

Sustainable Landscape Construction:

Materials and Products — Aggregates and Precast Pavers and Blocks¹

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LOOSE AGGREGATES ARE small stone pieces that are used in numerous applications in the landscape, such as a ground cover or below the surface drainage layers. The most sustainable aspect of aggregate is its pervious nature that allows the material to drain while it protects topsoil and filters contaminants. Its pervious nature makes aggregate a good substitute for concrete. Stone aggregates are also more sustainable than concrete in that they require less energy to produce because they are generally crushed (recycled) from the waste of large stone quarries.

Precast pavers and blocks are formed from concrete off site where the primary environmental impact is in the manufacture of the key ingredient, Portland cement. However, the pavers and blocks tend to have low environmental impact after installation. Pavers are essentially very large aggregates that create a pervious surface when laid on a sand base. They can be recycled and are easily repaired. Some permeable paver systems are cast with voids or in shapes that create large voids to allow areas for vegetation or gravel for drainage. Neither the pavers nor blocks require mortar in the joints, which avoids the repair and recycle problems of mortar. Segmented retaining wall blocks also have less installation disturbance and in-place environmental impact because they do not require deep footings and they can be easily dismantled and reused or recycled. Design strategies and construction techniques for aggregates, pavers, and blocks include:

DESIGN STRATEGIES:

- **Make no surface any harder, or any more impervious, than absolutely necessary.** For example, do not use paving if you can use crushed stone, and do not use crushed stone if bark or pine straw will do.
- **For best drainage choose well-graded aggregates.** These have a specific size range that results in a higher percentage of voids. Aggregate types also tend to vary by regions, so learn the local designations.

- **Try bank-run gravel and crushed stone.** Bank-run gravel (an aggregate directly from natural deposits with both large and small smooth stones), is most appropriate for mulches, and crushed stone works best for walkways and drives. The angular facets of crushed stone (crusher-run stones) tend to interlock more and provide more stability.
- **Use small pavers.** This will increase the total number of joints and thus drainage throughout the entire surface.
- **Lay out the paver pattern to create voids between the pavers.** The size and configuration of the joints will determine the capacity for stormwater drainage.

CONSTRUCTION TECHNIQUES:

- **Use the right grade for the job.** Use coarse grades for drainage areas and finer grades for pathways or driveways where people will walk. The finer grades are a more stable surface for foot traffic.
- **Use crushed stone to fill voids.** Sand has too slow a filtration rate to make it a good material to use in the voids in permeable paving systems. Crushed stone is best for the voids and as the base course.
- **Use a filter fabric or geotextiles.** Using these materials under stone will keep it from compacting with the soil base.

Adapted From:

Calkins, M. (2009). *Materials for sustainable sites: A complete guide to the evaluation, selection, and use of sustainable construction materials*. Hoboken, NJ: John Wiley & Sons, Inc.

Sovinski, R. (2009). *Materials and their applications in landscape design*. Hoboken, NJ: John Wiley & Sons, Inc.

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