



## Regulations for Groundwater Dewatering during Construction of Below Ground Structures

### A How-to Guide to Meeting City of Palo Alto Dewatering Requirements

#### I. BACKGROUND

In recent years, concerns that temporary construction-related groundwater dewatering may be wasting water, potentially damaging structures, trees and vegetation, and depleting or altering the flow of groundwater, have arisen. In response, the City of Palo Alto (City) established new requirements in February 2016 designed to minimize and standardize the process of pumping and discharge of groundwater from dewatering of below ground structures (e.g., basement or parking garage) during construction.

After assessing the results of new groundwater dewatering regulations from the 2016 and 2017 Construction Seasons, the City Council approved several enhancements to the dewatering policy that were codified in the Palo Alto Municipal Code and went into effect in May 2017, and again in December 2017 (Attachment 1). The 2017 changes include improving Fill Station performance, monitoring actual groundwater elevation changes during the entire dewatering season, assessing impacts on nearby structures, clarifying reporting requirements, and enhancing the Geotechnical (now Hydrogeological) Study (Study). This guide provides further explanation regarding the most recent code changes (which became effective on February 21, 2018) and is intended to assist project applicants in meeting code requirements.

#### II. GENERAL GROUNDWATER DEWATERING REQUIREMENTS

Note that this document is in reference to *temporary groundwater dewatering during construction of below ground structures*. This document does not contain information regarding dewatering of *existing* below ground structures in the City of Palo Alto. Temporary construction-related groundwater dewatering (dewatering) may be conducted using 1) groundwater exclusionary techniques (e.g., secant or cut-off wall), or 2) controlled groundwater pumping, otherwise known as drawdown well dewatering. The City's Public Works Department (Public Works) does not allow open pit dewatering of groundwater during construction; however, it may be allowed, if water quality limits are met, for removal of rainwater if it has accumulated at the bottom of an excavation site. If rainwater dewatering is required, the project manager/applicant must contact the City's Watershed Protection Group at (650) 329-2122 before discharging to the City's storm drain system.

Attachment 2 provides applicants a basic flow chart to understand the City's compliance process regarding the two types of allowed construction dewatering. To assist the City in determining whether dewatering will likely be required in the construction of below ground structures, the project applicant must submit a Geotechnical Report (separate from the Hydrogeological Study described below) prior to the Building Permit application. In addition, if the deepest excavation will be within five feet of the anticipated groundwater level submitted in the Geotechnical Report, the contractor must determine the depth to groundwater immediately prior to submittal of the [Excavation and Grading Permit](#).

If groundwater is found to be within two feet of the deepest excavation, a drawdown well dewatering system or cutoff wall must be installed. Regardless of this testing, if groundwater is actually encountered during construction (and the applicant does not have a dewatering permit), the contractor must immediately stop all work and must meet all of the following requirements prior to resuming work.

The City's dewatering season is April 1 through October 31 due to the capacity of the City's storm drain system. Dewatering to the sanitary sewer system will be allowed only under special circumstances and with a discharge permit obtained through Public Works' Watershed Protection Group. During the dewatering season, sites will be allowed to dewater for a 12-week time period, including a two-week start-up period. The two-week start-up period is intended to provide adequate time for the contractor to meet the City's dewatering requirements as well as City staff to inspect and approve the equipment set-up and discharge quantity and quality. At the end of the two-week start-up period, compliance with all performance standards and water quality standards shall be demonstrated in order to continue dewatering.

Residential sites are expected to complete dewatering within the allotted time period, but may be allowed to continue dewatering beyond 12 weeks only under special circumstances and if approved by the City Engineer. For large, non-residential sites, City staff will consider allowing groundwater discharges to occur (to the storm drain system) from November 1 to March 31 if 1) the discharge is limited to  $\leq 10$  gallons per minute or 2) the applicant can provide sufficient evidence that the receiving storm drain line and water body has sufficient capacity to accommodate a 10-year, 6-hour storm event in addition to the dewatering discharge.

Where dewatering is required, applicants shall conduct dewatering in full compliance with the provisions of Chapter [16.28](#) (Excavation, Grading and Fills) as well as Chapter [9.10](#) (Noise) of the [City's Municipal Code](#), the regulations in this guide, and other permit conditions established by City staff. Due to the complexity of dewatering projects, City staff may impose and enforce additional requirements when or after a permit is issued in order to ensure public safety, ensure the condition of its infrastructure, or to protect the water quality of downstream water bodies. During the period of construction and dewatering discharge, project applicants/permittees are expected to promptly implement actions identified and required by City staff, including, but not limited to, notices of non-compliance and directives requiring immediate cessation of discharge. Administrative penalties may be put into effect for sites not in compliance with City requirements, and will accrue if the applicant does not comply as requested by the City. A cessation order may be issued for reasons including, but not limited to: capacity issues in the storm drain or sanitary sewer systems; storm drain or sanitary sewer system failures; excess flow entering the Palo Alto Regional Water Quality Control Plant, including exceptional storm events; emergency or routine maintenance of City infrastructure; and protection of the environment, public health, safety and welfare.

