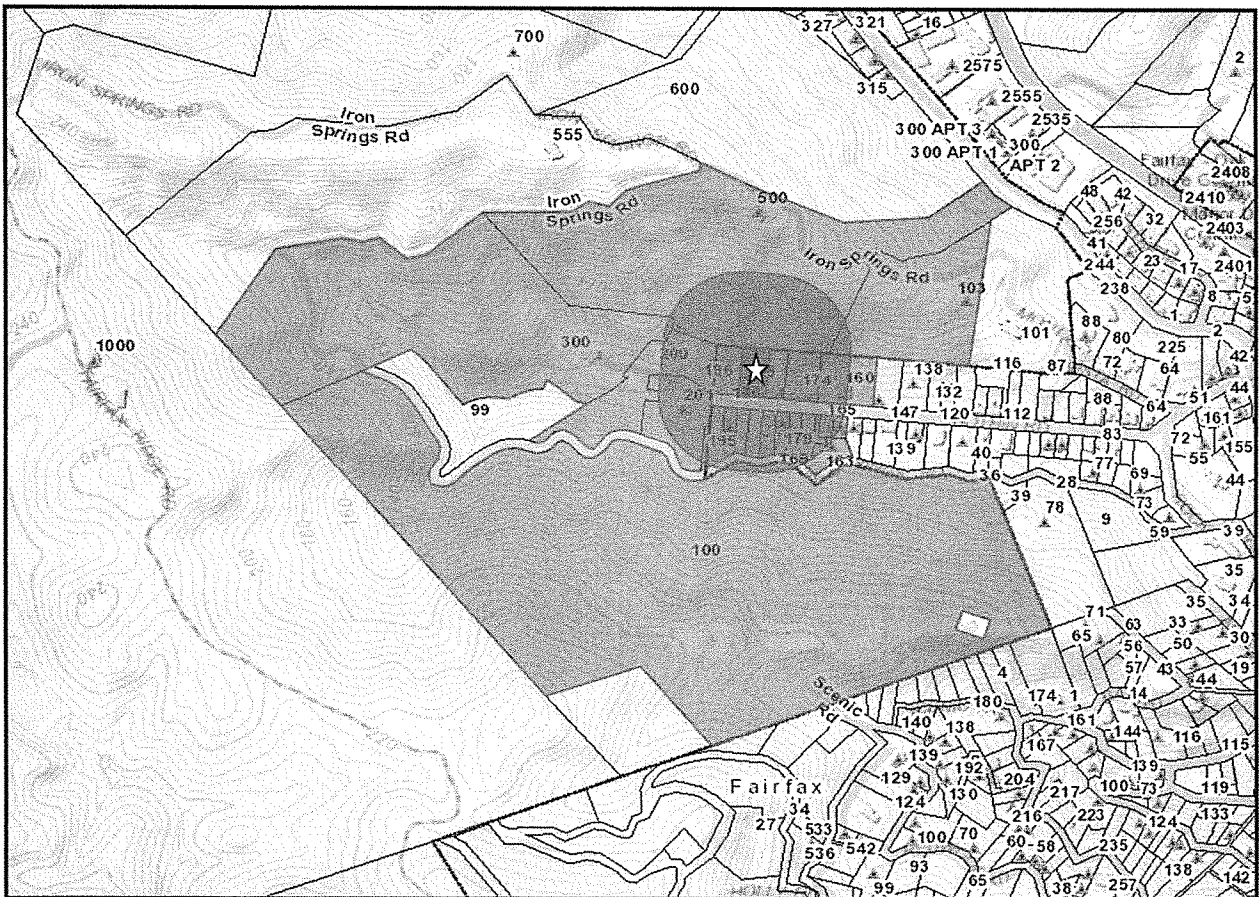


**TOWN OF FAIRFAX
STAFF REPORT
Department of Planning and Building Services**

TO: Fairfax Planning Commission
DATE: May 21, 2015
FROM: Jim Moore, Director of Planning and Building Services
Linda Neal, Principal Planner
LOCATION: 188 Bothin Road; Assessor's Parcel No. 001-082-56
ZONING: Residential Single-family RS 6 Zone District
PROJECT: Addition/remodel of a single-family residence
ACTION: Hill Area Residential Development Permit and Combined Side Setback Variance; Application # 15-14
APPLICANT: Ted Arleo, Architect
OWNER: Cheryl Tatum
CEQA STATUS: 15301(e)(1) and 15305(a)



188 BOTHIN ROAD

BACKGROUND

The property was created in its current configuration by the recording of the Bothin Park Subdivision on September 11th in 2013. The 20,000 square foot site slopes up from Bothin Road at an average rate of 24% with a relatively level area at the front of the site where the house and garage are located.

The existing 1,549 square foot, three bedroom, 1 bath, single-family residence was constructed in 1932 with the bathroom projecting out from the rest of the house and maintaining a now substandard, 2 ½ foot setback from the western side property line. There is no record on when the two car garage was constructed but it maintains a 3.5 foot setback from the eastern side property line.

DISCUSSION

The project encompasses remodeling 336 square feet of the existing 1,549 square foot structure and the addition of 853 square feet that will include a new an internal stairway to a second story that will contain a study, walk-in closet, master bedroom and bathroom addition with a new deck. The addition/remodel will result in a 2,403 square foot, 3 bedroom, 2 ½ bath residence. The project will include pulling the lower floor bathroom back from the property line so that it maintains the minimum required 5 foot setback [Town Code § 17.080.040(B)(2)].

The project complies with the Residential RS 6 Zone District regulations where the site is located as follows:

	Front Setback	Rear Setback	Combined Front/rear Setback	Side Setbacks	Combined Side Setbacks	FAR	Lot Coverage	Height
Required/ Permitted	6 ft	12 ft	35 ft	5 ft & 5 ft	20 ft	.40	.35	28.5 ft, 3 stories
Existing	9 ft (garage)	136 ft (rear of house)	145 ft	2.5 ft (west side of house), 3.5 ft (east side of garage)	6 ft	.08	.15	16 ft, 1 story
Proposed	9 ft (garage)	90 ft (rear of house)	96 ft	5 ft (west side of garage, 3.5 ft)	8.5 ft	.12	.13	20 ft, 2 stories

The project constitutes a 50% remodel and requires the approval of the following discretionary permits:

A Hill Area Residential Development Permit –

There are several different features of a proposal or site that can result in a project being subject to the Hill Area Residential Development (HRD) Overlay Zone Ordinance (Town Code Chapter 17.072). This site is subject to the HRD Ordinance because it is located within a landslide hazard zone as shown on the Open Space Element Map of the General Plan (based on the "Geology for Planning: Central and Southeastern Marin County, California" study done in 1976, by Rice, Smith and Strand).

The Town Engineer has reviewed the following documents and reports pertaining to the geology, site drainage and the project plans:

- The project architectural plans by Ted Arleo, Architect, dated October 30, 2014
- The project engineering plans, including the grading a drainage plan and the erosion control and storm water pollution plan, revised 3/9/15 by LTD Engineering.
- The recorded property survey by J.L. Engineering, Land Surveyors, dated October 2013
- A geotechnical investigation by Dave Olnes, Civil and Soil Engineer, dated 12/9/13 (Exhibit B)
- An addendum to the original report by Dave Olnes, dated 3/24/15 (Exhibit B)
- A response to the Town Engineer's comments by LTD Engineering dated 4/16/15 (Exhibit C).

The site features of main concern to the Town Engineer are the steep potentially unstable slopes uphill of the site and the natural drainage swale draining the area upslope that has been realigned on the lower portion of the swale to divert water to the side of the site to avoid the yard and garage, before directing the flow to the street.

To quote the geotechnical report by Dave Olnes dated 12/9/13, "The site lies within a deep canyon, at the foot of a seasonal drainage swale which discharges storm water out onto Bothin Road during major storms. This flow is currently poorly confined within a shallow earth swale that angles across the upper portion of the lot, passes through a narrow space beside the garage, discharging over the curb onto the street".

