January 2015

AMERICAN PUBLIC WORKS ASSOCIATION

APWA

Public Works Project of the Year Awards Program

Falls Road Culvert Replacement
Disaster or Emergency Construction/Repair
Less than $5 Million

CLARK COUNTY, WASHINGTON

Prepared by
Clark County, Washington
Public Works - Engineering & Construction Division

2015 APWA PROFESSIONAL AWARDS

Public Works Project of the Year Award Nomination Form

Deadline January 15, 2015
(electronic submitttals only)

Project Name
Falls Road Culvert Replacement

Project Completion Date
Must be substantially completed (90%) and available for public use as of December 31, 2014.
October 2014

Public Agency
Clark County Public Works

Project Category
- ☐ Structures
- ☐ Transportation
- ☐ Environment
- ☐ Historical Restoration/Preservation
- ☒ Disaster or Emergency Construction/Repair

Project Division
- ☒ Less than $5 Million
- ☐ $5 Million, but less than $25 Million
- ☐ $25 Million–$75 Million
- ☐ More than $75 Million

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Primary Contractor
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Continued...

2015 APWA
PROFESSIONAL AWARDS

Public Works Project of the Year Award
Supporting Data Form

Please address each of the following areas in your nomination, adhering to the sequence below when possible.

- Completion date contained in contract. Any time extensions granted should be addressed in the submittal.
- Construction schedule, management, and control techniques used. Use of alternative materials, practices of funding that demonstrates a commitment to sustainability.
- Safety performance including number of lost-time injuries per 1,000 man-hours worked and overall safety program employed during the construction phase.
- Environmental considerations including special steps taken to preserve and protect the environment, endangered species, etc., during the construction phase.
- Community relations—a summary of the efforts by the agency, consultant and contractor to protect public lives and property, minimize public inconvenience and improve relations.
- Unusual accomplishments under adverse conditions, including but not limited to, adverse weather, soil or site conditions, or other occurrences over which there was no control.
- Additional considerations you would like to bring to the attention of the project review panel, such as innovations in technology and/or management applications during the project.

NOTE: Supporting documentation is **limited to 20 pages,** exclusive of photographs and nomination form. Photographs will be used for promotional purposes by the association. Submittal should include nomination form and supporting documentation form, and photographs. No letters of recommendation please. Simultaneous nomination of the same project in both Public Works Project of the Year and SC/RC Project of the Year or in two categories is not permitted.

Nominations not chosen in a specific year for the Public Works Project of the Year–Small Cities/Rural Communities Award cannot be resubmitted in a subsequent year in the other category.

Nominated by:

(Can only be nominated by managing public agency or APWA chapters.) Projects that involve or reside within two or more chapters locations can be co-nomiated. Each chapter will receive credit to submit a PACE nomination. All chapters must be identified on the nomination form and before the nominations are judged.

Tom Grange, PE
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Overview

In late summer 2014, a Clark County Public Works crew chief in the most rural part of the county made a routine visit to a culvert one mile east of the tiny town of Yacolt.

As part of its standard operating procedures, Public Works monitors the condition of culverts across its service area. The culvert had been on the department's "watch list" since an inspection earlier in 2014.

The crew chief, during his visit in early September, observed that the culvert's deterioration had accelerated, to the point the metal was partially crushed and in danger of collapsing completely.

The collapsing culvert under Falls Road, one month before it was replaced in early October 2014.

The Northwest's notoriously rainy weather would begin in about six weeks. There was significant concern that the culvert could fail, causing water to back up during winter rains and wash out the entire road.

Besides the safety concern of a road wash out, more than a dozen rural households depend on NE Falls Road as their only access route in and out from their homes. The two-lane road comes to a dead end east of the failing culvert. The road also provides access to public and private logging roads in the region.

Faced with the likelihood that a minor concern could become a huge problem for these households, Clark County Public Works responded swiftly and nimbly in coordinating an emergency plan to remove the partially collapsed culvert and install a new 60-inch culvert with less than a month's lead time.

The rapid pace required coordination between different divisions within the department, along with other county departments, federal and state agencies, private consultants and the contractor hired for construction.

Existing conditions

The culvert for Weaver Creek is about 12 to 15 feet below the road surface, with steep (1:1) rocky fill slopes.

The culvert slope is about 7 percent and is founded on bedrock, coarse gravels and cobbles. Existing backfill contains large cobbles and boulders in direct contact with the culvert. The fill also contains woody material.

Weaver Creek's 100-year peak flow is estimated to be 180 cubic feet per second.

