

## Voids under interchange concern scientists

Published: July 08, 2008 1:00 PM

Excavations at the Spencer Road Interchange construction area have unveiled a network of void spaces below ground, leading a geoscientist and cave experts to be concerned that the ground will safely support the road.

In and around Langford Lake cave, metres away from where the road will pass, are a number of limestone rock cavities and fissures. Called karst caves, these limestone formations have many cracks where water can enter and form cavities through dissolving rock.

Rob Bowen, a geoscientist and former resident of Leigh Road, believes the combined concentration of all these pockets could create instability to the bearing strength of the road being built.

Consultants for Langford conducted a surface karst survey in March, but he is pushing to ensure a more comprehensive survey be done to better understand the environment and the potential risks.

"We're seeing the concern shifting from environmental impact to risk," he says.

"Now that more karst cavities have been found down slope of the cave, it is clearer than ever there is a groundwater connection underlying in the area," Bowen says. "The impact to karst in one location will have a ripple effect, potentially transporting contaminants to all areas associated to the karst formation."

Bowen is concerned about the potential of groundwater contamination from the interchange entering the karst network and polluting Spencer's Pond. Studies have shown ponds and wetlands that are connected with karst formations are 10 times more productive because of the valuable nutrients the caves transport, he says.

Tim Stevens, project manager for the interchange, said there is nothing special about this limestone or its stability. In all limestone there are passages where water can flow and it's not a unique ecosystem, he says.

Bowen and others lobbied for a karst assessment to be done before the digging began at the interchange site. That didn't happen, but the assessment was completed last March when Golder and Associates hired a professional geologist to carry out the work.

The cave itself wasn't entered due to safety reasons, despite tours given to the media and the public by caving experts. Stevens said according to WorkSafeBC, nobody should enter the cave to perform work or an assessment, and it would be a risk for them to enter.

"While there was no legal requirement to do the (karst) survey, we did it because it was the right thing to do and people were asking for it," Stevens says.

The survey found limestone was sitting on top of bedrock called gneiss, or sandstone that in time transforms under great weight and pressure, so his conclusion was to drill through.

"We'll go through the limestone and into the bedrock for the purpose of the road," he says. "We're not concerned with the stability of the bridge."

Stevens says they don't know the extent of the limestone or its exact location because it can't be seen from the surface. The assessment was performed by looking at the land, seeing the surrounding outcrops of rock in the area, as well as some probing, he says.

Even if there were void spaces, there are ways to ensure safely building over the terrain, he adds, but there isn't a concern in this case.

Adrian Duncan, president of Vancouver Island Cave Exploration Group and a professional engineer, is doubtful. Duncan was involved in negotiations with Langford to realign the interchange route to avoid the karst.

"Anytime you build a structure on karst you run a serious risk of building over cavities beneath the structure in the rock," Duncan says, who originally advised the City there were likely more caves beneath the surface. "There have been many cases of structural failure. Engineers tend to avoid building on karst wherever possible."

Stevens also noted there is no legal reason to protect Langford Lake cave, but the City did so due to public interest. It lies within about 30 feet from the future roadway leading to the overpass, well protected from construction, Stevens says.

"We blast within 30 feet of houses all the time, in fact we blast inside basements all the time, you just have to be very careful," Stevens says.

Stevens says they will be erecting a chain link fence around the cave due to public safety requirements and a City responsibility to keep people out. They will also be putting a concrete barred structure over the opening of the cave as there may be access by a trail that will cross near the cave.

As requested by the Ministry of Environment, the City is building an amphibian underpass so the red leg frogs can pass beneath the road in a fenced-in gravel culvert.

They must follow environmental rules in the construction process of how they handle oil and grease. Stevens says that if water comes down the fissures, they'll transport it to the other side of the road without it touching the road, and it will flow in a culvert to the pond.

Stevens says there is not much water drainage through the rock. It appears to be dry and Skirt Mountain and Florence Lake feed the majority of water to Spencer's Pond, he says. To date the City has not made the survey public yet but have the intention to do so.

The building of the bridge is scheduled for the first two weeks of July. The project is scheduled for completion by fall of 2009.

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