The geotechnical engineer recommended, and the recommendations have been incorporated into the revised civil engineering plans, installation of two debris walls to deflect any debris flow event that may occur. One diversion wall has been located on the west side of the drainage swale on the upper portion of the lot and is slightly angled to the east. This wall will deflect debris flows away from the house and proposed project area, towards the earthen drainage swale. A second debris diversion wall is proposed along the eastern property line to deflect any debris event away from the neighboring home. This wall can be a stout fence, 4 to 6 feet in height, if it is constructed upon

drilled piers and the flow dimensions of the earthen swale between the two diversion walls are increased.

The plans also call for the existing earthen swale to feed into a formed concrete channel which will pass through the narrow space between the garage and the side property line. Calculations have been provided showing that the concrete channel will be of an adequate size to accommodate water flows from a 100 year storm. The channel will also contain a hydraulic jump to slow the water down (dissipate energy) to minimize the speed of the water as it flows into the street during heavy storms.

The neighbors have indicated they have reviewed the plans and are willing to allow access to the portion of their property needed to install the debris barrier and drainage channel (Exhibit E). Staff has included in the draft action Resolution, should the project be approved, the condition that creation of a recorded maintenance access easement be a condition of project approval.

The mitigation measures that have been incorporated into the project have met with the approval of the Town Engineer and he has recommended that the project, as designed, meets the intent of the Hill Area Residential Development Ordinance and the project can be acted upon by the Commission.

A Combined Side Setback Variance –

Town Code § 17.084.070(B)(2) sets forth the minimum required setback for properties having over a 10% slope. This site has an average slope of 24% so the minimum side setbacks for the property are 5 feet but the combined side setback (distance from the closest structure wall to the west side property line when added to the distance between the closest structure wall to the east side property) is 20 feet. The garage on the property maintains a 3.5 foot side setback. The side setback in the residential zones was 3 feet prior to 1961 when the minimum side setback requirement was increased to 5 feet. The location of the garage in its legal non-conforming location at the front eastern corner of the site, makes it difficult to design an addition to the existing home that conforms to the required 20 foot combined side setback. However, the proposed addition does not encroach any further into the required combined setback than the existing structures and the bathroom that currently encroaches to within 2.5 feet of the eastern property line will be pulled back to comply with the minimum 5 foot setback. Therefore, the project will eliminate one non-conforming aspect of the house and will not increase any non-conformity.

An addition could be designed to the east of the house towards the garage but that would eliminate a significant amount of the level usable outdoor area available on the site.

Design Review

Home Size

A review of other homes in the immediate area on similar sized and sloped lots indicates that the smallest is a 1,141 square foot, 3 bedroom, 1 bath home on a 20,000 square foot parcel (150 Bothin Road) and the largest is a 2,571 square foot, 4 bedroom, 3 bath residence on a 25,000 square foot parcel (174 Bothin Road). Therefore, the proposed 2,403 square foot, 3 bedroom, 2 ½ bath residence on this 20,000 square foot lot is similar in size and mass to other homes in the immediate area on similar sized properties.

Height

Town Code § 17.080.060(A) limits the height of residences on up-sloping properties in the Residential Single-family RS 6 Zone District to 28.5 feet and three stories. Therefore, a structure on the project site could be 28.5 feet in height and three stories and be in compliance with the law. The proposed house will reach a maximum of 20 feet in height, 8.5 feet below the permitted height, and will only be two stories with the second story stepped up the hillside behind the existing house. Visually, the impact of the house as designed will be that of a single-story residence except for a 21 foot long section in the middle of the structure. The addition will have a minimal impact on neighboring residences which maintain over a 27 foot setback (196 Bothin Road) to the west and over a 52 foot setback to the east (180 Bothin Road).

Design/Architecture

The exterior façade of the addition has been articulated through the use of different sized windows, alternating horizontal and vertical siding, different siding materials and the utilization of different directional shed roof slopes. Portions of the existing residence and proposed addition will have new cedar siding treated with a transparent stain, other portions will have the cedar siding stained a charcoal color and other areas of siding will be wood painted a charcoal grey color to compliment the stain. The charcoal grey paint will also be used on the window frames and trim. The roof will be a gray standing seam metal roof that is zinc colored (the colors and materials board will be available at the public hearing for review).

Site Disturbance

The only trees to be removed will be the stumps of 4 bay trees that were previously cut down but have now re-sprouted – 2 at the northwest corner of the property addition, and 2 south of a proposed 4 foot tall retaining wall being construction to accommodate a new planting bed and stairs leading from the new deck into the side yard.

Parking

The parking on the site complies with the Town parking requirements set forth in Town Code § 17.052.030(A)(1) and (2) with two spaces provided in the garage and the third guest space provided within the public right-of-way along the property frontage.

Other Non-conforming Features

Fences are deemed structures by the Town Code and are regulated (Town Code § 17.008.020, definition of structure). The Town Code limits fences to 4 feet in height anywhere within a front setback [Town Code §17.044.080(B)(1)]. Additionally, fences are private improvements and require an encroachment permit granted by the Planning Commission if they are going to be located within a public right-of-way [Town Code 12.32.010(B)]. There is no record of a Fence Height Variance or Encroachment Permit being granted by the Commission for the existing 6 foot tall fence located along the front property line, 3 feet into the public right-of-way. The fence will be relocated to a conforming location 6 feet north of the front property line in compliance with the 6 foot setback requirement for 6 foot tall fences [Town Code § 17.044.080(B)(2)].

Other Agency/Department Comments/Conditions

Ross Valley Fire Department

1. A fire suppression system that complies with the National Fire Protection Association (NFPA) 13-D requirement and local standards is required. A separate deferred permit is required for the system which can be obtained from the Ross Valley Fire Department. The system must be designed by an individual or firm licensed to design and/or design/build such systems.
2. Interconnected smoke detectors provided with AC power shall be installed for simultaneous alarm. Detectors shall be located in each sleeping room, outside sleeping rooms centrally located in the corridor and over the center of all stairways with a minimum of one detector per story of the occupied portion of the residence.
3. Carbon monoxide alarms shall be provided outside each sleeping area in the vicinity of the bedrooms and on every level of the residence.
4. Address numbers at least 4 inches tall must be in place adjacent to the front door. If not clearly visible from the street, additional numbers are required and must be internally illuminated or illuminated by an adjacent light controlled by a photocell and switched off only by a breaker so it will remain illuminated all night.
5. The applicants have submitted a required Vegetative Management Plan (VMP) that has been approved by the Ross Valley Fire Department subject to the following conditions:

- a. Do not remove any tree that requires a permit from the Town without first requiring permit approval.
- b. Any vegetation within 30 feet of the structures shall be irrigated. Seasonal grasses are not permitted within the 30 foot zone unless they are regularly irrigated. If no regularly irrigated, seasonal grass areas shall be covered in a weed barrier that is covered in a layer of mulch.
- c. Erosion control measures shall be in compliance with Town of Fairfax Standards.
- d. The approved plan by Studio Green Landscape Architecture, page L-1, dated 10/29/14, is in effect for the life of the property unless amended and approved by the Fire Department under separate review.
- e. Vegetation shall be maintained to ensure address numbers are visible from Bothin Road from both angles of approach.
- f. The above minimum standard shall be in place prior to the site final fire clearance.
- g. Evidence of final fire clearance shall be provided to the Town prior to the final building permit inspection.

Marin Municipal Water District

- 1. Nothing about the proposed project will affect the District's ability to provide service to the property.
- 2. Compliance with all indoor and outdoor requirements of District Code Title 13, Water Conservation, is a condition of water service. Indoor fixtures must meet specific water efficiency requirements, landscape plans shall be submitted and reviewed to confirm compliance.
- 3. Should backflow protection be required it shall be installed, inspected and approved by a District Inspector.
- 4. Evidence of compliance with the District's requirements shall be provided to the Town prior to the final building permit inspection.

