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# TMV Dayton Bridge Project

**Brevard County Proposal Meeting April 10, 2019** Isnardi Office

Attendees: Facilitator, County Commissioner Kristine Isnardi & Chief of Staff Danielle Stern

Asst. Brevard County County Manager, John Denninghoff, Chief Road and Bridge Project Manager / Engineer Bruce Black

TMV Mayor Heidi Salmon, TMV Public Works George Tompkins

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# Current Bridge Condition

## Analysis of Current Conditions

### → Pipe Culvert

60 Years Old, Plated Pipe, Made by Joining Sections Together, Not one piece

→ Pipe Culvert with Road on top

→ Road Base was taken from Tippie Lake and immediate area, not Marle or Lime

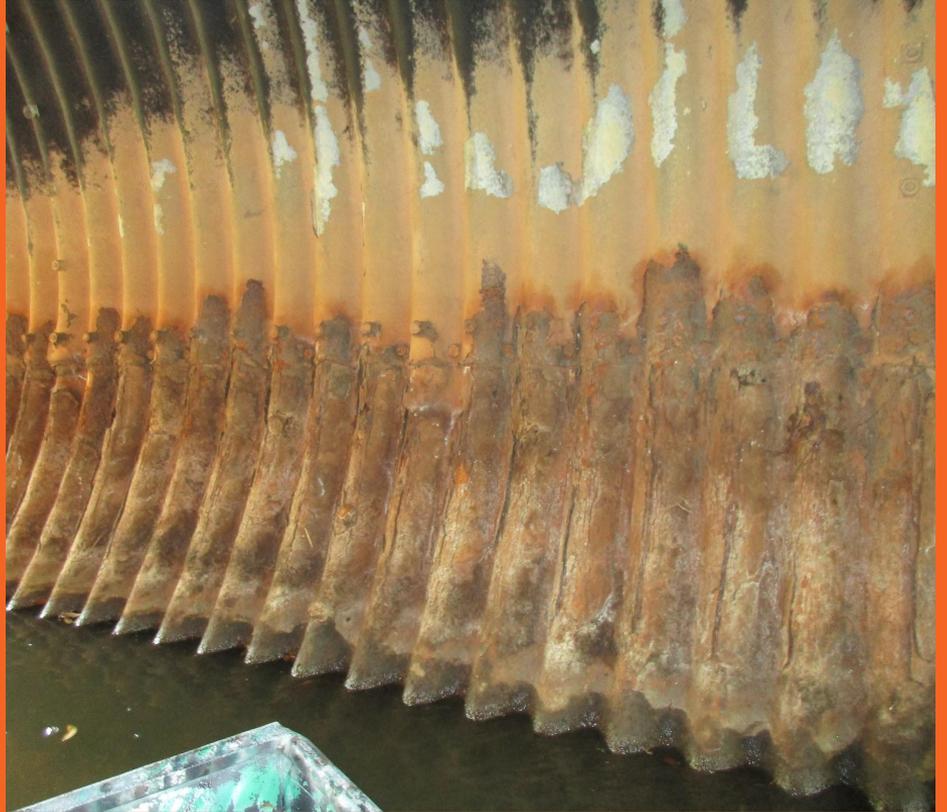
### → Deterioration

Cracking and Flaking Walls. Road rippling and buckling. Deteriorating Headwalls

→ Need to take action including Repair, Repipe or Replace before collapse.















# Current Bridge Condition cont.

- **Visible Deterioration, Flaking, and Cracks in Metal Pipe**
- **Buckling of Roadway**
- **Intrusion of Subsoil**
- **Deterioration of Headwalls**
- **Unknown conditions below water surface**

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**Q: Can we Repair the Pipe --  
Either by coating the interior  
or by replating portions?**

– **A:** Yes, it's possible, but coating it could last up to 10 years and does not fix the underlying deterioration. Coating would extend the use, but repiping would still be needed soon. Additionally, this does not address road buckling.

Replating it is not advised because it would affix plates to cracked unstable pipe.

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**Q: Can we insert a pipe into ours and backfill around it?**

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**A:** This is not advised because it would reduce water volume capacity and could lead to pooling and flooding in storm conditions. This pooling would also weaken our failing headwalls. It also does not address the road buckling.