### **III. GROUNDWATER EXCLUSIONARY TECHNIQUE REQUIREMENTS**

*If the rate of groundwater discharge is greater than thirty gallons per minute for residential sites, groundwater exclusionary techniques cannot be used, and the requirements of Subsections IV (below) shall be followed.*

When groundwater exclusionary techniques are utilized, applicants must submit to the City a Dewatering Permit packet with Grading and Excavation Permit application (after planning entitlement is issued). The Grading and Excavation Permit for a project will not be issued until all required submittals related to dewatering have been submitted, reviewed and approved by Public Works Engineering staff. The (Exclusionary Techniques) Dewatering Packet (Attachment 3) shall include the following: 1) Cover Page and 2) Inspection Checklist. Groundwater exclusionary techniques shall be conducted in compliance with the following:

- A. The rate of discharge of groundwater shall be limited to thirty gpm or less for.
- B. The Dewatering Plan shall be followed at all times when removal of groundwater from the project site is required and must focus on using the pumped groundwater to the maximum extent possible. When feasible, the primary focus of discharge shall be to percolate the discharge onto the construction property where pumping is occurring rather than into the storm drain system. Groundwater may be discharged on neighboring properties located on the same side of the street if the property owners provide permission. This should be handled between the project applicant and the property owners without facilitation or further approval from the City.
- C. A Traffic Control Plan, which must be followed during the entire dewatering period may be required with the Grading Permit Application and be followed. The traffic control plan shall include, among other provisions, an appropriate schedule for an attendant to be present on the street during the period of the installation of the groundwater exclusionary technique.
- D. The applicant shall install a groundwater monitoring well at the site. It shall be at the farthest feasible point on the construction site from the underground structure. Initial groundwater level results must be included in the dewatering plan (same data point as the one required prior to grading and excavation permit application).
- E. Project status reporting: During the construction period of the underground structure, the applicant must submit periodic groundwater level reports and have the data available per request. At minimum, monitoring well data shall be collected daily for the first two weeks of the 12-week period and weekly thereafter. A final report shall be submitted two weeks after pumping ceases. All status reports should be submitted to Public Works Engineering staff at the Development Resource Center. Questions should be directed to [pwecips@CityofPaloAlto.org](mailto:pwecips@CityofPaloAlto.org).

#### **IV. CONTROLLED GROUNDWATER PUMPING (WITHOUT A SECANT OR CUT-OFF WALL) REQUIREMENTS**

When controlled groundwater pumping techniques are utilized, applicants must submit to the City a Dewatering Permit Packet with the Street Work and Grading and Excavation Permit applications (after planning entitlement is issued). Once all required submittals have been reviewed and approved by Public Works Engineering staff, the applicant may be issued the Grading and Excavation Permit, a Dewatering Permit, and a Street Work permit; a Dewatering Permit must be obtained before any discharge from the site occurs. Note that for residential projects, the grading and excavation permit is only issued concurrently with the

Building Permit. While discharging to the storm drain system, construction work on the underground structure shall be continuous and occur daily, with the contractor making progress towards completion of the underground structure without delay and following the detailed construction schedule provided in the Dewatering Permit packet.

In addition to what is required for exclusionary techniques (aside from the cut-off wall itself and the 30 gpm limitation), a Hydrogeological Study and an in-depth Groundwater Use Plan must also be submitted. Refer to the Controlled Groundwater Pumping Dewatering Permit Packet in Attachment 4 for more information. The following provides additional details regarding the City's controlled groundwater pumping requirements:

As with exclusionary techniques, the applicant shall install a groundwater monitoring well at a farthest feasible point on the construction site from the underground structure. Initial groundwater level results must be included in the Hydrogeological Study. During the construction period of the underground structure, the applicant must submit periodic groundwater level reports and have the data available per request. At minimum, monitoring well data shall be conducted daily for the first two weeks of the 12-week period and weekly thereafter. At the end of the start-up period or thereafter, if drawdown results are greater than anticipated, the applicant shall submit a revised Dewatering Hydrogeological Study and any revised conclusions on impacts of the groundwater drawdown.

- A. Dewatering Hydrogeological Study - The purpose of this Study is to determine the initial, pre-construction groundwater levels as well as the impacts of groundwater pumping on the site and surrounding area. The Study should include the radius of influence (i.e. extent of cone of depression) from each dewatering well (if more than one is installed on-site) as a function of time, based on local soil and groundwater conditions. Avoidance measures are to be employed to the maximum extent practicable to minimize the flow rate and duration of the pumping. The Study shall be stamped by a California licensed Hydrogeologist or equivalent and submitted to the City as part of the Dewatering Packet. The Study should also include the following items:
  - i. A description and cross section(s) of the cone(s) of depression of on-site monitoring well(s) as well as any nearby dewatering sites within a 400-foot radius of the property that may interact with or be influenced by the dewatering activity at the site. The location of the monitoring well(s) and nearby sites should also be shown on a map.
  - ii. Verify the anticipated drawdown curve with a pump test performed on monitoring well(s) installed on the project site. Though the City is not currently requiring a particular type of pump test, the type used should be authorized and approved by a California licensed Hydrogeologist. Using the pump test and any other relevant data, the report shall state the anticipated pumping flow rate as well as the total amount of water due to be pumped for the 12 week dewatering period; daily pumped totals shall also be included. Following the two-week start-up period, the dewatering, pumping rates and maximum amount of water pumped on a daily basis shall be limited to the values calculated in the verification study.
  - iii. Prior to pouring a basement slab, groundwater may be pumped no

deeper than three feet below the depth of the slab, measured at the center. After the slab is poured, groundwater may be pumped no deeper than one foot below the center. These values can be extrapolated using the (verified) drawdown curves and the on-site monitoring well data points.