Sanitary District

A sewer connection permit is required.

Evidence of compliance with the Sanitary District's permit conditions shall be provided to the Town prior to the final building permit inspection.

Police, Public Works and Building Departments

The Fairfax Police, Public Works and Building Departments had no comments on or conditions to place on the project.

RECOMMENDATION

1. Open the public hearing and take testimony.
2. Close the public hearing.
3. Move to approve application # 15-14 by approving attached Resolution No. 15-15, which contains the findings and recommended conditions of approval.

ATTACHMENTS

Exhibit A – Resolution No. 15-15
Exhibit B – 12/9/13 and 3/24/15 geotechnical reports by Dave Olnes
Exhibit C – 4/16/15 letter from LTD Engineering, Inc.
Exhibit D – 3/6/15 and 12/2/14 Town Engineer memorandums
Exhibit E – Letter from neighbors at 180 Bothin Road

RESOLUTION NO. 15-15

A Resolution of the Fairfax Planning Commission Approving a Hill Area Residential Development permit, Design Review and Variance for a 50% Remodel/Addition at 188 Bothin Road

WHEREAS, the Town of Fairfax has received an application for a remodel/addition to a residential structure increasing it from a from a 1,549 square foot single-family residence to a 2,403 square single-family residence; and

WHEREAS, the Planning Commission held a duly noticed Public Hearing on May 21, 2015 at which time all interested parties were given a full opportunity to be heard and to present evidence, and at which time the Planning Commission determined that the proposed residence complies with the Hill Area Residential Development Overlay Ordinance and Design Review Ordinance and could make findings to approve the requested Combined Side Setback Variance; and

WHEREAS, based on the plans and other documentary evidence in the record, as well as testimony at the public hearing, the Planning Commission has determined that the applicant has met the burden of proof required to support the findings necessary to approve the project.

WHEREAS, the Commission has made the following findings:

1. The proposed residence conforms to the regulations set forth in the Hill Area Residential Development Ordinance, Town Code Chapter 17.072, the Design Review Ordinance, Chapter 17.020 and findings for a Variance can be made in compliance with Town Code § 17.028.070, Required "Variance" Findings; and
2. The proposed development harmonizes with the surrounding residential development, meets the design review criteria and does not result in the deterioration of significant view corridors.
3. The proposed development is of a quality and character appropriate to, and serving to protect the value of, private and public investments in the area.
4. The residence complies with the required front, rear and minimum side setbacks, lot coverage, height, parking and floor area ratio regulations set forth in the Town Zoning Ordinance, Title 17; and
5. The addition to residence has been designed and some exterior colors and materials changes have been incorporated so that the addition will complement the existing building; and
6. The site planning preserves identified natural features.

9. Based on the soils report finding, the site can be developed without geologic, hydrologic or seismic hazards.
10. Vehicular access and parking are adequate.
11. The Town Engineer, after reviewing the body of submitted information, including geotechnical and hydrology report, survey and topographic information and the development plans has determined that, a) the health safety and welfare of the public will not be adversely affected; b) adjacent properties are adequately protected by project investigation and design from geologic hazards as a result of the work; and, c) adjacent properties are adequately protected by project design from drainage and erosion problems as a result of the work;
12. The visual and scenic enjoyment of the area by others will not be adversely affected by the project more than is necessary;
13. Natural landscaping will not be removed by the project more than is necessary;
14. The time of year during which construction will take place is such that work will not result in excessive siltation from storm runoff nor prolonged exposure of unstable excavated slopes (Town Code § 171.072.090 prohibits grading from October 1st through April 1st).
15. The requested variance to allow the addition to the existing house to maintain a combined setback of 8.5 feet because of the close location of the detached garage to the property line, is similar to variances previously granted to other property owners in the vicinity, will not have a significant impact on immediate neighbors, will not impact the general public and is the minimum necessary to allow reasonable development of the site.

WHEREAS, the Commission has approved the project subject to the applicant's compliance with the following conditions:

1. Prior to issuance of the any building permit to start construction the following shall be provided to the Town and shall be reviewed and approved by the Town Attorney and Town Engineer at the property owner's expense:

A maintenance easement document to permanently allow access to an adequate area of the property at 180 Bothin Road to maintain the debris fence and drainage channel that will run along the east side of the property.

2. Once for format and wording of the easement is approved by the Town the easement shall be recorded at the Marin County Recorder's Office.

3. The foundation location shall be certified in the field and in a signed stamped letter from the surveyor shall be provided to the Town as being per the approved plans presented to the commission prior to the foundation concrete pour.

4. This approval is limited to the development illustrated on the architectural plans prepared by Ted Arleo, Architect, revision date 10/30/14 pages A-0.00, A 1.00, A 1.10, A 2.01, A 2.10, A 2.20, A 2.30 and A 3.30, the landscape and vegetative management plan, sheet L1 by Studio Green Landscape Architects, record of survey by Jay Hallberg of J.L. Engineering, geotechnical engineering reports by Dave Olmes P.E. Inc. dated 12/9/13 and 3/24/15, the engineering letter from Glenn Dearth, LTD Engineering Inc. dated 3/16/15 and the engineering plans drawn by Glenn Dearth, LTD Engineering Inc. dated 4/1/15, pages C-1 through C-4.

5. Prior to issuance of any of the residence building permits the applicant or his assigns shall:

a. Submit a construction plan to the Public Works Department which may include but is not limited to the following:

- Construction delivery routes approved by the Department of Public Works.
- Construction schedule (deliveries, worker hours, etc.)
- Notification to area residents
- Emergency access routes
- Parking plan to minimize the impacts of contractor/employee vehicles and construction equipment on neighborhood parking

b. The applicant shall prepare, and file with the Public Works Director, a video tape of the roadway conditions on the public construction delivery routes (routes must be approved by Public Works Director).

c. Submit a cash deposit, bond or letter of credit to the Town in an amount that will cover the cost of grading, weatherization and repair of possible damage to public roadways. The applicant shall submit contractor's estimates for any grading, site weatherization and improvement plans for approval by the Town Engineer. Upon approval of the contract costs, the applicant shall submit a cash deposit, bond or letter of credit equaling 100% of the estimated construction costs.

d. The foundation and retaining elements shall be designed by a structural engineer certified as such in the state of California. Plans and calculations of the foundation and retaining elements shall be stamped and signed by the structural engineer and submitted to the satisfaction of the Plan Checker.

e. The grading, foundation, retaining, and drainage elements shall also be stamped and signed by the site geotechnical engineer as conforming to the recommendations made by the project engineer.

- f. Prior to submittal of the building permit plans the applicant shall secure written approval from the Ross Valley Fire Authority noting the development conformance with their recommendations. The residence shall be provided with sprinkler system that complies with the requirements of the Ross Valley Fire Authority.
 - g. Submit the record of survey with the building permit plans.
- 7. During the construction process the following shall be required:
 - a. The geotechnical engineer shall be on-site during the grading process (if there is any grading to be done) and shall submit written certification to the Town Staff that the grading has been completed as recommended prior to installation of foundation and/or retaining forms and piers.
 - b. Prior to the concrete form inspection by the building official, the geotechnical and structural engineers shall field check the forms of the foundations and retaining elements and provide written certification to the Town staff that the work to this point has been completed in conformance with their recommendations and the approved building plans. The Building Official shall field check the concrete forms prior to the pour.
 - c. All construction related vehicles including equipment delivery, supply delivery, cement trucks and construction materials shall be situated off the travel lane of the adjacent public right(s)-of-way at all times. This condition may be waived by the Building Official on a case-by-case basis with prior notification from the project sponsor.
 - d. Any proposed temporary closure of a public right-of-way shall require prior approval by the Fairfax Police Department and any necessary traffic control, signage or public notification shall be the responsibility of the applicant or his/her assigns. Any violation of this provision will result in a stop work order being placed on the property and issuance of a citation.
- 8. Prior to issuance of an occupancy permit the following shall be completed:
 - a. The geotechnical engineer shall field check the completed project and submit written certification to the Town Staff that the foundation, retaining, grading and drainage elements have been installed in conformance with the approved building plans and the recommendations of the soils report.
 - b. The Planning Department shall field check the completed project to verify that all planning commission conditions have been complied with prior to issuance of the certificate of occupancy.
- 9. Excavation shall not occur between October 1st and April 1st. The Town Engineer has the authority to waive this condition depending upon the weather.
- 10. a) The roadways shall be kept free of dust, gravel and other construction materials by sweeping them, daily, if necessary.

b) Every effort shall be made to minimize the disturbance of dust, sand or other particulate matter during construction.

