISHED GUIDELINES THAT ARE READILY AVAILABLE. THE FOLLOWING SPECIFICATIONS AND DETAILS PROVIDE A DESIGN TO INCORPORATE GEOGRID REINFORCEMENT INTO THE SOIL FOR THE PURPOSES OF CONSTRUCTING RETAINING WALLS. CONSULT MIDWEST BLOCK AND BRICK FOR ADDITIONAL DETAILS REGARDING DESIGN, APPEARANCE AND AESTHETIC CONSIDERATIONS.

STANDARD DESIGN PROCEDURE:

THE FOLLOWING DESIGN TABLES ESTABLISHED FOR THE CONSTRUCTION OF SOIL REINFORCED WALLS ARE BASED UPON GENERALLY ACCEPTED SOIL PARAMETERS IN THE ST LOUIS COUNTY, MISSOURI AREA. ALL SOIL PARAMETERS ASSUMED IN THE DESIGN ARE WELL DRAINED, LONG TERM STRENGTH CONDITIONS. HIGH PLASTIC SILTS AND CLAYS SHOULD BE AVOIDED WITHOUT SPECIFIC DESIGN RECOMMENDATIONS FROM LOCAL GEOTECHNICAL ENGINEERS. FROST HEAVE AND SETTLEMENT NEED TO BE ADDRESSED IF WARRANTED BY CONDITIONS. ALSO, SPECIFIC PRECAUTIONS ARE NECESSARY FOR WALLS CONSTANTLY IN CONTACT WITH WATER, I.E. NEAR OR AT RIVERS, LAKES AND PONDS.


SOIL PROPERTIES:

<table>
<thead>
<tr>
<th></th>
<th>FRICTION ANGLE (DEGREES)</th>
<th>UNIT WEIGHT (LBS/CF)</th>
<th>COHESION (LBS/SF)</th>
</tr>
</thead>
<tbody>
<tr>
<td>WALL FILL</td>
<td>28</td>
<td>120</td>
<td>0</td>
</tr>
<tr>
<td>RETAINED BACKFILL</td>
<td>28</td>
<td>120</td>
<td>0</td>
</tr>
<tr>
<td>FOUNDATION SOIL</td>
<td>28</td>
<td>120</td>
<td>0</td>
</tr>
</tbody>
</table>

MINIMUM FACTORS OF SAFETY CALCULATED:

- REINFORCEMENT PULLOUT = 1.5
- REINFORCEMENT RUPTURE = 1.5
- EXTERNAL SLIDING = 1.5
- INTERNAL SLIDING = 1.5
- OVERTURNING = 2.0
- BEARING CAPACITY = 1,500 PSF
**SPECIFICATIONS - ST LOUIS COUNTY MASTERPLAN:**

**MATERIALS:**

RETAINING WALL UNITS SHALL BE CAESAR 12 STANDARD UNITS AS MANUFACTURED BY MIDWEST BLOCK AND BRICK. THE UNITS ARE 6" TALL x 18" WIDE x 12" DEEP. CONCRETE WALL UNITS SHALL MEET THE REQUIREMENTS OF ASTM C 1372-01 WITH THE MAXIMUM WATER ABSORPTION LIMITED TO 6.0 PERCENT. THE CONCRETE SHALL HAVE ADEQUATE FREEZE THAW RESISTANCE IN ACCORDANCE WITH ASTM C 1372-11.

REINFORCED WALL BACKFILL MATERIAL SHALL BE COMPACTED SOIL FROM ON-SITE. THE SOIL SHALL BE FREE OF CLUMPS, FREE OF ROCKS LARGER THAN 4" AND FREE OF ORGANIC MATERIALS. DO NOT USE HIGH PLASTIC SOILS THAT HAVE PI>20 OR LL>40.

GEOGRIDS SHALL BE STRATA SG150 OR SG200 AS MANUFACTURED BY STRATA SYSTEMS, INC. BOTH OF THESE GEOGRIDS MEET THE STRENGTH REQUIREMENTS OF THE DESIGN CALCULATIONS.

