Contra Costa County Flood Control & Water Conservation District

Flood Stage Report

April 10, 2025

Grayson Creek @ Taylor Boulevard

The Contra Costa County Flood Control and Water Conservation District (FC District) received a grant from the State of California Department of Water Resources. The grant program was the Statewide Flood Emergency Response (FER) Grant Round 3 Under, Proposition 84: "The Safe Drinking Water, Water Quality & Supply, Flood Control, River & Coastal Bond Act of 2006 Et Seq." The purpose of the grant awarded to the FC District was to fund a project that would determine flood stage elevations at 12 of the FC District's stream gauges and outreach to agencies and the public about the findings and use of those flood stages. This report documents the flood stage determination for Grayson Creek using the stage at the stream gauge just downstream of Taylor Blvd pedestrian bridge over Grayson Creek in Pleasant Hill.

RESULTS AND HOW TO USE THEM:

Model analysis of the creek shows there could be several flood stage locations along Grayson Creek and Murderers Creek. Table 1 lists the stream gauge stages along with locations where the associated flooding could occur. A map showing the locations in Table 1 can be found at the end of this document. The creek stage and flood stage can be read from a plot on the FC District's **RainMap** at www.ccflood.us/rainmap.

Table 1: Grayson Creek @ Taylor Boulevard Gauge Stage and Flooding Location List
GC = Grayson Creek, MC = Murderers Creek

Flooding Order	Guage Stage	Flooding Location	Creek
8th	7.9	800 Ruth Dr	GC
7th	7.4	Oak Park Ln	GC
6th	7.3	509 Masefield Dr	GC
5th	6.9	Theo Ln Ft Bridge	GC
4th	6.6	Boyd Rd (MC) | Boyd Rd (GC) Babette Ct (GC)	GC/MC
3rd	6.1	265 Campbell Ln	GC
2nd	5.8	245 Stevenson Dr	MC
1st	4.0	110 Poshard St	MC

Note: The gauge stage listed is the height of water above the sensor at the gauge. It is not the depth of water in the creek because the sensor is not set at the low point of the creek. The elevation of the water can be calculated by adding 21.46 feet. In the future we will likely provide both stage and elevation in our flood stage information.

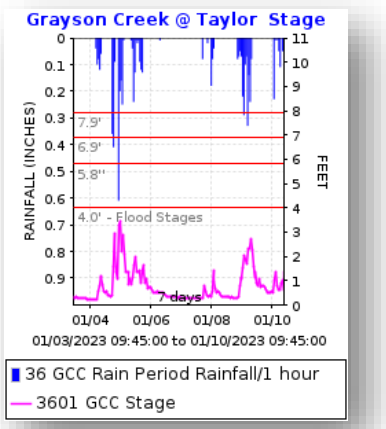
Observing Flood Stage

Anyone with web access can use the FC District's RainMap (www.ccflood.us) to observe the stage at the stream gauge. To view the stream gauge stage, go to RainMap. On RainMap, click the "**Datasets**" button in the upper left. A menu will drop down. Click on "**Water Level**" and the map will show all the points for the stream gauges the FC District operates. Then pan and zoom on the map until you find the location of the stream gauge you are interested in. Click on the point at the stream gauge location and a window for the stream gauge will pop up. The popup will have the name of the stream gauge, a table with the latest stage, and a plot of the

stage for the last 7 days. The popup will also have links associated with the gauge (see example below).

Flood Stage Lines

On the plot you see flood stage line(s) matching those in the table above. Not all of the flood stage lines will be shown. Other flood stage lines may be added if it is found they will help communicate the potential flooding better. If you click the plot, it will open another webpage that has the same 7-day plot you see in the popup and a wider plot of the gauge you choose with data for the last day. That page also has plots of all of the FC District stream gauges with their respective flood stage lines they have been determined.



Flood Stage Information

Above the graph on the popup is a link that says, "Flood Stage Information". Clicking this link will go to a webpage with information about the flood stage. That page has a link which can be clicked to email feedback about when and where flooding from the creek was observed. This feedback is critical for confirming and correcting the flood stage.

HOW THE FLOOD STAGES WERE DETERMINED:

The FC District engineering personnel (staff) started the development of the model by searching for existing models, creek flow data, terrain data, and engineering drawings. These were used to build the initial model. The following explains how each component that went into the model was developed.