- B. Groundwater Use Plan (Plan) shall illustrate how the pumped groundwater will be used to the maximum extent practicable. Two required components of this plan are the 1) groundwater flow meter and sediment settling tank system and 2) the Fill Station. Both components must be inspected and approved by City staff before applying for a Controlled Groundwater Pumping Dewatering Permit. The inspections are documented via the Inspection Checklist (Attachment 4), which **must** be signed by a Public Works Inspector prior to issuing the Grading Permit, Dewatering Permit, and associated Building Permit; no Dewatering Permit will be issued without a Public Works Inspector–signed Checklist. At a minimum, the Plan should include the items below; however, the applicant should be creative in its plan to use the pumped groundwater and shall adhere to the Plan throughout the dewatering period.
- i. Groundwater flow meter and sediment settling tank system:
    1. Provide an accurate and **safely-accessible** flow meter with a data logger in good working condition at the inlet of the tank. Both flow rate and total flow measurements shall be easily readable. Before any water is pumped, the initial flow meter reading shall be checked and approved by the Watershed Protection Inspector (WP Inspector) as part of the initial dewatering approval process. The WP Inspector will collect regular meter readings on a daily basis during the two-week start-up period and weekly thereafter.
    2. Design the tank system so that the storage tank is always at minimum one-half full during the entire dewatering period to facilitate water truck usage.
    3. During the start-up period, once the tank is at least half-full and before any discharge of groundwater, contact Watershed Protection at (650) 329-2122 for an initial inspection and for water quality testing. For non-(contaminated) plume areas, basic measurements will generally include pH, conductivity and turbidity.
    4. After the Watershed Protection Inspector collects water quality samples and provides a clearance that the sample is within limits, the tank should be drained to the property while waiting to obtain the Dewatering Permit Packet from Public Works Engineering. Consult the Inspector for assistance. Provide a screen or a type of translucent covering over the tank for mosquito management. City staff may require the use of *Bacillus thuringiensis israelensis* (Bti), a naturally occurring soil bacterium that effectively kills mosquito larvae, if necessary.

5. Settling tank set-up:

- The area surrounding the tank should be kept clear at all times, with a **safe** and **accessible** pathway to the meter and tank.
- The edge of the tank should not be at the edge of the excavation area, as it may lead to unsafe conditions.
- Temporary power source for pump(s) should have an "in-use" cover and should be placed in an area that will be minimally impacted by weather.
- Provide signage that reads "Non-Potable Discharge" at the discharge point.

ii. A Fill Station shall be established to provide the City and nearby residents and business owners the opportunity to use the pumped groundwater to minimize the amount discharged to the storm drain system. The Fill Station should include two points for water distribution: a truck-filling outlet for water truck irrigation of sites in the City and a fill-up outlet for neighboring properties. Detailed information about the fill station and its components is listed below. A comprehensive detailed fill station plan should be included in the Groundwater Use Plan to be reviewed by staff as part of the Dewatering Permit Packet submittal. When the Fill Station is ready, contact Public Works Engineering Inspection staff (PWE Inspector) at (650) 496-6929 for an inspection of both the Fill Station and settling tank system and contact Building Inspection staff at (650) 444-6173 for an Electrical Safety Check. Inspectors must check off and sign the Inspection Checklist. The following is required in the Fill Station Plan:

1. Location and set-up:

- Locate the Fill Station outside the site construction fence to allow 24-hour access. The construction site should be locked outside of normal construction hours.
- A lock is not required at the Fill Station, but if the applicant deems it necessary, a combination lock should be used with the combination of 2, 4, 6, 8.
- Truck fill area: provide a 2.5-inch hydrant fitting hose connection with a 50-foot traffic-rated hose.
- Neighboring properties fill outlet: provide at least two 100-foot (minimum) hoses arranged on reels and connected to standard hose bibs. Hose bibs shall produce a minimum of 10gpm at the end of each 100 foot hose simultaneously. The applicant shall allow adjacent properties to use hoses connected to the fill station(s). If used and as needed, applicant must provide ADA-compliant bridges across sidewalks. Hoses shall be placed in a manner that is safe to the public and does not cause damage to neighboring or City property, and shall not cross the street. The City may modify these requirements as circumstances require.

- As with the tank system, the fill station shall include accurate and safely accessible flow meters with data loggers in good working condition at the outlet point of the Fill Station outlet points to log water reuse. Both flow rate and total flow measurements shall be easily readable. The initial flow meter reading should be noted before any water is pumped, which shall be checked and approved by the PWE Inspector as part of the initial dewatering approval process. The WPG Inspector will collect regular meter readings on a daily basis during the two-week start-up period and weekly thereafter.
  - Supply log sheets and a pen for truck drivers to show the date and amount of each fill-up.
  - The temporary power source needed for the Fill Station should be placed inside the locked construction area (and NOT in the Fill Station), if possible. If needed, a switch to power on the pump station may be placed inside the fill station cabinet, only with an installed in-use cover. Two switches should be used, one for the truck-fill hose and one for the residential hose area. These switches should be appropriately and clearly labeled.
  - Provide easy-to-read signage for the Fill Station (including "Do not Drink") and directions explaining how to use it.
  - For the hose bibs, provide signage that reads "No Hoses Crossing Street, Sidewalk and Private Properties."
2. The applicant must demonstrate maximum 10-minute fill time for a ~2700 gallon water truck to obtain staff approval.
  3. Prior to the commencement of dewatering activities, the applicant shall notify occupants of neighboring properties of the temporary availability of water. Contact Public Works Engineering staff (650 329-2496, Option 8) for copies of door hangers to be used for notification. Door hangers must be removed after 24 hours.
- iii. Irrigation of sites: The applicant is responsible for having pumped groundwater delivered to nearby parks and schools as requested by the City. The applicant shall contract with or otherwise provide water truck service to deliver water as directed by the City on a regular basis as described below. The City's Urban Forestry staff should be contacted by the truck service company at (650) 496-5986 to determine a list of sites to be irrigated. During the first six weeks of dewatering activities (not including the two-week start-up period), water should be trucked one full day (8 hours) per week from the project site to the irrigation sites. This shall increase to five days per week (8 hours per day) during the remaining 4 weeks of the dewatering period.
  - iv. On-site Use of Groundwater: Pumped groundwater should be used on the construction site when possible, such as for controlled infiltration, irrigation of existing landscaping, dust suppression and other determined

construction needs.