Project objectives

- Replace the failing culvert as soon as possible to minimize the safety risk during low stream flow and before rainy weather starts.

- Design the replacement culvert as a long-term solution that incorporates feedback and requirements from environmental permitting agencies.
- Coordinate with nearby residents, emergency services, schools and other stakeholders.

A new 60-inch culvert is gently lowered into place.

Alternatives and Design Considerations

Engineers from Clark County Public Works and two private consultants, ESA Vigil-Agrimis and Landslide Technology, visited the site to evaluate whether the culvert would survive a wet weather.

Engineers concluded that the risk was high for total collapse over the winter, which would create an unacceptable public safety and property damage risk.

Based on this assessment, Public Works sought and received an emergency declaration by the Board of Clark County Commissioners on Sept. 24, 2014.

Other design considerations included:

- The culvert itself, which had to be readily available from suppliers. There was no time for a special order.
- The culvert's size and length to meet hydraulic and environmental considerations.
- Steep road fill slopes, which required engineered backfill and slope treatment to maintain 1.5:1 fill slopes.
- Designing a stream bypass prior to construction that included fish salvage.

Project Development

A project team was quickly assembled that included county survey, project management, design, environmental permitting, real property services, public outreach and construction management.

Consultants were hired for geotechnical evaluation (Landslide Tech.) and for the hydraulics analysis and culvert design (ESA Vigil-Agrimis).

With the emergency declaration, the county did not have to go through competitive bidding (RCW 39.04.280) and was able to directly hire a contractor, Tapani Inc., based on firm's qualifications and its ability to assemble the necessary staff and equipment to get the project done on short notice.

Another look inside the failing culvert.

With the survey and geotechnical information in hand, the designer developed a hydraulic analysis and prepared a draft culvert construction plan. Using this plan, the contractor developed a work plan and schedule, along with providing feedback on constructability. Having the contractor at the table during the design meetings helped expedite the final plans and construction schedule.

To further expedite the project, the county agreed to supply crushed rock for construction from its Maple Pit quarry, located about 6 miles from the project site.

The designer worked on the final construction plans, with emphasis on the inlet and outlet designs. Also, to minimize culvert length, fill slopes had to remain at 1.5:1 or steeper. This required engineered fill using geogrid and geotextile fabric.

Funding

The project used the County Road Fund to pay for 100 percent of engineering, design and construction costs.

Engineering / Design Phase	$58,500	32 percent
Construction Phase	$126,000	68 percent
TOTAL	$184,500	100 percent

Project Team

Project Manager – Matt Hall, PMP
Construction Engineer – David Dolan, PE, PMP
Contractor – Darren Cahoon and Sam Rhodes, Tapani Inc.
Project Engineer – Adam Zucker, PE and Nathan Dasler, EIT, ESA Vigil-Agrimis
Geotechnical Engineer – Randy Hill, PE and Logan Allender, PE, Landslide Technology
Operations Support – Carl Oman and Tom Sutton
Survey Lead – Carl Schutt, PLS
Environmental Permitting – Lisa Hemesath
Real Property Services – Steve Hansen
Construction Inspection – Ron Freer and Joey Gastineau
Program (funding) Manager – Bill Wright, PE
Public Information – Jeff Mize

Contract completion date and time extensions

Construction was substantially complete on Oct. 5, 2014. There were no time extensions.

The following project timeline provides a snapshot of how this emergency project was completed in less than a month:

• Culvert inspection	Sept. 10
• Project team formed	Sept. 18
• Design team site visit	Sept. 22
• Formal emergency declaration	Sept. 24
• Survey completed	Sept. 25
• Contractor hired	Sept. 25
• Draft design (culvert ordered)	Sept. 30
• Final design	Oct. 2
• Road closed, construction start	Oct. 3
• Road open, construction substantial completion	Oct. 5

Traffic control and closure barricades were part of the emergency replacement project.

Construction schedule, management and control techniques

Clark County Public Works worked with Tapani, Inc. to develop a schedule, based on the contractor's availability and the amount of work involved. The county also considered the need to take advantage of favorable early-fall weather and the need to minimize public disruption.

For all these reasons, the weekend of Oct. 3-5 was selected. Tapani would begin work Friday afternoon and work continuously until completion, which was planned for Sunday afternoon.

