

CASE STUDY: Galbraith Pervious Concrete



LOCATION: 318 S. Grape St., Medford, Oregon

PROJECT TYPE: Pervious Pavement

PROPERTY TYPE: Commercial

CONSTRUCTION DATE: 2005

INSTALLER: S & B James Construction

DESIGN: Galbraith & Associates, Inc.

Summary

Pervious concrete was used to renovate a parking lot while saving a mature oak tree, complying with city drainage requirements and reducing costs.

Project Background

Galbraith & Associates, Inc. is a landscape architecture firm that purchased an older Medford home to transform into their office. In addition to major building renovations, a parking lot needed to be installed to meet the needs of the firm. To comply with city code regarding drainage and handicap access, a conventional concrete parking lot would have required significant lengths of storm sewer connections and tricky grading solutions. It also would have severely damaged a mature oak tree.

To eliminate the cost of storm sewer connections and to save the root structure of the oak, pervious pavement was chosen as an alternative.

Soil Type & Infiltration

The soil is Coleman loam which is a very deep and moderately well drained soil. The permeability of this soil class is slow but sufficient for permeable pavement considering the water storage capacity of the gravel base. Medford averages 18.9 inches of precipitation annually.



Pervious concrete looks nearly identical to the non-pervious type.

Specifications

The parking lot, estimated at 1085 ft², branches off of an asphalt alleyway that connects to the street. A large oak stands within the parking area. Site preparation included the compaction of an 8 inch layer of 1-inch diameter rock on top of the existing natural soil surface. Once this base was in place, a 4 inch layer of *StoneyCrete* pervious pavement was poured. The concrete is a mixture of 1/8 inch diameter rock with bonding material that consists of 80% Portland cement and 20% fly ash. Fly ash is a byproduct of coal burning that can be used to improve strength and durability of cement mixtures. This combination of rock and bonding material creates 20% airspace in the concrete, which allows it to accommodate drainage for a 10 year storm event.

Benefits

In choosing permeable pavement, the Galbraith

firm was able to save the structural integrity of the oak's root system. The roots of most large trees are located within the top 24 inches of soil, in an area as much as three times the diameter of the tree's canopy. It is important not to damage these roots or the tree will not be able to continue its helpful work of eliminating particulates from the air, producing oxygen, and slowing runoff and erosion.

The firm also avoided installing up to 100 feet of connections to the main sewer line which drains to Bear Creek. Stormwater runoff is kept on site where it filters through the soil and replenishes the natural water table.

Costs

The pervious concrete is estimated to cost \$6.50 per square foot, totaling \$6500 for the entire parking lot. Traditional asphalt for this area is estimated at \$4.50 per square foot and traditional

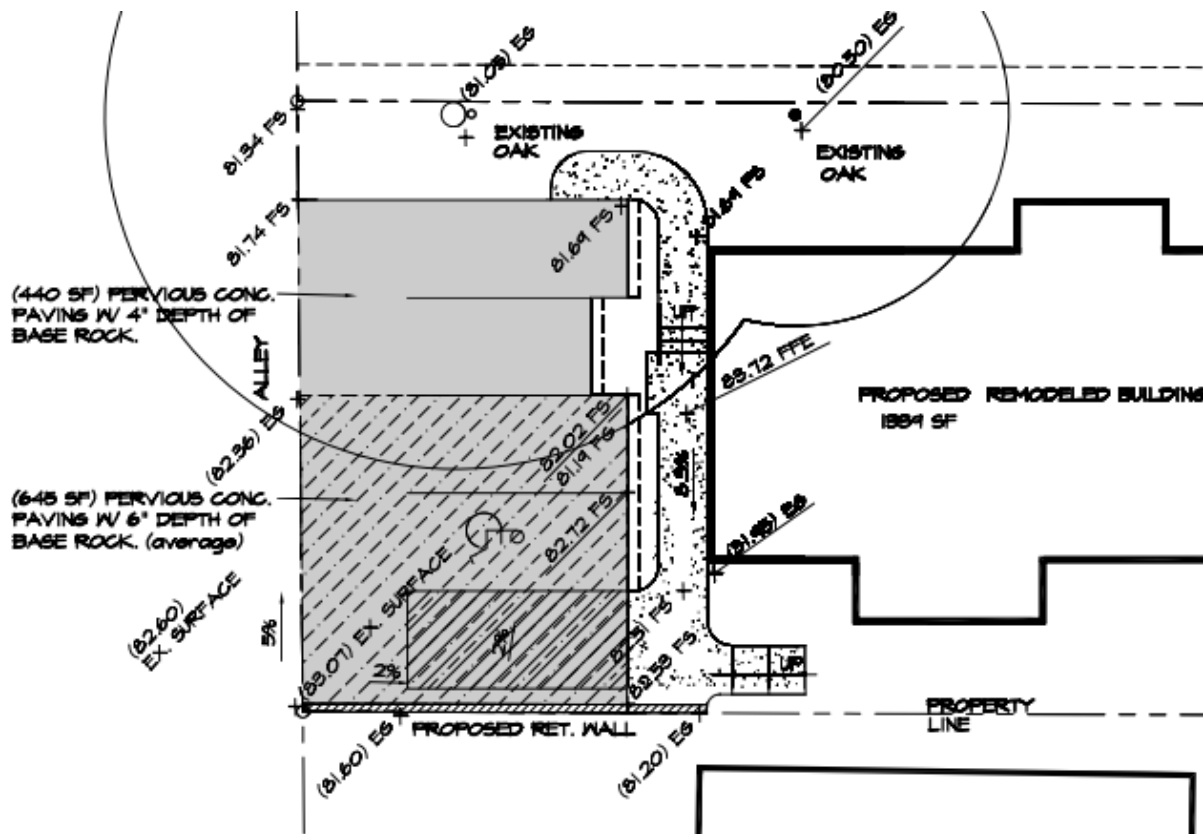
concrete is estimated to cost the same. However, by eliminating the need for a storm sewer connection, the Galbraith firm saved \$6000 in connection costs.

Maintenance

The manufacturer of the permeable concrete recommends industrial vacuuming of the concrete surface as little as four times per year. This practice will lift debris from the top layers and prevent clogging of the concrete for optimal drainage performance. StoneyCrete also recommends power washing the surface to flush fine silt through the system.

Effectiveness & Monitoring

When the concrete was poured, samples were made and tested for strength at seven days and 27 days. The strength increased from 1921 pounds of force per square inch (psi) at seven days to 2617 psi at 27 days.



Successes & Lessons Learned

During installation, a small swale was created in the permeable pavement on one end of the parking lot. This swale is unnecessary due to the pervious nature of the concrete, and actually decreased the pavement's function. Creating the swale compacted the concrete more than necessary in that area and forced most airspace from the materials, therefore reducing its performance.

Contact Information

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References

Galbraith, John. Phone conversation 9/26/2008 & email correspondence

www.galbraithla.com

www.stoneycreekmaterials.com, <http://www.stoneycretenw.com/>

Page 2 diagram and page 3 picture provided by John Galbraith.

Picture on front page courtesy of Oregon Environmental Council.



Installation of the pervious concrete.