



# **LEED Reference Guide For Precast Concrete Products UNDERGROUND UTILITY VAULTS**



**NPCA**

Precast ... The Concrete Solution

# UNDERGROUND UTILITY VAULTS



Perfect for communications, electrical, gas or steam systems, precast concrete utility structures protect the vital connections and controls for utility distribution. Precast concrete is nontoxic and environmentally safe. It resists buoyancy, making it an ideal material for use in all underground applications. Products include: hand holes, hollowcore products, light pole bases, meter boxes, panel vaults, pull boxes, telecommunications structures, transformer pads, transformer vaults, trenches, utility buildings, utility vaults, utility poles, controlled environment vaults (CEVs) and other utility structures.

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**For additional information about using precast concrete within the LEED system, please visit [www.precast.org](http://www.precast.org)**

## Advantages of Precast Concrete Underground Utility Vaults

### Why precast concrete?

Precast concrete underground utility structures are the perfect solution for most underground applications. The use of precast concrete utility structures has become so widespread that they are covered by four ASTM standards:

#### **ASTM C 857**

Standard Practice for Minimum Structural Design Loading for Underground Precast Concrete Utility Structures

#### **ASTM C 858**

Standard Specification for Underground Precast Concrete Utility Structures

#### **ASTM C 891**

Standard Practice for Installation of Underground Precast Concrete Utility Structures

#### **ASTM C 1037**

Standard Practice for Inspection of Underground Precast Concrete Utility Structures

These specifications govern the structural design, installation and inspection of underground precast concrete utility structures. They also help specifiers ensure a quality precast concrete product during and after installation.

### Easy to install

Precast concrete is desirable over cast-in-place concrete due to the relative ease of installation. Precast concrete underground utility structures can be easily installed and immediately backfilled — there is no need to wait for concrete or mortar to cure. The structural capacity of other materials is often dependent on the design and quality of backfill material. In addition, precast concrete underground utility structures have several other advantages over competing materials:

### Can take the heat

Precast concrete utility structures are noncombustible and can withstand high



temperatures. Fiberglass loses its structural integrity at 200 F; HDPE melts at 266 F.

### Rock solid

Precast concrete gradually strengthens over time. Other products, such as fiberglass and steel, can deteriorate and lose strength, especially in the presence of ground water.

### Heavyweight champion

With a specific gravity of 2.40, precast concrete structures resist buoyant forces better than other materials. Fiberglass has a specific gravity of 1.86, and HDPE has a specific gravity of 0.97. Additional labor-intensive and timeconsuming on-site preparation is necessary for anchoring structures made of more buoyant materials.

Precast concrete is the material of choice for underground utility structures. Precast is modular and can fit any design situation. It is produced in a qualitycontrolled environment and can be installed immediately upon arrival at the job site. Precast concrete utility structures can be manufactured for watertightness and are durable during storage, transportation and use. They are easily installed and environmentally friendly.

Precast concrete...it's the best solution for environmentally friendly underground utility tanks.

# UNDERGROUND UTILITY VAULTS



## UNDERGROUND UTILITY VAULTS LEED New Construction

### SS 5.1 Sustainable Sites

Site Development  
Protect or Restore Habitat

## Credit Requirement

Max. Points: 1

### Site Development – Protect or Restore Habitat

#### Case 1 – Greenfield Sites

Limit all site disturbances to the following parameters:

- 40 feet beyond the building perimeter
- 10 feet beyond surface walkways, patios, surface parking and utilities less than 12 inches in diameter
- 15 feet beyond primary roadway curbs and main utility branch trenches
- 25 feet beyond constructed areas with permeable surfaces (such as pervious paving areas, stormwater detention facilities and playing fields) that require additional staging areas to limit compaction in the constructed area.

#### Case 2 – Previously Developed Areas

Restore or protect a minimum of 50% of the site (excluding the building footprint) or 20% of the total site area (including building footprint area), whichever is greater, with native or adapted vegetation.

## Precast Contribution

Precast concrete products are cast and cured in the plant and delivered to the site ready to set so they reduce the staging area required, which can reduce the overall site disturbance.

The impact on the construction site is also reduced because there is no additional formwork, which often requires more construction area for above-ground products and larger excavation areas for underground products.

Less impact on sites can reduce construction waste, shorten the construction schedule and require fewer laborers on-site.

# UNDERGROUND UTILITY VAULTS



**UNDERGROUND UTILITY VAULTS**  
**LEED New Construction**

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**MR 4**  
**Materials and Resources**

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**Recycled Content**

## Credit Requirement

**Max. Points: 2**

### Recycled Content

#### Requirements

Use materials with recycled content such that the sum of postconsumer recycled content plus 1/2 the preconsumer content constitutes at least 10% or 20% (based on cost) of the total value of the materials in the project. The minimum percentage materials recycled for each point threshold is:

Recycled Content	Points
10%	1
20%	2

The recycled content value of a material assembly is determined by weight. The recycled fraction of the assembly is then multiplied by the cost of the assembly to determine the recycled content value.