- C. A Pre-construction Building Condition Survey and Report of structures located on adjacent parcels prepared by a licensed surveyor and meeting City standards must be included in the Dewatering Application Packet. The applicant is responsible for obtaining permission from neighboring property owners to enter their property to take survey points of the building interior. If permission is not granted, City staff should be notified; however, interior survey points are not required in order to obtain a Dewatering Permit. The survey shall include a photographic and narrative report on the external condition of each structure as well as surveyed and marked elevations of adjacent parcels, with particular attention to the condition of concrete foundations, structural connections, brickwork, plasterwork and other architectural finishes that are susceptible to cracking. The report shall assess the likelihood that the proposed dewatering would cause effects (including but not limited to settlement or movement) on off-site private or public structures or infrastructure, including the right-of-way, easements, and utilities within public utility easements, and the health or viability of vegetation or trees. To the extent that the report concludes that off-site effects are reasonably likely to occur, the applicant shall identify avoidance measures to be implemented that will minimize the type and severity of those effects, and shall develop a monitoring plan to assess any actual effects on vegetation, trees, structures and infrastructure.
- F. Project status reporting: During the construction period of the underground structure, the applicant must submit periodic reports and have the data available per request. Report contents and submittal frequency requirements are listed below. All status reports should be submitted via email to the Public Works Engineering staff who has been working on your project and who issued the Excavation and Grading permit. Questions should be directed to [pwecips@CityofPaloAlto.org](mailto:pwecips@CityofPaloAlto.org).
- 1) Monitoring well levels: At minimum, monitoring well data shall be collected daily for the first two weeks (start-up period) of the 12-week period and weekly thereafter. Status reports should be submitted weekly during start-up period and monthly thereafter. A final report shall be submitted two weeks after pumping ceases.
  - 2) Flow meter readings: At minimum, monitoring well data shall be collected daily for the first two weeks (start-up period) of the 12-week period and weekly thereafter. Status reports should be submitted weekly during start-up period and monthly thereafter. A final report shall be submitted two weeks after pumping ceases.
  - 3) Survey data (see subsection IV.C. above). Once dewatering commences, survey data should be collected and reported weekly during the two-week start-up period and monthly thereafter. Note that the information will be made available to the public upon request.

## V. ADDITIONAL REQUIREMENTS FOR TEMPORARY CONSTRUCTION-RELATED GROUNDWATER DEWATERING IN GROUNDWATER (CONTAMINATED) PLUME AREAS

Certain areas in the City have contaminated groundwater plumes due to previous land use. To determine if a site is in or nearby one of these areas, refer to the Attachment 5 figure. Dewatering sites in these areas must be carefully managed to ensure pumped groundwater does not enter the City's storm drain system nor that it is used by members of the public without being treated. Therefore, Fill Stations are not required at these sites. However, the same flow meter/data logger requirements described in Section IV (B.i.) shall still be followed in order to account for the amount of groundwater pumped from the site.

Construction of below ground structures in these areas triggers treatment requirements (in addition to sediment settlement) before discharging to the City's storm drain system in order to protect the water quality of downstream creeks and the SF Bay. Because of site complexities, specific requirements may vary site by site. Therefore, for any site in or within 500 feet of the edge of a plume, contact the City's Watershed Protection Group at (650) 329-2122 for guidance and requirements on sampling, treatment and disposal of temporary construction-related groundwater. Sampling groundwater for contaminants prior to initial discharge will be required, and potentially at intervals during dewatering. For all required sampling, the contractor must retain an independent testing firm to collect and process samples. Finally, the applicant should contact the Regional Water Quality Control Board (Water Board) to ensure additional state agency requirements are met. Note that compliance with the City does not imply compliance with the Water Board.

## ATTACHMENTS

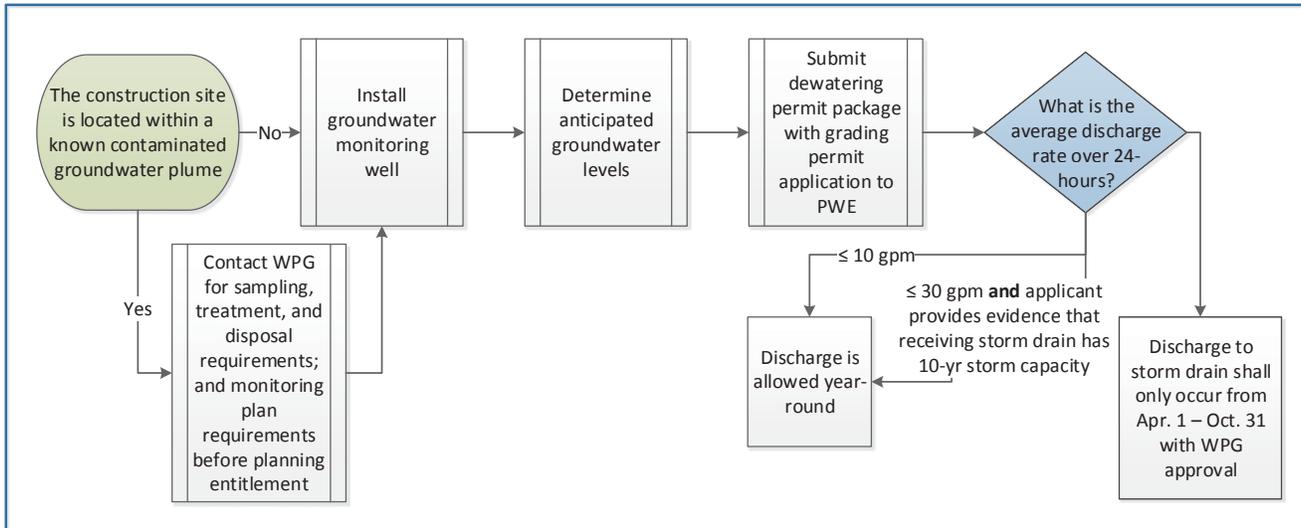
**ATTACHMENT 1: COMPARISON OF MARCH 2017 AND FEBRUARY 2018 CHANGES:  
GROUNDWATER DEWATERING ORDINANCE (Section 16.28 of the P.A.M.C.)**

