ISSUE	REMARKS/DATE
1	1-9-13 REVISED PER CITY COMMENTS
2	2-7-13 REVISED PER CITY COMMENTS
3	3-20-13 REVISED PER CITY COMMENTS
4	4-9-13 REVISED PER CITY COMMENTS

General

See subdivision grading plan by Sterling Engineering dated 1/9/13. This design is to specify the structural requirements of the modular block retaining walls #1 and #2. Partial copies of the applicable areas are attached for reference. Existing utilities shall be field located. The contractor shall protect all utilities, and shall be responsible for all job site worker and public safety during the work. Landscaping shall be per owner's direction under separate plan. All installation shall be per the material manufacturer's construction recommendations, and as noted herein.

Uncompacted backfill in any utility trenches in the wall vicinity can affect wall stability and/or settlement performance. The contractor shall locate any utilities at or in the vicinity of the wall to determine if any utility backfill could affect the wall.

A complete drainage design is not part of this design. Finish grading shall be completed to direct drainage around the walls. Storm water drainage must not be directed over the top of the retaining walls. Some periodic maintenance may be required at the top of the walls to maintain drainage.

Materials

Leveling pad shall be one-inch minus, crushed limestone, compacted to at least 90 percent of the material's maximum dry density as determined by the Modified Proctor Compaction Test or ASTM D 1557-78.

Retaining wall units shall be Rockwood Classic (8") units. The units must provide an infilled unit weight of at least 115 pounds per cubic foot (pcf). Concrete wall units shall meet the requirements of ASTM C 145-85. Concrete compressive strength shall be 3,000 pounds per square inch (psi) or greater. The maximum water absorption shall be limited to 6.0 percent. The concrete shall have adequate freeze-thaw resistance in accordance with ASTM C 666-90.

Reinforced Wall Backfill (above low side finish grade) shall be one-inch clean crushed limestone tamped to improve the interlock and bond between the particles. **The below grade fill** shall consist of one-inch minus crushed limestone compacted to at least 90 percent of the material's maximum dry density as determined by the Modified Proctor Compaction Test or ASTM D 1557-78.

Geogrid shall be Miragrid 3XT as indicated on these plans.

Filter fabric shall be 4-oz non-woven.

Block infill shall be one-inch clean, crushed limestone.

Soil Cap shall consist of low plasticity soil compacted at least 88 percent of the soil's maximum dry density per ASTM D 1557-78. The compaction should be tested to confirm adequate densification. The soil shall be placed with moisture slightly above the optimum moisture content to help minimize water infiltration.

Wall Foundation

The wall site shall be excavated per OSHA guidelines to reach the base of the geogrid reinforced fill zone, and trenched to the base of the leveling pad. Both areas must be approved by the Wall Design Engineer for support of the retaining wall and to verify global stability. The exposed bearing, foundation, and retained materials shall be observed by the Wall Design Engineer prior to placing leveling pad to help confirm the soil parameters are as good or better than the soil parameters used for the design of the retaining wall. The base of the excavation beneath the leveling pad, the reinforced fill zone, and the retained soils must consist of a material with an internal angle of friction (Φ) of at least 28-degrees. Undercut any unsuitable materials and backfill, or modify design, as directed by the Wall Design Engineer. The excavation must be free of loose soil, uncompacted fill, water, high plasticity clay with less than 50 percent rock content, or frozen material.

Wall Construction

Provide a six-inch thick, 1-inch minus, crushed limestone leveling pad a minimum of 18 inches wide, compacted to at least 90 percent of the material's maximum dry unit weight per ASTM D 1557-78. Check that units do not "rock" or "wobble" on the leveling pad and has full bearing. Install the next course in a running bond stack. Top of leveling pad shall be embedded a minimum of 12" below low side finish grade.

The geogrid's maximum strength direction will be directed perpendicular to the length of the wall face (into the fill). The geogrid shall be kept taut. Any slack in the geogrid shall be removed prior to placing backfill. All geogrid installation details shall be in accordance with the geogrid manufacturer's specifications. Place reinforced minus rock backfill (below low side finish grade) in maximum six-inch loose lifts and compact to at least 90 percent of the maximum dry unit weight per ASTM D 1557-78, and verify by field density tests. Clean rock shall be tamped. Only hand-operated equipment, weighing less than 1,500 pounds shall be used within four feet of the concrete block. Filter fabric shall be placed behind and above the clean drainage rock to prevent migration of fines into the clean rock.

Earthwork

Any fill retained by the wall must be compacted to at least 90 percent of the material's maximum dry density per ASTM D 1557-78, and consist of low plasticity soil, *i.e.* a soil having a Liquid Limit less than 50, a rocky clay having at least 40 percent rock content distributed through the fill material, or approved granular material. The fill compaction shall be verified through field density testing during placement. Fill placed on slopes with an inclination of 5 (horizontal) to 1 (vertical) shall be placed on level benches cut into approved virgin soil. All organic material shall be stripped from the areas to be filled.