GEOTEXTILE FILTER FABRIC SHALL BE A NONWOVEN FABRIC WITH A MINIMUM WEIGHT OF 3.5 OZ/SY.

LEVELING PAD SHALL BE CONSTRUCTED OF WELL GRADED CRUSHED LIMESTONE SIMILAR TO 1" MINUS.

DRAINAGE ROCK SHALL BE FREE DRAINING ROCK SUCH AS 3/4" CLEAN CRUSHED LIMESTONE.

PERFORATED PIPE SHALL BE HDPE COIL PIPE.

**WALL FOUNDATION:**

FOUNDATION SOIL SHALL BE EXCAVATED AS REQUIRED FOR THE LEVELING PAD AND THE REINFORCED FILL ZONE TO THE DEPTHS AND LOCATIONS SHOWN ON THE PLAN SHEET. THE EXPOSED FOUNDATION SOIL SHALL BE OBSERVED PRIOR TO CONSTRUCTION TO VERIFY THAT THE EXPOSED MATERIAL IS SUITABLE FOR A NET DESIGN BEARING PRESSURE OF 1,500 psi AND THAT THE BASE OF THE EXCAVATION IS FREE OF LOOSE SOIL, UNCOMPACTED FILL, WATER OR FROZEN MATERIAL. UNDERCUT ANY UNSUITABLE SOIL. UNDERCUT AREAS SHALL BE FILLED WITH CRUSHED LIMESTONE AND COMPACTED TO AT LEAST 95% OF THE MATERIAL'S STANDARD PROCTOR MAXIMUM DRY DENSITY.

CONSTRUCT THE CRUSHED ROCK LEVELING PAD TO LINES AND GRADE SHOWN ON THE PLANS.


**WALL CONSTRUCTION:**

INSTALL THE FIRST COURSE OF UNITS ON THE LEVELING PAD. INSTALL THE NEXT COURSE IN A RUNNING BOND CONFIGURATION. FULL UNIT FORWARD. UNITS MAY NEED TO BE CUT TO MAINTAIN THE RUNNING BOND AROUND CURVED SECTIONS. A MINIMUM OF 4" OF THE UNIT SHALL OVERLAP THE UNIT BELOW IT. BACKFILL UNITS AND CONTINUE CONSTRUCTION. CAP UNITS SHALL BE GLUED IN PLACE AT THE TOP OF THE WALL.

DRAINAGE ROCK SHALL BE DIRECTLY BEHIND THE WALL UNITS A MINIMUM OF 12" THICK.

**WALL BACKFILL:**

WALL BACKFILL MATERIAL SHALL BE PLACED IN 8" MAXIMUM LOOSE LIFTS AND COMPACTED TO AT LEAST 95% OF THE MATERIAL'S MAXIMUM DRY DENSITY AS DETERMINED BY THE STANDARD PROCTOR METHOD. BACKFILL SHALL BE PLACED, SPREAD AND COMPACTED IN SUCH A MANNER THAT MINIMIZES WRINKLES AND MOVEMENT OF THE GEORGID.

PLACE 12" OF DRAINAGE ROCK BEHIND UNITS. SEPARATE DRAINAGE ROCK AND SOIL WITH THE FILTER FABRIC.

DURING BACKFILL PLACEMENT THE 3 FOOT ZONE DIRECTLY BEHIND THE WALL SHALL BE LIMITED TO THE USE OF HAND OPERATED COMPACTING EQUIPMENT ONLY.

CONSTRUCTION EQUIPMENT SHALL NOT BE OPERATED DIRECTLY ON THE GEORGID.

**PROTECTION OF WORK:**

THE SURFACE OF THE WALL BACKFILL SHALL BE GRADED AT THE END OF EACH DAY OF WORK TO PROVIDE POSITIVE SURFACE DRAINAGE AWAY FROM THE WALL. GRADING SHALL INCLUDE PROPER COUNTERCOURING OF FILLS IN ADJACENT AREAS TO PREVENT THE FLOW OF SURFACE WATER INTO THE REINFORCED EARTH ZONE.

