City of
MOUNT
VERNON
PUBLIC WORKS DEPARTMENT

Mount Vernon Downtown Flood Protection Project

AND RIVERWALK PLAZA

APWA Washington | 2020 Project of the Year Award | Category: Disaster or Emergency Construction Repair Projects - $25 Million, but less than $75 Million

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Executive Summary

Ever since the City of Mount Vernon was established in 1893 along the banks of the Skagit River, its downtown has been threatened by major floods. Protecting the downtown from river flooding always required the mobilizing up to 2000 volunteers working intensely for almost a day placing 150,000 sandbags along the waterfront. These conditions caused the downtown business district to be in the Federal Emergency Management Agency's (FEMA's) 100-yr flood zone, requiring costly flood insurance for land owners and hampering development in this important area. Fifteen years ago the City began the project that would solve these problems by permanently protecting the historic downtown from flooding and removing it from FEMA's 100-year flood zone

In 2019 the City completed a four phase waterfront project with a system of concrete and steel floodwalls and earthen levees that extends for 1.6 miles along the left bank of the Skagit River past the downtown around its waste water treatment plant. The project duration spanned almost 15 years from the start of conceptual design to completion of construction, and it cost over $31 million dollars. The City completed the project in 2019 when on October 25th FEMA officially removed the downtown from its 100-year flood maps.

The project has transformed the City, and it has many laudable features beyond the floodworks that protect the downtown. It includes a river walk, plaza area, aesthetic features such as theme lighting and artwork, and low impact development (LID). (See the "Downtown Flood Protection Project and Riverfront Trail" graphic for a diagram of the entire project.

Construction Schedule, Management, and Control Techniques

Top: Crews installing the Sheet piling.

Right: Phase 1 construction.

Bottom: Where the Floodwall meets the Levee.

The project was constructed in four phases and employed a number of proactive construction management techniques. During each phase of construction, the City sought to build a partnership between the City, contractor, construction management firm, and local businesses. A partnership approach provides for good outcomes by recognizing that all parties have a vested interest in the project.

The partnership was nurtured with the public through a number of simple techniques. For example:

- By providing regular project updates through multiple communication outlets such as a project website and project email list.
- By listening to the concerns of affected businesses, citizens, and working quickly to address reasonable requests.
- By providing advanced notice of project impacts so businesses and the public can plan accordingly.
- By reinforcing the vision and long-term benefit of the project.
- By meeting in person with affected business owner.

Top: Sheet piling installation near Commercial Cold Storage (CCS).
Middle: Complete and exposed sheet piling by CCS.
Bottom: Workers install sheet piling underneath the Division St Bridge (SR536).

A partnership was built with the four Contractors during construction by employing the following:

- By meeting weekly with the City, construction management firm and the contractor.
- By addressing questions and resolving issues quickly so as to maintain construction schedules.
- By providing full-time onsite construction oversight to ensure project quality and to provide real-time problem solving in the field.
- By showing the contractor that their success is the City's success.

The overall construction was divided into four separate phases of construction, consisting of four separate construction contracts. Each of the phases were broken into a reasonable and affordable size of work tailored to the overall general nature of the construction. For example, the earthwork portion of work was largely separated into a phase, as was phase 2, the most architecturally intense phase of the project.

By breaking the project into phases, the City was able to break the design, construction management, and construction work down to be performed by area engineering, construction management, and construction contractors; all of whom demonstrated genuine interest in the success of the project and success for the community.

Safety Performance

The City emphasized safety with all four contractors over the course of this project. At the start of each phase of the project a safety plan was developed by the contractor and reviewed by the City and engineering consultant. The plan was then implemented and modified as needed. With a culture of safe construction techniques the project was able to achieve a zero time lost due to injuries over the entire span of the project.

During the course of construction, all four contractors took pride in the safety of their employees and of others on their job site. Simple safety equipment such as basic PPE's (personal protective equipment) were always employed along with additional equipment when necessary such as safety harnesses and personal floatation devices when working over and near the water.

Top and Bottom: Crews work to remove the Revetment parking structure to make room for the Riverfront Trail.

Safety of the public was also of concern during the course of all four phases of construction. The homeless population within the project site was treated with respect and relocated out of the active work zones. The project sites were properly secured during non-working hours to prevent both inadvertent and malicious access to the work areas.

The partnership approach to construction allowed for any party to bring a safety concern to the attention of others knowing that it would be addressed for the benefit of all.

Top: Levee wrapping around the City's Waste Water Treatment Plant.
Bottom: Levee construction near Dairy Valley.

Community Relations

Riverwalk Plaza used by the Mount Vernon Farmer's Market

Community relations are especially vital to the success of a project such as this. The big components of the effort were the citizen advisory group of downtown business leaders and community representatives that was formed by the mayor to help develop the aesthetics, concepts, and the mitigation of the project impacts for the downtown. Secondly the City completed a state environmental impact statement that included many formal procedures for involving the community and stakeholders in the project.

The City continuously interacted with the community about the vision for this project. It was advertised and talked about continuously for at least 12 years with involvement at all levels of local and state government. Relations included dike districts, local organizations, and residents. The project was presented on the local City Tv10 station, website, council meetings, public works committee meetings, project meetings, community meetings, and discussed at every public forum where it made sense. The City made videos that showed a preconstruction conceptual promotional advertisement and a post construction video of the project.

Mount Vernon has a population of 36,000 and it became obvious that the message was getting out as many of the residents in the town were talking about the project. The downtown business owners and residents were the easiest to reach and the most excited about the project as they also are the most impacted by it, and gained most directly from its effects. There was outreach before every phase of construction and public meetings explaining work sequences and downtown parking. During construction, City staff and the public works director walked the project daily and informally talked with affected business owners and residents to help address their needs and concerns.

Environmental Protection

The Skagit River is quite environmentally pristine with all five species of salmon, and it is one of the main bull trout rivers in the United States. These facts make the environmental elements of this project especially important. Beyond its overall positive environmental benefit in preventing pollution and damage that would otherwise occur during major flood events (such as flooding the wastewater treatment facility grounds, inundation of pavements, and server systems), the project has other benefits to the environment.

A large asphalt parking area immediately adjacent to Skagit River in the City's downtown was demolished and replaced with permeable pavers so that the area can be used as a public plaza. The permeable pavers cover approximately half the area and almost all of the 30,000 square foot plaza drains into an infiltration and tree cell gallery. The plaza is designed to maximize both organized and informal public recreation. Also included in the large open area is a gallery of bioretention tree cells that provide shading which will reduce any heat island effects from the pavers and create additional stormwater quality and quantity treatment.

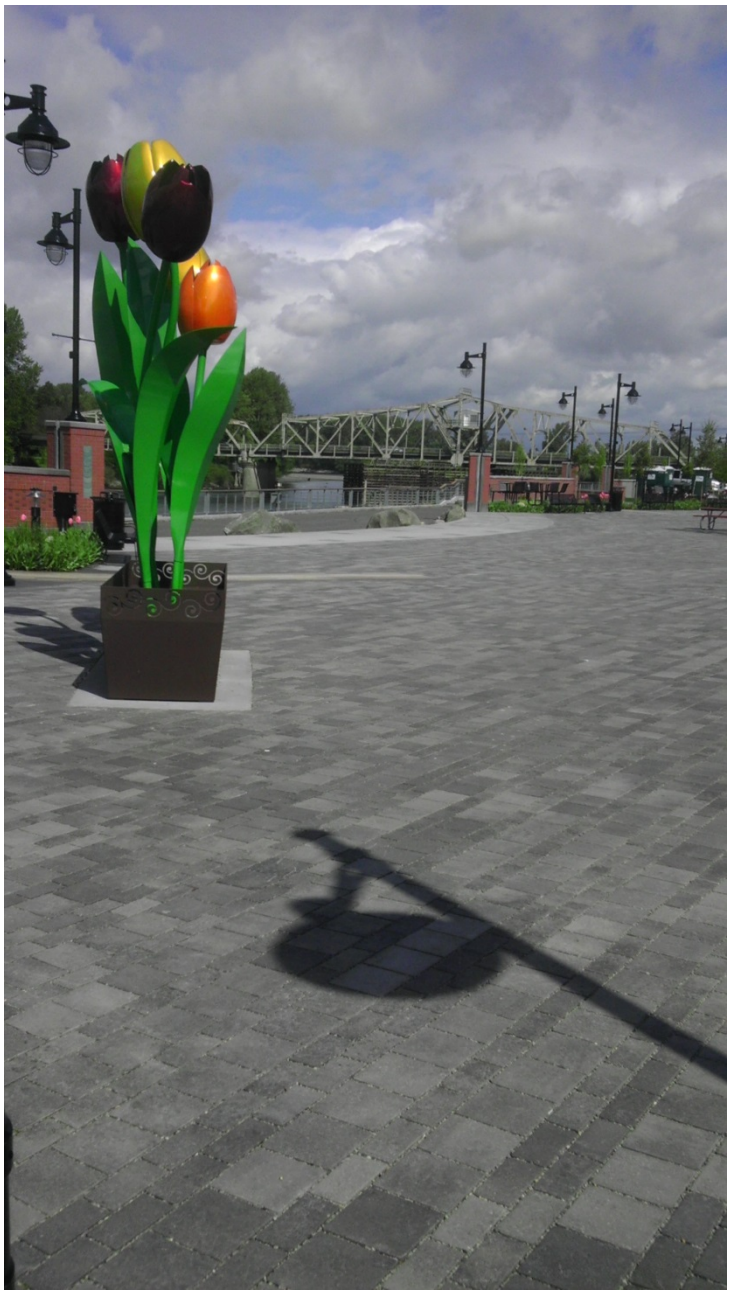
At the time of design and construction, LID was encouraged by the state, county, and local jurisdictions but it was not a requirement. Even so, the City chose to design the plaza as a functional gathering place that highlighted the use of LID.

Specific Water Quality Benefits

The City of Mount Vernon on average gets 38 inches of precipitation per year. In the project area all of that precipitation would have drained directly into the Skagit River prior to the project. Further statements of the benefits are as follows:

1. The LID areas treat an average of 6,650 cu. ft. of runoff annually.
2. The Contech filter that were installed as part of the project treat an average of 17,250 cu. ft. annually.
3. There is an educational benefit of events that are held in downtown that expose LID to people. Between the Tulip Festival, Plaza Concert series, Farmers Market, and the Lincoln Theater Brew Festival there are conservatively over 250,000 people that use and see the Downtown LID features.

Removal of an over-the-river-bank parking structure that eliminated pollutants such as total suspended solids (TSS), nitrogen, heavy metals, petroleum, and greases from draining directly to the Skagit River was a good benefit. The installation of permeable pavers also greatly reduces the amount of stormwater that enters portions of the City's combined sewer system by allowing for surface infiltration where previously there was none. In addition, the tree cells increase the water holding capacity of the soil profile under the permeable pavers. These bioretention tree cells add a combined 4000 cubic feet of uncompact, highly retentive organic soil that is retained in the cells. A built in structure supports the pavers and allows for vehicle traffic as needed for events or floodwall operation.



Adverse Conditions

The project is located in an environmentally sensitive location along the Skagit River, crosses a mainline Burlington Northern Santa Fe railroad track, an arterial street, and extends beneath a state bridge and through the heart of the city. Eight buildings of significant size were purchased and demolished in order to complete the project. Difficult portions of the work were in narrow confines between the river and a cold storage industrial plant that needed to continue operations during construction. There was underground infrastructure such as old building foundations and fuel storage tanks encountered during construction. Utilities needed to be undergrounded such as powerlines or relocated glue laminated power poles for large transmission lines.

In the fall, this project work occurred under the threat of Skagit River floods. The City's flood protection plan was in need of constant change to continuously adapt the flood fight operations for every new flood season. New methods of protecting the downtown were developed and the City's flood manual was edited annually prior to the flood season. This information was then disseminated to the advisory team, policy makers, and staff to ensure that implementation would be completed with minimal disruptions or confusion.

Over the course of this project, there was a significant amount of coordination with environmental and regulatory agencies. The project went through the City- State Environmental Policy Act (SEPA) which included an Environmental Impact Statement (EIS), Federal Highway Administration-National Environmental Policy Act (NEPA), US Fish and Wildlife & NOAA-Endangered Species Act (ESA) Concurrence, State-Cultural & Historic Resources Review, State Ecology-Coastal Zone Management Consistency Determination, City-Shoreline Substantial Development Permit, State Fish & Wildlife-Hydraulic Permit Approval, State Ecology-Construction NPDES Permit, and of course a City-Fill and Grade Permit.

Mount Vernon spent the last 15 years coordinating with various agencies and organizations to get this project completed:

The Federal government from Army Corps of Engineer, Federal Emergency Management Agency, National Marine Fisheries Service, Congressional Offices.

The Washington State Agencies to include the Governor's Office, State Representatives, Department of Ecology, Washington State Recreation and Conservation Office, and the Washington State Department of Transportation.

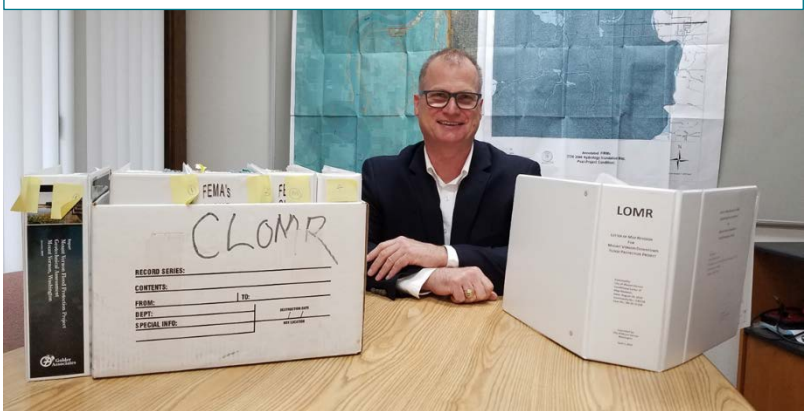
Skagit County Government

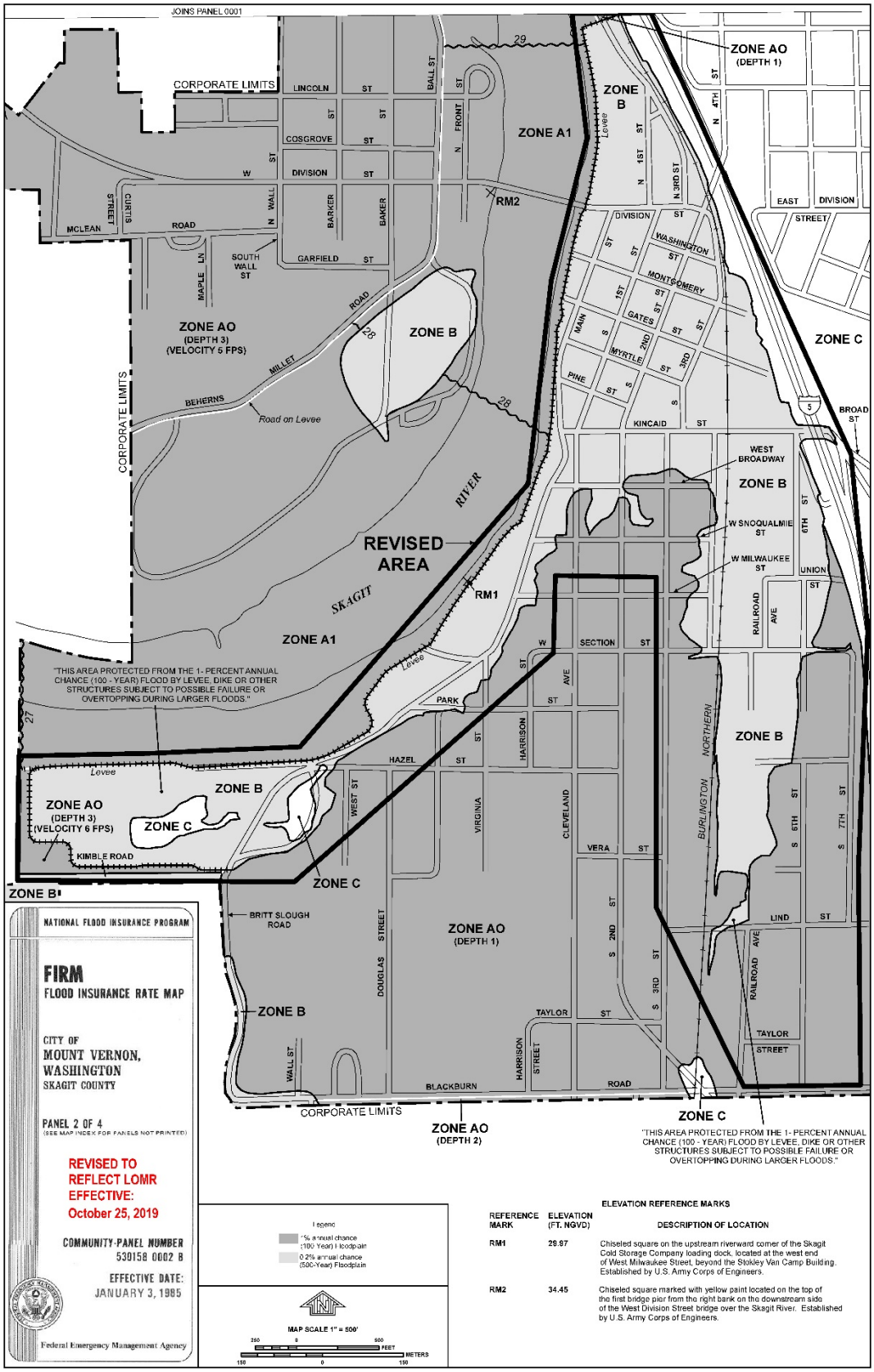
Local Dike Districts.