Model Limits

The limits of the model for Grayson Creek were from Walnut Creek confluence to up the East Branch of Grayson creek to the confluence upstream of Gregory Lane up Murderers Creek to near Caitlin Court

Hydraulic Model

For this stream gauge, three pre-existing HEC-RAS models were used to model the watershed analyzed by the gauge. The model for the Grayson Creek reach downstream of Taylor Boulevard was the product of joint work by FCD and the US Army Corps of Engineers in a study of the Lower Walnut Creek watershed. This model was then updated with geometric data from 2018 LiDAR surveys and plans for the replacement of Marsh Drive Bridge, the widening of State Route 4, and the desilt of Walnut and Grayson Creeks. The simulation was run using the five recurrence intervals available for this geometric model of Grayson Creek, and for each one the water surface elevation (WSE) at the location of the stream gauge was noted. Stage was calculated by subtracting the minimum channel elevation at the stream gauge (23.95ft NAVD 88) from each of the WSE values. Two more models were used to model Murderers Creek, Grayson Creek between Roche Drive and Taylor Boulevard, and the East Fork of Grayson Creek.

For this analysis, the first (flood-producing) storm event that overtopped the banks of Grayson was identified for each flood stage occurring during the 25-year storm. Using the recurrence interval at which the flood stage was noted and the next weaker storm, an interpolation was

performed to calculate the WSE of the flood stage at the stream gauge. This was effective as a calculation method for flood stages occurring after the peak flow of the 5-year storm. For the WSE calculations of the first and second flood stages, interpolation was used between the 5-year storm and a lower bound hydrology file created by scaling down the hydrograph multipliers of the 5-year storm.

Hydrology
The hydrology for the model was performed several years ago and is a set of hydrographs developed by the US Army Corps of Engineer for their project. We have simply used the hydrographs that are in that model for this effort.

FLOOD STAGE ANALYSIS:

The HEC-RAS model was reviewed and adjusted to meet the project needs while staying within the project schedule and budget. Flow depths were analyzed using RAS Mapper, which overlays floodwater depth on the terrain, making it easy to identify when water levels exceed creek banks. By reviewing each model run, staff could observe where flooding occurred and document the flood flow scenarios and locations. If the results appeared inaccurate, the model was further reviewed and adjusted. Additional flow scenarios may have been incorporated as discussed above.

SUMMARY AND CONCLUSON:

The flood stages presented in this report are intended to increase awareness of potential flooding. However, since these stages have not been validated by actual storm events, they should be used with caution.

Individuals using these flood stages for situational awareness during storms are encouraged to report observations to the FC District at hydro@pw.cccounty.us. Please include the location, time of flooding, and any other relevant details. If the water level rises above the flood stage line without causing flooding, or if flooding occurs before the water reaches the flood stage line, the FC District needs to be informed.

DISCLAIMER:

The flood stages in this report are based on models with inherent limitations and assumptions that may change over time. Use them with caution, as conditions in the creek channel and at bridge crossings can change seasonally and during storms due to debris blockages, bank failures, or fallen trees. Sediment buildup, vegetation growth, and human activities can alter the creek's capacity over time, reducing the accuracy of these models. Such changes may obstruct flow and lead to flooding at lower storm levels than predicted. Also, associated maps and websites may have errors or inconsistencies and real-time data is reliant on power and internet connections which can fail to operate and provide data in a timely manner. During stormy weather power and communications are more prone to fail. Use this information with caution and do not rely solely on this information and associated data when making decisions related to emergency situations.

This report may be revised and updated as needed based on feedback regarding flood stages.

TERMS AND ABBREVIATIONS (not all terms used in this report)**:**

ArcMap is a GIS program (see below) that can be augmented with other installed tools such as HEC-GeoRAS (see below). It is used extensively and is the most widely used GIS software and is created by Esri, Inc.

Geometric data is data representing the geometrical aspects of the creek including elevations, locations of cross section, spacing between cross sections, and bridge geometry information. It also includes values related to hydraulic aspects of the creek including roughness, obstructions, expansion and contraction coefficients.

Graphical Information System (GIS) is a type of mapping software used to storm, map, and analyze geographic data in point, line, polygon, raster and database formats.

HEC-GeoRAS and **HEC-RAS** are software developed by the US Army Corps of Engineers, Hydrologic Engineering Center (HEC) who developed the River Analysis System (RAS) software. RAS Mapper works inside HEC-RAS.