THE DESIGN OF THE WALL IS BASED ON CONDITIONS AND LOADS IMPOSED ON THE WALL AT COMPLETION OF THE PROJECT. PRIOR TO PROJECT COMPLETION, THE WALL IS VULNERABLE TO DAMAGES CAUSED BY CONSTRUCTION ACTIVITY ADJACENT TO THE WALL. OF PARTICULAR CONCERN IS GRAVITY AND PAVEMENT CONSTRUCTION EQUIPMENT ON THE RETAINED BACKFILL AT THE TOP OF THE WALL. ONLY EQUIPMENT WITH A WEIGHT NOT EXCEEDING ONE TON CAN BE USED IN THE 3 FOOT ZONE DIRECTLY BEHIND THE BACK OF THE WALL FACE.

THE SOIL IN FRONT OF THE WALL SHALL BE PROTECTED FROM FUTURE EROSION.

**GEORGID REINFORCING:**

THE GEORGID SHALL BE CUT TO DESIGN LENGTHS AND PLACED BETWEEN THE BLOCKS AT THE ELEVATIONS SHOWN ON THE PLANS. THE GEORGIDS PRIMARY STRENGTH DIRECTION WILL BE DIRECTED PERPENDICULAR TO THE WALL FACE (INTO THE FILL). THE GEORGIDS PLACED OUTSIDE A PLUS OR MINUS 4" ZONE OF THE GEORGID DESIGN ELEVATION WILL NOT BE ACCEPTED. THE GEORGID SHALL BE PLACED HORIZONTALLY AND LAY FLAT ON THE REINFORCED FILL SOIL. THE GEORGID SHALL BE PLACED SO A MINIMUM OF 8" OF GRID IS BETWEEN BLOCK LAYERS. SLACK IN THE GEORGID SHALL BE REMOVED PRIOR TO PLACING ADDITIONAL BACKFILL.

THE UPPER BLOCK AT ALL GEORGID LOCATIONS SHALL HAVE THE REAR LIP REMOVED.

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THE SOIL IN FRONT OF THE WALL SHALL BE PROTECTED FROM FUTURE EROSION.
BEVELED FACE BLOCK DETAIL

ABUTMENT DETAIL

STRAIGHT FACE BLOCK DETAIL

FILTER FABRIC EXTENDING 18" BOTH SIDES OF WALL

AT ALTERNATING COURSES CUT BLOCK FLUSH WITH WALL

MIDWEST BLOCK & BRICK
12901 ST. CHARLES ROCK RD
BRIDGETON, MO 63044
314-291-3200
314-291-0265 FAX

DATE: APRIL 2014

DETAILS
SHEET 4 OF 10
NUMBER E-28703
PROFESSIONAL ENGINEER
STATE OF MISSOURI
BRIAN SCHALLER
TYPICAL SECTION WITH REINFORCEMENT

- Cap unit glued in place
- Geogrid reinforcement
- Compacted soil in reinforced earth zone
- Refer to details for length and location
- Excavate to a safe and stable condition
- 6" lift of drainage rock required if ground water is present - extend to end of geogrid
- 4" drain pipe at base of first unit daylight at low point in the wall
- 6"x18" crushed rock leveling pad

TYPICAL SECTION WITHOUT REINFORCEMENT

- Cap unit glued in place
- Geogrid reinforcement
- Compacted soil in reinforced earth zone
- Refer to details for length and location
- Excavate to a safe and stable condition
- 6" lift of drainage rock required if ground water is present - extend to end of geogrid
- 4" drain pipe at base of first unit daylight at low point in the wall
- 6"x18" crushed rock leveling pad

TYPICAL SECTIONS

- Sheet 5 of 10
- Date: April 2014

BRIAN SCHALLER

MIDWEST BLOCK & BRICK
12901 St. Charles Rock Rd
Bridgeton, MO 63044
314-291-3200
314-291-0265 FAX

