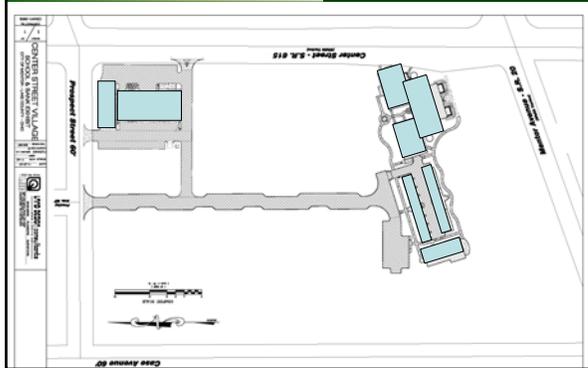
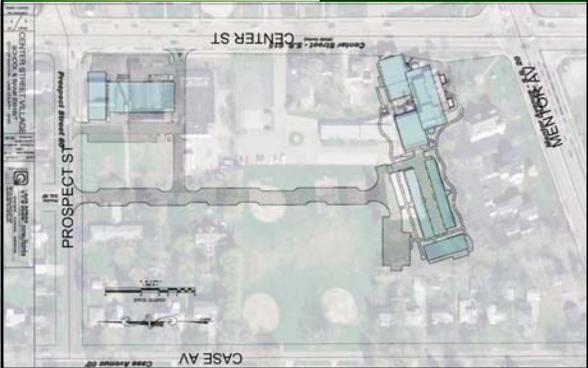
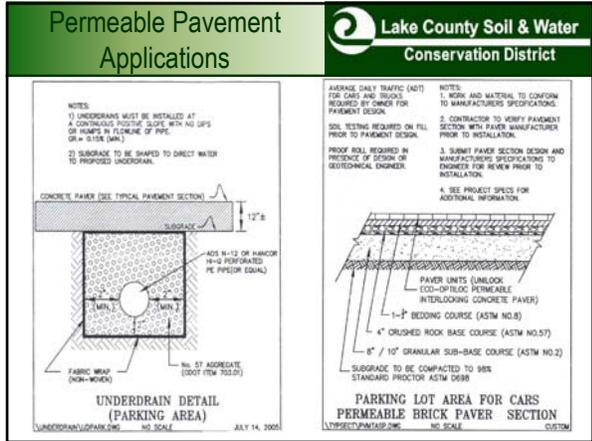


2 Applications in Lake County

- Pervious Pavers
- Permeable Concrete

Center Street Village – Mentor Ohio





### Permeable Pavement Applications

**LAKE COUNTY SOIL & WATER CONSERVATION DISTRICT**

**COUNTY HIGHWAY 2000000**

**CENTER STREET VILLAGE PAVEMENT QUANTITIES**

NO. 1 SUB-BASE	SQUARE FEET	CUBIC FEET	CUBIC YARDS
PHASE 1	12,760	8,908	342
PHASE 2	20,700	14,895	546
TOTAL	33,460	23,803	888

NO. 2 SUB-BASE	SQUARE FEET	CUBIC FEET	CUBIC YARDS
PHASE 1	28,020	21,016	802
PHASE 2	2,214	1,659	62
TOTAL	30,234	22,675	864

NO. 3 SUB-BASE	SQUARE FEET	CUBIC FEET	CUBIC YARDS
PHASE 1	38,020	28,515	1,054
PHASE 2	2,214	1,659	62
TOTAL	40,234	30,174	1,116

### Permeable Pavement Applications

**LAKE COUNTY SOIL & WATER CONSERVATION DISTRICT**

**TyB -- Tyner loamy sand, 1 to 6 percent slopes**

This deep, nearly level and gently sloping, well drained soil is on the upper part of side slopes and crests of post-glacial bench ridges. Most areas are long and narrow in shape and range from 20 acres to several hundred acres in size.

This soil warms and dries early in spring. **Permeability is rapid.** Runoff is slow. Available water capacity is low in the deep rooting zone. This soil is droughty. **Organic matter content is low.** The subsoil is strongly acid to slightly acid, but the surface layer varies widely in reaction, depending on the amount of liming.

This soil is suitable for building sites. The possible contamination of ground water limits the use of this soil for sanitary facilities. Lawn seedings are difficult to establish during the drier part of the year. Lawns should be seeded early in spring; if seeded during dry periods, they should be mulched and watered.

CHARACTERISTIC/USE	LIMITATIONS
Dwellings without basements	Slight
Dwellings with basements	Slight
Local roads and streets	Slight
Septic tank absorption fields	Slight
Flooding frequency	None
High water table	Deeper than 6 feet
Bedrock depth	Greater than 60 inches

**Hydrologic Group "A"**

### Permeable Pavement Applications

**LAKE COUNTY SOIL & WATER CONSERVATION DISTRICT**

### City of Mentor Approval Process

- Reviewed other projects, Waterford CT and Bloomington In.
- Geotechnical Review
  - Predominately Sandy Soils
  - Water table 7-12 feet
  - Permeability 20in/hour or greater
  - Determined 17,227 cf of storage

**Permeable Pavement Applications** 

### Ohio EPA Position

- Generally No WQ Credit (except in redevelopment scenarios)
  - NPDES Requires a 20% reduction in impervious area
  - Can use pervious paver system to reduce imperv at 1 to 1
  - May have to go to 1.66 to 1 based on research
  - Suitable Soils Hydrological Group “A”, sometimes B
  - Facilities with no under-drain preferred