CATEGORY	MARCH 2017 ORDINANCE	FEBRUARY 2018 ORDINANCE REVISION
GROUNDWATER EXCLUSIONARY TECHNIQUE	Optional for all projects.	Optional for all projects.
	No specific requirements presented for the installation or during subsequent construction.	Requires a traffic control plan with a schedule for an attendant during the installation. Requires a groundwater monitoring well located at the farthest feasible point.
PRE-CONSTRUCTION BUILDING CONDITION SURVEY OF NEIGHBORING STRUCTURES	Not included	Requires evaluation of existing condition of neighboring structures as well as evaluation of likelihood of dewatering impacts to the neighboring structures, trees, and vegetation.
FILL STATION	While not expressly described in ordinance, the City Guidelines required applicant's trucking of water one day per week during entire dewatering period.	The previous Guidelines are clarified in the Ordinance. In addition, trucking of water must increase to five days per week after six weeks of dewatering period (not including two-week start-up period).
LIMITS OF DISCHARGES TO DRY SEASON	Discharges to storm or sanitary drains only allowed April 1st through October 31st.	Provides a provision, case-by-case, to consider allowing discharge from November 1 to March 31st if (1) the discharge is limited to $\leq 10$ gallons per minute or (2) the receiving storm drain line would have sufficient capacity for a 10-year storm. Discharges subject to cessation orders from the City.
LIMITS TO PUMPING DEPTH	Not included	Prior to pouring a basement slab, groundwater may be pumped no deeper than three feet below the depth of the slab, measured at the center. After the slab is poured, groundwater may be pumped no deeper than one foot below the center.

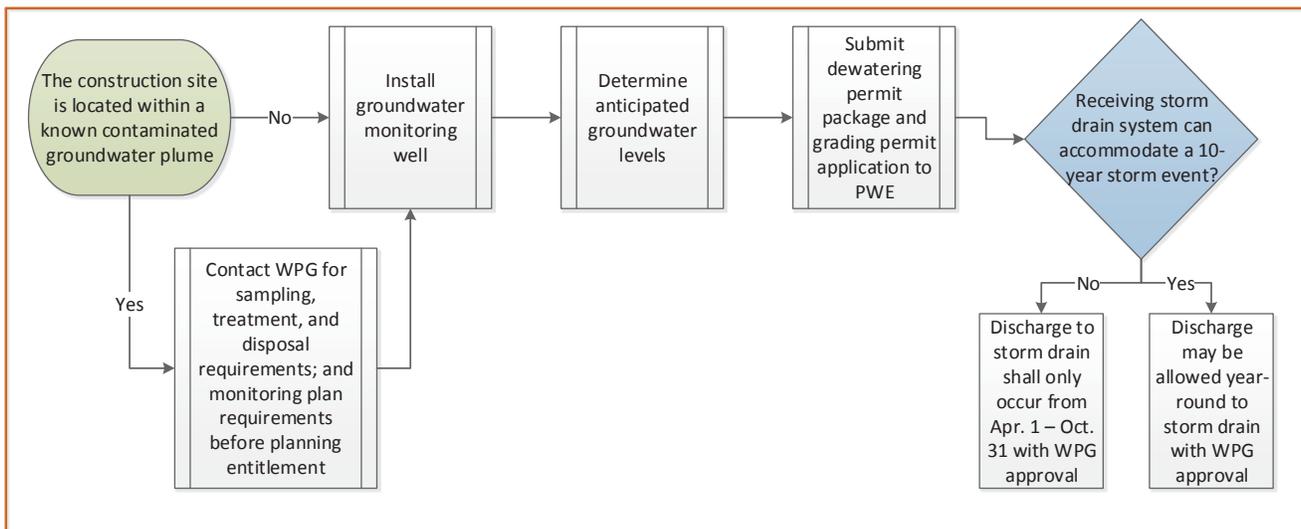
CATEGORY	MARCH 2017 ORDINANCE	FEBRUARY 2018 ORDINANCE REVISION
PRE-DEWATERING TECHNICAL STUDY	Required Geotechnical Study but the details were not expressly described in ordinance.	Renamed a Dewatering Hydrogeological Study and incorporated details from the 2017 City Guidelines to clarify content of the study.
VERIFICATION OF DEWATERING STUDY	Required verification via pump test and project site monitoring wells.	Clarified that after the 2 week start-up, the pumping rates and volume pumped shall be limited by the values calculated in the study.
MEASUREMENTS DURING DEWATERING	Required periodic measurements as required by the City.	Clarified that measurements include periodic groundwater level monitoring and weekly surveys of adjacent buildings.
GROUNDWATER USE PLAN	Not expressly described in ordinance but was included in City Guidelines.	Ordinance clarifies the Use Plan requirements based on the 2017 guidelines and field observations during 2017 construction season.
DEWATERING PLAN AND STREET WORKS PERMIT	Not expressly described in ordinance.	Clarifies required submittals if there is a planned storm drain discharge.
EXCEPTIONAL WASTE DISCHARGE PERMIT APPLICATION	Not expressly described in ordinance.	Clarifies required submittals if there is a planned sewer discharge.

