AGENDA DATE: July 17, 2019  ITEM NO. 14

SUBJECT: Status of 2017 Flood Damage Repairs

SUMMARY:

- Zone 7 is committed to providing an effective flood control system to the Livermore-Amador Valley. This includes maintenance and repair of the 37 miles of flood control channels owned by Zone 7.

- Zone 7 continues to assess and repair damage from the winter of 2017. The extent of damage ranged from significant erosion and damaged infrastructure to minor surficial erosion. Damages were prioritized to repair the most critical or significantly damaged sites first. The timing of the non-emergency repairs also depended on the ability to procure regulatory permits.

- The current status of repair progress is shown below:

<table>
<thead>
<tr>
<th>Year Repaired</th>
<th>Number of Sites</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>2017</td>
<td>10</td>
<td>Complete</td>
</tr>
<tr>
<td>2018</td>
<td>39</td>
<td>Complete</td>
</tr>
<tr>
<td>2019</td>
<td>47</td>
<td>Began repairs in May</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>96</strong></td>
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</tbody>
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- 25 remaining sites will be further evaluated for potential repair in 2020, bringing the total repaired sites to 121.

- 87 sites were removed from the field-documented 208 potential issues, as these were deemed appropriate to be incorporated into Zone 7’s routine maintenance program.

- The 2017 damage rehabilitation effort will be concluded in 2020 with the repair of the remaining 25 sites.

FUNDING:

Funds are budgeted and available in Fund 200 – Flood Control Emergency Operations.

RECOMMENDED ACTION: Information only.
BACKGROUND:

Zone 7’s Flood Protection section continues to assess and repair damage resulting from the storms of January and February 2017. The initial assessment documented 208 sites showing issues on channels owned by Zone 7, ranging from severe to minimal damage. Staff engineers later reviewed what was reported in the field before deciding what actions, if any, to take on the noted sites. Field documentation of a potential issue does not necessarily equate to a needed repair.

Upon monitoring over the past two years and further inspection, staff recommend reducing the initially documented 208 sites to 121 sites that may need repair. Of these, 49 have already been repaired, an additional 47 will be repaired in 2019, and the remaining 25 will be further evaluated for potential repair in 2020. Upon completion of the 2019 repairs, all plastic currently protecting vulnerable sites from the 2017 damage will have been removed. The use of weighted plastic sheeting to prevent further damage to a bank from erosion is a standard engineering practice for flood protection that is used throughout the country and is often reimbursable when state and federal disasters are declared. Because acquiring regulatory permits can be a lengthy process, sites are prioritized to help the regulatory agencies permit the most critical sites earlier.

To address the 2017 damages in order of highest importance, Zone 7 prioritized the damages for repair in accordance with the established priority ratings listed below:

- **Priority 1.** Imminent danger of loss of property (outside flood control right-of-way) or public roadway. Any possible life-threatening situation. Requires immediate action.
- **Priority 2.** Danger of damage to flood control facilities that could lead to Priority 1 rating or loss of access or increased liability exposure.
- **Priority 3.** Conditions that may lead to a Priority 2 rating, if not remedied within a reasonable (1-3 year) time period.

Priority 1 sites were all repaired immediately in 2017. In 2018, most of the Priority 2 sites were repaired, and in 2019 the remainder of the Priority 2 and many of the Priority 3 sites will be repaired. The table below summarizes repairs that will be completed by the end of the 2019 construction season.

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The remaining 87 sites removed from the original count of 208 potential damages have been incorporated into the flood protection section’s regular maintenance program. Staff conducts monthly inspections of all Zone 7 facilities, and should the condition of these damages change, they will be reconsidered for repair. The locations of all sites are documented in GIS and staff uses this tool as part of the monitoring program to keep track of issues and compare site conditions over time.
DISCUSSION:

The following photos from the winter of 2017, with descriptions of actions taken, represent examples from each priority level of damages.

Priority Level 1:

This slide on Arroyo Mocho in Pleasanton was considered a Priority 1 site for a few reasons: it was a large and unstable bank slide; there is a utility line in this bank; the fence was lost due to the slide; it was near a public road; and the access road was compromised. Zone 7 staff covered this slide in plastic for the rest of the winter to protect it from further rain damage and repaired it during the summer of 2017.

Priority Level 2:
This bank slide on Arroyo Mocho in Pleasanton was considered Priority 2 because if not repaired in a timely manner, it would likely have resulted in loss of the access road. However, it did not pose an immediate danger to Zone 7 facilities or other public or private property. This slide was covered with plastic to protect it from further damage and was repaired by the U.S. Army Corps of Engineers in the summer of 2018.

Priority Level 3:

![Image of Priority Level 3 slide]

This slide on Arroyo Mocho in Pleasanton was considered a Priority level 3 because while it does not pose any imminent risks, if left unrepaired, over time additional erosion could potentially undermine the concrete structure next to it. This slide will be repaired in Zone 7’s Phase 2 project in the summer of 2019.

As described in the Priority 1 and 2 examples above, Zone 7 often covers unrepaired bank slides with plastic to protect them from additional rainfall that could worsen the slide. As sites incorporated into our routine maintenance program are stabilizing and not expected to worsen, there is no need to cover them with plastic. New plastic will only be placed if inspectors find a new slide or if an existing damage worsens.

Staff uses engineering judgement when deciding if and when to repair a damaged site. Construction must be planned and considered carefully and only done when needed. While the criteria described in the priority rating is the governing factor in managing repairs, other considerations include the benefit to cost ratio and other impacts the repair will have, including environmental impacts and disruption to the public (i.e. if recreational trails must be closed). If a damaged site does not pose a problem and the channel has neared equilibrium with the damage in place; that is, the damage does not grow nor contribute to additional damage, it may warrant monitoring rather than incurring the cost, environmental impact, and potential public disruption to construct a repair.

The following page shows an example of one of the 2017 sites that staff has recommended for incorporation into our routine inspection program.
The erosion at this site is superficial and does not pose a risk to the overall bank stability. The erosion did not over steepen the bank. Vegetation has regrown and helps to stabilize the soil. As seen by comparing the 2017 and 2019 photos, the apparent issue is now nearly indistinguishable from the rest of the channel bank.

Although the flood control channels are engineered features and must be maintained, a small amount of earth movement is a natural part of any waterway and not necessarily a cause for concern. By monitoring sites rather than constructing a repair for every apparent damage to the channel, Zone 7 saves money and resources and reduces environmental and public impacts. Monitoring these sites is a cost effective way to fulfill our mandate to provide flood protection and allows us to prevent unnecessary repairs and prioritize critical ones.
After the 2020 construction season, Zone 7 will have completed all repairs of 2017 damages currently considered necessary. As we continue our routine inspections, should the condition of any site change, we will modify our plans as required to maintain the flood control channels’ efficacy.

**RECOMMENDED ACTION:** Information Only.