Overview

On February 1, 2016, Palo Alto City Council strengthened requirements designed to minimize the pumping and discharge of groundwater from basement (or below ground garage) dewatering during construction. Pumping of groundwater after the completion of basement construction has not been permitted for over a decade. In recent years, concerns that construction dewatering may be wasting water, potentially damaging structures, trees and vegetation, and depleting or altering the flow of groundwater, have arisen. Therefore Palo Alto added new requirements.

Public Works only allows drawdown well dewatering of groundwater. Open pit dewatering of groundwater is disallowed. Open pit dewatering is allowed for rainwater that may accumulate at the bottom of an excavation, if water quality limits are met. Groundwater dewatering is only allowed from April 1 through October 31 due to inadequate capacity in the City's storm drain system. Open pit dewatering of rainwater is allowed throughout the year, but must meet water quality requirements.

After assessing the results of new dewatering regulations from the 2016 Construction Season, the City Council approved several enhancements to the dewatering policy that have been codified in Palo Alto Municipal Code and go into effect May 4, 2017. The 2017 enhancements include improving fill station performance, ensuring watering of adjacent neighboring vegetation, monitoring actual groundwater elevation changes, clarifying reporting, and enhancing the Hydrogeologic Study, while adding an exemption to the Study if groundwater pumping can be limited to 30 gpm or less using techniques such as cut off wall design.

Residential sites are now only allowed to dewater for a 10-week time period with a 2-week startup period. At the end of the two-week startup period, compliance with all performance standards and water quality standards shall be demonstrated. In addition, groundwater can only be pumped up to a maximum of 3 feet below the basement slab center following the two week start up period. Once the slab is poured, the depth to the center of the slab shall be 1 foot.

A geotechnical report must be submitted for the site (separate from the Geotechnical Study described below), and must list the highest anticipated groundwater level. Public Works recommends a piezometer to be installed in the soil boring. The contractor must determine the depth to groundwater immediately prior to excavation by using the piezometer or by drilling an exploratory hole if the deepest excavation will be within 3 feet of the highest anticipated groundwater level. If groundwater is found to be within 2 feet of the deepest excavation, a drawdown well dewatering system or cutoff wall must be installed, or, alternatively, the contractor can excavate for the basement without a dewatering system in place and hope not to hit groundwater. However, if groundwater is hit, the contractor must immediately stop all work and must meet all of the following requirements prior to resuming work.
Public Works may require water to be tested for contaminants prior to initial discharge and at intervals during dewatering. If testing is required, the contractor must retain an independent testing firm to test the discharge water for the contaminants Public Works specifies and submit the results to Public Works.

Below is a summary of the pre-existing requirements, with the recently adopted requirements included. The overall goal is to minimize the discharge of groundwater from basement construction dewatering. The requirements fall into four categories: 1) Fill stations are required so that others may fill water trucks or connect garden hoses for irrigation; 2) Use plans are required to demonstrate that the applicant/builder is arranging for use of as much of the pumped water as possible and minimizing storm drain discharge; 3) A Geotechnical Study is required to determine any potential effects and needed avoidance measures; and 4) Street Work/Dewatering permits are required (and are issued after requirements #1, #2 and #3 are completed).

1. **Fill Station Requirements**

   Fill station requirements are explained in the attached “Fill Station Requirements” and are summarized in the check-list shown below:

   Note: When the City determines that the site is too close to an area of ground water contamination, no fill station shall be provided.)

   a) Locate the fill station box outside the fence to allow 24-hour per day access;
   b) Provide 2 ½” hydrant fitting hose connection with a 50-foot (minimum) hose. Applicant must demonstrate maximum 10-minute fill time for a ~2700 gallon water truck
   c) Provide at least two 100’ hoses outside the fill station box, 10 gallons per minute (gpm) deliveries (simultaneously) during the two week start up period
   d) Design the tank system so that the storage tank is always at least one-half full;
   e) GFI outlet inside or electrical connection outside the box;
   f) “In-use” cover over switch/outlet in box;
   g) Provide a “Water Filling Station” sign on the fill station box;
   h) Provide a “Non-Potable Discharge” sign on the discharge point;
   i) “No Hoses Crossing Street and Sidewalk” sign at hose bibs;
   j) Supply log sheets, and a pen inside the box for truckers to show date and amount of filling;
   k) Provide a fill station box combination lock (combination should be 2, 4, 6, 8)
   l) Provide sufficient flow meters and data loggers to determine both the water used through the fill station and the total water pumped from the ground;
   m) Protect against trip hazards with sidewalk bridges and appropriate signage as needed;
   n) Once water is in the tank, call Watershed Protection (650-329-2430/2122) for water quality testing;
   o) When Fill Station is ready, call Public Works Engineering Inspection (650-496-6929) for inspection and call 650-444-6173 for Electrical Safety Check;
   p) Flow meters should start at zero, should be easily readable and in a safe location at the outlet of the settling tank;
   q) Pump and hose bib are operational;
   r) Applicant will be required to report on all measurements and requirements (reports due at the end of the two-week start-up period, then bi-weekly, and then a final report at the end of pumping).
2. **Use Plans**

A brief groundwater use plan must be prepared to show how the groundwater will be used to the maximum extent practical. It shall be submitted with the Street Work/Dewatering Permit Application, and shall contain the following minimum provisions:

a) Applicant distribution of City-provided door-hangers to advertise the availability of water; these are to be collected if still apparent after 24 hours.

b) Applicant watering of on-site and neighboring vegetation, to the extent desired by owners;

c) Applicant piping water to any nearby parks and schools as requested by City;

d) Applicant trucking water one full-day per week to irrigation sites as directed by the City;

e) Applicant using water on-site for dust suppression and other construction needs.

3. **Geotechnical Study / Determination of Effects and Associated Avoidance Measures**

   **Note:** applicants are exempt from this requirement if groundwater pumping can be limited to 30 gpm or less using techniques such as cut off wall design.

Conduct a Geotechnical Study to determine the radius of influence (i.e. extent of cone of depression) from each dewatering well as a function of time, based on local soil and groundwater conditions. All wells and other dewatering sites within a 400-foot radius (roughly one City block) of the property that may interact with dewatering activity, using information available from the City, shall be included in the study. State or show the exact location of these dewatering sites. Prepare a map and cross sections of the cone(s) of depression.

The key change for 2017 is applicants are now required to verify the anticipated drawdown curve with a pump test using actual wells. Cone Penetrometer Tests (CPT) are also encouraged to verify soils data. The actual pumping rates, following the two week start-up period, shall be limited to the rates calculated in the verification. The maximum amount of water pumped over the 10-week period shall be limited to that calculated during verification. To support this work, measure the ground water level at a distance representative of the distance to the nearest structure on an adjacent parcel, or farthest feasible point on the subject site. This monitoring shall be daily for the first week, then weekly thereafter. At the end of the 2 week start-up period or thereafter, if drawdown results are greater than anticipated, submit a revised Geotechnical Study and any revised conclusions on impacts of the groundwater drawdown. Survey and mark land elevations on structures on adjacent parcels (obtain permission first) prior to any pumping and weekly thereafter.

State whether it is reasonably likely that the proposed dewatering will cause effects (including settlement or movement) on off-site private or public structures or infrastructure, including the right of way, easements, and utilities within public utility easements. State whether it is reasonably likely that the proposed dewatering will reduce the amount of water taken up by vegetation or trees to a level that will affect the health or viability of the vegetation or trees. Utilize a Certified Arborist Sub Consultant to verify any such effect on trees.

To the extent that the qualified professional states that off-site effects are reasonably likely to occur, identify avoidance measures to be implemented that will minimize the type and severity of those effects. Avoidance measures are also to be employed to the maximum extent practical to minimize the flow rate and duration of the pumping, even when off-site effects are not specifically identified. Avoidance measures may include, for example: optimizing well count, well depth, well location, pumping rate, and/or duration of pumping; supplemental irrigation of trees or vegetation, soil amendment, or other
plant protection methods recommended by a certified arborist; alternative dewatering or construction methods. Develop a monitoring plan to assess any actual effects on vegetation, trees, structures and infrastructure. The Geotechnical Study and description and extent of the cone of depression must be stamped by a California licensed Geotechnical Engineer and submitted to the City, and will be made available for public review. A Geotechnical Study Worksheet is attached.

4. **Grading Permit/Street Work/Dewatering Permit Application**

Dewatering will now be reviewed as part of the Grading Permit. The Grading Permit for a project will not be issued until all required submittals related to dewatering have been submitted, reviewed and approved by Public Works. Once all required submittals have been reviewed and approved by Public Works, a Dewatering Permit and Street Work Permit must be obtained before any discharge from the site occurs. Dewatering discharge to the storm drain system cannot occur between October 31 and April 1 to ensure that the full capacity of the storm drain system is available for storm flows. If the applicant can demonstrate that they can maintain 30 gpm flows, the attached Street Work/Dewatering Permit Application Checklist becomes the operative worksheet (as opposed to the Geotechnical Study worksheet).

A Residential Street Work/Dewatering Permit will be issued for a maximum period of 10 weeks to ensure that minimization of pumping duration occurs. Administrative penalties shall accrue following the permit expiration date, if pumping and/or discharge continues.

J. Michael Sartor, P.E.
Public Works Director

[Signature]

5/12/17

Date