

Construction 101

Why does construction take so long?

The City of Shoreline is in the process of completing the final phase of the Aurora Corridor Project. The City hired contractor Gary Merlino Construction Company (GMCC) in late 2013 to construct improvements on the final section of Aurora Avenue between N 192nd Street and N 205th Street. Minimizing the inconvenience to affected businesses, residences, bicyclists, pedestrians, and the motoring public while building a new roadway is a challenge. To minimize the inconvenience, 2014 work has been staged on the west side of Aurora, with travel shifted to the east.

When work on the west side is sufficiently completed in early 2015, GMCC plans to shift traffic to the west and work on the east side. During the summer of 2015, GMCC will shift traffic to both the east and west sides while working on the median. The project will be complete in early 2016, weather permitting.



Traffic shifted to the east side of Aurora Avenue

To help illustrate why construction takes so long, the following is a general sequence of the construction work:

1. Site Preparation

Construction work begins with site preparation. For the Aurora Corridor Project, it began with surveying and removing the existing median curbs. The road was restriped to shift traffic to the east in order to establish the work zone on the west side.

The existing signals at N 200th and N 205th streets were also removed and replaced with temporary wire strung signals to match the temporarily realigned traffic. The contractor then started clearing the vegetation and material on the west side to prepare for utility relocation and installation. A similar process will occur when work shifts to the east side.



Starting to clear vegetation near N 195th Street

2. Utility Relocation

A number of utilities on the Aurora Corridor are being converted from aerial (on poles) to underground.

These include:

- Power (Seattle City Light, aka SCL)
- Telecommunications (Frontier and Comcast)
- Street lighting
- Intelligent Transportation System (ITS) fiber optics for signal coordination

Other utilities that have to be relocated for the project are water (Seattle Public Utilities), sanitary sewer (Ronald Wastewater), and storm drainage lines.

The sequence for the utility installation is:

1. Sanitary sewer
2. Water
3. Power
4. Joint utility trench for telecommunications, street lighting, and ITS
5. Storm drainage
6. Irrigation lines (in many locations)

Depending on the number of utilities, the contractor may have to dig five to six trenches of different widths and depths in front of businesses and properties. This will occur on both sides of Aurora and on adjacent side streets.

The general order of work for utility relocation and installation is as follows:

A. Locate Existing Utilities

To avoid hitting existing buried utility lines, the contractor locates existing utilities with a trackhoe or a vactor truck, or both, depending on the location and expected depth. The contractor can then determine whether adjustments are needed to the new utility installation (i.e. whether the pipes or conduits need to be raised, lowered, or put in a slightly different place).

B. Install Utility Vaults

Utility vaults are sealed boxes used for various purposes such as housing electrical transformers and wiring systems in order “to feed power” from the main service line to businesses and residences. They also provide access to the underground utility system. Utility vaults vary in size, from a few square feet (usually called handholes) to vaults that are the size of a small room. They are generally used for power, telecommunications, and irrigation. Stormwater and sanitary sewers require inlets or manholes that are installed in a similar way. The contractor excavates the area to accommodate the vault, handhole, inlet, or manhole and sets them to the proper elevation to be flush with the finished road or sidewalk grade.

C. Excavate Utility Trench

For power and telecommunications, the lifeline for the utility vaults is through wiring protected by plastic or metal conduits. To provide the vaults with their lifelines, utility trenches are excavated and new conduit is put in the trenches. Concrete slurry is added to the SCL trenches to provide additional insulation and protection of the system. The trench with conduits is then reburied. Storm drainage runoff and sanitary sewage are conveyed by separate pipe systems. They are installed by excavating the trench, placing a bed of rock, placing the pipe on the rock, connecting the pipe sections, and reburying the trench.

The City has made a commitment to keep two lanes of traffic open in each direction during commute hours. When the contractor needs to cross Aurora with utility trenches, the work is done at night because several lanes need to be closed. This includes the installation of drainage systems that will eventually connect the median and street drainage system to the storm drain system.

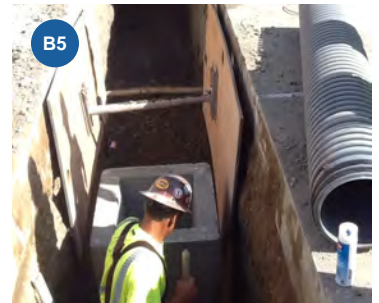
Utility Relocation Photo Gallery



A1. Locating existing utilities



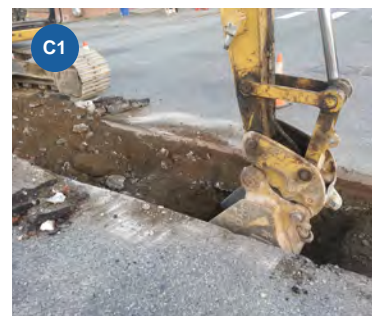
B1/B2/B3. SCL vault, cover, and lid installation



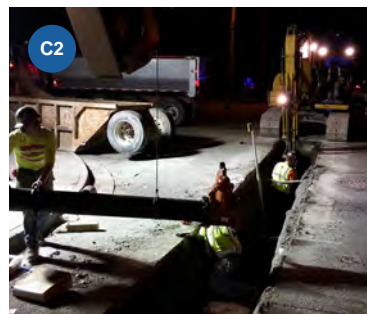
B4/B5. Installing storm drain inlets and manholes