11. During construction the developer and all employees, contractor's and subcontractor's must comply with all requirements set forth in Ordinance # 637 (Chapter 8.26 of the Town Code), "Storm Water Management and Discharge Control Program."

12. Notwithstanding section # 17.38.050(A) of the Fairfax Zoning Ordinance, any changes, modifications, additions or alterations made to the approved set of plans will require a modification of Application # 15-14. Any construction based on job plans that have been altered without the benefit of an approved modification of Application 15-14 will result in the job being immediately stopped and red tagged.

13. Any damages to Bothin Road or public roadways used to access the site resulting from construction activities shall be the responsibility of the property owner.

14. The applicant and its heirs, successors, and assigns shall, at its sole cost and expense, defend with counsel selected by the Town, indemnify, protect, release, and hold harmless the Town of Fairfax and any agency or instrumentality thereof, including its agents, officers, commissions, and employees (the "Indemnitees") from any and all claims, actions, or proceedings arising out of or in any way relating to the processing and/or approval of the project as described herein, the purpose of which is to attack, set aside, void, or annul the approval of the project, and/or any environmental determination that accompanies it, by the Planning Commission, Town Council, Planning Director, Design Review Board or any other department or agency of the Town. This indemnification shall include, but not be limited to, suits, damages, judgments, costs, expenses, liens, levies, attorney fees or expert witness fees that may be asserted or incurred by any person or entity, including the applicant, third parties and the Indemnitees, arising out of or in connection with the approval of this project, whether or not there is concurrent, passive, or active negligence on the part of the Indemnitees. Nothing herein shall prohibit the Town from participating in the defense of any claim, action, or proceeding. The parties shall use best efforts, acting in good faith, to select mutually agreeable defense counsel. If the parties cannot reach agreement, the Town may select its own legal counsel and the applicant agrees to pay directly, or timely reimburse on a monthly basis, the Town for all such court costs, attorney fees, and time referenced herein, provided, however, that the applicant's duty in this regard shall be subject to the Town's promptly notifying the applicant of any said claim, action, or proceeding.

15. The applicant shall comply with all applicable local, county, state and federal laws and regulations. Local ordinances which must be complied with include, but are not limited to: the Noise Ordinance, Chapter 8.20, Polystyrene Foam, Degradable and Recyclable Food Packaging, Chapter 8.16, Garbage and Rubbish Disposal, Chapter 8.08, Urban Runoff Pollution Prevention, Chapter 8.32 and the Americans with Disabilities Act.

16. The applicant shall comply with any and all the conditions of the Marin Municipal

Water District, Ross Valley Sanitary District, Ross Valley Fire Department, Fairfax Public Works Department and Fairfax Building Department as follows unless a specific agency waives their conditions in a written letter to the Department of Planning and Building Services:

Ross Valley Fire Department

1. A fire suppression system that complies with the National Fire Protection Association (NFPA) 13-D requirement and local standards. A separate deferred permit is required for the system which can be obtained from the Ross Valley Fire Department. The system must be designed by an individual or firm licensed to design and/or design/build such systems.
2. Interconnected smoke detectors provided with AC power shall be installed for simultaneous alarm. Detectors shall be located in each sleeping room, outside sleeping rooms centrally located in the corridor and over the center of all stairways with a minimum of one detector per story of the occupied portion of the residence.
3. Carbon monoxide alarms shall be provided outside each sleeping area in the vicinity of the bedrooms and on every level of the residence.
4. Address numbers at least 4 inches tall must be in place adjacent to the front door. If not clearly visible from the street, additional numbers are required and must be internally illuminated or illuminated by an adjacent light controlled by a photocell and switched off only by a breaker so it will remain illuminated all night.
5. The applicants have submitted a required Vegetative Management Plan (VMP) that has been approved by the Ross Valley Fire Department subject to the following conditions:
 - a. Do not remove any tree that requires a permit from the Town without first requiring permit approval.
 - b. Any vegetation within 30 feet of the structures shall be irrigated. Seasonal grasses are not permitted within the 30 foot zone unless they are regularly irrigated. If no regularly irrigated, seasonal grass areas shall be covered in a weed barrier that is covered in a layer of mulch.
 - c. Erosion control measures shall be in compliance with Town of Fairfax Standards.
 - d. The approved plan by Studio Green Landscape Architecture, page L-1, dated 10/29/14, is in effect for the life of the property unless amended and approved by the Fire Department under separate review.

- e. Vegetation shall be maintained to ensure address numbers are visible from Bothin Road from both angles of approach.
- f. The above minimum standard shall be in place prior to the site final fire clearance.
- g. Evidence of final fire clearance shall be provided to the Town prior to the final building permit inspection.

Marin Municipal Water District

- 1. Nothing about the proposed project will affect the District's ability to provide service to the property.
- 2. Compliance with all indoor and outdoor requirements of District Code Title 13, Water Conservation, is a condition of water service. Indoor fixtures must meet specific water efficiency requirements, landscape plans shall be submitted and reviewed to confirm compliance.
- 3. Should backflow protection be required it shall be installed, inspected and approved by a District Inspector.
- 4. Evidence of compliance with the District's requirements shall be provided to the Town prior to the final building permit inspection.

Sanitary District

- 1. A sewer connection permit is required.
- 2. Evidence of compliance with the Sanitary District's permit conditions shall be provided to the Town prior to the final building permit inspection.

NOW, THEREFORE BE IT RESOLVED, the Planning Commission of the Town of Fairfax hereby finds and determines as follows:

The approval of the Hill Area Residential Development permit, Design Review and Variance for the proposed residence is in conformance with the 2010 – 2030 Fairfax General Plan and the Fairfax Zoning Ordinance, Town Code Title 17; and

Construction of the residence can occur without causing significant impacts on neighboring residences and the environment.

The foregoing resolution was adopted at a regular meeting of the Planning Commission held in said Town, on the 21st day of January, 2015, by the following vote:

AYES:

NOES:

Chair, Philip Green

Attest:

Jim Moore, Director of Planning and Building Services

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TOWN OF FAIRFAX

NOV 04 2014

RECEIVED

DAVE    
OLNES P.E.
INC.
CIVIL & SOIL ENGINEER
7915 CREST AVENUE, OAKLAND, CALIFORNIA 94605
PHONE & FAX: (510) 568-2162 davedolnes@sbcglobal.net

December 9, 2013

Cheryl Tatum
188 Bothin Road
Fairfax, CA 94930

RE: Report of Geotechnical Investigation
Proposed Residential Improvements
188 Bothin Road, Fairfax

Dear Mrs. Tatum:

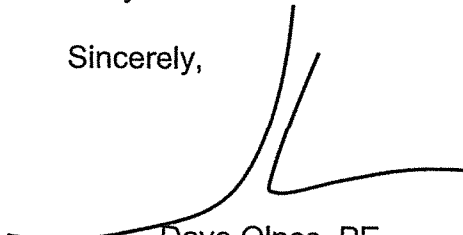
In accordance with your request I have performed a Geotechnical investigation at your residential property located at 188 Bothin Road in Fairfax, where you are planning an addition and landscaping improvements. The purpose of the investigation was to provide recommendations for foundation support of proposed improvements.