The following is a synopsis for how construction progressed:

- Fish salvage and creek bypass was completed Friday afternoon (Oct. 3).
- Road closed and trench excavation began Friday evening.
- Culvert installation was completed by Saturday morning.
- Upstream backfill and fill slope at inlet was completed by Saturday afternoon.
- Downstream backfill and fill slope at outlet was completed by early Sunday morning.
- Road was re-opened to traffic by daylight Sunday morning (Oct. 5).
- The small amount of paving on the road was completed on Tuesday, Oct. 7, with striping on Thursday, Oct. 9.

Safety performance

The project had zero injuries per 1,000 man-hours worked. The contractor was required to strictly adhere to all safety regulations and protocols. The county had inspectors on site to ensure that safety regulations and protocols were followed.

Metal plates were used to shore up a trench for the replacement culvert.

Environmental considerations and protections

As previously noted, the project's design included a stream bypass, with fish salvaging done prior to the start of construction.

Shortly after a project team was assembled, the county's environmental permitting section began discussing the emergency repair with permitting agencies, the Washington Department of Fish and Wildlife and the U.S. Army Corps of Engineers.

The county applied for permit applications to both agencies and received feedback from both on the design.

Fish and Wildlife issued an HPA (hydraulic project approval) permit for the project, but the Corps of Engineers was unable to issue a permit due to time constraints. The Corps of Engineers is still reviewing the project, which may lead to mitigation/enhancement work for any impacts.

Community relations

Keeping residents informed of projects in their area is a major emphasis of any Clark County Public Works project, regardless of its size.

This particular project was somewhat unusual because of the urgent nature of the repair. Nevertheless, Public Works did an abbreviated form of its standard outreach procedures to inform key stakeholders.

Emergency responders and schools – Public Works contacted first responders (police, fire and ambulance). The contractor would give priority to first responders in the unlikely event of a police, fire or medical emergency on the other side of the construction zone during the emergency repair.

The old culvert that was removed after sunset Friday.

Public Works also worked with the Battle Ground Public Schools to address possible impacts to school buses. To avoid conflicts, Public Works had the contractor start on the emergency repair after the last school bus had dropped off students Friday afternoon.

Resident outreach – Once Public Works had a firm date for when the repair would be done, a letter was drafted explaining why the county was moving quickly to replace the culvert.

Instead of relying on a traditional mailing, the department's Real Property Services supervisor went door to door to have as many conversations as possible so people could get their questions answered at the same time they were learning about the upcoming construction.

Many residents already we aware of the problem and had noticed the sag in the roadway where the culvert was collapsing. Virtually everyone supported the county taking decisive action to prevent the culvert from collapsing completely and leading to the entire road washing out.

Residents were asked to plan ahead and avoid discretionary travel during the weekend repair. If it was absolutely necessary to leave their homes during construction, they should expect 20-30 minutes of delay.

The contractor mobilized equipment even before the road was closed.

A letter was left for anyone who was not home that explained why the county was replacing the culvert and how the short-term construction would affect them. It also provided names, phone numbers and email addresses for two Public Works employees who could answer questions.

Signage – Public Works put up temporary message boards before the start of construction alerting drivers to the upcoming work. The signs remained throughout construction until the repair was complete and the both lanes of the road were reopened.

The replacement culvert, shortly after it was put into place.

Other outreach – Public Works contacted the Town of Yacolt and the mayor to provide them with project and schedule information. The county also contacted the Yacolt postmaster to let him know about the repair and the short-lived effect it would have on mail delivery.

Targeted outreach also was done to Weyerhaeuser Co. and Washington State Department of Natural Resources because of the amount of land they own in the area.

In addition, the county made a conscious decision to have the work done on the first weekend in October, one week before the start of hunting season. The first weekend of hunting season could have brought an influx of people into the area to hunt on private and public lands.

Unusual accomplishments under adverse conditions

By far the biggest accomplishment was coordinating and completing the emergency repair in less than a month. The project highlighted the ability of Clark County Public Works to react quickly and with a sense of urgency as conditions warranted.

Additional considerations

Many things had to come together to make this project successful, including favorable weather, an available contractor, available materials and a coordinated/focused construction crew.

The ensuing project had several positive outcomes, including:

- Eliminating the risk of the existing culvert failing.
- Resolving the concern for public safety, property damage and cutting off access for residents, state and federal property owners, as well as for recreationists.
- Eliminating the need for an emergency contingency plan in case the culvert failed over the winter.

If the county had waited for the culvert to fail, conditions would have been much more challenging and less safe, with higher creek flows and potentially unstable slopes.

Finally, even though this was an emergency replacement, the culvert design and construction provided a permanent, long-term structure for conveyance of the creek.

Water runs into the replaced culvert on the upsteam side.

A look at water flowing out of the new culvert.