BUSINESS OF THE CITY COUNCIL
CITY OF MERCER ISLAND

AB 6422
March 5, 2024
Regular Business

AGENDA BILL INFORMATION

TITLE:	AB 6422: Advanced Metering Infrastructure (AMI) Data Collector System	☒ Discussion Only ☐ Action Needed: ☐ Motion ☐ Ordinance ☐ Resolution
RECOMMENDED ACTION:	Receive report. No action necessary.	

DEPARTMENT:	Public Works
STAFF:	Jason Kintner, Chief of Operations Alaine Sommargren, Deputy Public Works Director Allen Hunter, Utilities Operations Manager
COUNCIL LIAISON:	n/a
EXHIBITS:	1. 2021 Propagation Study Design 2. 2024 Propagation Study Design 3. Photo renderings
CITY COUNCIL PRIORITY:	3. Make once-in-a-generation investments to update and modernize aging infrastructure, capital facilities, and parks.

AMOUNT OF EXPENDITURE	$ n/a
AMOUNT BUDGETED	$ n/a
APPROPRIATION REQUIRED	$ n/a

EXECUTIVE SUMMARY

The purposes of this agenda bill is to present information on the status of the Advanced Metering Infrastructure (AMI) meter replacement project and to discuss the preferred location for data collection stations associated with the project.

- More than 70% of the City's water meters are considered older and contribute to high, unaccountable water loss, lost revenue, and wasted water from leaks.
- The City Council approved the Water Meter Replacement contract on July 19, 2022 to replace all water meters on Mercer Island with an Advanced Metering Infrastructure (AMI) system (see AB 6112).
- Water meter replacements are scheduled to be completed between March and August 2024.
- Data collection equipment, which is needed to fully implement the AMI system and customer portal, has not yet been installed.
- During the public engagement phase of the permit application process for the installation of seven data collection stations, the City received public input opposing two of the proposed locations. City staff paused the permit process to evaluate location alternatives and present findings to the City Council.

- A new study of antenna locations was completed, which reduces the number of data collection stations and the height at which they must be mounted.
- Staff recommends implementing the new data collector system design, using new City-owned poles for mounting equipment.

City staff are seeking input from the City Council to inform the location of the data collection stations and will return to the City Council with a final recommendation for review and consideration at a future meeting.

BACKGROUND

MERCER ISLAND WATER METER INFRASTRUCTURE

The City of Mercer Island owns and maintains 7,833 water meters, which vary in manufacturer, type, and age. Currently, 70% of the system's meters were installed more than 15 years ago, the age at which meters are considered in decline and likely to malfunction. This large number of older meters contributes to high, unaccountable water loss, lost revenue, and wasted water from leaks.

City staff collect readings from every water meter on the island to calculate water use with corresponding utility customer billing. Approximately 18% of these meters are radio-read, transmitting data to staff driving or walking by the meters. The remaining meters (approximately 6,500) are read manually, with staff visiting each meter to visually record usage data.

PROJECT BACKGROUND

In 2018, Mercer Island hired HDR Engineering (HDR) to assess the City's current metering program and evaluate which technology would best meet the City's needs. Based on HDR's Water Meter Replacement Program Analysis Report, the City, in consultation with the Utility Board, decided to pursue "smart meters" through an Advanced Metering Infrastructure (AMI) system. This system automatically transmits water usage data from the meters via a secure, cloud-based network to the utility billing software.

Fully implemented, AMI systems provide precise, real-time water use data that helps support conservation activities with improved leak detection and allows staff to focus on addressing water issues by significantly reducing or eliminating the amount of walking and driving to individual meters.

After issuing a Request for Proposals, the City selected Ferguson Enterprises, LLC as the contractor for project implementation in August 2022 (AB 6112). Ferguson will use Sensus AMI Solutions equipment and software in the project implementation. Though equipment procurement began immediately, there were significant delays obtaining adequate metering equipment due to high demand. As a result of equipment delays, the start of the meter replacement phase of this project was moved from April 2023 to March 2024. Ferguson's installation subcontractor, Pedal Valves Inc., will begin meter installations on Mercer Island this week.

DATA COLLECTION INFRASTRUCTURE & SYSTEM DESIGN

For the City to collect data from these new smart meters, data collection equipment must be installed at key locations around the Island and be positioned to capture signals from nearly every water meter. This data collection equipment is made up of two pieces: a base station box (approximately 22' square) and a tall, thin antenna (7-9' tall). Reliable signal coverage on Mercer Island can be particularly difficult due to the steep topography in some areas. To determine where this equipment should be placed, Sensus ran a propagation study in 2021, which is a computer-generated analysis of where and at what height antennas should be located to maximize signal coverage.

As part of the propagation study, the City identified two City-owned structures well-suited for this equipment: (1) a communications tower at the City reservoir, and (2) a ballfield light pole at Island Crest Park. After these locations were integrated into the analysis, the results of the propagation study indicated that five additional antenna locations were needed at various locations around the Island to provide adequate coverage. The propagation study also indicated the appropriate height for each antenna, which ranged from 80-110'. Results of this propagation study, showing the seven proposed data collection locations on Mercer Island, are shown in Exhibit 1 and references below as Option 1.

PERMITTING

The AMI system equipment is an essential public facility (EPF), which is defined in MICC 19.16 as "any public facility or facilities owned or operated by a unit of local or state government, public or private utility, transportation company, or any other entity that provides a public service as its primary mission, and is difficult to site."

EPFs require a Conditional Use Permit (CUP) in all zones, following the process outlined in chapter 19.15 MICC, a Type IV review process. In addition to the requirements for a pre-application meeting, Notice of Application, a Public Hearing with the Hearing Examiner, and a Notice of Decision, a Conditional Use Permit also requires the applicant to plan and execute a substantial public participation process.

In addition, because of its size and height, the AMI system equipment does not meet Small Wireless Facilities standards under MICC 19.06.070, and consequently, it cannot be permitted as such.

PUBLIC ENGAGEMENT

As the City prepared to apply for Conditional Use Permits for the seven locations identified in the propagation study, it also deployed a public engagement campaign in November 2023. This public outreach included a letter and Frequently Asked Questions flier mailed to every address within at least 300' of each of the proposed locations. Doorhangers about the project were hung at every parcel within the same radius of each site and the City launched a Let's Talk page for the project, with specific pages for each location that included a map of each area, information about the equipment dimensions and height, and a photo rendering of the new equipment.

Each element of the outreach program encouraged the public to provide comments and questions to staff through the Let's Talk page or via e-mail. The City received comments and questions from 11 households, the majority of which came from residents located near two proposed sites in south Mercer Island.

In mid-December 2023, the City decided to pause the permit application process for five of the seven proposed locations to evaluate alternative designs for the AMI data collection stations and to schedule a meeting to discuss these alternatives with the City Council. On December 15, staff submitted Conditional Use Permit applications to the Community and Planning Department (CPD) for two locations: Island Crest Park and the City Reservoir, both of which have existing structures on which an antenna and base station can be mounted.

CPD sent out a Notice of Application to every parcel within 300' of the two proposed locations on January 8, 2024, opening a 30-day comment period. These applications are currently under review by CPD. A Public Hearing with the Hearing Examiner will be scheduled next month, at which time a 30-day Notice of Public Hearing will be sent to all parcels within 300' of the sites. The Hearing Examiner will issue a Notice of Decision for each application following this hearing.

ISSUE/DISCUSSION

2024 PROPAGATION STUDY

In late 2023, City staff began work to evaluate alternative designs for the AMI data collection system that would reduce the height (and visual impact) of the antenna equipment. Staff requested a new propagation study from Sensus to determine how a maximum height of 60' would impact the distribution of new antennas without compromising data capture from meters. Because the Island Crest Park and City Reservoir antenna locations were already in permit review, the new propagation study included these two in the analysis, mounted at 80' and 110' feet, respectively.

The new computer analysis indicates that at the 60' maximum height, four additional antenna locations are needed (see Exhibit 2). The coverage provided by the new design is comparable to the previous design. While the first analysis attempted to tie antenna locations to City-owned properties and assets, Sensus has indicated that the less-restrictive parameters of the second analysis allowed them to pinpoint optimal antenna locations that are able to cover the island just as well as the initial study. In the second analysis, Sensus was told all utility poles on the island should be considered possible data collector locations, effectively allowing the antennas to be located in any area within City right-of-way.

DATA COLLECTOR INSTALLATION OPTIONS

The City is currently evaluating several options to install the remaining data collectors and complete the network required to operate the AMI system as designed. These options are outlined below, with an estimate of changes to the cost and timeline of project completion. For consistency, all options presented here are predicated on the approval of the two locations currently undergoing plan review. Should these CUP applications be denied, staff will need to work with consultants on a new propagation study for the areas these antennae would have covered.