Sewer and Utility Backfill

All sewer pipe and structure backfill and other utility trench backfill adjacent to the retaining wall, *i.e.*, within, below, in front of and behind the reinforced fill within a lateral distance of twice a given wall's total cumulative height, must be compacted in accordance with the general structural fill specifications. Where sewers pass beneath the wall, the trench backfill should consist of compacted crushed limestone with fines.

Protection of Work

The surface of the wall backfill area shall be graded at the end of each day of work to provide positive surface drainage away from the wall. Grading shall include proper contouring of adjacent ground areas to prevent the flow of surface runoff toward the wall.

The construction methods, and safety and stability of any temporary excavation are strictly the responsibility of the contractor. Until the wall and finish grading is complete, the wall is at greater risk of storm water damage during construction.

Design Parameters

This design is based upon certain design parameters that should be field verified by Brucker Engineering Company as part of the construction process. This verification is subject to standard limitations but should include both existing soils and new fill material. If any actual conditions are of lesser strength or quality than the design parameters the design may not function as intended. It should be noted that if actual site conditions are of lesser strength or quality than the design parameters than remediation or redesign and additional expenses could be required to properly complete project. Pre-construction subsurface exploration and quality control monitoring during construction can reduce the risk of encountering adverse actual conditions.

Miscellaneous

Brucker Engineering Company is available to confirm that the wall construction is done in accordance with these specifications. Brucker Engineering Company will make the necessary field observations for an additional fee provided these services are requested and authorized sufficiently prior to the wall construction. No changes shall be made to these plans without the written approval of Brucker Engineering Company.

Revised 4-5-13

JORDAN LEO EUREN NUMBER E-22083 REGISTERED PROFESSIONAL ENGINEER STATE OF MISSOURI

4-5-13

This seal refers to the structural design of the retaining wall only as shown herein.

Weatherby Landing
O'Fallon, Missouri

RETAINING WALL SPECIFICATIONS

Brucker Engineering Company
Phone: 314-781-0126

February, 2013
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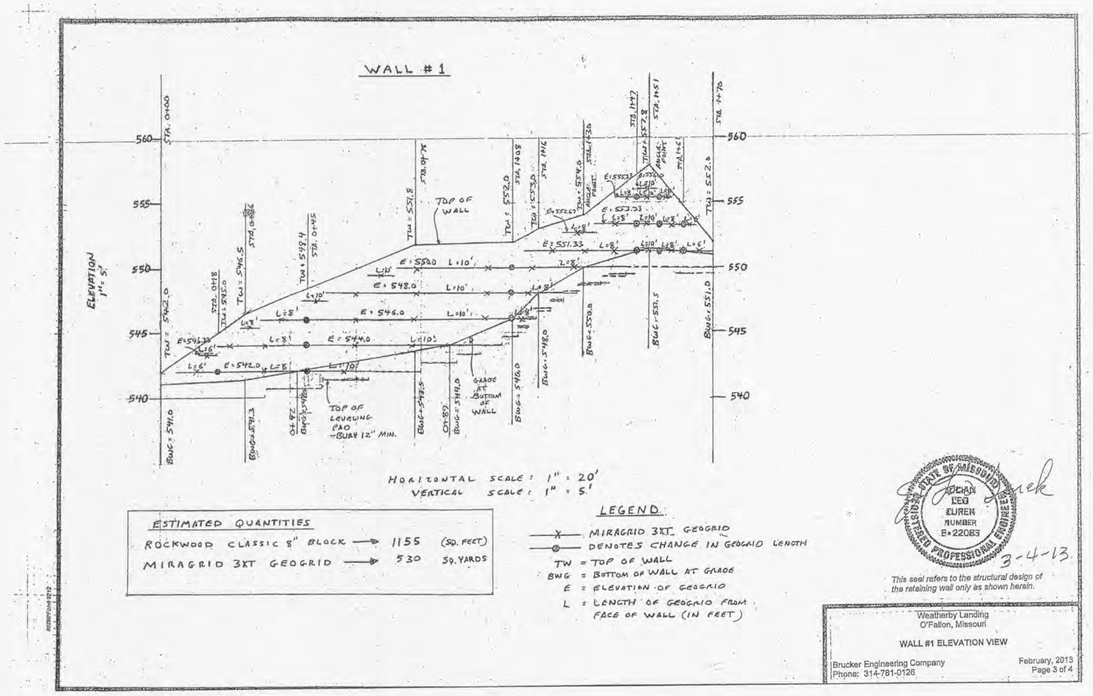

ESTIMATED QUANTITIES		
ROCKWOOD CLASSIC 8" BLOCK	1155	(SQ. FEET)
MIRAGRID 3XT GEOGRID	530	SQ. YARDS

LEGEND

- X — MIRAGRID 3XT GEOGRID
- ⊙ — DENOTES CHANGE IN GEOGRID LENGTH
- TW = TOP OF WALL
- BWG = BOTTOM OF WALL AT GRADE
- E = ELEVATION OF GEOGRID
- L = LENGTH OF GEOGRID FROM FACE OF WALL (IN FEET)

JORDAN LEO EUREN NUMBER E-22083 REGISTERED PROFESSIONAL ENGINEER STATE OF MISSOURI

3-4-13

This seal refers to the structural design of the retaining wall only as shown herein.