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**Q: Can we replace the pipe  
culvert and bridge?**

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**A: Yes. Brevard County is able to help us by doing the work, using their materials, permitting, engineers, equipment, and labor.**

**Solution**

**Replacement  
of  
Dayton Bridge**

**Using  
Box Culvert  
Bridge**





# Box Culvert Bridge Info

A decision must be made as to when a bridge needs to be replaced and what cost, complexity of design, available materials, permitting, engineering, and amount of time the highway is closed to traffic. Future maintenance costs and labor should always be a part of the decision-making process. Maintenance and replacement of roads and bridges over small streams are ongoing concerns for cities responsible for their upkeep.

Installed quickly with less labor, maintenance-free precast concrete box culvert bridges deliver a long service life. They are a cheaper alternative both in initial cost, and in ongoing maintenance costs.



## **Maintenance-free service and ASTM design assurance**

Precast concrete box culverts offer a range of sizes and configurations to fit specific site conditions. When properly installed, a precast concrete bridge replacement can provide maintenance-free service for many years. There are concrete structures in operation today that are 100 years old, and many of these structures don't require an annual maintenance budget. The concrete sits in place year after year and does its job.

Design of box culverts is not difficult, and Building Codes and Standards such as ASTM C1577-11a1 provide guidelines to ensure that the product design is adequate. By producing the same product repeatedly, the precast concrete industry can offer reliable, high-quality products at low costs.



## **Advantages of precast bridges over CIP installations**

Replacing a bridge over a stream using a conventional cast-in-place (CIP) installation can close a road for 10 to 12 months due to the time required for curing concrete on site. For a typical CIP job, footings must be installed first. After they cure, the pedestals formwork can be made, followed by another concrete pour. After that, more curing time is required to form and place the concrete riding surface. Waiting three to four weeks between pours significantly extends the time required to finish a project.

Less time and labor: A precast concrete box culvert can be installed much faster than CIP construction, because the three- to four-week curing time is spent at the fabricator's plant. Precast box culverts are often manufactured before a project is started. In many cases, preparation at the site takes less than one week. Installation of the finished precast box culverts is complete in a matter of days and those with roadways over them are usually finished within a few weeks. Fast installations provide an added advantage in cost savings, because labor hours are kept at a minimum.

Brevard County estimates this bridge replacement could last potentially 75 years without much maintenance.



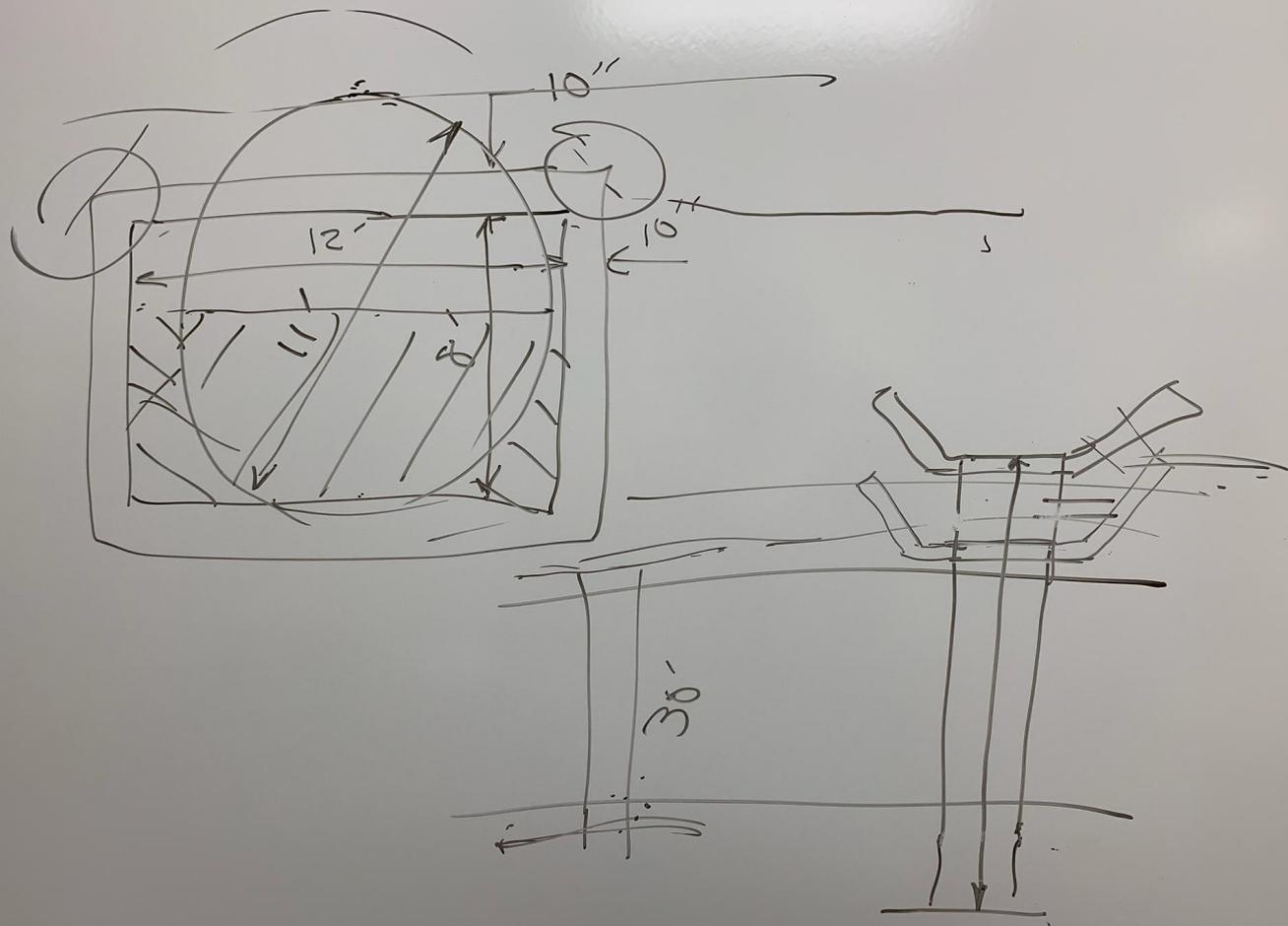
Design flexibility: The box culvert concept has been modified over the years to solve many job-site problems. Standard rectangular boxes are produced in many combinations of height and width. They are approved by Building Code Standards ASTM C1577 provides a table for sizes ranging from 3 ft wide by 2 ft high to 12 ft wide by 12 ft high.