2021 Design – Option 1

Implementing the original design for the system (Option 1) would entail the installation of five data collection stations in addition to the two currently under permit review. The seven proposed data collection stations are summarized in the table below and shown in Exhibit 1.

Location	Permit status	Antenna mount height	Pole information
1 - Roanoke/70th & 20th	Paused	80'	PSE-owned replacement pole
2 - MI City Hall	Paused	90'	New City-owned pole
3 - Eastside 71st & 72nd	Paused	80'	PSE-owned replacement pole
4 - South Mercer Playfields	Paused	80'	New City-owned pole
5 - South Point/Benotho Pl.	Paused	80'	PSE-owned replacement pole
6 - City Reservoir	In process	80'	Existing City-owned structure
7 - Island Crest Park	In process	110'	Existing City-owned pole

This option would require CUP applications for each location, installation of new City-owned poles, coordination with Puget Sound Energy (PSE) for pole replacements, and power drops to the new City-owned poles.

2024 Design – Option 2

The new design presented as a result of the 2024 propagation study (Option 2) requires four additional data collection stations in addition to the two currently under permit review. The six data collection stations are summarized in the table below and shown in Exhibit 2.

Location	Permit status	Antenna mount height	Pole information
1 - Roanoke/70th & 20th	Paused	50’	PSE or City-owned pole
2 - WMW & 32nd	Not started	50’	PSE or City-owned pole
3 - Crestwood	Not started	50’	PSE or City-owned pole
4 - WMW & EMW	Not started	50’	PSE or City-owned pole
5 - City Reservoir	In process	80’	Existing City-owned structure
6 - Island Crest Park	In process	110’	Existing City-owned pole

Option 2 identifies existing PSE-owned poles that would need to be replaced with poles approximately 10’ taller. Alternatively, the City could install new poles in the vicinity and coordinate power drops to these poles. Regardless of pole ownership, each new antenna location would require a public outreach program and CUP application, and pole installation/replacement. Exhibit 3 presents photo renderings of the WMW & EMW location with both a taller PSE-owned pole replacement and a new City-owned pole.

Small Wireless Facilities – Option 3

Although it has not yet been explored in detail, redesigning the AMI data collector system as an assemblage of small wireless facilities is an option as well. To meet the standards of small wireless facilities, the system would employ smaller antennae mounted below 50’. Determining the number of antennae required to provide coverage of the Island, and where they would need to be placed, would require another propagation study.

It can be assumed, however, that exploration of Option 3 would require the deployment of more data collection devices given the lower reach of the smaller devices. This would increase the equipment associated with the system, potentially increasing maintenance and replacement costs. The benefit, however, would likely be that the smaller devices could be co-located on existing poles.

Implementation of Option 3 would not require a CUP application for each site, and instead would require a Type II Administrative Review, which includes public notification. This option would also require coordination with PSE for devices intended to be co-located on the PSE poles.

TIMELINE CONSIDERATIONS

Ideally, an AMI system’s data collection network is fully deployed and operational before the installation of smart meters. Having the data network online during meter replacement enables the installers to test each meter as it is installed, ensuring that each can transmit data, and allows the installer to troubleshoot and correct connectivity issues immediately.

In the Mercer Island system, it is likely that most meters will be installed prior to the installation of the data collection equipment, and quality assurance testing will be performed once the antennae are activated. However, reducing the delay between meter installation and full network connectivity means that customers will have quicker access to their own water use data, leak alerts, and notifications. This information, which will be accessed through the customer portal, will be available once the network is able to transmit hourly

water use to the City's utility software. In the meantime, Utility Billing staff will read meters via drive-by radio-read data collection, once every two months.

Each of the options presented above will take several months to over a year to implement, and each has specific timeline trade-offs. Several examples are listed here:

- The CUP decision process can take up to six months, depending on the specific sites and permit workload.
- The process for replacing a PSE-owned pole requires an extensive application process, which takes approximately one year to complete.
- Running a new propagation study for a small wireless system will take several months, and the new design will require the procurement of new data collection equipment.

PROJECT COST

The staff will return to the City Council with revised project cost estimates based on feedback received as to the preferred option(s).

NEXT STEPS

City staff will use feedback from this Study Session to finalize a recommendation on the data collection station locations, including preparation of a revised cost estimate.

RECOMMENDED ACTION

Receive report. Provide feedback to staff.