The subsurface investigation found that the site is underlain by 5 to 7 feet of colluvial soils, consisting of rocky silt and clay. Beneath the colluvial soils soils, highly weathered Shale bedrock was encountered within the vicinity of the proposed addition, with possible sandstone at the eastern side of the site. Based on this finding recommendations are provided for supporting the proposed addition on deep drilled piers.

The site lies within a deep canyon, at the foot of a seasonal drainage swale which discharges storm water out onto Bothin Road during major storms. This flow is currently poorly confined within a shallow earth swale that angles across the upper portion of the lot passes through a narrow space beside the garage, discharging over the curb onto the street. In order to better contain this flow, and to mitigate a moderate risk of debris flow landsliding, it is suggested that two flow diversion walls be constructed.

If you have any questions regarding the findings or recommendations contained in this report, please contact my office.

Sincerely,


Dave Olnes, PE
GE 2469

2Bothin(188)-Geotech



EXHIBIT # **B**

GEOTECHNICAL INVESTIGATION

PURPOSE AND SCOPE OF SERVICES: The purpose of this investigation was to explore the soils and geological conditions in the areas of proposed improvements, and to provide appropriate geotechnical guidelines regarding the design and construction of new foundation elements.

The scope of services for this investigation included review of published geological literature and proposed improvement plans, a reconnaissance of the site (including the drainage swale which extends up the steep canyon slope behind the property), examination of the foundation conditions of the existing structure, exploration of the subsurface conditions in the vicinity of proposed construction, limited laboratory testing and preparation of this report. This investigation did not include screening for potential hazardous materials.

SITE DESCRIPTION: The subject property consists of a residential parcel located near the upper end of Bothin Road, approximately 3/4-mile northwest of downtown Fairfax. The lower portion of the lot, which contains the existing residence and a detached two-car garage, is essentially flat, sloping at a gradient of 10:1 or less toward the street. The central portion of the lot rises at a gradient of approximately 3:1 to the base of the steeper canyon slope, which continues at 2:1 or steeper, eventually meeting with Iron Springs Road, approximately 800 feet beyond the rear property line.

A seasonal drainage swale, flowing down from the steeper canyon slopes, enters the subject parcel near the center of the rear property line, approximately 120 feet beyond the existing house structure. This channel angles across the upper portion of the lot to the eastern property line, where it passes through a narrow corridor between the garage and the fence. There is no storm drain in place to handle the water, so it discharges over the curb onto the road surface. It is my understanding that during very heavy rains, the flow occasionally leaves the channel and flows onto the adjacent property to the east, causing flooding problems. Also, the neighbor's driveway is poorly sloped, such that when the road gutter becomes overwhelmed, the excess flow will occasionally overspill into their garage.

The property currently contains a modest single-story house, located at the left front (southwest) quarter of the lot, set back approximately 35 feet from the street. There is a detached two car garage located at the right front (southeast) corner of the lot. The garage is situated only about 3 feet from the eastern property line, as is the garage of the neighboring property to the east. The central portion of the lot contains a terraced garden and some minor auxiliary structures.

PROPOSED CONSTRUCTION: It is my understanding that you plan to add a partial two-story addition, stepping up the slope behind the existing house. The lower level of the addition will be cut into the slope, with a perimeter retaining wall and possibly a slab on grade floor. This level will contain laundry and utility space, and stairs leading up to the larger upper level. The upper level contain a study and a master bedroom and bath. A

new terrace area will be constructed behind the addition, containing a hot tub. You area also considering the construction of a new swimming pool, which will likely be constructed on the flatter slope behind the garage.

EXAMINATION OF EXISTING HOUSE STRUCTURE: The existing house structure appears to be approximately 75 to 100 years old. The existing foundations consist of trapezoidal concrete footings, which appear to be in fair condition (these may not be the original foundations for the house). Base-level seismic improvements were completed in recent years.

During my initial site visit a floor level survey performed within the house. This survey found that the main structure is within approximately 2 inches of relative level, with a moderate slope toward the left front (southwest) corner. The left front bedroom slopes an additional 2 inches toward the front. However, this bedroom appears to be an addition occupying a portion of the original front porch, which likely was constructed with slope for drainage. Little or no active distress was observed in the finishes within the house. In general the house has performed relatively well for an older structure bearing on shallow footings.

GEOLOGY REVIEW: Bothin Road lies at along the base of a relatively steep canyon. The main stream channel for this canyon (Bothin Creek) exists behind the residences at the opposite side of the creek. Iron Springs Road runs along the rim of the canyon, approximately 800 feet beyond the subject property.

Review of geologic maps of the area by Smith, Rise and Strand (1976) indicate that the base of the canyon, including the lower portion of the subject property, is underlain by alluvial soils associated with the seasonal stream channel. The modest slope at the central portion of the lot is mapped as a colluvial deposit, derived from material washed down from the steep canyon slopes during historic major storm events. Franciscan Sandstone and Shale are mapped in the slopes of the canyon. No bedrock outcrops are visible on the property. However, sandstone and shale are readily exposed within the incised stream channel on the canyon slope above the property.

LANDSLIDE POTENTIAL: No landslides are mapped in the immediate vicinity of the site, although there is a large mapped shallow landslide complex indicated within the adjacent drainage swale to the west, a few hundred feet from the site. The map authors have assigned the slopes within and above the subject site a stability number of 3, indicating a moderately high risk of landsliding. In contrast, to the mapped slide feature to the west has a stability number of 4, indicating a high risk of instability.

It is my understanding that a few years ago a major debris flow landslide did occur within the drainage swale to the west, causing some damage to neighboring properties along

Bothin Road. This slide appears to have occurred when a storm drain at Iron Springs Road became obstructed, causing uncontrolled runoff to spill over the edge of the roadway, washing out the shoulder fill. The displaced material washed down the stream channel, apparently inundating the properties below (although the subject property was not affected). The slide was remediated by constructing a massive structural wall to retain the shoulder of Iron Springs Road. A new concrete-lined ditch was added along the up-slope side of the roadway, feeding to a larger storm drain pipe which discharges to a rubble dissipater within the incised channel. At the base of the swale, a large storm drain pipe was installed, which passes under the end of Bothin Road to discharge into Bothin Creek.

As with any drainage channel that descends through steep, wooded slopes, the swale above the subject property also poses some risk of debris flow activity (as is evident by the blanket of colluvial soils which covers the central and upper portions of the site). In order to assess this risk, I accompanied you and your contractor on a visual reconnaissance of the swale. The lower half of the channel is relatively deeply incised, exposing sandstone and shale bedrock along much of its length, including one or two cascades over resistant outcrops. The upper portion of the swale branches off into three lesser tributaries, which are less defined. The lowest branch enters from the west approximately half way up the slope. The final two come together in a Y perhaps 200 to 300 feet below the intersection of Iron Springs and Monte Vista Roads. We followed the larger of these two upper tributaries until it met with an existing residence below this intersection (500 Iron Springs Road). However, none of the tributaries seem to reach all the way to Iron Springs Road.

We also walked Iron Springs Road from the intersection with Monte Maria, to the site of the recent slide repair that affected the neighboring property to the west. It appears that *all* of the runoff from this stretch of roadway is conveyed to the ditch which feeds into the storm drain in the vicinity of that slide. There are no other storm drains along this stretch of roadway, and the configuration of the road surface is such that there appears to be little chance of concentrated runoff spilling over the slope within the watershed of the subject property. Thus the swale on the subject property is largely fed by direct rainfall onto the canyon slope below Iron Springs Road, combined with discharge from the property improvements at 500 Iron Springs.