**Permeable Pavement Applications** 

### Initial Research

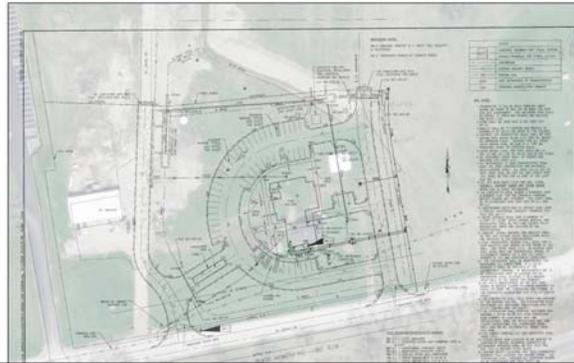
- Data coming out of North Carolina Coop Extension
  - Average runoff reduction of 60% (100% possible)
  - Can function for 20 years
  - Standard Maintenance (street sweeping) increased infiltration
  - Sites adjacent to active construction more likely to clog. Phasing Very Important !!

**Permeable Concrete** 

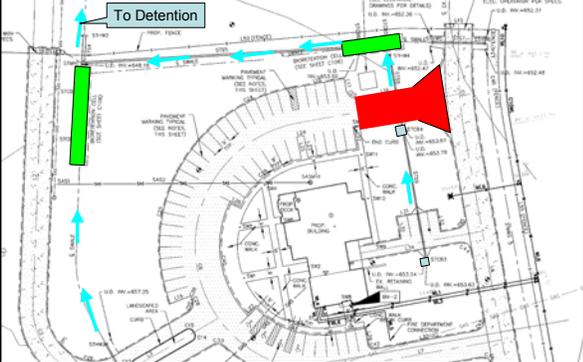
Lake County Utility Training Center – Painesville Twp.



**Permeable Pavement Applications** 



**Permeable Concrete** 



**Permeable Pavement Applications** 





**Permeable Pavement Applications**

Lake County Soil & Water Conservation District

**ITEM 306 CEMENT TREATED FREE DRAINING BASE**

306.01 Description  
 306.02 Materials  
 306.03 Proportioning, Mixing, and Transporting  
 306.04 Verification of Design  
 306.05 Equipment  
 306.06 Placing and Spreading  
 306.07 Limitations on Placing Operations  
 306.08 Compaction and Shaping  
 306.09 Curing  
 306.10 Protection of the Subgrade  
 306.11 Protection of the Cement Treated Free Draining Base  
 306.12 Thickness Tolerances  
 306.13 Surface Tolerances  
 306.14 Exposure to the Elements

306.11 Protection of the Cement Treated Free Draining Base. The Department has not designed CTDD for use as a hard road. Provided there is no significant displacement, break, or contamination of the CTDD, the Department will not require the Contractor to repair or replace the CTDD. The Department will not require the Contractor to repair or replace the CTDD if the Contractor has satisfactorily demonstrated that displacement, break, or contamination is not expected to occur. The use of the CTDD by loading vehicles or construction equipment is at the risk of the Contractor. Repair or replace all damage to the CTDD, base, subgrade, or underdrain caused by the Project or the CTDD from the normal construction at all times. Provide adequate surface and subsurface drainage for the CTDD, base, and subgrade at all times. If constructing asphalt concrete pavement on the CTDD, place the first course using a paver mounted on tracks. Allow the first course to cure overnight before placing the succeeding pavement.

306.12 Thickness Tolerances. Ensure that the compacted depth of CTDD is  $4 \pm 1/2$  inch (100  $\pm$  13 mm). Ensure that the compacted depth conforms to the plan. Verify the specified depth by randomly checking the CTDD's depth along construction for at least every 2000 square yards (1850 m<sup>2</sup>). If the depth is less than the specified depth by more than 10 percent, the Contractor shall correct the CTDD.

306.13 Surface Tolerances. Use templates, slope boards, or other devices to verify the surface tolerance. Ensure that the finished surface is uniform and does not vary more than 1/2 inch (13 mm) from a 10-foot (3 m) straightedge applied to the surface parallel to the centerline of the pavement within the specified tolerance at any exposure to the Department.

306.14 Exposure to the Elements. Place the next level of pavement within 90 days of the end of the CTDD's curing period. The Contractor shall construct the CTDD at any time that complies with the temperature restrictions specified in 306.07. However, completely cover the CTDD with the next level of pavement.

**Permeable Pavement Applications**

Lake County Soil & Water Conservation District

**450 RIGID PAVEMENT**

**ITEM 451 REINFORCED PORTLAND CEMENT CONCRETE PAVEMENT**

451.01 Description  
 451.02 Materials  
 451.03 Equipment  
 451.04 Setting Forms  
 451.05 Fine Grading of Subgrade or Subbase  
 451.06 Placing Concrete  
 451.07 Placing Reinforcement  
 451.08 Joints  
 451.09 Finishing  
 451.10 Curing  
 451.11 Removing Forms  
 451.12 Surface Smoothness  
 451.13 Profile Grading  
 451.14 Pavement Grooving  
 451.15 Sealing Joints  
 451.16 Opening to Traffic  
 451.17 Pavement Thickness  
 451.18 Method of Measurement  
 451.19 Basis of Payment

451.01 Description. This work consists of constructing a pavement composed of reinforced portland cement concrete on a prepared surface.

Permeable Pavement  
Applications



# URBAN Waterways

**Permeable Pavements,  
Green Roofs, and Cisterns**

*Stormwater Treatment Practices for Low-Impact Development*

• [http://www.bae.ncsu.edu/stormwater/  
PublicationFiles/BMPs4LID.pdf](http://www.bae.ncsu.edu/stormwater/PublicationFiles/BMPs4LID.pdf)