# Groundwater Dewatering Regulations for Construction of Below Ground Structures

## Groundwater Exclusionary Techniques



## Controlled Groundwater Pumping



## Additional Information

**PWE – Public Works Engineering**  
**WPG – Watershed Protection Group**

**For more information contact:**  
 City of Palo Alto, Public Works Engineering – (650) 329-2496 Option 8, [cityofpaloalto.org](http://cityofpaloalto.org)  
 City of Palo Alto, Watershed Protection Group – (650) 329-2122  
 Palo Alto Regional Water Quality Control Plant – (650) 329-2598, [cleanbay.org](http://cleanbay.org)

**Refer to *Regulations for Groundwater Dewatering During Construction of Below Ground Structures* for more information.**

**Attachment 3: Groundwater Exclusionary Techniques Dewatering Packet**

**1) Cover Page**

**2) Dewatering Inspection checklist**



# DEWATERING PERMIT – GROUNDWATER EXCLUSIONARY TECHNIQUE

## PUBLIC WORKS

Engineering Services Division

pweצים@cityofpaloalto.org – 650.329.2496 Ext.8 – Inspection: 650.496.6929

Related Permits:

LOCATION OF WORK:  
CONSTRUCTION TYPE:  
DESCRIPTION OF WORK:

### PERMITTEE/CONTRACTOR

Name:  
Company:  
Address:  
Contractor's License Number:  
Phone:  
Email:  
Dewatering Sub-contractor:  
Sub-contractor Phone:

EXPECTED START DATE:

EXPECTED COMPLETION DATE:

PERMIT EXPIRATION DATE: \_\_\_\_\_

Attachment Name	Page
<input type="checkbox"/> Exclusionary Technique Plan	1
<input type="checkbox"/> Groundwater Use Plan	2
<input type="checkbox"/> Traffic Control	3
<input type="checkbox"/> Completed Inspection Checklist – Groundwater Exclusionary Technique	4

**Contact Public Works Inspection minimum 24 hours prior to starting work: 650-496-6929**

Permittee affirms that the facts stated heron are true and agrees that they, their agents, employees, and contractors shall perform all work described heron in conformance with ordinances and standard specifications of the City of Palo Alto, all pertinent state laws and to the plans specifications approved by the City Engineer. The work allowed in this permit shall be performed by an appropriately licensed contractor as required in the Palo Alto Municipal Code. The Permittee shall pay the cost of all soils investigation and compaction tests, and shall reimburse the city for any services provided as may be required by the City Engineer, Utilities Department, or Police Department. Permittee further agrees to hold the City of Palo Alto, its officers, agents, and employees harmless from all costs and damages which might arise from the Permittee's use or occupancy of the public right-of-way. The Permittee also agrees to maintain required insurance coverage through the closure of the permit and sign off by the Public Works Inspector. This permit is subject to all attached conditions made part of the permit document and may be revoked at any time for violation of any of these conditions.

**The dewatering season is from April 1 to October 31. If dewatering occurs past permit expiration or outside the dewatering season, administrative fines may occur. Refer to Dewatering Regulations and Guidelines for more information.**

Applicant Signature \_\_\_\_\_

Permit Issued By \_\_\_\_\_

(Initials)

Printed \_\_\_\_\_

Permit Issuer \_\_\_\_\_

\_\_\_\_\_ Date

Date

Inspector



# GROUNDWATER DEWATERING INSPECTION CHECKLIST

**PUBLIC WORKS INSPECTION**

Engineering Services Division

[pwecips@cityofpaloalto.org](mailto:pwecips@cityofpaloalto.org) – 650.329.2496 Ext. 8 – Inspection: 650.496.6929

**ALL CONDITIONS *MUST* BE CHECKED 'YES' BEFORE A GRADING PERMIT AUTHORIZING GROUNDWATER DEWATERING CAN BE PROCESSED AND ISSUED. THE INSPECTOR WILL SIGN THIS FORM AND PROVIDE IT TO THE CONTRACTOR. THE CONTRACTOR MAY THEN SUBMIT THIS INSPECTION FORM TO PUBLIC WORKS STAFF AT THE DEVELOPMENT CENTER AND OBTAIN A GRADING & DEWATERING PERMIT AUTHORIZING THE START OF DEWATERING OPERATIONS.**

**Address:** \_\_\_\_\_

**Contractor:** \_\_\_\_\_ **Phone:** \_\_\_\_\_

Required Water Station Features	Yes	No	Additional Comments
If the fill station is secured by a lock with 4 digit lock combination, then the combination should be 2,4,6,8			
Log sheets with pen in box			
Minimum 50', 2.5" hose in box with hydrant fittings for water truck filling			
At least 2 hose bibs outside the fill station box with 2, 100' hoses providing a minimum of 10 GPM each, simultaneously			
GFI outlet inside or electrical connection outside of box			
"In-use" cover over switch/outlet in box if in the fill station			
Electrical Safety Check (from Building Inspector, phone: 650.444.6173. Alternate - Bud Starmer: 650-444-6175)			
"Water Filling Station, Non-Potable Water, Do Not Drink" sign on fill station door box with Public Works phone number: 650.329.2496			
"No Hoses Crossing Street and Sidewalk and Private Property " sign at hose bibs			
Switches labeled – bibs and hose; instructions for use			
* "Non-potable Discharge" sign on the discharge point			
* Water quality test – acceptable for discharge to storm drain (from Inspector, phone number: 650.617.3165)			
* Flow meters showing instantaneous and total flow at inlet point of settling tank			
* Verify flow meters are starting at Zero or a start-up reference starting point			
* Flow meters easily readable and in a safe location; one at inlet of settlement tank and one at fill station (if fill station is required)			
Pump is operational (tested personally by a PW inspector)			
Hose bib is operational (tested personally by a PW inspector)			
* No diesel or gas generator pumps – electric pumps only			
Door Hangers			
Monitoring wells – 1, farthest onsite point from structure			
Demonstrate maximum of 10-minute fill time for a ~2700 gallon water truck			
Demonstrate 10 GPM flow rate from both 100' hoses simultaneously			
Received initial survey plan and data from adjacent structures			

Date

PW Inspector Passed By

\*Only requirements for Groundwater Exclusionary Technique. Controlled Groundwater Pumping must comply with entire checklist.