The lower portion of the channel appears to have historically flowed along the central axis of the subject property prior to development. The earth swale that diverts the flow to the eastern property line appears to be man-made, in order to open up the central portion of the lot for landscape purposes (unconfirmed).

SEISMICITY: It should be considered common knowledge that this site and the Bay Area in general are subject to strong ground shaking due to the regular occurrence of large earthquakes. The site is located approximately 9 kilometers east of the San Andreas and

San Gregorio Faults (type A). The San Andreas has a Maximum Credible Earthquake (MCE) magnitude of 7.9 on the Richter Scale. This fault has a 21% probability of generating a major quake over the next 30 years, and the Bay Area fault systems as a whole have a 70% probability. Other surrounding active faults with equal or lesser expected magnitudes and probabilities include the Hayward and Rogers Creek Faults (type A), located approximately 20 kilometers to the east, and the Concord and Calaveras Fault (type B), located approximately 40 kilometers to the east.

Given the shallow bedrock conditions observed in the area, there is no potential for liquefaction, and little risk of seismically-induced landsliding at the site. Since the site is located outside of the Alquist-Priolo Special Studies Zones and there are no known fault traces through the area, the risk of ground rupture is also considered to be very low.

Design of the improvements in accordance with the 2010 CBC should utilize the following factors.

Site Class:	B
Mapped Short Period Spectral Acceleration, S_s:	1.500
Mapped 1-Second Spectral Acceleration, S_1:	0.667
Short Period Site Coefficient, F_a:	1.0
1-Second Site Coefficient, F_v:	1.0
Modified Short Period Spectral Acceleration, S_{ms}:	1.500
Modified 1-Second Spectral Acceleration, S_{m1}:	0.667
Design Short Period Spectral Acceleration, S_{ds}:	1.000
Design 1-Second Spectral Acceleration, S_{d1}:	0.445
Design Category:	D

FIELD AND LABORATORY INVESTIGATION: Subsurface conditions at the site were investigated by performing three exploratory borings. All borings were drilled with a portable Minute Man rig, using an SPT sampler with a 70 pound dropping hammer. The boring locations are plotted on the attached Figure 2. Boring B1 was performed at the upper portion of the lot, beside the drainage swale. Boring B2 was performed near the center of the proposed addition, behind the existing house. Boring B3 was performed at the eastern perimeter of the lot, behind the garage, near the proposed pool site.

Samples were initially logged in the field and later returned to the laboratory for extrusion and further identification. The samples were then weighed and dried for moisture content determination. Logs of the borings are included on attached Figures 3 through 5. In addition to identification of the soils encountered, the logs also contain standardized penetration values for the borings, as well as moisture contents, and groundwater observations.

All of the borings encountered colluvial soils, consisting of tan-brown fine-sandy Clay SILT/Silty CLAY with Sandstone fragments. The depth of the colluvium varied from 5 to 7 feet. Although the matrix material is moderately soft, the sampler generated relatively high blow count values, probably due to sandstone fragments embedded in the softer soil. Borings B1 and B2 encountered residual soils consisting of very stiff to hard tan-grey Silty CLAY/Clayey SILT. This material is highly sheared and weathered Shale, which has intermittent rock structure that increases with depth. B3 met refusal in what appeared to be hard sandstone at a depth of 8 feet (no sample was retrieved).

No groundwater was encountered during drilling. However, peizometer pipes placed in the holes were re-checked approximately one week after drilling, and ground water was found at a depth of 20 feet in the upper boring (B2). The other holes were dry.

COMMENTARY AND CONCLUSIONS: Based on the conditions encountered, the proposed addition will require a pier and grade beam foundation to extend support through the soft colluvial soils into the underlaying stiff residual soil/weathered bedrock. Pier depths on the order of 15 feet are anticipated, except in areas of cut grading.

Assuming that the proposed swimming is located on the lower portion of the lot where the slope is minimal, no special foundational requirements are necessary (since the pool itself is essentially a deep foundation). However, if the pool is to be located on the sloping grade, or if the surrounding finishes have a very low tolerance for minor movement, the pool should be supported on drilled piers.

The poorly confined drainage swale poses a clear risk of general flooding, and a moderate risk of generating a debris flow event, which could cause significant damage to improvements. I believe that existing house and the proposed addition are only marginally at risk, given the configuration of the topography. However existing garage and the proposed pool site are susceptible to inundation.

Based on my observations along the path of the swale, it is my opinion that there is a relatively low likelihood of a major debris flow event (such as the one that affected the adjacent properties to the west) occurring at the subject property. However, it is very possible (*if not likely*) that at some point, *a small to moderate debris flow could occur*, possibly related to a fallen tree or collapsed embankment along the flow upper flow path. In order to protect the house and central landscape area from damage from such an event, it is recommended that a stout diversion wall be constructed at the west side of the swale on the upper portion of the lot, angled slightly to the east (see attached Figure 2). This wall should be at least 4 feet tall, and should be supported on deep drilled piers. Note that if a significant debris flow event were to occur, the pool (in its presently considered location) could be filled with debris, and the garage structure could potentially be damaged or

Geotechnical Investigation
188 Bothin Road, Fairfax
December 9, 2013
Page 7

destroyed, along with its contents. If this is not acceptable, the pool and/or garage could be relocated to the west. It would be well to inspect the upper stream channel on a yearly basis, to insure that it is kept clear of accumulated debris.

Past history suggests that there is a high risk of the stream flow jumping the shallow channel at the lower portion of the lot, and flooding the neighboring property to the east. A significant debris flow event could do the same, with a higher risk of potential damage. Since the flow passes over your property, and the natural flow path may have been altered by historic improvements to your lot, there could be legal repercussions if this were to occur. Therefore it is recommended that a second debris flow diversion wall be constructed along the eastern property line. This wall might take the form of a stout fence, 4 to 6 feet in height, and should also be supported on drilled piers. The flow dimensions of the earth swale between the two diversion walls should be increased.

It is noted that the configuration of the eastern neighbor's driveway is inherently flawed, so there can be no guarantee that their garage will not continue to incur occasional flooding, even if the proposed debris wall is carried all the way out to the curb. This neighbor should be advised to consult with a Civil Engineer for possible remedy, which might include raising the elevation of the garage slab to allow the driveway to slope down to the street.

In summary, it is my opinion that the site is suitable for the proposed construction, provided that the following recommendations are adhered to.

RECOMMENDATIONS

1. **GRADING:** Grading work anticipated for this project will consist of modest cuts as needed accommodate crawlspaces and foundation walls for the additions, minor terracing of the slope above the addition, and a deep cut for the new pool. No significant fill placement is anticipated.
 - 1.1 **Site Preparation:** Areas to receive fill or flatwork shall be cleared of vegetation and stripped to a sufficient depth to remove buried debris or major root systems (12 inches minimum), then shall be re-compacted to 95% minimum.
 - 1.2 **Cut Grading:** Cut slopes shall be graded at a maximum inclination of 2:1, or should be retained by engineered walls as outlined in Section 4 below.
 - 1.3 **Fill Grading:** Fill slopes shall also be graded at a maximum inclination of 2:1. Fills shall be placed in level lifts no more than 8 inches in thickness, and shall be compacted to 95% beneath the proposed structure, or 90% at exterior yard or pavement areas. Fill soils should have a Plasticity Index of 15 or less.
 - 1.4 **Backfill of Utility Trenches:** Utility trench backfill shall be compacted to a relative density of 95% beneath the structure or pavements, or 90% beneath exterior yard areas. Trenches shall be capped with at least 18 inches of relatively impermeable material (site soils are acceptable).
 - 1.5 **Erosion Control:** Due to their clayey nature, the site soils are moderately susceptible to erosion. Appropriate erosion control measures should be in place if construction is to proceed during the rainy season (which is not advised).
2. **HOUSE FOUNDATIONS:** All new foundation elements for the house structure should be supported on deep drilled piers. All piers shall be 18 inches in diameter, and shall be drilled a minimum depths of 8 feet into firm residual soils or weathered Shale bedrock. Final pier depths shall be confirmed in the field by the undersigned Geotechnical Engineer. In addition to supporting addition foundations, the existing footings at the north perimeter of the existing structure should be underpinned with piers, to provide consistent support. Drillers should be prepared to deal with potential ground water in the deeper piers.
 - 2.1 **Pier Design Parameters:** Drilled piers constructed in accordance with Section 2 may be designed for a friction value of 500psf, beginning at a depth of 7 feet below the existing grades. A passive resistance of 200pcf may be assumed to act against twice the pier

diameter, beginning at a depth of 5 feet. No creep loads need be assumed, provided that the piers are reinforced as outlined below

- 2.2 Minimal Pier Reinforcing:** All piers should contain a minimum of six #5 bars contained within a #3 spiral at a 6-inch pitch.
 - 2.3 Grade Beams:** All new piers shall be interconnected with reinforced concrete grade beams measuring a minimum of 12 inches by 18 inches in section, and containing a minimum of four #5 bars.
- 3. FLOOR SLABS ON GRADE:** Floor slabs shall be a minimum of 5 inches thick and should be reinforced with #4 bars at 18 inches on center, epoxy doweled to the perimeter foundations. Slabs used as living space shall be cast over 4 inches of pea gravel, covered by a minimum 10 mil vapor barrier. A 2 inch sand layer over the vapor barrier is optional.
- 4. CONVENTIONAL RETAINING WALLS:** Foundation walls and engineered landscape walls (ie terrace walls over 4 feet tall, or any structures which are sensitive to movement) should be designed for an active pressure of 50pcf. Walls should be supported on drilled piers as outlined above. For walls located in level cuts extending at least 5 feet below the present grades, the passive resistance may be assumed to begin at the base of the wall. Gravel drains wrapped in filter cloth should be provided for all retaining walls. Foundation walls should include waterproofing membranes (such as Bithuane, Paraseal or Prepruf, attached at the top with a termination bar.
- 5. DEBRIS FLOW WALLS:** The proposed debris flow walls should also be supported on drilled piers. These walls should be free-standing structures at least 4 feet tall (ie the walls should retain no soil under static conditions). The debris flow walls should be designed to resist an active pressure of 100pcf generated by potential debris flow events. Note that since this would be a short-term load, the passive resistance may be increased by 1/3 to 267pcf, and may be assumed to begin at grade.
- 6. SWIMMING POOL:** If the pool is to be located on the flatter slope at the lower portion of the lot, and some possibility for minor movement is acceptable, the proposed swimming pool may be designed "standardized" pool design, without pier. However, if you the pool is to be sited on the steeper slope, or if you would like a more definitive guarantee that the pool will not settle, it could be supported on grid of drilled piers, designed in accordance with the recommendations of Section 2 above.

7. **Drainage:** Adequate drainage is important to mitigate seasonal fluctuations in the shallow foundations, and to prevent potential mold and mildew problems related to seepage intrusion under the house.
 - 7.1 **Perimeter Gravel Drain:** I recommend that a gravel drain be installed along up-slope perimeters all proposed addition. Gravel drains should be excavated directly adjacent to the perimeter foundations. The system should extend at least 12 inches below the adjacent crawlspace, and should slope at 1% to discharge to the street. The trench should be lined with filter cloth and backfilled with 3/4-inch drain rock. A perforated pipe should be installed at the bottom of the trench, and a second non-perforated pipe should be tied to the roof downspouts and area drains. All piping shall consist of 4-inch SDR-35 PVC, sloped at 1%. Capped clean-out stand pipes should be installed at the beginning of the perforated line, and periodically along its length.
 - 7.2 **Surface Drainage:** In addition to the gravel drain, the ground surfaces around the house should be graded to slope away from the house toward or V-1 Christy boxes or brass inlets tied to the solid pipe for the drainage system. All roof gutters should be tied to the solid discharge line.
 - 7.3 **Discharge Pipes:** The drain systems shall be collected into solid 4-inch SDR-35 PVC pipes. The discharge lines should run to rubble dissipater fields located on the surface of the slope along the south perimeter of the lot.
 - 7.4 **Enlargement of Drainage Swale:** The flow dimensions of the existing drainage swale should be increased to at least 36 inches wide by 24 inches deep, or as determined by a Civil Engineer performing a volume calculations based on a 100 year storm event. To minimize maintenance, the swale could be lined with rip rap or concrete.
8. **Exterior Flatwork:** Exterior concrete slabs should be a minimum of 5-inches thick, and should be reinforced with a minimum of #4 bars at 18-inch centers. Some distress should be expected, due to concrete shrinkage, and due to minor settlement or swelling of the clay subgrade.
9. **Plan Review and Construction Observation:** The undersigned Geotechnical Engineer should review the final building plans for conformance with the above recommendations. All pier drilling and subdrain trenches should also be inspected prior to placement of reinforcing steel, concrete or backfill. Allowances should be made for potential changes to the final design requirements in the event that actual construction conditions differ from the conditions assumed in this report.

Geotechnical Investigation
188 Bothin Road, Fairfax
December 9, 2013
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LIMIT OF LIABILITY: This report was prepared under written contractual agreement with the addressee (client) indicated above. The client has agreed to limit the liability of Dave Olnes P.E., Inc. to an amount not to exceed ten times the fee for services indicated above, for any and all matters arising from this visual examination and report. The information provided herein is for the exclusive use of the specified client. Dave Olnes P.E., Inc. shall assume no liability for other parties who use the report without its express written consent. The recommendations contained in this report are valid for a period of two years, pending further review by the undersigned Geotechnical Engineer.

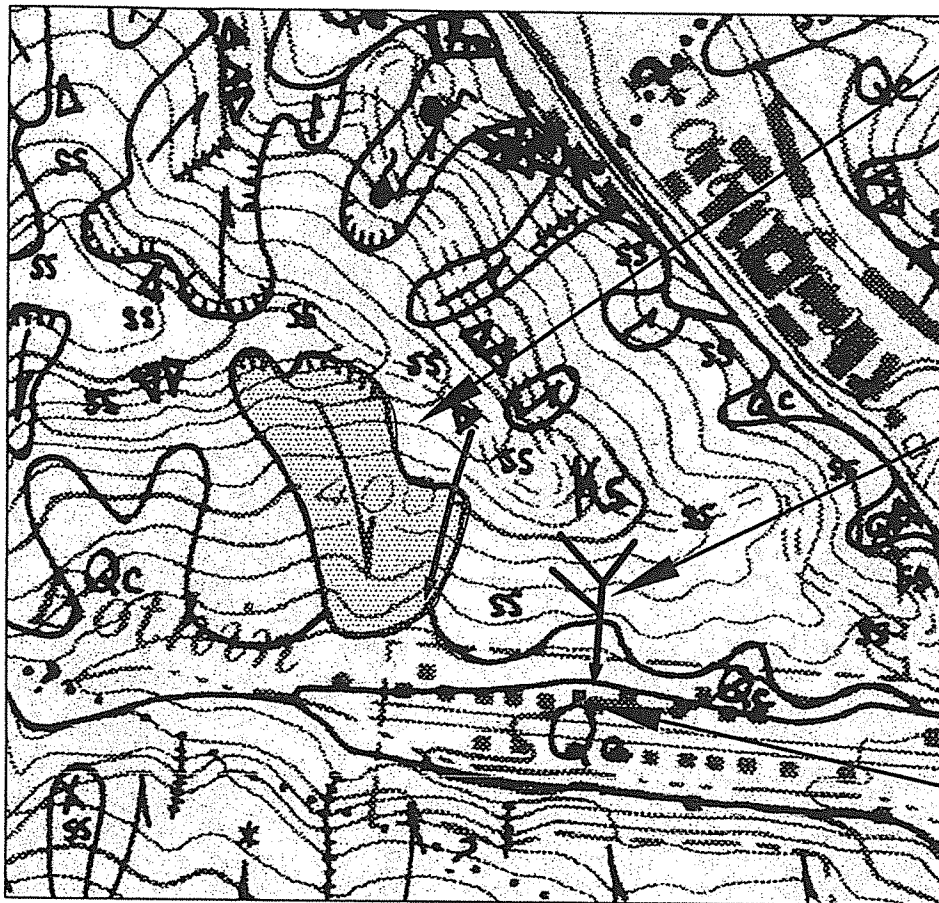
REFERENCES

Knudsen, Keith L., Sowers, Janet M. Witter, Robert S., Wentworth, Carl M, Helley, Edward J., "Preliminary Maps of Quaternary Deposits and Liquefaction Susceptibility, Nine-County San Francisco Bay Region, California", USGS Open File Report 00-444, 2000.

