

HOW TO AVOID CONSTRUCTION PITFALLS IN GREEN STORMWATER INFRASTRUCTURE (GSI)

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Green Stormwater Infrastructure (GSI) is a powerful tool for managing stormwater by mimicking natural hydrology. From rain gardens and porous pavements to green roofs and underground infiltration beds, GSI systems help reduce flooding, recharge groundwater, and support resilient urban ecosystems. Yet despite its benefits, GSI remains underutilized often due to misconceptions about cost, complexity, and maintenance.

One of the biggest threats to GSI success isn't poor design or long-term neglect; it's what happens during construction. Even well-designed systems can fail if construction practices compromise soil quality, compaction levels, or material cleanliness. This guide walks you through how to avoid the most common construction-phase threats to GSI performance.

1. Use the Right Soil—And Treat It Right

Soil is the heart of any surface GSI system. Whether you're building a rain garden or a stormwater bumpout, the soil must support both infiltration and vegetation.

Best Practices:

- Use engineered soil mixes made of sand and compost.
- Ensure the mix is free of fine particles like silt and clay, which can clog infiltration zones.
- Source soil from reputable suppliers with proven GSI specifications.
- If using on-site soil, amend it with sand and compost and test it to confirm proper ratios.

Why It Matters:

Fine particles can clog the bottom or surface of a GSI system, preventing water from soaking in. Healthy, well-structured soil supports plant roots and creates voids for water storage.



2. Prevent Soil Compaction

Compaction is one of the most common and most damaging construction mistakes in GSI projects. It destroys the pore spaces that allow water to infiltrate and roots to breathe.

Avoid Compaction By:

- Keeping heavy equipment off infiltration areas.
- Clearly marking GSI zones during construction.
- Educating crews about the importance of maintaining soil structure.

GSI bed bottoms should not be compacted except in cases where infiltration is not recommended or possible. Photo: Cedarville Engineering Group.

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Stone in GSI systems should be clean-washed and not contain fine particles. Even some washed stone can arrive at a construction site dirty, at which time it should be rejected or washed on site. Photo: Cedarville Engineering Group.



A GSI street bumpout can provide traffic calming and stormwater management with uncompacted, engineered soils.
Photo: Cedarville Engineering Group.

stabilize soil, create pore space, and help manage water.

Planting Tips:

- Use native species adapted to both wet and dry conditions.
- Avoid plants that require irrigation or can't tolerate flooding.
- Ensure vegetation is installed after soil and grading work is complete.

Benefits:

- Improved system resilience,
- Reduced maintenance needs, and
- Enhanced ecological value.

5. Monitor Construction and Educate Stakeholders

Even the best design can fail without proper oversight. Construction-phase vigilance is essential to long-term GSI success.

Key Actions:

- Assign a knowledgeable inspector to oversee GSI installation.
- Train contractors on GSI-specific requirements.
- Communicate the long-term benefits of GSI to project stakeholders.

Final Thoughts

Green Stormwater Infrastructure offers a sustainable, nature-based solution to urban water challenges. But its success hinges on what happens during construction. By prioritizing soil quality, preventing compaction, using clean materials, and educating your team, you can ensure your GSI project delivers on its promise.

When done right, GSI doesn't just manage stormwater; it transforms communities.

3. Select and Protect Clean-Washed Stone

Subsurface GSI systems rely on clean stone to store and infiltrate water. But not all “washed” stone is truly clean.

What to Do:

- Specify clean-washed stone with a high void ratio in your design.
- Inspect stone deliveries for dust and fine particles.
- Store stone off bare soil and protect it from sediment-laden runoff.
- If stone arrives dirty, reject it or wash it on site.

Why It Matters:

Dirty stone can clog infiltration surfaces just like silty soil. Once clogged, subsurface systems lose their ability to store and drain water effectively.

4. Choose Resilient, Native Vegetation

Plants in GSI systems do more than look good — they