Additional Comments:

**Attachment 4: Controlled Groundwater Pumping Dewatering Packet**

**1) Cover Page**

**2) Hydrogeological Study Worksheet**

**3) Dewatering Inspection Checklist**



# DEWATERING PERMIT – CONTROLLED GROUNDWATER PUMPING

## PUBLIC WORKS

Engineering Services Division

pwecips@cityofpaloalto.org – 650.329.2496 Ext.8 – Inspection: 650.496.6929

Related Permits:

LOCATION OF WORK:  
CONSTRUCTION TYPE:  
DESCRIPTION OF WORK:

### PERMITTEE/CONTRACTOR

Name:  
Company:  
Address:  
Contractor's License Number:  
Phone:  
Email:  
Dewatering Sub-contractor:  
Sub-contractor Phone:

EXPECTED START DATE:

EXPECTED COMPLETION DATE:

PERMIT EXPIRATION DATE: \_\_\_\_\_

Attachment Name	Page
<input type="checkbox"/> Dewatering Hydrogeological Study & Accompanying Worksheet	1 2
<input type="checkbox"/> Groundwater Use Plan	
<input type="checkbox"/> Completed Inspection Checklist	3
<input type="checkbox"/> Pre-Construction Survey & Report	4 5

**Contact Public Works Inspection minimum 24 hours prior to starting work: 650-496-6929**

Permittee affirms that the facts stated heron are true and agrees that they, their agents, employees, and contractors shall perform all work described heron in conformance with ordinances and standard specifications of the City of Palo Alto, all pertinent state laws and to the plans specifications approved by the City Engineer. The work allowed in this permit shall be performed by an appropriately licensed contractor as required in the Palo Alto Municipal Code. The Permittee shall pay the cost of all soils investigation and compaction tests, and shall reimburse the city for any services provided as may be required by the City Engineer, Utilities Department, or Police Department. Permittee further agrees to hold the City of Palo Alto, its officers, agents, and employees harmless from all costs and damages which might arise from the Permittee's use or occupancy of the public right-of-way. The Permittee also agrees to maintain required insurance coverage through the closure of the permit and sign off by the Public Works Inspector. This permit is subject to all attached conditions made part of the permit document and may be revoked at any time for violation of any of these conditions.

**The dewatering season is from April 1 to October 31. If dewatering occurs past permit expiration or outside the dewatering season, administrative fines may occur. Refer to Dewatering Regulations and Guidelines for more information.**

Applicant Signature \_\_\_\_\_

Permit Issued By \_\_\_\_\_

(Initials)

Printed \_\_\_\_\_

Permit Issuer \_\_\_\_\_

Date \_\_\_\_\_

Date

Inspector



# DEWATERING HYDROGEOLOGICAL STUDY WORKSHEET & DEWATERING PLAN

### Which Projects Must Complete This Worksheet?

Applicants for **all projects** anticipating the need to perform construction dewatering via groundwater pumping must complete this worksheet.

**Please note that this information must be stamped by a California licensed Hydrogeologist (or equivalent) and will be made available to the public.**

## 1. PROJECT INFORMATION

Project Name: \_\_\_\_\_ APN: \_\_\_\_\_

Project Address: \_\_\_\_\_

Applicant Name/ Developer: \_\_\_\_\_

Geotechnical Engineer: \_\_\_\_\_

Project Description: \_\_\_\_\_

\_\_\_\_\_

## 2. SITE ASSESMENT Hydrogeological Study provided<sup>1234</sup> (see guidelines for specific requirements) : Yes No

a. Depth to groundwater: \_\_\_\_\_

b. Maximum depth of excavation (including utilities, pits, shafts, etc.): \_\_\_\_\_

c. Proposed maximum depth of dewatering wells/pumping: \_\_\_\_\_

d. Size and anticipated flow from each pump: \_\_\_\_\_

e. Anticipated dewatering flow rate and total dewatering duration: \_\_\_\_\_

f. Control to be utilized:  Settling Tank  Turbidity Curtain  Other (describe): \_\_\_\_\_

g. Location of anticipated discharge including final receiving water (creek name or Bay): \_\_\_\_\_

h. 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, show the exact location of these dewatering sites.

Map attached:  Yes  N/A (no wells or other dewatering sites within 400 foot radius)

i. Include a schematic diagram showing pipe and pump sizes and locations and sizes of all tanks, fill station, pipe route to nearest storm drain inlet (including flexible and rigid pipe locations), and all street and sidewalk impacts including trenching, saw cuts, and asphalt patching between project site and storm drain inlet.

Schematic attached:  Yes  No

j. 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. Prepare a map and cross sections of the cone(s) of depression.

Map and cross sections attached:  Yes  No

k. State whether it is reasonably likely that the proposed dewatering will cause effects (including settlement or movement) on off-site structures or infrastructure, including the right of way, easements, and utilities within public utility easements.  Yes  No

<sup>1</sup> The Hydrogeological Study must include verification of the anticipated drawdown curve with a pump test using a minimum of one actual well, by the end of the two week start-up period.

<sup>2</sup> Cone Penetrometer Tests (CPT) is also encouraged to verify soils data. The actual pumping rates, following the two week start-up period, shall be limited to the rates used in the verification. The maximum amount of water pumped over the ten week period, (excluding the two week start-up period) shall be limited to that calculated during verification.

