

## Stormwater Committee Summary Report and Recommendations

### *Introduction*

Over the past two months the stormwater committee has evaluated The Greens stormwater design, historical records and evaluated the current status of the system. Previous flooding of our roads (Cambridge Loop and Ashbury Court, around Tract D) 3 of the last 5 rainy seasons have prompted this effort. The recommendations are made in good faith based on the research conducted by the committee.

### *Executive Summary*

- 1) The 2021 inspection by David Evans & Associates (DEA) indicated that the inlets and outlets of the dual 24-inch culverts from Tract C (runoff conveyance for portions of Division 2, Lots 55 through 64 of Division 1, and the golf course) to Tract D (flow through conveyance and stormwater treatment area), and from Tract D to Tract E (open space downstream of Cambridge Loop) required mowing/clearing.
- 2) Tracts C and D should be mowed in August
- 3) There are no records that Tract E has had any maintenance such as mowing or dredging performed.
- 4) The committee requests funding to perform this effort. Blockage in the stream channel downstream of Cambridge Loop is preventing our culverts from functioning as designed, with as much as 50% of the available pipe area under standing water thus being ineffective. This blockage most likely is in Tract E, but potentially could be in the properties downstream given the extremely flat slope. (See Figures 1 thru 4 at the end of this document).
- 5) The committee recommends the priority should be to mow Tract E along the drainage path to expose the drainage path, identify the blockage and determine corrective actions needed. We can then estimate mitigation costs to correct any issues.
- 6) WRS inspection from May and June 2023 indicated the culverts need a plan to be cleaned. About an inch of sediment has accumulated at the pipe inlets and outlets, but the entire pipe cannot be checked without proper equipment.
- 7) The drainage channel in the original stormwater design plans for Division 1, located behind lots 55 thru 60 and 61 thru 64 was not constructed, or was subsequently filled, and does not currently exist. This channel was required to convey runoff from the golf course and portions of Division 2 on the north side of Castlerock Drive, and all runoff from Tract B, over to Tract C. Therefore, stormwater conveyance in this area relies on the 8-inch pipe located in the easement area of lots 55 thru 64 to convey water to Tract C. Currently the ends of the two easement pipes remain underwater even in the dry summer months. As a result, the 8-inch easement pipes behind lots 55 thru 60 and 61 thru 64 should be added to the community stormwater maintenance plan and cleared of any blockage.
- 8) Tract D was recently improved, sediment was removed, and it appears to be functioning properly. Mowing and grass cutting removal are still required.
- 9) The committee recommends holding off on installing the proposed maintenance ladders until maintenance work has been completed to determine whether they are necessary. The HOA has spent \$11,500 fabricating the ladder and will require \$6,500 of concrete foundation work, plus the cost of transporting the ladder and installing it in Tract C. The 2021 inspection by David Evans and Associates has recommended a more permanent solution to manage a high-water event at the outlet of Tract D to prevent debris from clogging the culverts, however this appears to only facilitate clearing of debris.
- 10) Whatcom County has indicated (but not yet confirmed) that there is an Enforcement case against the second property downstream of Tract E, which has a storage pond, that has not been

resolved. Because the drainage channel is very flat, high water downstream could impact Tract E runoff. The stormwater committee will monitor the situation.

### *Design Summary*

The Greens stormwater system is designed to handle a 25-year storm event (defined as a 4% chance of being equaled or exceeded in any given year). It consists of a stormwater treatment facility (Tract D) which collects surface and roof runoff for most homes on Ashbury Court and the north side of Castle Rock Drive. The remaining homes in Division 1 and Division 2 drain to bioswales that are directed towards defined Open Spaces and ultimately California Creek. The roof runoff from homes on the north side of Castlerock Drive in Division 2 is also directed to Tract B in Division 2. This runoff water, along with the golf course runoff, combines and flows to a stormwater catch basin located on lot 63. An 8-inch infiltration pipe then discharges runoff into Tract C. A similar infiltration pipe is located behind lots 55 thru 60 that collects roof runoff and golf course water. The original Stormwater report stated that there was a ditch behind these lots to facilitate conveying water from Tract B Division 2 and the golf course - however it does not exist today. Dual 24-inch diameter culverts under Ashbury Court drain this runoff water into Tract D, the stormwater treatment area, and it also includes a flow-through channel to allow golf course and Division 2 water to bypass stormwater treatment, which then passes under Cambridge Loop through dual 24-inch culverts into Tract E.

The stormwater treatment section of Tract D has three ponds that are deeper than the drainage culverts and hence usually store water until evaporated. The two outer ponds collect stormwater from the neighborhood. When filled, these ponds overflow into the center pond, via designed spillways. The center pond has another spillway that discharges treated water into the flow-through drainage channel that connects the golf course, Tracts C, D, and E using the 24-inch culverts. Once water flows through Tract E and exits our property, it then flows through three other properties before going through a large culvert under Blaine Road and into California Creek. During high tides, California Creek water backs up through the culvert under Blaine Road and progresses up towards our property. One of the downstream properties has constructed a dam. This dam and its reservoir require a permit, but the permitting status is unknown, however the county is aware of the issues. Tracts A and B in Division 2 and Tracts C and E in Division 1 are platted as Open Space. Tract D is platted as a storm water treatment facility. We do not have any defined wetlands.