**There are Eight designs of box culverts.**

**TYPE RECOMMENDED FOR DAYTON BRIDGE REPLACEMENT:**

**1. Single box culvert:** One structure, 11 to 12 ft wide with wing walls, is installed (end-to-end as needed for road width) above narrow streams. The height of the box culvert is dependent on amount of flow and site conditions. Headwalls made of combination of poured concrete and stacked concrete bags layered and stacked and secured with rebar skewers are labor intensive, but very sturdy and long lasting.





**Asst. County Mgr,  
John Denninghoff  
Drawings**

## – IMPACTS TO TMV:

**Increased water volume and flow directions will degrade current bridge and headwalls faster than current rate.**

1. M-1 Canal Water Flow Reversal Westward -- St. Johns Water Management District is Constructing a Weir between TMV and the Mall and will Reverse the Daily Flow of Water A Weir is a low dam built across a river to raise the level of water upstream or regulate its flow. It is a movable dam.
2. Higher Normal Water Levels Maintained in Canals emptying westward because of close proximity of TMV to the high point (the weir).
3. In potential flood or storm conditions, weir will be opened and flow will be reversed to empty eastward to Indian River Lagoon.

**Brevard County has the equipment, the engineers, the labor, the permitting and the experience.**

The County is Prohibited by Law from Competing. Therefore, if we solicit outside bids, we **exclude** the County from participating.