MIDCOAST & ASSOCIATES, LLC
636-978-7770
O'Fallon, MO
MO COA #E-201301539

CAESAR 12 STANDARD RETAINING WALL SYSTEM

STATE OF MISSOURI

PROMOTIONAL ENGINEER

NUMBER E-28703
OVERLAP GEOGRID AS NECESSARY

ABUT GEOGRID AT FACE OF WALL

OUTSIDE CORNER DETAIL
NOT TO SCALE

INSIDE RADIUS DETAIL
NOT TO SCALE

OUTSIDE RADIUS DETAIL
NOT TO SCALE

INSIDE CORNER DETAIL
NOT TO SCALE

OUTSIDE CORNER DETAIL
NOT TO SCALE

ALTERNATE BOND AT CORNER OVERLAP

OVERLAP GEOGRID IN CORNERS

SPLIT BLOCK FOR CORNER UNIT

MIDCOAST & ASSOCIATES, LLC
636-978-7770
O'FALLON, MO
MO COA #E-2013015539

CAESAR 12 STANDARD
RETAINING WALL SYSTEM

MIDWEST BLOCK & BRICK
12901 ST. CHARLES ROCK RD
BRIDGETON, MO 63044
314-291-3200
314-291-0265 FAX

STATE OF MISSOURI
BRIAN SCHALLER
NUMBER E-28703

PROFESSIONAL ENGINEER

DETAILS
SHEET 6 OF 10
DATE: APRIL 2014
LEVELING PAD DETAIL

LEVELING PAD MADE FROM CRUSHED ROCK OR UNREINFORCED CONCRETE
MINIMUM SIZE 6" x 18"

NATIVE SOIL

LEVELING PAD DETAIL

LEVELING PAD MADE FROM CRUSHED ROCK OR UNREINFORCED CONCRETE
MINIMUM SIZE 6" x 18"

CONNECTION DETAIL

REINFORCEMENT LENGTH

8" MINIMUM

PULL SLACK OUT OF REINFORCEMENT

REMOVE LIP ON UNIT ABOVE THE GEOGRID

STATE OF MISSOURI

BRIAN SCHALLER
NUMBER E-28703
PROFESSIONAL ENGINEER

CAESAR 12 STANDARD RETAINING WALL SYSTEM

MIDWEST BLOCK & BRICK
12901 ST. CHARLES ROCK RD
BRIDGETON, MO 63044
314-291-3200
314-291-0265 FAX

MIDCOAST & ASSOCIATES, LLC
636-978-7770
O'FALLON, MO
MO COA #E-2013015539

DETAILS

DATE: APRIL 2014

SHEET 7 OF 10
NOTES:
1. GEOGRID LENGTH MEASURED FROM FACE OF WALL.
2. GEOGRID SHALL BE STRATAGRID SG150 OR SG200.
3. BLOCKS DIRECTLY ABOVE GEOGRID SHALL HAVE THE REAR LIPS REMOVED.
4. WALL HEIGHT MEASURED FROM TOP OF LEVELING PAD TO TOP OF WALL.
5. SEE TYPICAL DETAIL FOR BACKFILL REQUIREMENTS AND CONSTRUCTION NOTES.
6. GRADE AT BASE OF WALL IS TO SLOPE AWAY FROM WALL TO PREVENT PONDING.

TYPICAL SECTION - 100 PSF SURCHARGE
NOT TO SCALE

2' TALL WALL
3' TALL WALL
4' TALL WALL
5' TALL WALL
6' TALL WALL

MIDCOAST & ASSOCIATES, LLC
636-978-7770
O'FALLON, MO
MO COA #E-2013015539

CAESAR 12 STANDARD
RETAINING WALL SYSTEM

MIDWEST BLOCK & BRICK
12901 ST. CHARLES ROCK RD
BRIDGETON, MO 63044
314-291-3200
314-291-0265 FAX

FLAT BACKFILL

STATE OF MISSOURI
BRIAN SCHALLER
NUMBER E-28703

DATE: APRIL 2014
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2' TIERED WALLS

3' TIERED WALLS

4' TIERED WALLS

NOT TO SCALE