• Taking effective, proven and market-ready technologies and getting them into widespread use.
Cross-Section of GRS-IBS

Beam Seat
(Supported Directly on Bearing Bed)

Jointless
(Continuous Pavement)

Integrated Approach
(Geotextile Wrapped Layers at Beams to Form Smooth Transition)

Facing Elements
(Frictionally Connected – Top Three Courses Pinned and Grouted)

Bearing Bed
Reinforcement
(Load Shedding Layers Spaced at ≤ 6 in.)

Scour Protection (Rip Rap)
(If Crossing a Water Way)

GRS Abutment
(Reinforcement Spacing ≤ 12 in.)

Reinforced Soil Foundation
(Encapsulated with Geotextile)
Site Selection

• Single span (currently 140 ft)
• 30 ft abutment height
• Grade separation
• Water crossings with low scour potential
• Steel or concrete superstructures
• New or replacement structures
Summary of Benefits

- Reduced construction cost (25 - 60%)
- Reduced construction time
- Construction less dependent on weather conditions
- Flexible design - easily field modified for unforeseen site conditions (e.g. obstructions, utilities, different site conditions)
- QA/QC Advantages
GRS Research at Turner-Fairbank Highway Research Center

to the
SE Transportation Geotechnical Engineering Conference
Richmond, VA
CASE HISTORIES

National projects:
- LA – Maree Michel & Creek Bridges
- WV – Stanaford Rd.
- DE – Bridge 1-366 on Chesapeake City Rd
- ME – Beach Bridge over Pulpit Harbor Inlet
- MA – SH 7A over the Housatonic Railroad
- MN – CR 55 over MN Southern Railway
- CO – SH 71 over Fort Lyon Canal
- CO – I 70/Smith Rd Intersection
- UT – I 84 Bridge
- IL – Great Western Trail over Grace ST.
- WI – STH 40 Bloomer, WI
LA – Maree Michel & Creek Bridges
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WV – Stanaford Rd
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MN – CR 55 over MN Southern Railway
MN – CR 55 over MN Southern Railway
CO – SH 71

• Single span
  – 48 ft wide by 98 ft long
  – Clayey sand/sandy clay over claystone
NOTES:
2. Geotextile reinforcement shall be placed by alternating Machine Direction (MD) with a Cross Machine Direction (CD) from layer to layer.
3. The Geotextile reinforcement wrap at Back Face of Abutment shall be pulled back slack free with its end anchored to soil underneath with staples or pins.
4. Geogrid reinforcement in the bearing bed reinforcement zone shall have a minimum long-term design strength (L.T.S.) value of 1080 lbf/ft.
5. Minimum splice of all Geotextile shall consist of 6" of overlap.
6. Payment for construction of RFT shall be made under Item 206 Structure Backfill (Special) and Item 420 Geotextile Reinforcement).
7. Payment for construction of RFT shall be made under Item 206 Geotextile Reinforcement of Slope, etc.) Item 206 Structure Backfill (Special) and Item 206 Structure Backfill (Class II B, etc.).
8. Grade and level the top of RFT prior to final encapsulation with geotextile reinforcement as this will serve as the leveling pad for the concrete facing panels.
9. Geomembrane and drain boards and heat-resistant geogrid will not be measured and paid for separately but will be included in the work.
CO – I 70 over Smith Road

- Twin bridge project with GRS abutments.
- Very first GRS project in the category of continuous multiple spans welded plate girder curved bridge
  - Silty/sandy clay over claystone
  - Three spans: 107’ + 158’ + 129’
  - Piers 2 and 3 on pile foundation
  - Abutment 1 and 4 on GRS IBS
- Will incorporate sheet piles/H-pile and tie back/dead men in abutments for global stability
SECTION A-A AT HCL (PERPENDICULAR TO ABUTMENT NO. 1)

ABUTMENT FISHER DESIGN LOADS*
Service Dead Load = 2.75 KSF
Factored Dead Load = 4.23 KSF

* Design Loads for Eastbound and Westbound are the same.
UT – I 84 Bridge
NOTES:

1. VERTICAL WALL FACE BATTER = 0°
2. MINIMUM OF 5 LAYERS OF BEARING BED REINFORCEMENT.
3. PRIMARY GEOSYNTHETIC REINFORCEMENT VERTICAL SPACING FOR THE INTERCEPTED APPROACH IS A MAXIMUM OF 12 INCHES.
4. SHORT TERM BACK-SLOPE RATIO PER CSA SAFETY REGULATIONS (MIN: 1.5:1 MAX: 1.3:1) REQUIREMENTS. PRIMARY REINFORCEMENT LAYERS MAY BE REPLACED IF LIFE EXPECTANCY OR STRESS WEAR REQUIRE SHORT TERM BACK-SLOPE. INFRA SPECIFIED CANNOT BE OBTAINED.
5. EXTEND INTEGRATION/ZONE LAYERS PER CUT SLOPE.
6. INSURE THAT HIGH QUALITY FILL IS PLACED IN THIS AREA.
7. THE FIRST BEAM SEAT REINFORCEMENT LAYER LENGTH IS A MAXIMUM OF 5 FEET WITH A CONVEXURAL 4 FOOT TAIL.

DETAIL "A"  
(BEAM SEAT AND INTEGRATED APPROACH DETAIL)
IL – Great Western Trail over Grace ST.
IL – Great Western Trail over Grace ST.
WI – STH 40 Bloomer, WI
GRS IBS projects Nationally (Google Earth)