Unusual Accomplishments

The project itself is an unusual accomplishment for a small city. Clearly, the City's downtown had Skagit River flooding from the beginning and a flood protection project was understood to be needed for decades. Even so, mustering the will and resources to complete the project was not achieved and sustained until now.

Mount Vernon Public Works Director, Esco Bell, sitting with the multiple binders of paperwork for both the CLOMR and the LOMR.





FEMA's LOMR process stands out as a herculean accomplishment (certainly from a city staff point of view), and FEMA has certified very few flood works in Washington. $1.5 Million dollars went into developing a model of the Skagit River and the design along with about 2 years of back and forth effort to get FEMA's conditional letter of map revision (CLOMR) that was not received until construction had already begun. At the completion of the project more than a year of back and forth work with FEMA staff was required to finally get the flood works accepted and the downtown removed from the 100 year floodplain. As a result the City just completed working with FEMA to obtain the Letter of Map Revision (LOMR) that officially recognizes the project and removes the downtown from the 100-year flood.

FEMA has chosen the Downtown Flood Protection Project to use as a national example of resilient cities. FEMA has produced a video and literature of the flood protection project to use for its resilient cities campaign.

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Left: Bioretention LID cells improve water quality running off of the parking lot.
Bottom: Riverfront Trail facing south.

This project received national recognition as the 2019 Green Infrastructure -Top Overall Project Award Winner from NAFSMA (National Association of Flood and Stormwater Management Agencies).

This project is a beautiful amenity and it is widely used by the community as a river walk, community park and a pleasant place to stroll. The tree wells along the river walk are beautiful as is the plaza. The Farmers Market uses the riverfront plaza every Saturday from late spring to the middle of fall. Concerts, and other events are held at the Plaza during the summer. There are numerous restaurants located near the river walk in the downtown and folks tend to use it for late evening strolls. There is striking LED lighting along the river walk that especially enhances the experience of the waterfront during the evening.

Top: A sandbag wall is built on Main St in downtown Mount Vernon by a crew of volunteers
Bottom: Skagit River flooding on Main St prior to Floodwall installation

Top: City crew sets up the stoplogs using heavy equipment instead of volunteers.

Middle: Stoplogs close one of the openings in the Floodwall.

Bottom: The Riverwalk Plaza flooded by the Skagit River with Floodwall protection.

Additional Considerations

For the City of Mount Vernon, this project is truly transformational, and it was very difficult to achieve. It reduced the enormous threat of Skagit River floods to something that can be managed with city staff in one long work shift, and the project removed the downtown from the 100-year flood plain.

The project protects the City's historic downtown from flooding with FEMA certified flood protection and serves to revitalize the historic downtown area. Removing the downtown from the 100-year flood plain has saved flood insurance, alleviated serious physical threats, and released pent up economic opportunities that are so important to our region. The project is the key component of the comprehensive downtown redevelopment plan that is being used to guide public and private investments over the next 20 years.

The project transformed the public access to the river. Instead of parking structure over the river bank, there is a beautiful river walk and plaza area. Few projects are so impactful for the communities that they serve as this one and few are so difficult to accomplish

There were numerous challenges to overcome. This project had to go through property acquisition, permitting, and financial hurdles. There were many regulatory agencies that the City had to work with in order to fulfill numerous requirements. This included federal, state, and local requirements. The project, from planning and design to completion, has taken 15 years. The construction was done over 10 years and in 4 phases. The City has had the benefit of many great funding partners, talented professionals, and wonderful citizens that made this project possible.


PHASE 1 - COMPLETE 2010
0.25 MI FLOODWALL AND
RIVERWALK TRAIL
PHASE 2 - COMPLETE 2013
0.3 MI FLOODWALL AND
RIVERWALK PROMENADE,
AND 30,000 SF PLAZA
RIVERWALK PLAZA LID FEATURES
TREE BOXES
PERVIOUS PAVERS
BIORETENTION PLANTER
BIORETENTION TREE CELLS
PHASE 3B - COMPLETE 2017
0.55 MI COMBINATION FLOODWALL /
EARTHEN LEVEE
0.36 MI TRAIL CONNECTION TO
REGIONAL SYSTEM
WITH GRASSCRETE LID WALKWAY
PHASE 3A - COMPLETE 2015
0.6 MI EARTHEN LEVEE
MOUNT VERNON
WASTEWATER TREATMENT PLANT
5
536
BNSF RR
City of
MOUNT
VERNON
Downtown Flood Protection Project
and Riverfront Trail
Floodwall Complete
Floodwall / Levee in Progress
0
500
1,000
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