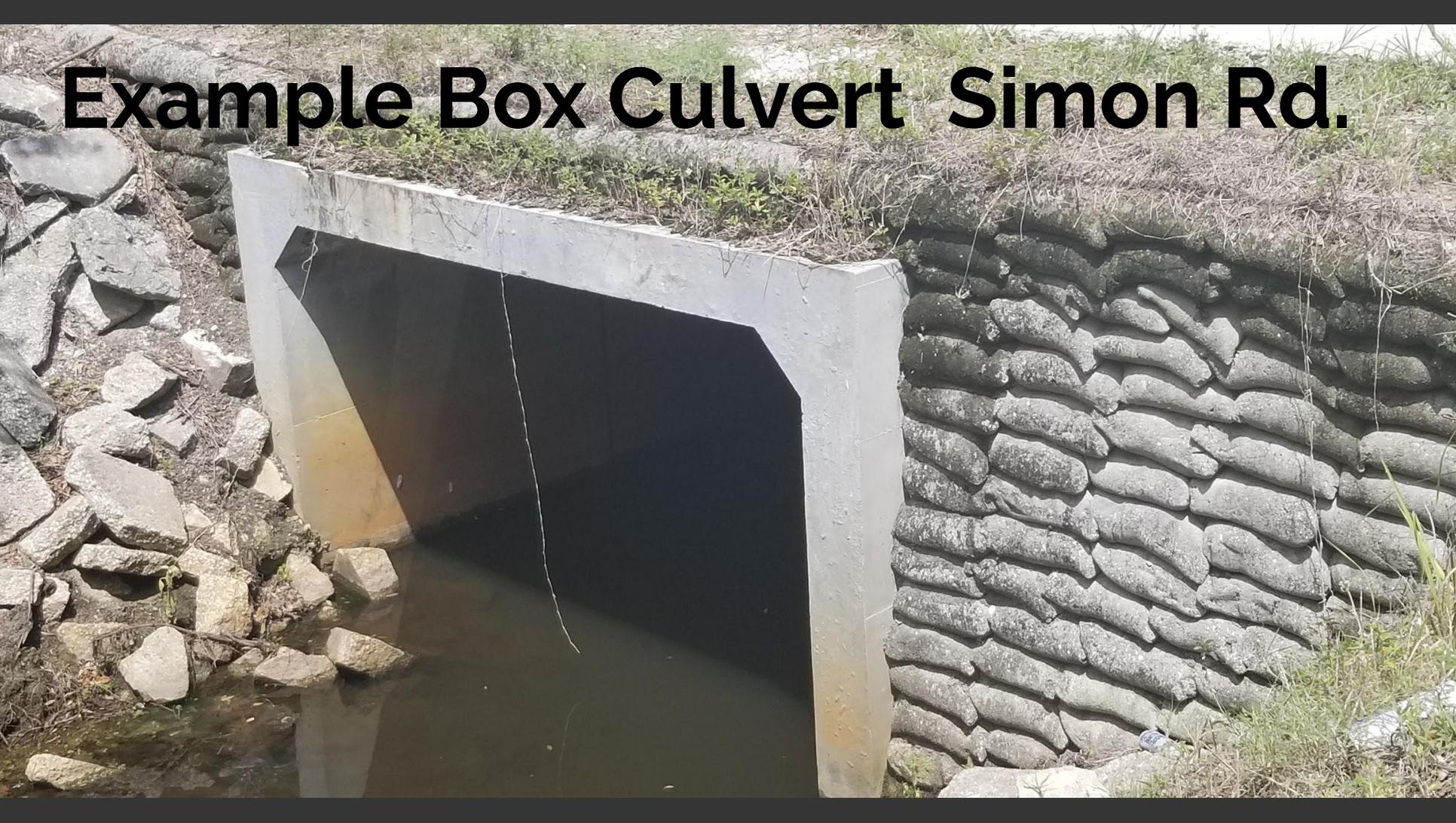
## Cost: \$310,000

Work to commence Feb of 2020 if agreed today. Price quote is good for 60 days. Includes new cement box culvert, roadway replacement size as-is, and all headwall replacements, permitting, engineering, labor, and materials.

Option to add additional feet for sidewalk or bike lane cost is \$410,000 and would make the bridge 10 feet wider.

Contract would be initiated as InterLocal agreement between TMV and Brevard County drafted by Atty Richardson, specs provided by Brevard County. Brevard County would provide and include all materials, labor, equipment, engineering, permits, and inspections of the project to completion.

# Example Box Culvert Simon Rd.



# Decision Time:

**VOTE YES**

**Create InterLocal Agreement and Get Project Scheduled for Feb 2020. Funding is due at Construction Commencement and can be included in our budget process for 2020.**

# Decision Time:

**VOTE NO:** Wait and get alternative RFP Request for Proposals, Interview Engineering Firms, Procure Bids, and Exempt County from Participating. Waiting without getting bids does not lock in price from County. Future Price could be \$1 million within 10 years. Waiting Jeopardizes our Bridge because of St. John's Weir plan. Waiting means we handle all Permitting and Engineering with County, St. Johns, Melbourne Tillman, and the State of Florida DOT. Waiting or partial repairs could be initial costs that we pay but will still have to pay again when finally replacing.

# **Decision Time:**

**MAYOR Heidi Salmon's Recommendation**

**VOTE YES**

**Create InterLocal Agreement and Get Project Scheduled for Feb 2020. Funding is due at Construction Commencement and can be included in our budget process for 2020.**

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**Example of Brevard County Box Culvert Bridge  
Replacement  
Palm Bay Road  
Took One Month**

<https://youtu.be/FR023hdKDTw>