<sup>3</sup> The ground water level must be measured 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 (including the two week start-up period), then weekly thereafter. If drawdown results are greater than anticipated by the Hydrogeological Study at the end of the two week start-up period or thereafter, a revised Hydrogeological Study and any revised conclusions on impacts of the groundwater drawdown must be submitted.

<sup>4</sup> The Hydrogeological Study and verification shall not be required if the dewatering pumping is continuously limited to 30 gallons per minute (gpm) or less following the two week start-up period. This could be accomplished through installation of groundwater cut-off walls (such as secant walls) or similar construction techniques. Additionally, the contractor need only provide off-site hauling of water sufficient to meet the needs of adjacent neighbors, as opposed to the one-day per week requirement for 2016.

I. State whether it is reasonably likely that the proposed dewatering will reduce the amount of water taken up by any vegetation or trees to a level that will affect the health or viability of the vegetation or trees. Utilize an Urban Forestry Sub Consultant (certified arborist) to verify any such effects on trees.  Yes  No

**3. MONITORING PLAN (All applicants must fill out this section)**

Describe monitoring plan to assess any actual effects on vegetation, trees, structures and infrastructure.

**4. ENGINEER CERTIFICATION: The hydrogeological study, description and extent of cone of depression, and determination of offsite effects must be stamped by a California licensed Hydrogeologist (or equivalent).**

Hydrogeological  
Report Prepared By: \_\_\_\_\_

Stamp with Signature:

**5. APPLICANT CERTIFICATION: I acknowledge the following dewatering requirements:**

- Fill Stations: Must demonstrate a maximum 10-minute, 2700 gallon truck fill time and 2 simultaneous, 100' hose, 10 gallons per minute (gpm) deliveries (for each hose) during the two week start up period defined below. Storage tank designed to be at least one-half full. Ongoing metering of instantaneous and total flow of fill stations required.
- Pump for no more than 10 weeks for residential sites. A two week start-up period ahead of the 10 weeks is allowed. At the end of the two week startup period, compliance with all performance standards and water quality standards shall be demonstrated.
- Report on all measurements and requirements (reports due daily for the first two weeks and weekly thereafter, and then a final report at the end of pumping). Refer to status reporting in regulations.
- At the center of the basement excavation (center of where the slab will be), the groundwater shall be pumped no deeper than 3 feet below the depth of excavation/bottom of slab, following the two week start-up period. Once the slab is poured, the depth to groundwater at the center of the slab shall be 1 foot.
- Offer to water trees/plants on adjacent properties and do so if requested. Refer to regulations.
- Prior to any pumping, survey and mark land elevations on structures on adjacent parcels (assuming permission is obtained) – results due daily for the first two weeks and weekly thereafter. Refer to Regulations.

Applicant Name: \_\_\_\_\_

Applicant Signature: \_\_\_\_\_



# GROUNDWATER DEWATERING INSPECTION CHECKLIST

**PUBLIC WORKS INSPECTION**

Engineering Services Division

[pwecips@cityofpaloalto.org](mailto:pwecips@cityofpaloalto.org) – 650.329.2496 Ext. 8 – Inspection: 650.496.6929

**ALL CONDITIONS *MUST* BE CHECKED 'YES' BEFORE A GRADING PERMIT AUTHORIZING GROUNDWATER DEWATERING CAN BE PROCESSED AND ISSUED. THE INSPECTOR WILL SIGN THIS FORM AND PROVIDE IT TO THE CONTRACTOR. THE CONTRACTOR MAY THEN SUBMIT THIS INSPECTION FORM TO PUBLIC WORKS STAFF AT THE DEVELOPMENT CENTER AND OBTAIN A GRADING & DEWATERING PERMIT AUTHORIZING THE START OF DEWATERING OPERATIONS.**

**Address:** \_\_\_\_\_

**Contractor:** \_\_\_\_\_ **Phone:** \_\_\_\_\_

Required Water Station Features	Yes	No	Additional Comments
If the fill station is secured by a lock with 4 digit lock combination, then the combination should be 2,4,6,8			
Log sheets with pen in box			
Minimum 50', 2.5" hose in box with hydrant fittings for water truck filling			
At least 2 hose bibs outside the fill station box with 2, 100' hoses providing a minimum of 10 GPM each, simultaneously			
GFI outlet inside or electrical connection outside of box			
"In-use" cover over switch/outlet in box if in the fill station			
Electrical Safety Check (from Building Inspector, phone: 650.444.6173. Alternate - Bud Starmer: 650-444-6175)			
"Water Filling Station, Non-Potable Water, Do Not Drink" sign on fill station door box with Public Works phone number: 650.329.2496			
"No Hoses Crossing Street and Sidewalk and Private Property " sign at hose bibs			
Switches labeled – bibs and hose; instructions for use			
* "Non-potable Discharge" sign on the discharge point			
* Water quality test – acceptable for discharge to storm drain (from Inspector, phone number: 650.617.3165)			
* Flow meters showing instantaneous and total flow at inlet point of settling tank			
* Verify flow meters are starting at Zero or a start-up reference starting point			
* Flow meters easily readable and in a safe location; one at inlet of settlement tank and one at fill station (if fill station is required)			
Pump is operational (tested personally by a PW inspector)			
Hose bib is operational (tested personally by a PW inspector)			
* No diesel or gas generator pumps – electric pumps only			
Door Hangers			
Monitoring wells – 1, farthest onsite point from structure			
Demonstrate maximum of 10-minute fill time for a ~2700 gallon water truck			
Demonstrate 10 GPM flow rate from both 100' hoses simultaneously			
Received initial survey plan and data from adjacent structures			

Date

PW Inspector Passed By

\*Only requirements for Groundwater Exclusionary Technique. Controlled Groundwater Pumping must comply with entire checklist.

Additional Comments: