

Town of Atherton

Drainage Criteria 1/2/13

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Town of Atherton Drainage Criteria

The following Manual of Standards for Storm Drainage supplements Chapter 8.50 and 8.54 of the Atherton Municipal Code (MC).

A. STANDARD SPECIFICATIONS

Storm drain facilities, manholes and appurtenances shall meet product and installation requirements listed in the current Caltrans Standard Specifications and Standard Plans, current APWA “Standard Plans for Public Works Construction” (commonly referred to as “The Green Book”) and associated Specifications. Standard details from other Bay Area Cities and Agencies may be used with prior approval of the City Engineer.

B. STORM DRAIN DESIGN STANDARDS

1. PROJECT DOCUMENTS

- a) A Drainage Area Master Plan, Storm Water Management Plan and either a Storm Water Pollution Prevention Plan or Erosion/Pollution Control Plan are to be submitted with all Improvement Plans. Exemptions to this requirement are listed in MC Chapter 8.54. The three plans each must be signed and stamped by a Professional Civil Engineer registered in the State of California.

Clarification: These Storm Drain Design Standards apply only to storm drain lines where flow is conveyed from buildings to off-site or where inadequate flow capacity associated with a storm drain line could cause runoff to enter a building. Storm drain lines that solely serve landscape areas where there is an overland release to an approved drainage system are exempt from the requirements of these standards.

b) Drainage Area Master Plans shall include the following information:

- 1) A scaled Engineering topographic map for the on-site drainage. The on-site drainage map shall document that either, (1) proposed improvements do not block subsurface or overland flow across the property, or, (2) appropriate drainage facilities are proposed to direct subsurface and overland flows around existing and proposed improvements.
- 2) A second map of appropriate scale, preferably 1"= 100' scale, as necessary to show large offsite drainage basins.
- 3) Delineated and labeled project site plan showing all existing and proposed drainage basins. The boundaries of the site plan shall extend a minimum of 10 feet outside the property line where accessible, to the centerline of all adjacent streets and to the opposite top of bank at channels. The survey requirements are described in more detail on the Town's Grading and Drainage Checklist.
- 4) The area in acres and the flow (Q) in cubic feet per second (cfs) of all drainage entering and leaving the site before and after development for the design storm event with associated calculations.
- 5) Drainage area and peak flow rates for all the drainage facilities for the design storm and 100-year storm. Hydrologic computations shall be provided that document flow rates.
- 6) Hydraulic computations for channel, structure and pipe sizing. Hydraulic gradients (for proposed structures or systems) shall be shown on a set of drainage plans or profiles.
- 7) A schedule for drainage improvements. For projects that construct greater than 5,000 square feet impervious area, stormwater detention facilities shall be in-place prior to construction of the impervious area. The schedule shall document that structures have required freeboard and that off-site flows are able

to pass through the property without increasing off-site water levels through all phases of project construction.

8) For any project that will include excavation of soils, depth to groundwater shall be reported. For portions of the Town east of Alameda de las Pulgas, groundwater depth from either Plate 2 or from a site specific Geotechnical investigation may be used. For areas west of Alameda de las Pulgas, a Geotechnical investigation is required that includes depth to groundwater.

9) A Geotechnical Report or additional soils information may be required at the discretion of the City Engineer. The Geotechnical Report is required if percolation is included as a Treatment Measure or if the lowest point of excavation is within 10 feet of the groundwater table. The Geotechnical Report shall include documentation of the soil percolation rate at the treatment measure location.

10) An Arborist Report shall be submitted in conjunction with the Storm Drain Report. The Storm Drain Report shall state measures proposed to comply with drainage recommendations contained within the Arborist Report.

c) Storm Water Management Plans shall include the following information:

1) A project description including graphics from the Drainage Area Master Plan.

2) The hydrologic setting of the site including flows from the Drainage Area Master Plan.

3) A listing of stormwater quality opportunities and constraints.

4) Best Management Practices for Source Control that would be implemented as a part of the project. A checklist shall be provided showing Town mandated source control measures. A description of supplemental source control measures shall be provided. The source control checklist can be acquired from San Mateo

Countywide Water Pollution Prevention Program (SMCWPPP) at www.flowstobay.org .

5) Best Management Practices for Treatment of site runoff that would be implemented as a part of the project. Calculations shall be included to document compliance with Section C.3 of the Regional Water Quality Control Board's Municipal Regional Stormwater Permit. The C.3 Stormwater Technical Guidance Manual can be acquired from San Mateo Countywide Water Pollution Prevention Program (SMCWPPP) at www.flowstobay.org .

6) A Monitoring and Maintenance Program (MMP) for stormwater treatment and detention facilities shall be provided. The MMP shall include an agreement to be recorded in the County property roles stating that the property owner will maintain the Source Control and Treatment measures and that monitoring and maintenance responsibility will be legally transferred during future property transfers. The plan shall include monitoring and cleanout access points. The plan shall provide for the facility being operable for the life-time of the system. Regulated projects (single family residential is not considered as "Regulated") must provide for inspection as required by the Municipal Regional Stormwater Permit in the MMP.

7) Non-residential projects that create and/or replace at least 2,500 square feet of impervious area, but less than 10,000 square feet of impervious surface, or stand-alone single family home that creates and/or replaces 2,500 square feet or more of impervious surface are required to incorporate at least **one** of the following site design measures:

- a) Direct roof runoff into cisterns or rain barrels for use in conformance with Bay Area Stormwater Management Agencies (BASMAA) Bulletin "Rain Barrels and Cisterns, Stormwater Control for Small Projects".
- b) Direct roof runoff onto vegetated areas in conformance with BASMAA Bulletin "Landscape Designs for Stormwater Management, Stormwater Control for Small Projects"

- c) Direct runoff from driveways/uncovered parking lots onto vegetated areas in conformance with BASMAA Bulletin “Landscape Designs for Stormwater Management, Stormwater Control for Small Projects”
- d) Construct sidewalks, walkways, and/or patios with permeable surfaces in conformance with BASMAA bulletin “Pervious Pavement, Stormwater Control for Small Projects”.
- e) Construct bike lanes, driveways, and/or uncovered parking lots with permeable surfaces in conformance with BASMAA bulletin “Pervious Pavement, Stormwater Control for Small Projects”.

A combination of these measures may be used at a site. Measures must be reasonable and appropriate as directed by City Engineer for the size and addition of impervious area associated with the site.

8) Storm Water Pollution Prevention Plan (SWPPP) or Erosion/Pollution Control Plan (EPCP) shall be provided prior to start of construction in conformance with Section E of these Standards. All projects shall include the San Mateo County, Construction BMP Plan Sheet, currently found at:

<http://www.flowstobay.org/pdfs/bmp/Construction%20Series/SWPPP.pdf>.

2. HYDROLOGIC CRITERIA

- a) On-site structures, on-site drainage facilities and on-site bridges shall be designed to convey the peak design flows for the following storm return periods for the total tributary basin area with full build-out based on general plan land use and shall provide the following freeboard.

1) Drainage Systems

25-year event with at least 0.50 feet freeboard at top of inlets where freeboard is the difference between the top of the inlet/grate and the design water level (in this case the 25-year water level). Landscape areas that have a surface release to an approved storm drain system are exempt from this requirement.

2) Bridge Structures

Where analyses show that there is existing channel capacity for the 100-year flow event with 1-foot freeboard to the top of bank, existing abutments may be reused in place. If there is not adequate freeboard, abutments must be relocated. New and relocated abutments for the bridge shall be on the overbank at least five feet horizontal from the top of bank. At the abutment, there shall be at least 1 foot of freeboard to the lowest elevation on the bottom of the structure for the 100-year event or largest flood of record, whichever is greater. Alternatively, at least 1 foot of freeboard shall be provided above the higher of, (1) the top of bank of the Atherton Channel, and (2) the proposed overbank elevation 5 feet horizontal from the channel. If the top of bank/overbank elevation is used, the 1 foot freeboard shall be maintained between the top of bank and the abutment.

The developer shall provide the Town of Atherton with an agreement that indemnifies the Town of Atherton of any liability associated with a bridge failure or of any liability associated with the channel constriction caused by the bridge. The agreement shall be provided as a part of the building permit documents. The indemnity agreement shall be prepared on a case by case basis and shall be subject to approval by the City Attorney. As a minimum, the agreement shall include indemnification against bridge and other property damage and any death or injury associated with water level, flow velocity, sediment, debris and scour at the bridge.

3) Buildings on Property adjacent to Creeks and Channels

Minimum finished floor elevation at least one foot above top of bank or 100 year flood elevation, if that is determined.

4) All Other Structures

Project shall provide at least 1 foot freeboard to the minimum finished floor during a 100-year flood based on a combination of overland flow and flow through the storm drain system. The Director of Public Works may allow the minimum finished floor elevation of non-habitable structures to be lower

provided flood proofing is included that accommodates water levels up to one foot above the 100-year water level.

The level of protection may be required to be greater than the minimum cited above if, in the opinion of the Director of Public Works, project failure would cause potential loss of life and/or unreasonable economic loss.

- b) Documentation shall be provided to confirm that site improvements do not increase water levels on upstream properties during the 2, 10, and 100-year storm events. Documentation shall show that runoff to the property and site runoff both have positive drainage across the site, and that runoff is directed away from on-lot buildings.
- c) The Town requires stormwater detention for the purpose of reducing peak flows to downstream creeks and channels. Stormwater detention is required for projects that create or replace greater than 5,000 square feet impervious surface. For projects that create or replace more than 25,000 square feet of impervious area, no credit is given for existing impervious surface that is removed. For projects that create or replace less than 25,000 square feet of impervious surface and have less than 50 percent impervious coverage on the parcel, only the net increase in impervious area is subject to the requirements of this section. For projects that create or replace less than 25,000 square feet of impervious surface and have more than 50 percent impervious area, no credit is given for the existing impervious surface that is removed that is in excess of 50 percent of site impervious surface. Credit is given for impervious surface removed that is less than 50 percent of the site area.
- d) Once upgrades are completed to the Bayfront Canal such that a 25-year storm event is contained in the Canal, projects that create or replace greater than 25,000 square feet and will have a total site impervious area less than 50 percent of the total site area will receive credit for existing impervious surface and must only detain for the increase in impervious surface. For projects that create or replace greater than 25,000 square feet of impervious surface and have more than 50 percent impervious area, no credit is given for the existing impervious surface

that is removed that is in excess of 50 percent of site impervious surface. Credit is given for impervious surface removed that is less than 50 percent of the site area.

- e) Three options are provided for detaining stormwater.

Option 1: Detain two inches of rainfall over the impervious area determined from Section B2c with no reduction for discharge from the storage area.

Option 2: Detain three inches of rainfall inflow over the impervious area less the volume of runoff associated with stormwater released from the basin. The peak release rate shall be the 100-year rainfall, 24-hour inflow volume over a 24-hour period. A higher rate of release is allowed if the calculated orifice size would be less than 1 inch diameter for a gravity release or less than that pumped by a 1/3 horsepower pumping unit, in which case, these minimum sizes are acceptable at each historic release point from the site. The required storage is the total inflow volume associated with three inches rainfall less the outflow of 6 hours discharge based on a constant discharge at the peak release rate, (A minimum storage volume of 0.06 cubic feet storage per square foot of impervious surface is required).

Option 3: Detain such that there is no increase in the runoff volume from the site during the 6-hour peak rainfall period of a 24-hour storm event. In addition, for projects that drain to Atherton Channel, the project shall document that there is no increase in the peak rate of runoff within the Atherton Channel (based on flow presented to the nearest 0.1 cfs) with the project. The Town's Corps of Engineers HEC-HMS model shall be used to document the changed flow conditions in the Atherton Channel. (For projects greater than 25,000 square feet, the increase is from the undeveloped condition of the site, for less than 25,000 square feet, from the existing development condition of the site. Once upgrades to Bayfront Canal are completed, detention will be based on existing conditions of the site.)

Historic release locations shall be maintained. If there are multiple historic release points, a separate outfall is needed for each release point. Storage is

required in all portions of the Town and within the Atherton Channel Drainage District. Detentions basins may discharge to either (1) groundwater, (2) the Town storm drain system as gravity flow, which includes gutter flow if no storm drain line is present, or (3) the Town storm drain system as pumped flow.

- f) Percolation from detention ponds is allowed only if a Geotechnical Report shows that there will be at least a 10-foot separation from the groundwater table and that percolating water in excess of the natural percolation rate for the site will not seep onto other properties. Raising the groundwater table by seepage is accepted. If the bottom of the storage basin is within 10 feet of the groundwater table or affects seepage to other properties, a low permeability barrier designed to mitigate the effects of the seepage is required. Infiltration devices shall be located at least 100 feet away from water supply wells.

If percolation is used, the Geotechnical Report shall verify that all soils down to the groundwater level will percolate at the minimum rate recommended for design.

- g) Use of the Rational Method is satisfactory for small drainage areas (< 200 acres). Analyses for projects with drainage areas greater than 200 acres shall be based on Hydrograph Methods following procedures listed in the (current at the time of permit application) Santa Clara County Drainage Manual.
- h) For areas less than 200 acres, use rational formula $Q=CIA$ to determine the peak flow rate. The rainfall intensity shall be calculated using the following equations:

$$I_{2\text{-year}} = 3.67 * K_2 / \text{Time of Concentration}^{0.50}$$

$$I_{10\text{-year}} = 6.18 * K_2 / \text{Time of Concentration}^{0.50}$$

$$I_{25\text{-year}} = 7.39 * K_2 / \text{Time of Concentration}^{0.50}$$

$$I_{100\text{-year}} = 9.61 * K_2 / \text{Time of Concentration}^{0.51}$$

Where K_2 is the correction factor for the Town of Atherton, which varies with Mean Annual Precipitation (MAP). Tables 1A, 1B, 1C, 1D and 2 present data

used for the intensity-duration-frequency equation. Tables 1B lists the precipitation values for the San Francisco Bay Area modified for the Town of Atherton, 10-year event, with a Mean Annual Precipitation (MAP) of 18 inches. Exhibit 1 shows the MAP within Atherton. Table 2 is the adjustment in rainfall intensity with respect to different MAPs.

i) Runoff Coefficients shall be as follows:

"C" Factor (10-Year Event)	Description
0.30	Parks and Open Areas
0.50	Residential (R-1) Areas (predominate in Atherton)
0.70	Multiple Dwelling and Single-Family Attached Areas
0.90	Paved Areas
0.95	Roof Areas

The 10-year Runoff Coefficients shall be multiplied by 1.1 for the 25-year event and by 1.25 for the 100-year event. The maximum runoff coefficient is 1.0.

(For combined paved and unpaved areas, a "weighted" C-factor shall be used, with a maximum C-coefficient of 1.0 used in the weighting equation.)

Runoff Coefficients for the Town of Atherton are assumed to be 0.5 for Residential suburban land uses. Specific exceptions are for schools, parks and other large land uses that are within the Town, and shall be calculated accordingly. The Runoff Coefficient of 0.5 was established by Nolte in the Town-wide Drainage Study dated June 28, 2001.

j) An initial time of concentration at the first catch point or concentration point of 5 minutes shall be used for steep (greater than 4:1 slope) and/or small (less than 100 feet to inlet) drainage areas and 10 minutes otherwise. The time of concentration shall be increased using the calculated flow time in pipe or drainage swale. For large drainage areas, the initial time of concentration is estimated from the equation below:

$$T_c = 10 + 0.0078 \left(\frac{L^{3/2}}{H^{1/2}} \right)^{0.77}$$

where: L = the maximum length of travel, in feet.
H = the difference in elevation along the effective slope line, in feet.
Tc = the time of concentration, in minutes.

k) Runoff to Adjoining Property

Runoff may flow to adjoining property so long as it meets all three of the following conditions:

- 1) The peak flow rate is consistent with the pre-development runoff pattern.
- 2) The portion of the flow associated with project development is detained in accordance with Town Requirements.
- 3) The flow is spread consistent with the pre-development release from the site.

Flow may be concentrated at a release point provided that an easement or written agreement is obtained from the downstream property owner. If an easement is not obtained, the peak flow rate and velocity at the property boundary shall be less than or equal to the pre-project condition peak flow and velocity for the 2, 10, 25 and 100-year storm events.

l) Calculation of Runoff within Atherton Channel

The peak flow rate within Atherton Channel shall be computed using the Unit Hydrograph Method described in the t (current at the time of permit application) Santa Clara County Drainage Manual. The Town has an existing HEC-HMS computer model of Atherton Channel that shall be used as a basis for calculating peak flow rates and runoff hydrographs. The model may be refined using improved information including survey, soil information or more refined information. Precipitation shall be based on the alternating block method and

shall be based on rainfall intensity rates presented in Section 2(f) adjusted for mean annual precipitation unless approved by the City Engineer.

3. HYDRAULIC CRITERIA

a) Starting Water Level – Piped System

1) Discharge to a Creek or Channel – Where practical, the systems are analyzed using the peak 25-year water levels for Atherton Channel and Redwood Creek, whichever is applicable. In lieu of analyzing the 25-year water level in the Channel, a water level at the top of the channel bank may be used.

2) Discharge to (1) a Town Storm Drainage System, or (2) curb side system where a drainage system is not present – The on-lot drainage system shall be evaluated using a starting water level that is the 25-year water level in the downstream system. If approved by the City Engineer in advance, the 25-year water level in the off-site system may be determined using the following simplifying approaches:

- i. If discharging to a storm drain, a starting water level 1 foot below the rim elevation at the connection point may be used.
- ii. If discharging to a roadside ditch, a starting water level 0.25 feet above edge of pavement may be used.
- iii. If discharging through a curb drain to a gutter, a starting water level 0.5 feet above gutter flow line may be used.

3) Discharge to Storage Area – Storm drain systems sized to convey runoff to a storage facility shall be sized based on the storage facility being full at the peak of the storm event unless detailed hydrographic analyses are provided based on the methodology presented in the Santa Clara County Drainage Manual.

b) The effect of debris, erosion, and channel bedload during flood flows shall be considered in the design of culverts and bridge structures.

- c) Where pump stations are used, discharge shall leave site as gravity flow with an air break provided, i.e., by a catch basin, that will: (a) protect the property by allowing the pumped flow to safely flow out if the gravity portion is clogged, and (b) readily indicate that the gravity portion is clogged.
- d) All drainage facilities, including treatment devices, shall completely dewater within 96 hours of the end of a rainfall event. Pumping facilities may be required to assure that complete dewatering occurs within 96 hours.
- e) All drainage facilities draining into the channel or other drainage system that may cause backflow above the lowest rim in the drainage system during a 100-year storm event shall include a backflow prevention device. The top of bank may be used in-lieu of calculating a 100-year water level.
- f) **Hydraulic Analysis and Design**
Storm drainage and flood protection systems must be sized so that design flows can be collected, conveyed, and safely discharged to receiving waters while meeting general drainage and freeboard requirements. Hydraulic analysis shall be conducted following current, at the time of permit application, Santa Clara County Drainage Manual guidelines. For drainage areas under 5 acres, overland flow depths may be calculated using Manning's Equation with normal depth. For drainage areas greater than 5 acres, a steady state, two dimensional flow model, such as the Army Corps of Engineers River Analysis System, HEC-RAS computer model shall be used.

C. Additional Permit and Notification Requirements

- 1. Prior to issuance of the Building Final, the Engineer of Record shall certify that the construction is in general conformance with the plans based on a visual inspection of underground structures prior to backfill and finished site conditions.**
2. All underground storm drain mains and Creek culverts constructed within the Town's right-of-way shall be located under the direct responsible charge of a California Licensed Land Surveyor (CA LLS) (for these regulations, a Civil Engineer that received a Professional Engineering license prior to the 1982 change in survey requirements may

also be used where standards call for a CA LLS) prior to backfilling for the purpose of assuring their correct location and slope. A CA LLS shall prepare and submit to the Town a letter certifying the storm drain/culvert location. This does not apply to laterals that originate on private property or to lines between a catch basin/drain inlet and a main line.

3. Every project shall provide the Town with a completed “NPDES Permit Compliance Checklist” (Attachment A). The checklist shows the requirements needed in order to prevent stormwater pollution as part of the San Mateo Countywide Water Pollution Prevention Program (SMCWPPP).
4. Projects with a disturbed land area (graded, cleared, or otherwise impacted) over one acre will need to file a Notice of Intent (NOI) and obtain a Waste Discharge Identification Number (WDID) from the State Water Resources Control Board, and must prepare a Stormwater Pollution Prevention Plan (SWPPP) and Stormwater Management Plan.
5. Developers are required to sign an Operations and Maintenance Agreement for any new permanent control measures. The Operations and Maintenance Agreement shall be based on the Town’s model Operations and Maintenance agreement (Attachment B).
6. San Mateo County Mosquito Abatement District shall be notified of location where standing water may occur for greater than 48 hours. See the County’s Vector Control Plan for guidance on how to address potential mosquito breeding habitat.

D. Basement Construction Hydraulic Criteria

1. Basement construction shall not impact groundwater within the Town. If any portion of a building is constructed below the existing ground surface, measures shall be taken to not impede seepage or groundwater flows. Construction shall not release contaminants into the groundwater. Measures to maintain seepage and groundwater flow around the basement include placement of a subdrain consisting of drain rock and perforated pipe that allows passage of flows around subsurface structures. Measures to prevent contamination of groundwater include placement of protective barriers to prevent the release of construction materials into the groundwater.
2. Pumping of groundwater to the Town drainage system during construction is accepted for a period not to exceed two weeks. If pumping is required for more than two weeks, pumping shall be to injection wells or by other means, with the approval of the City Engineer. For purposes of this requirement, a Geotechnical Engineer shall certify a Historical High Groundwater Level. The Geotechnical Engineer shall incorporate the groundwater levels presented in Exhibit 2. Seepage water, direct rainfall and nuisance flows may be pumped from the site at any time, however, the pump intake may not be lower than the historical high groundwater elevation except for during the two week period of allowed groundwater pumping. Non-stormwater discharge from a site may only occur only with prior approval of the San Francisco Bay Region Water Quality Control Board.
3. No groundwater pumping is acceptable after completion of construction. Seepage water, direct rainfall and nuisance flows may be pumped from the site at any time, however, the pump intake may not be lower than the historical high groundwater elevation. Subdrains are allowed to facilitate dewatering above the historic groundwater level. Underdrains are allowed but must be at least two feet above the historic groundwater level.
4. Basement areas shall be hydraulically isolated from runoff that would occur during a 100-year storm event. Runoff includes Creek flows and overland flows from upstream drainage areas. Calculations shall show that there is at least 1 foot of freeboard protecting

all entrances to the basement. The 100-year water level shall consider local overland flow, regional drainage and Creek water levels.

5. All basement access points including ventilation facilities, windows, doors, etc. must either be (1) at least one foot above the 100-year water level, or (2) protected by waterproof barriers that provide one foot protection above the 100-year water level.
6. Calculations shall be provided that document that the building can withstand loadings, including buoyancy, based on a water level at the 100-year overland flow water level.
7. Pumping of light wells shall be hydraulically isolated from other site pumping and from the underdrain system.
8. Light wells or other below grade areas adjacent to a potential opening to a basement, such as a window or door, shall have sufficient storage to contain a minimum of 6-inches rainfall below the lowest opening to the basement. No additional freeboard is required. Storage is based on a condition with a pump not operating.

E. Construction Site Control

1. Legal Authority for Effective Site Management - The Town of Atherton Building Inspectors and City Engineer are authorized to require effective stormwater pollutant controls, and escalate progressively stricter enforcement to achieve expedient compliance and clean up at all public and private construction sites.
2. Implementation Level
Atherton Building Inspectors and City Engineer have the legal authority to require that all construction sites maintain year-round, effective erosion control, run-on and runoff control, sediment control, active treatment systems (as appropriate), good site management, and non storm water management through all phases of construction (including but not limited to site grading, building, and finishing of lots) until the site is fully stabilized by landscaping or the installation of permanent erosion control measures.

Town of Atherton Building Inspectors and City Engineer have the legal authority to oversee, inspect, and require expedient compliance and clean up at all construction sites year round.

3. Best Management Practices Categories

For sites with less than 1 acre disturbed soil, an Erosion/Pollution Control Plan (EPCP) shall be submitted as a part of the grading and drainage plan permit review. For sites greater than 1 acre of disturbed soil area, a Stormwater Pollution Prevention Plan (SWPPP) shall be submitted. The EPCP shall follow outlines similar to a SWPPP or a Caltrans Water Pollution Control Plan. The EPCP for all construction sites shall include site specific, and seasonally- and phase-appropriate, effective Best Management Practices (BMPs) in the following six categories:

a) Erosion and sediment control BMPs

- A schedule of earthwork shall be provided in the EPCP. The City Engineer shall have discretion and authority to allow grading during the rainy season. To the extent practical, major soil disturbing construction activities should be conducted in the non-rainy season between April 15 to October 15. Erosion and sediment controls shall be operable year round
- preserve natural features, vegetation and soil
- Stabilize soils
- Protect slopes
- Protect storm drain inlets
- Use perimeter sediment control
- Use stabilized construction exits
- Provide wind erosion control

b) Run-on and Run-off Control

c) Sediment Control

d) Active Treatment Systems (as necessary)

e) Good Site Management

- Manage Material handling and waste
- Manage Building materials stockpiles

- Manage washout areas (concrete, paints, stucco, etc.)
- Control vehicle/equipment fueling to contractor's staging area
- Clean vehicle and equipment
- Prevent and control Spills

f) Non Stormwater Management.

These BMP categories are listed in the State General NPDES Permit for Stormwater Discharges Associated with Construction Activities (hereinafter the Construction General Permit).

The BMPs used at a site shall target specific pollutants within these six categories listed in Section 3i and shall be site specific. Site specific BMPs targeting specific pollutants from these six categories can be a combination of BMPs from:

- California BMP Handbook, Construction, January 2003.
- Caltrans Stormwater Quality Handbooks, Construction Site Best Management Practices Manual, March 2003, and addenda.
- California Regional Water Quality Control Board, San Francisco Bay Region, Erosion and Sediment Control Field Manual, 2002.
- New BMPs available since the release of these Handbooks.

g) Plan Approval Process

Before issuance of a grading permit, Contractor shall provide the following:

(1) The site EPCP or SWPPP that is consistent with these requirements and contains appropriate and adequate BMPs.;

(2) For sites disturbing one acre or more of soil, documentation shall be provided that a Notice of Intent for permit coverage under the Construction General Permit has been filed. The grading permit can be approved on a provisional basis prior to final certification on the State of California's Storm Water Multi Application and Report Tracking System (SMARTS). No site disturbance may occur until a Waste Discharge Identification Number (WDID No.) is received for the project.

h) Enforcement Response Plan (ERP)

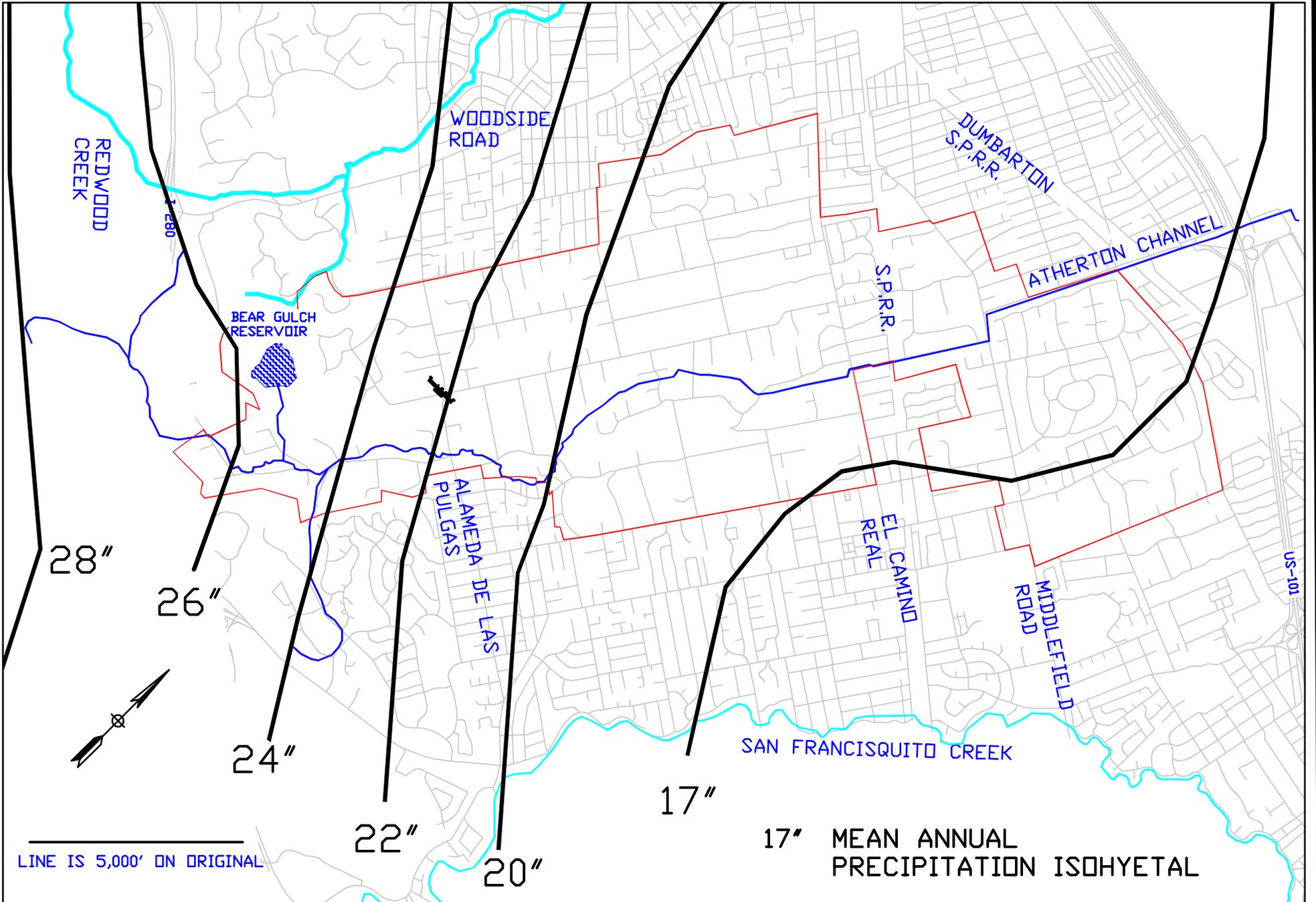
The Town of Atherton has developed and is implementing an ERP that serves as a reference document for inspection staff to take consistent actions to achieve timely and effective compliance from all public and private construction site owners/operators.

Implementation Levels

- (1) The site owner/operate shall implement measures described in the EPCP or SWPPP.
- (2) When a site owner/operator does not comply with the requirements of the EPCP or SWPPP, the ERP includes required enforcement actions – including timeframes for corrections of problems – for various field violation scenarios. All violations shall be corrected in a timely manner with the goal of correcting the violation prior to the next rain event but no longer than 10 business days after the violations are discovered. If more than 10 business days are required for compliance, the site owner/operator shall provide the Town with a rationale that will be recorded in the Town’s electronic database or equivalent tabular system.
- (3) If site owners/operators do not implement appropriate corrective actions in a timely manner, or if violations repeat, Town of Atherton will take progressively stricter responses to achieve compliance. The ERP includes the structure for progressively stricter responses and various violation scenarios that evoke progressively stricter responses.

F. Criteria References

1. The design of storm drainage facilities shall conform to standard accepted engineering practices. Common reference texts/web sites are:
 - "Handbook of Hydraulics," King & Brater
 - "Street and Highway Drainage," The Institute of Transportation, University of California
 - "Highway Design Manual," CalTrans
 - "Practices in Detention of Urban Stormwater Runoff, Special Report No. 43," American Public Works Association '
 - "Suggested Criteria for Hydrologic Design of Storm Drainage Facilities in the San Francisco Bay Region, California," United States Department of the Interior, Geological Survey
 - ASCE Manual of Engineering Practice No. 37
 - "Open-Channel Hydraulics," V.T. Chow
 - "A Guide to Hydrologic Analysis Using SCS Methods," McCuen
 - "Santa Clara County Drainage Manual 2007" Santa Clara County
 - US Army Corps of Engineers Hydrologic Engineering Center – www.hec.usace.army.mil – HEC-RAS and HEC-HMS Documentation
 - California Department of Transportation (CalTrans) www.dot.ca.gov/hq/construc.stormwater.manuals.htm SWPPP WPCP Preparation Manual that can also be used as a template for Erosion/Pollution Control Plans



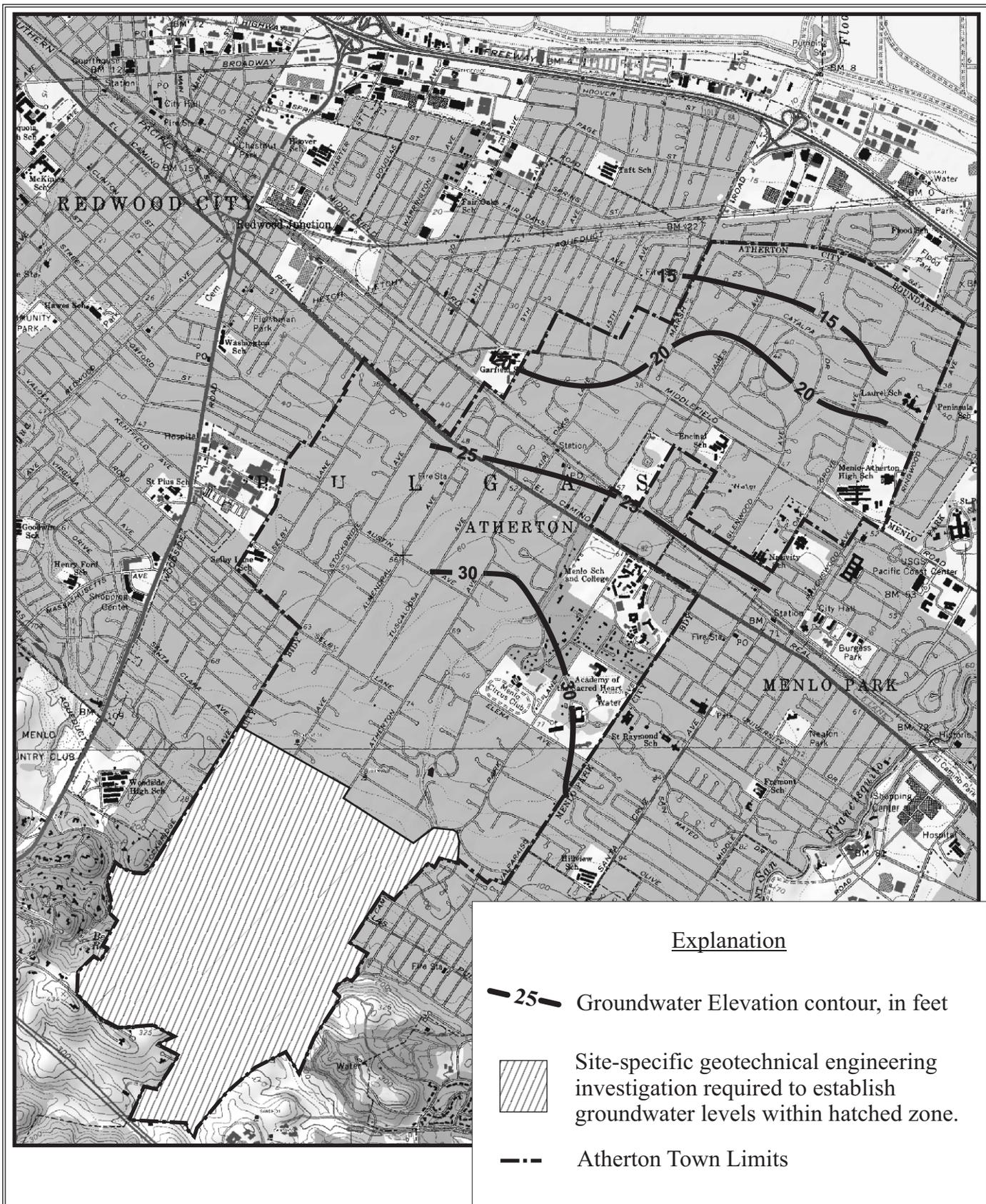
17" MEAN ANNUAL PRECIPITATION ISOHYETAL

BKF No. 20060005

MEAN ANNUAL PRECIPITATION (MAP) ISOHYETALS

EXHIBIT 1





Explanation

-  Groundwater Elevation contour, in feet
-  Site-specific geotechnical engineering investigation required to establish groundwater levels within hatched zone.
-  Atherton Town Limits

**Groundwater Elevation Contours
Town of Atherton, California**

GROUNDWATER MAP

Date
Jan., 2007

Job Number
BKFEN-05-01

Exhibit
2



TABLE 1A

TOWN OF ATHERTON
DRAINAGE CRITERIA

Precipitation Values
Atherton, 2-Year Event, MAP 18 inches

Duration (minutes)	Rainfall Amount (inches)	Rainfall Intensity (inches/hour)	Intensity from Equation (inches/hour)
5			1.64
10	0.20	1.19	1.16
15	0.24	0.95	0.95
30	0.34	0.68	0.67
60	0.47	0.47	0.47
120	0.67	0.34	0.34
180	0.82	0.27	0.27

Equation: $I = K_1 * K_2 / Tc^n$

I 2-yr = 3.67 * $K_2 / Tc^{0.5}$

Where K_2 varies with MAP and is from Table 2

**TOWN OF ATHERTON
DRAINAGE CRITERIA**

**Precipitation Values
Atherton, 10-Year Event, MAP 18 inches**

Duration (minutes)	Rainfall Amount (inches)	Rainfall Intensity (inches/hour)	Intensity from Equation (inches/hour)
5			2.76
10	0.33	1.99	1.95
15	0.40	1.59	1.59
30	0.57	1.14	1.13
60	0.80	0.80	0.80
120	1.13	0.56	0.56
180	1.38	0.46	0.46

Equation: $I = K_1 * K_2 / Tc^n$

$I_{10\text{-yr}} = 6.18 * K_2 / Tc^{0.5}$

Where K_2 varies with MAP and is from Table 2

TABLE 1C

**TOWN OF ATHERTON
DRAINAGE CRITERIA**

Precipitation Values
Atherton, 25-Year Event, MAP 18 inches

Duration (minutes)	Rainfall Amount (inches)	Rainfall Intensity (inches/hour)	Intensity from Equation (inches/hour)
5			3.30
10	0.39	2.32	2.34
15	0.47	1.89	1.91
30	0.68	1.36	1.35
60	0.95	0.95	0.95
120	1.36	0.68	0.67
180	1.65	0.55	0.55

Equation: $I = K_1 * K_2 / Tc^n$

$I_{25-yr} = 7.39 * K_2 / Tc^{0.5}$

Where K_2 varies with MAP and is from Table 2

TABLE 1D

**TOWN OF ATHERTON
DRAINAGE CRITERIA**

**Precipitation Values
Atherton, 100-Year Event, MAP 18 inches**

Duration (minutes)	Rainfall Amount (inches)	Rainfall Intensity (inches/hour)	Intensity from Equation (inches/hour)
5			4.10
10	0.33	2.91	2.90
15	0.40	2.40	2.37
30	0.57	1.71	1.67
60	0.80	1.19	1.18
120	1.13	0.84	0.84
180	1.38	0.68	0.68

Equation: $I = K_1 * K_2 / Tc^n$

$I_{100\text{-yr}} = 9.17 * K_2 / Tc^{0.5}$

Where K_2 varies with MAP and is from Table 2

TABLE 2

**TOWN OF ATHERTON
DRAINAGE CRITERIA**

Adjustment in Intensity with Mean Annual Precipitation

Mean Annual Precipitation	K2, Percentage Increase (%)
18.0	100%
20.0	104%
22.0	109%
22.5	110%
23.0	111%
24.0	113%
26.0	118%
28.0	122%
30.0	126%

No adjustment for less than 18"