### *Historical Review*

The Greens development property was originally a farm and horse stable. The golf course runoff water drained through it. The catch basin (located behind future lot 63) collected runoff from both the golf course and the north side of what is now Castle Rock Drive. Runoff discharged through an 8-inch pipe directing water towards the roundabout area in Division 1. Tract C, D, and E had a natural drainageway, stated as one-foot deep and about 10 feet wide, conveying runoff water into California Creek along the same path it flows today. Long term residents of The Greens have observed standing water in the culverts most years in the summer months. Water has flowed over either Ashbury Court and/or Cambridge Loop 4 times since the Greens stormwater system was installed. These have been reported as sometime in 2010, December 12, 2017, January 7, 2020, and November 15, 2021. Data from the first three storms is lacking, but the 2021 storm exceeded the design capacity of our stormwater system and hence overtopping the road would be expected. And given that the drainage culverts are compromised by downstream blockage in Tract E, the conveyance capacity has been reduced, smaller storms (although still severe) will also overtop the road. Thus the road elevation above the culverts was constructed low enough such that runoff from a greater event, such as the 1% storm (100-year storm), can overtop the road, continue to flow downstream, and not reach the finished floor elevation of neighboring homes. It is usually too costly to construct stormwater infrastructure to higher standards. Most jurisdictions have

regulations that set reasonable expectations, and Whatcom County requires up to a 25-year event (one of the highest requirements in the country, primarily due to very infrequent thunderstorms in our area). Another requirement is that the 100-year storm event flood should remain 1-foot below the finished floor elevation of all homes, but basements and crawl spaces are not designed to be protected during these rare events. Therefore, during rare storms such as November 2021, some basements and crawl spaces can be impacted even if all installed stormwater infrastructure is performing to design standards.

### *Maintenance*

The stormwater bioswales and culverts are inspected once per month by WRS, who currently is the community's landscape service. Every three years, the design firm David Evans and Associates inspects the system per requirements by Whatcom County. Yearly, in August or September, the grass in Tracts A and B in Division 2 and Tracts C and D in Division 1 is mowed. In 2015, David Evans and Associates determined the storm water pond facility (Tract D) needed sediment removed. These ponds must be deeper to allow stormwater to be retained. Sediment removal was a \$26,000 expenditure at that time.

### *County Code and Review*

Given the standing water in the culverts, particularly at the outfall to Tract E, the committee determined the drainage path in Tract E should be cleared to determine the reason for the blockage preventing drainage. The current blockage renders the outfall pipes ineffective during high flow events because about half the pipe flow area is ineffective.

Some questions have been raised whether this area is a native growth area. We contacted Whatcom County and they sent a stormwater engineer to site to meet with us and superficially inspect the area. We have confirmed with the County that it is not a native growth area and is zoned open space. If the blockage that needs to be cleared is on our property (Tract E), it can be defined as a repair, and the HOA will need to notify the county before work begins. If the County determines it is not a repair and a permit is required, this will complicate matters and add significant cost. It also needs to be established if the dam and reservoir downstream on the adjacent was properly permitted and not causing a negative impact on our drainage. If there is an impact, the County would help address the issue.

### *Actions*

The first step is to mow the flow path in Tract E to determine if there is any blockage. Ultimately, we may need to mow all of Tract E, but for now we can limit cost by simply identifying the flow path. We also need to maintain the other Tracts as specified in our landscape agreement. After mowing, the committee will inspect the area make further recommendations. It is also advised to remove the blackberries along Cambridge Loop as this is an invasive nonnative species (New Zealand Blackberry), and any trash and woody material within our drainages that could block the culverts. The committee further recommends holding off on installing the proposed maintenance ladders (grate) at the outlets of Tract C and D until further notice. We will also evaluate removing the existing grates on the culverts, as they are normally required on small-diameter pipes to prevent people from entering the pipes. The original design had grates on both ends of the pipes for this purpose but grates are installed on only one side, negating their effectiveness.

### *References*

- 1) The Greens Loomis Trail As-Built Documents (on the HOA website)
- 2) Final Environmental Impact Statement, Loomis Trail Planned Development
- 3) Loomis Trail Division 1 Stormwater Design Report
- 4) Whatcom County Code Chapter 16
- 5) David Evans 2021 inspection report

- 6) WRS monthly inspection report
- 7) E-Mail from Ryan Barnes to the HOA Board summarizing concrete cost, dated October 12, 2022
- 8) On-site Whatcom County visit August 1, 2023 and subsequent discussions with County stormwater technician and planner

Respectfully submitted by the Stormwater Committee, Doug Moore, Mike Jacobs, and Jim Dunlap



Figure 1: Tract D outlet filled with standing water





Figure 2: Tract E Inlet with standing water



Figure 3: Tract D Inlet with standing water





Figure 4: Tract C Outlet with standing water