Weatherby Landing
O'Fallon, Missouri

WALL #1 ELEVATION VIEW

Brucker Engineering Company
Phone: 314-781-0126

February, 2013
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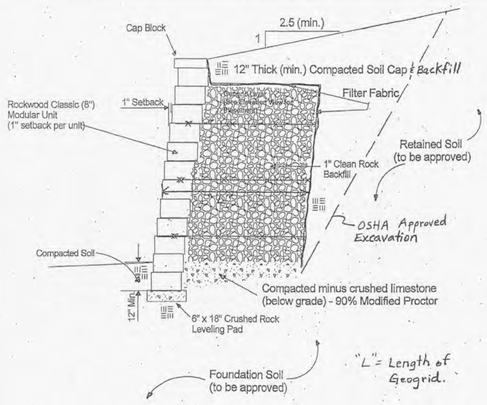
Typical Reinforced Wall Section
(not to scale)



NOTE:
INSTALL 4' HIGH BLACK VINYL COATED CHAINLINK FENCE BEHIND WALL.

JORDAN LEO EUREN NUMBER E-22083 REGISTERED PROFESSIONAL ENGINEER STATE OF MISSOURI

3-4-13

This seal refers to the structural design of the retaining wall only as shown herein.

Weatherby Landing
O'Fallon, Missouri

TYPICAL WALL SECTIONS

Brucker Engineering Company
Phone: 314-781-0126

February, 2013
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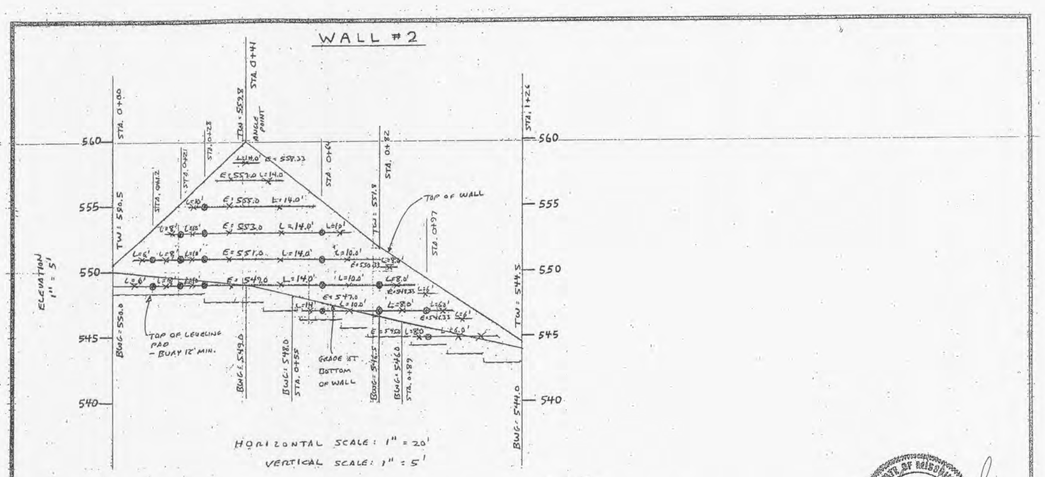

ESTIMATED QUANTITIES		
ROCKWOOD CLASSIC 8" BLOCK	940	(SQ. FEET)
MIRAGRID 3XT GEOGRID	470	SQ. YARDS

LEGEND

- X — MIRAGRID 3XT GEOGRID
- ⊙ — DENOTES CHANGE IN GEOGRID LENGTH
- TW = TOP OF WALL
- BWG = BOTTOM OF WALL AT GRADE
- E = ELEVATION OF GEOGRID
- L = LENGTH OF GEOGRID FROM FACE OF WALL (IN FEET)

JORDAN LEO EUREN NUMBER E-22083 REGISTERED PROFESSIONAL ENGINEER STATE OF MISSOURI

3-4-13

This seal refers to the structural design of the retaining wall only as shown herein.

Weatherby Landing
O'Fallon, Missouri

WALL #2 ELEVATION VIEW

Brucker Engineering Company
Phone: 314-781-0126

February, 2013
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PROJECT TITLE

WEATHERBY LANDING

O'FALLON, MISSOURI

THE **STERLING** CO.
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5055 New Baumgartner Road
St. Louis, Missouri 63129
Ph 314-487-0440 Fax 314-487-8944
www.sterling-eng-sur.com
Corporate Certificate of Authority #001348

Date:_____

License No.
Civil Engineer

MCBRIDE & SON HOMES LAND DEVELOPMENT, INC.
16091 SWINGLEY RIDGE ROAD, STE. 300
CHESTERFIELD, MISSOURI 63017
Ph. 636-537-2000
www.mcbridehomes.com

RETAINING WALL SPECIFICATIONS

P+Z No. 1305.05
City No.
Date: 11/12/2012
Job No. 12-05-127

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