LiDAR stands for **Li**ght **D**etection and **R**anging and is a remote sensing technology that uses lasers to measure distances and create 3D maps. The data used was collected by LiDAR equipment mounted in an airplane.

File path: G:\fldctl\Hydrology\Streamflow\Flood Stage Reports\Final Flood Stage Reports\Grayson Creek @ Taylor Boulevard.docx

Attachment: Map

Contra Costa County Flood Control and Water Conservation District
255 Glacier Drive
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Flood Stages

Grayson Creek @ Taylor Blvd (GCC)

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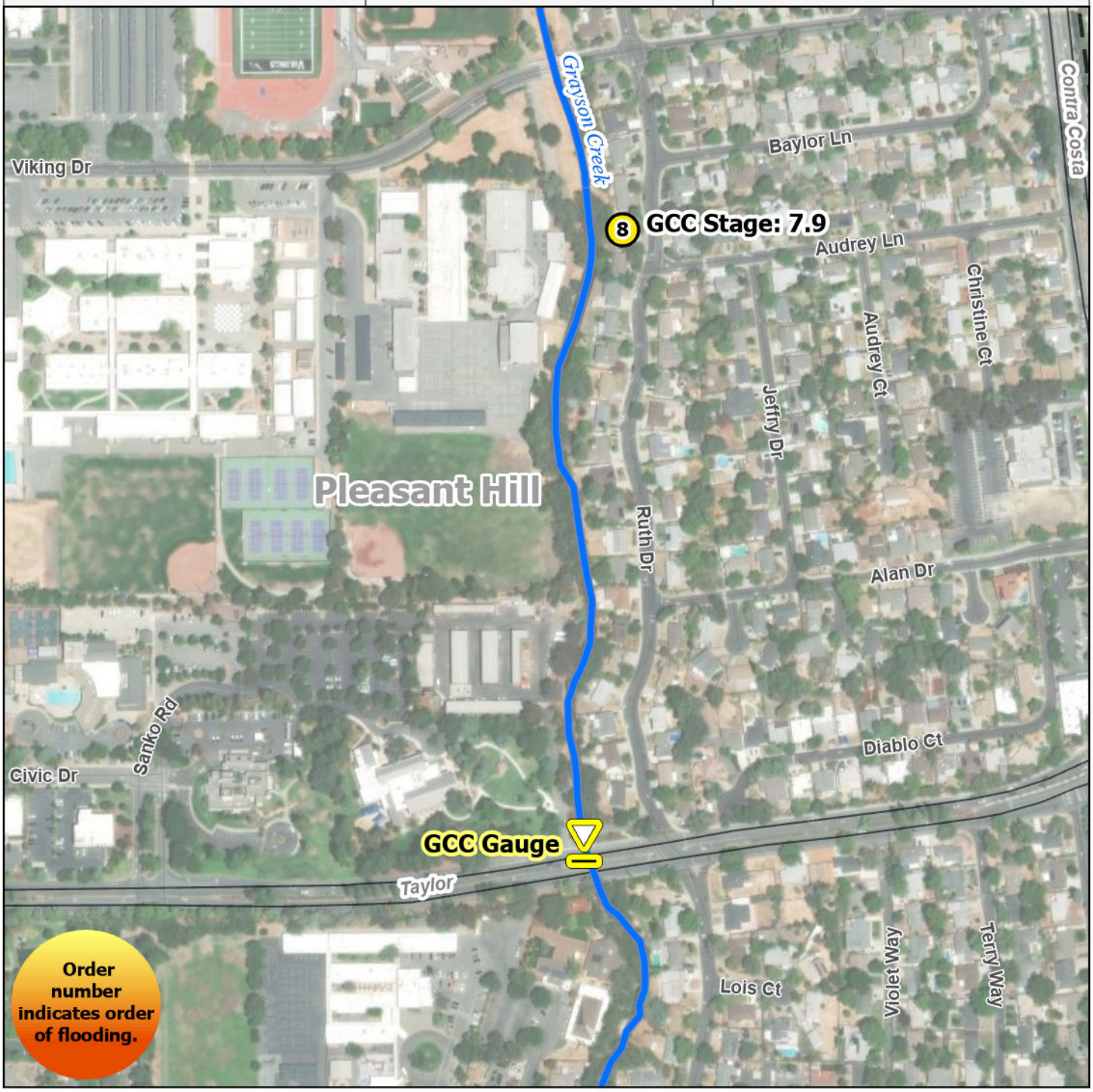

