Natural Resources Impacts

This section describes the existing environmental and potential impacts to natural resources conditions in the immediate context of the means restriction project for selected East Hill bridges. Natural resource information is presented on topography, geology, soils, vegetation and wildlife.

Topography
Like most areas within the Finger Lakes Region of Central New York, topography within the immediate context of the project was largely shaped by the movement of continental ice sheets. The most glacial event within New York, the Wisconsin Advance, retreated about 11,000 years ago. The advance and retreat of the glaciers scraped away the topsoil and gouged the shale and bedrock below to form what is now Cayuga Lake. Since the last ice age, Cascadilla Creek and Fall Creek eroded their steep-sided gorges through the layers of bedrock. The gorges are characterized by steep rocky slopes and cliffs, with the creeks flowing over a series of waterfalls between the steep cliffs of the gorges. The best known waterfalls in the project’s immediate context are Ithaca Falls (150 feet high and 175 feet wide) and Triphammer Falls (80 feet high) in Fall Creek.

The proposed means restriction for the Suspension Bridge is a vertical steel mesh net anchored to the bridge structure and as such does not connect to the gorge in any way. Impacts on topography, if any, will be minimal.

Geology
The project’s immediate context is underlain by consolidated sedimentary rock, including shale, sandstone and limestone, formed approximately 375 million years ago during the Devonian period. Within the Fall Creek and Cascadilla Creek watersheds, the bedrock consists of shales and siltstones in the valleys; while more erosion-resistant sandstones intermixed with siltstones dominate the hilltops and ridges. The exposed layers of sedimentary bedrock visible in the gorges are associated with the Genesee Group, which is comprised of limestone, shale and siltstone at elevations of 400 to 1000 feet. Within the Genesee group is the Ithaca Formation, which makes up much of the gorge walls. At Ithaca Falls in Fall Creek there is a brachiopod fossiliferous rock outcrop that identifies the base of the Ithaca Formation. The fossils of this thin rock bed are so distinctive that the layers are used as a geological marker to date the layer in the rock column. A geotechnical engineering overview of the gorges, is included in the preceding Overview Section.

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Soils
When conducting the Tompkins County Soil Survey, soils scientists made either detailed or reconnaissance-level soil surveys. Detailed soil mapping was not conducted for the project area because of the early construction of Cornell University. The reconnaissance-level soil surveys that were conducted in the vicinity of the project area generated soil association maps instead of the more specific mapping units. There are 3 soil associations mapped within the project area. The four bridges over Fall Creek are all within the Hamlin-Teel soil association. These soils are deep, moderately well to well drained, medium textured soils with 3.5 to 5 feet of moderately permeable silt loam or very fine sandy loam that is underlain by rapidly permeable, stratified alluvial deposits. The three bridges over Cascadilla Creek are within Howard-Palmyra soil association (Stewart Avenue Bridge) or the Hudson-Dunkirk soil association (Stone Arch and Trolley bridges) which are well drained, medium textured soils. In many areas soils within the gorge itself are generally thin or lacking due to erosion. In order to accommodate roads and other facilities next to the gorges, fill has been placed over the native soils in some locations to raise the elevation.

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Vegetation
Vegetation in the project area can be generally categorized into two types: natural areas and managed lands. Both Fall Creek and Cascadilla Creek gorges are designated as Unique Natural Areas by Tompkins County, and managed as natural areas by Cornell Plantations. The gorges are predominantly forested with a range of forest and creek habitats (north- vs. south-facing slopes and older vs. younger forests) packed into a small area. The upper ridges and south-facing slopes host vegetation adapted to dry conditions. Species such as chestnut oak, scarlet oak, hickories and shadbush are found here. The shady, damp, cool gorge bottom and north-facing slopes host hemlock, beech, and maple forests. There are ferns, mosses, lichens, and liverworts on the rock faces. In addition, many nonnative species listed by the New York State Invasive Species Clearinghouse are found in both the natural areas and adjoining managed landscape. The most common invasive species include Norway maple, bush honeysuckles and common buckthorn. There are no known or federally endangered or threatened plants known to occur within the project areas (e.g. Fall Creek and Cascadilla Gorges). The following species are known State of New York endangered or threatened plant species known to occur in the proximity of the project areas:
**Boechera stricta** (*Arabis drummondi*) Drummond’s rock-cress.– locally rare, NYS endangered G5, S2, is found in portions of Fall Creek gorge; steep slopes, gorge walls and dry crests.