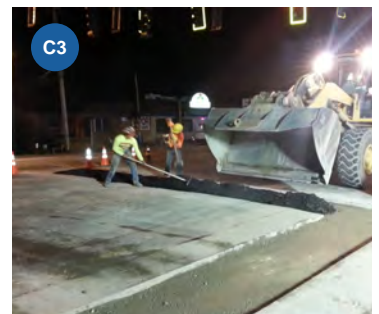
B6. Setting a Frontier vault



C1. Starting to excavate the trench



C2. Water main installation



C3. Patching the trench

It is a race against the clock to excavate the trench, perform the work (which includes the process of installing the pipe or conduit), and patch it back in time for the morning commute. Sometimes the “patch” consists of steel plates because work will continue. Unfortunately, because the original Aurora has concrete pavement, it requires jackhammering through the existing pavement, resulting in increased noise.

D. Connect Utilities

Following installation of the utility conduit or pipe work, connections are made to the vaults, manholes, inlets, etc., and to the existing system. After testing, the utility can be put into service. When the underground electrical/cable systems are in place and the customers’ service has been transferred to the new systems, the original overhead wires can be removed. This transferring process is the responsibility of each utility (not the contractor) and can take four or more months to accomplish, depending on the customer needs and the availability of utility crews. After the last utility has removed its system from the poles, the power poles can be removed. In the interim, the contractor may proceed with new pavement or sidewalk work in the area to stay on schedule, even if the poles have not yet been removed.



Roadway excavation and grading



Roadbed with rock base

3. Roadway Excavation

When utilities are installed and underground work is finished, excavation for the roadway, sidewalks, curbs, and gutters can begin. Some of the side streets have to be lowered to meet the future Aurora grades. The excavation and grading required results in short-term closures of the streets. When the excavated grades are reached, the roadbed is further prepared with a rock base.

Roadway work has many different elements:

A. Retaining Walls

Due to the differences in elevation of roadway and the adjacent properties, some areas require retaining walls. One type of retaining wall is a “soldier pile” wall. Examples of this wall can be found along N 195th Street and Firlands Way N. Soldier pile walls require drilling holes for the vertical steel posts or piles, called soldier piles. After the soldier piles are set, timber lagging (similar to railroad ties) is placed between the piles. Finishing this wall includes installing reinforcement bar (rebar) for the concrete exterior. There are 22 retaining walls of various heights and designs along this section of Aurora.

B. Curbs, Gutters, and Sidewalks

Once the roadway is excavated, and in some cases, the retaining walls are installed, grading begins for the new curbs, gutters, and sidewalks. Formwork is then set in place and concrete pours begin. Curbs and gutters are built separately from the sidewalks.

C. Illumination and Signals

Before or concurrent with forming sidewalks, the foundations for new street lights and signal poles are set. Because it takes a long time to manufacture poles, they are ordered early in the project. When the illumination poles are delivered and installed, power can be connected. Traffic signal poles may also be installed earlier, but the signals on the new poles are not used until traffic is switched to its permanent configuration.

D. Paving

Paving occurs at a later date, following the placement of curbs and gutters. Paving includes several layers, or lifts. Each layer is no more than four inches deep and requires a complete operation of putting the asphalt down and compacting it with a roller before starting on the next layer. The new roadway pavement will be nine inches thick when completed. The contractor will place seven inches throughout the project for now. This base paving will allow the contractor to shift traffic onto it when the new phase of work begins. There will be temporary asphalt ramps at driveways and sidewalks to make up for the two-inch difference between base paving and final lift.

Roadway Excavation Photo Gallery

E. Medians

The last phase includes installation of medians, which include rain gardens or concrete curbs. Drainage in the median is connected to the previously installed storm drain system.

F. Final Paving

After all the base paving is completed throughout the project, the final asphalt layer can be placed. Lane striping and reflective buttons will then be installed. Among the key elements on the Aurora Corridor are the red concrete crosswalks. These must be installed after the final asphalt paving in order to match the paving surface. The crosswalk will be excavated out of the new asphalt. Concrete for the new crosswalk will be poured in sections across Aurora to maintain traffic flow.

G. Landscaping

The final touch on the project is landscaping, which includes planting trees, shrubs, and native plants. Plantings will occur when construction is nearly complete or when it is optimal for plant survival. The irrigation system, installed earlier during the utility phase, is already in place for plant establishment.



A1. Drilling for soldier piles



A2. Soldier pile wall along N 195th Street



B1/B2. Curb and gutter formwork and concrete pour



B3. Pouring concrete sidewalk



D1. Paving the first lift of the future southbound business access and transit lane

Questions or concerns during construction?

24-hour hotline (206) 801-2485
aurora@shorelinewa.gov
www.shorelinewa.gov/aurora

For more information, scan this QR code:



The intent of this article is to give the reader a better understanding of the roadway construction process. The above construction sequences (not always in the order described) can take weeks or months to complete. The City of Shoreline realizes construction work is inconvenient and difficult for all affected. At times, construction seems endless and it may appear as if the contractor keeps digging up the same area over and over. Hopefully this article has explained the reasons for what is being observed. The City is doing its best to mitigate the disruption, noise, and congestion, and appreciates everyone's patience as improvements are completed on this last section of Aurora Avenue in Shoreline. And please remember to visit businesses in the construction zone on a regular basis, as they are all open for business and rely on our continued patronage.