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Legend

- 1 — Flood Location and Order
- Stream Gages
- 9 / 1 — Order of Flood Stage
- Creeks
  - Creeks
  - Underground Creeks

1:4000

0 200 400
Feet

N

Pg 1of 3 GCC

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5/1/2025 by: A Torres and M. Boucher

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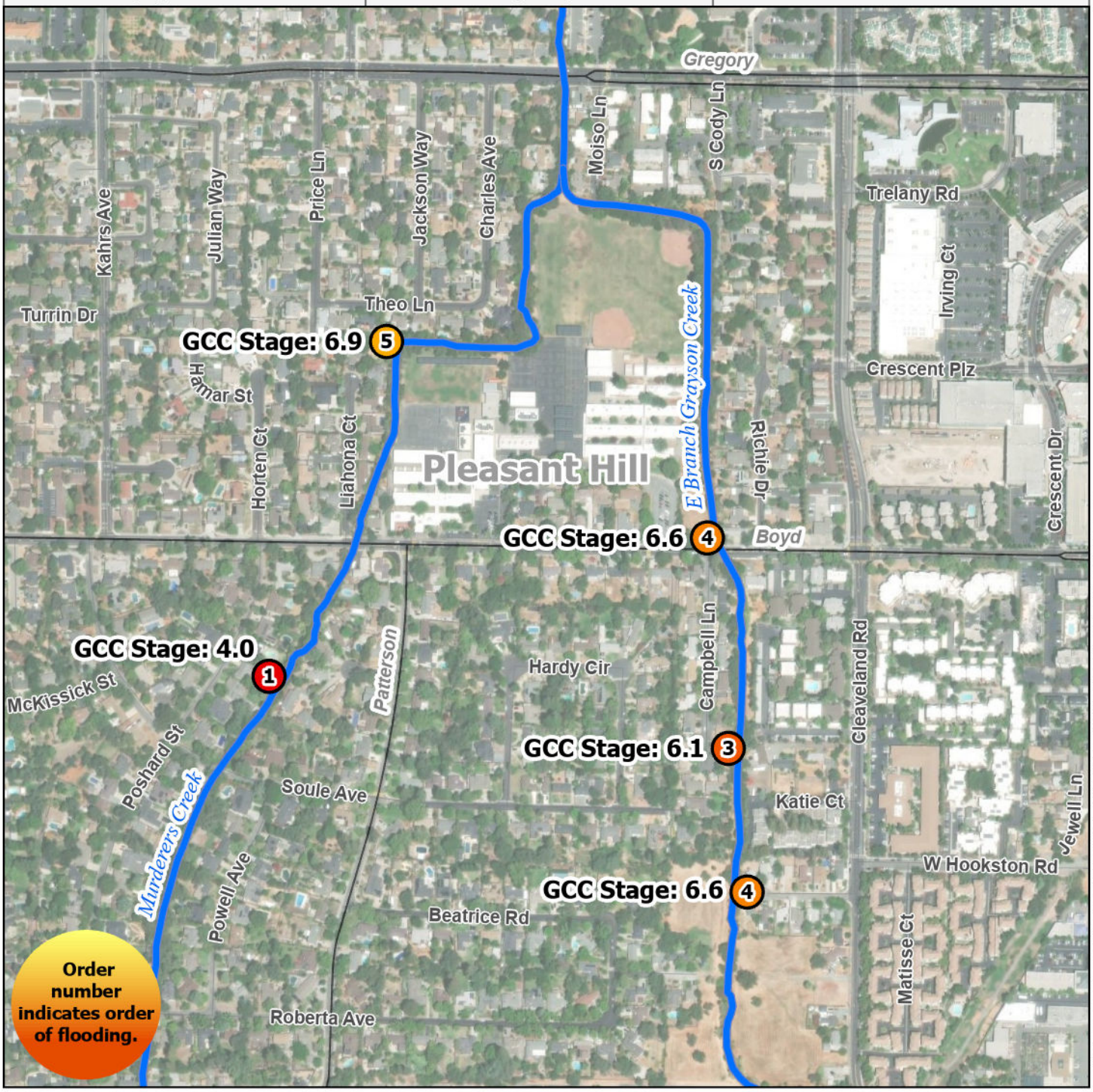

