Whether you want to replace an aging, deficient bridge, span a creek or river for a golf course cart path, expand an airport tarmac over a roadway, develop a tunnel for vehicular traffic, or provide access to land for new development, a precast concrete short-span bridge is the solution.

Designs include attractive single-piece arches, functional two-piece arches, conventionally reinforced flat bridges, parapets, wingwalls, headwalls and endwalls. Each system has its own specification for span length, span height and load capacity.

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The Credit Requirements listed in this document are contained within the Leadership in Energy and Environmental Design Green Building Rating System developed by the United States Green Building Council. For more information on the LEED Green Building Rating System, please visit www.usgbc.org.

For additional information about using precast concrete within the LEED system, please visit www.precast.org
**Here to stay**
The strength of precast concrete gradually increases over time and does not deteriorate when exposed to harsh environments as some other materials do. Other materials can deteriorate, experience creep and stress relaxation, lose strength and/or deflect over time. Studies have shown that precast concrete products can provide a service life in excess of 100 years. Additional design options can extend the service life of products exposed to severe conditions.

**We’re talking quality here**
Because precast concrete products are made in a controlled plant environment, they exhibit high quality and uniformity. Problems affecting quality typically found on a job site – temperature, humidity, craftsmanship and material quality – are nearly eliminated in a plant environment.

**Ready to go when you are**
Because precast concrete bridge sections are manufactured well in advance of installation, they are ready for transportation to the job site at a moment’s notice. They are quickly set onto the bridge foundation in a matter of hours using a small crew and crane. Backfilling and overlaying can begin immediately rather than waiting several days for cast-in-place concrete to reach proper strength. Projects designed with precast concrete can save weeks or months over cast-in-place concrete construction.

**Who needs good weather?**
Precast concrete increases job efficiency because weather will not delay production in the plant. In addition, weather conditions at the job site do not significantly affect the schedule. Conversely, forming and placing cast-in-place concrete can result in significant delays due to poor weather.

**A pretty face — and more**
Precast concrete short-span bridges can also include spandrel and wingwall panels with architectural finishes. Finishes commonly available are: colored smooth-as-cast, textured formliner, exposed aggregate, acid etch, brick and sand blast. Each are distinctly different and provide architects and owners a broad choice in appearance to help match the surrounding environment.

**Environmentally friendly**
Precast concrete is nontoxic, environmentally safe and made from all-natural materials, making it an ideal material for use over and near natural waterways. Concrete has no proven ill effects on groundwater and surface water quality. Also, with a three-sided precast concrete bridge, disturbance of creek and river beds is significantly reduced, allowing the water environment to return to normal more quickly than other alternatives.

**Check the bottom line**
Precast concrete bridges offer lower long-term costs when compared with other materials. Additionally, because precast bridges require significantly less construction time, overall project cost savings can be realized. If the precast manufacturer provides a bridge design, the owner’s consultant needs only to specify the design criteria, foundation and geotechnical requirements, saving on project design costs. Precast concrete is the material of choice for short-span bridges. Precast bridge sections can be manufactured in a broad range of sizes; are durable during transportation, installation and use; can easily be installed by a small crew; are structurally sound; are environmentally safe; and are less vulnerable to damage from weather and corrosion than other materials.
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, or

Case 2 –Previously Developed Areas
Restore or protect a minimum or 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.

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

Precast Contribution

Precast concrete products are cast and cured in the plant and delivered to the site ready to set. The impact on the construction site is significantly reduced because there is no formwork, less construction waste, less noise and fewer laborers needed on-site.

Precast components also make it easier to fit into tight spaces with a minimum of site disturbance and shorter installation times.

In addition, precast products can be custom-built to nearly any specification. Because the products are ready to install, they can be staged off-site and delivered on a schedule that keeps impact to the site at a minimum.
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:

<table>
<thead>
<tr>
<th>Recycled Content</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>10%</td>
<td>1</td>
</tr>
<tr>
<td>20%</td>
<td>2</td>
</tr>
</tbody>
</table>

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 helps members respond with the proper documentation required for this credit. Simply input the Zip Code/Postal Code and weight for each component to generate a pdf file that can be e-mailed directly to the LEED AP, contractor or architect.
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 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 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.
Credit Requirement

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 USGBC’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.
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 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.