**Pinguicula vulgaris** Butterwort – locally rare, NYS threatened G5 S2; is found in seepy, wet, north-facing dripping cliffs in Fall Creek gorge.

**Primula mistassinica** Bird’s-eye primrose – locally rare, NYS threatened G5 S2; is found in seepy, wet, north-facing dripping cliffs in the Fall Creek gorge.

The proposed means restriction for the Suspension Bridge is a vertical steel mesh net anchored to the bridge structure and as such does not connect to the gorge in any way. Because of the high level of transparency of the net and associated structure, there will be no significant change to the quantity of light or rainfall reaching any vegetation below the bridge.

**Wildlife**

The project area provides wildlife habitat to a variety of birds, herpetofauna (reptiles and amphibians or “herps”), and mammals. Many herp species inhabit the shaded gorges in this region, including the long-tailed salamander, garter snake, and wood frog. These areas provide a moist microclimate, which is preferred by frogs and salamanders, and the talus layer at the bottom of the cliffs provides cover and foraging areas. The gorges provide perching, nesting, and feeding habitat for birds such as bank swallows, nuthatches, chickadees, and juncos. The stream corridor also provides stopover and nesting habitat for migratory bird species including forest species (e.g. warblers and vireos) and wetland species (e.g. swamp sparrow). Small mammals such as bats, chipmunks and squirrels use the area for foraging and cover. In addition, the gorge provides foraging habitat and a travel corridor for larger species such as raccoon, and deer. There are no known State of New York or Federally endangered or threatened animals known to occur within the project areas. However, the northern rough winged swallow (**Stelgidopteryx serripennis**), a locally scarce species, nests in the crevices of rocky cliffs.

The proposed means restriction for the Suspension is a vertical steel mesh net anchored to the bridge structure and as such does not connect to the gorge in any way. It will not have any impacts on most wildlife. The net could impose a local flight obstruction to birds and bats, but they are expected to be able to avoid or fly through just as they avoid chain link or other fences in the environment. Unlike fine mist nets that are purposed to catch birds, the aperture of the net is approximately 8”.
**Construction Impacts:**

The scope of work for the Suspension Bridge means restriction project involves the removal of the existing metal bar system and installation of a new vertical cable steel mesh system along the entire length of the bridge. The construction time frame is estimated to last two months during which the time the suspension bridge would be closed to pedestrian traffic. Although material and equipment demands for the project are minimal, contractor staging would occur in the university owned service parking lot adjacent to at the north east side of the bridge. Because of the topography construction access to the bridge will only occur from the north side of the bridge. The scope of work should not require the use of any heavy equipment and it is anticipated that the tension cables and vertical cable mesh will be installed from a man lift driven onto the bridge deck. The tools for the installation of the tension cables and cable mesh are generally hand operated. As a result noise impacts from construction will be minimal and will not exceed levels allowed by law. Any site areas disturbed by construction activity will be restored to their original condition.

Although local codes allow construction activity daily from 7:30 A.M. to 10:00 P.M., exterior noise generating construction activities will be restricted, when feasible, to the hours of 7:30 A.M. to 7:00 P.M. in order to minimize impact on the community.

**Stormwater Impacts**

The proposed means restriction for the Suspension Bridge is a stainless steel mesh net anchored to the bridge structure and as such does not connect to the gorge in any way. As the proposed means restriction is not connected to the ground on either side of the bridge, it will not have any impacts on stormwater flows.

**Traffic Impacts**

This section addresses the traffic impacts of the proposed design. Impacts to traffic from Construction are addressed above. The proposed steel mesh net is attached to the outer sides of the bridge structure and does not intrude into the pedestrian path in any way. There is no vehicular traffic on this bridge. The proposed means restriction does not create or take away any parking near the bridge. The project when completed will not create any traffic impacts either to pedestrian or vehicular traffic on and around the site.