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Legend

- 1 — Flood Location and Order
- Stream Gages
- 9 / 1 — Order of Flood Stage
- Creeks
  - Creeks
  - Underground Creeks

1:6000

0 305 610

Feet

N

Pg 2 of 3 GCC

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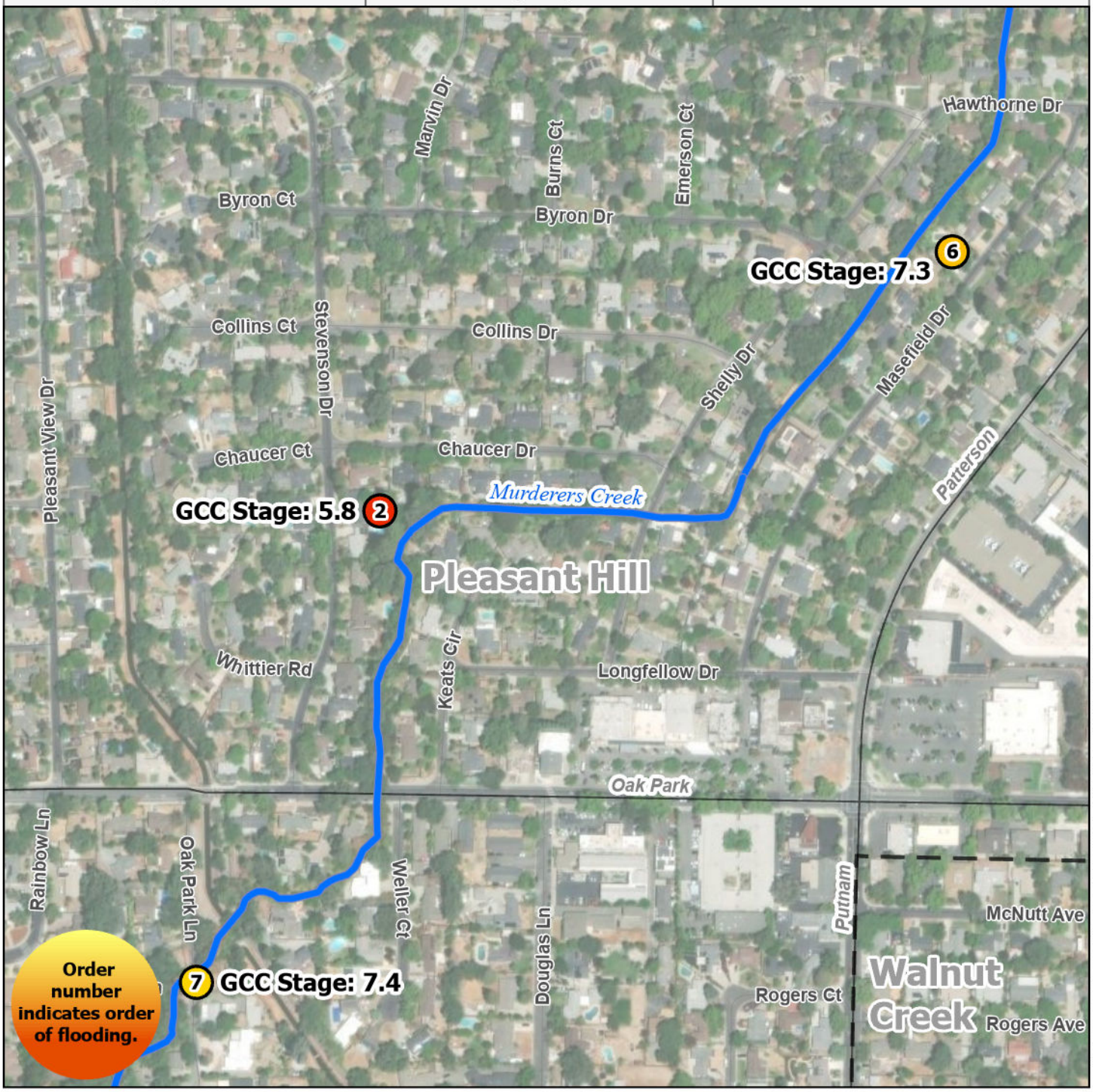

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Legend

- 1 — Flood Location and Order
- Order of Flood Stage (9 … 1)
- Stream Gages
- Creeks
  - Creeks
  - Underground Creeks

1:4000

0 200 400
Feet

N

Pg 3 of 3 GCC

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