Mechanical, electrical and plumbing components and specialty items such as elevators cannot be included in this calculation. Include only materials permanently installed in the project. Furniture may be included if it is included consistently in MR Credit 3: Materials Reuse through MR Credit 7: Certified Wood.

## Precast Contribution

Precast concrete products may contain supplementary cementitious materials such as fly ash and blast furnace slag which will add to the project's recycled content goals.

Precast products may also contain rebar and welded wire mesh which is often made from recycled steel.

Other less frequently used recycled content components include various fiber reinforcements, glass aggregates, silica fume, and recycled crushed concrete.

The NPCA LEED Calculator will consider both options for use of recycled content. For help with this credit, visit [www.precast.org/leed](http://www.precast.org/leed).

# UNDERGROUND UTILITY VAULTS



<b>UNDERGROUND UTILITY VAULTS</b> LEED New Construction
<b>MR 5</b> Materials and Resources
Regional Materials

## Credit Requirement

**Max. Points: 2**

### Regional Materials

Use materials or products that have been extracted, harvested, and manufactured within 500 miles of the project site.

The calculation is based on the overall materials cost. Materials costs include all expenses to deliver the material to the project site. Materials costs should account for all taxes and transportation costs incurred by the contractor but exclude any cost for labor and equipment once the material has been delivered to the site.

**Regional Materials of 10% = 1 point**

**Regional Materials of 20% = 2 points**

See the NPCA LEED Calculator at [www.precast.org/leed](http://www.precast.org/leed) for help with this credit.

See the LEED Canada guide for information on Canada's credit requirements.

## Precast Contribution

Because concrete uses plentiful and natural raw materials, concrete components can be extracted, harvested and manufactured within 500 miles of the project site. Using locally obtained raw materials helps reduce transportation distances which reduces the environmental impact of carbon emissions.

If shipping is done by rail or water, LEED Canada allows up to 2,400 km (1,500 miles) from both the manufacturing site to the project site and the location where building materials are extracted, harvested, recovered and processed to the manufacturing site.

The NPCA LEED Calculator helps provide the proper documentation required for this credit. Simply input the Zip code or postal code where each raw material originates and the weight of each material to generate a printable file that can be e-mailed to the LEED AP, contractor or architect.

# UNDERGROUND UTILITY VAULTS



**UNDERGROUND  
UTILITY VAULTS**  
LEED Neighborhood  
Development

**GIB 7**  
Green Infrastructure  
and Buildings

Minimized Site  
Disturbance in Design  
and Construction

## Credit Requirement

Max. Points: 1

### Minimized Site Disturbance in Design and Construction

#### Option 1 – Development Footprint on Previously Developed Land:

Locate 100% of the development footprint on areas previously developed, or

#### Option 2 – Undeveloped Portion of Project Left Undisturbed:

Limit disturbance to:

- 40 feet beyond the building perimeter
- 10 feet beyond surface walkways, patios, surface parking and utilities less than 12 inches in diameter
- 15 feet beyond street curbs and main utility branch trenches
- 25 feet beyond constructed areas with permeable surfaces that require additional staging areas to limit compaction in the constructed zone.

**Note:** This is a condensed version of the credit. The full credit may be downloaded from USGBG's Neighborhood Development Guide.

## Precast Contribution

Precast concrete products are plant cast and delivered to the site ready to set so they reduce the staging area required which can reduce the overall site disturbance.

The impact on the construction site is also reduced because there is no additional formwork, which often requires more construction area for above-ground products and larger excavation areas for underground products.

Less impact on sites can reduce construction waste, shorten the construction schedule and require fewer laborers on-site.

# UNDERGROUND UTILITY VAULTS



**UNDERGROUND  
UTILITY VAULTS**  
LEED Neighborhood  
Development

**GIB 15**  
**Green Infrastructure  
and Buildings**

**Recycled Content in  
Infrastructure**

## Credit Requirement

**Max. Points: 1**

### Recycled Content in Infrastructure

Use materials for new infrastructure such that the sum of postconsumer recycled content, in-place reclaimed materials and one-half of the preconsumer recycled content constitutes at least 50% of the total mass of infrastructure materials.

Count materials in all of the following infrastructure items as applicable to the project:

- Roadways, parking lots, sidewalks, unit paving, and curbs
- Water retention tanks and vaults
- Base and subbase materials for the above
- Stormwater, sanitary sewer, energy distribution, and water piping

See the NPCA LEED Calculator at [www.precast.org/leed](http://www.precast.org/leed) for help with this credit.

See the LEED Canada guide for information on Canada's credit requirements.

## Precast Contribution

Precast concrete products may contain supplementary cementitious materials such as fly ash and blast furnace slag which will add to the project's recycled content goals.

Precast products may also contain rebar and welded wire mesh which contains recycled steel.

Other less frequently used recycled content components include various fiber reinforcements, glass aggregates, silica fume, and recycled crushed concrete.

Beyond precast products themselves, recycled crushed concrete can also contribute to this credit when utilized as road fill base.