Olmes, David A., "Geotechnical Investigation, Proposed Secondary Unit, 150 Lovell Avenue Mill Valley", 2006.

Rice, Salem J.; Smith, Theodore C.; Strand, Rudolph G., State of California Division of Mines and Geology, Open File Report 76-2, "Geology for Planning: Central and Southwest Marin County, California", 1976.

State of California Division of Mines and Geology, "Maps of Known Active Fault Near-Source Zones in California and Adjacent portions of Nevada", 1998.



MAPPED AREA OF SHALLOW LANDSLIDING.
RED ARROW INDICATES PATH OF RECENT DEBRIS FLOW ACTIVITY.

BLUE ARROWS INDICATE APPROXIMATE ORIGINS OF RUNOFF FEEDING SEASONAL DRAINAGE CHANNEL AT SUBJECT SITE.

SITE, LOCATED WITHIN MAPPED COLLUVIAL AND ALLUVIAL DEPOSITS (QA & Qc).

SOURCE:

STATE OF CALIFORNIA DEPT. OF MINING & GEOLOGY, OPEN FILE REPORT 76-2
GEOLOGY FOR PLANNING: CENTRAL & SOUTHEAST MARIN COUNTY, CALIFORNIA,
SALEM J. RICE, THEODORE C. SMITH & RUDOLPH G. STRAND, 1976.

GEOLOGY AND SITE LOCATION PLAN

SCALE: 1"=500'

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PH & FX: (510)568-2162 daveolnes@sbcglobal.net

SCALE: 1"=500'

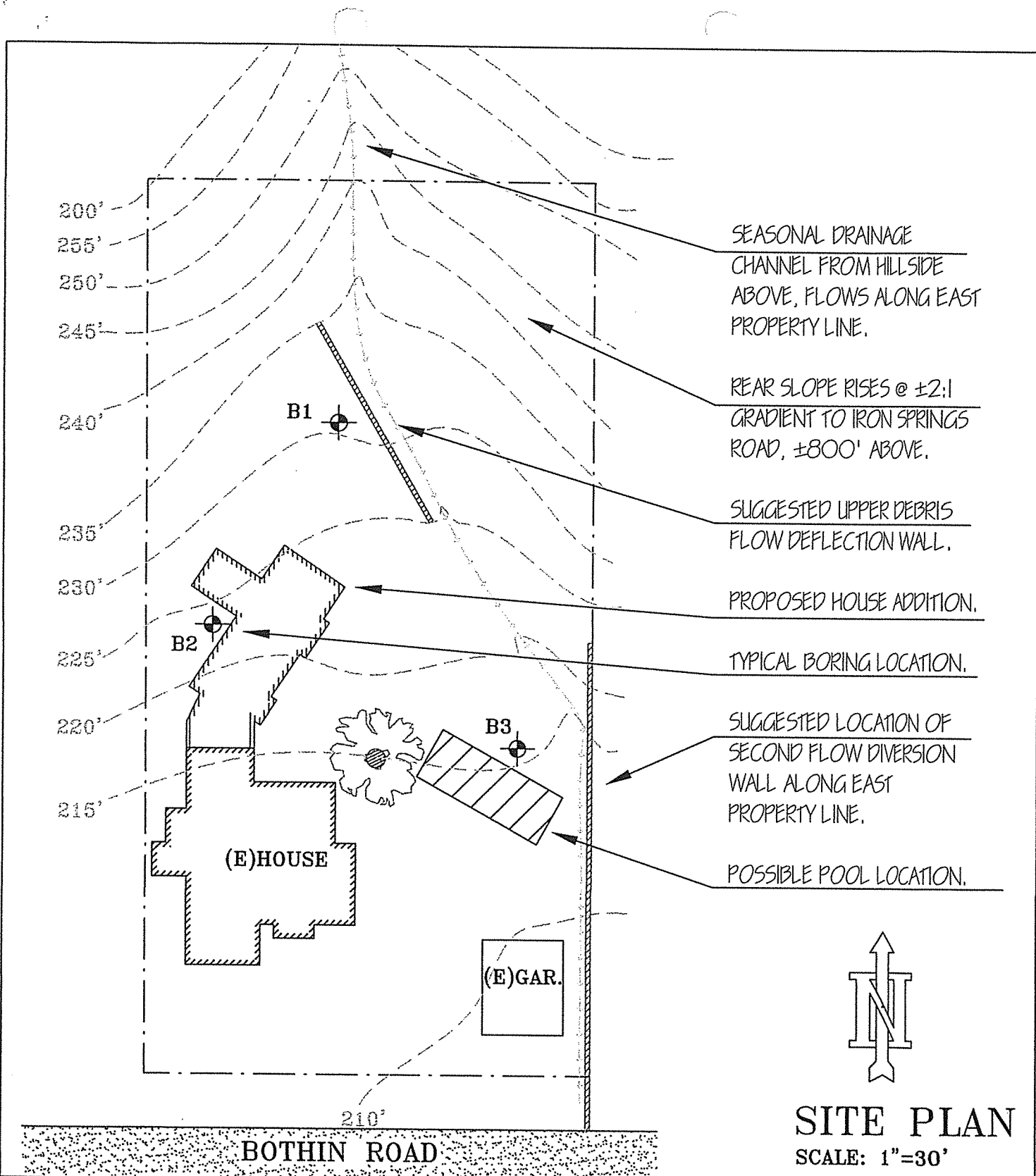
JOB #: 0-3706

DRAWN: DAO

DATE: 12-9-13

GEOTECHNICAL RECONNAISSANCE
PROPOSED IMPROVEMENTS
180 BOTHIN ROAD
FARIFAX, CALIFORNIA

FIGURE: 1



DAVE

OLNES P.E. INC.

CIVIL & SOIL ENGINEER

7915 CREST AVENUE OAKLAND CALIF. 94605

PH & FX: (510)568-2162 daveolnes@sbcglobal.net

SCALE: 1"=20'

JOB #: 0-3706

DRAWN: DAO

DATE: 12-9-13

GEOTECHNICAL RECONNAISSANCE
PROPOSED IMPROVEMENTS
180 BOTHIN ROAD
FARIFAX, CALIFORNIA

FIGURE: 2

BORING: 1Location: **ABOVE PROPOSED ADDITION**

DESCRIPTION	DEPTH FEET	SAMPLE NUMBER	BLOW COUNT	MOISTURE CONTENT	COMMENTS
tan-brown fine Sandy Clayey SILT/Silty CLAY with Sandstone fragments (loose-medium dense)					Colluvium
		1-1	40	6.3%	
	5	1-2	42	8.3%	
rusty grey tan mottled fine Sandy Silty CLAY/ Clayey SILT with increasing rock structure (very stiff-hard)		1-3	43	14.1%	Highly Weathered Bedrock
	10	1-4	27	18.5%	
Sheared Shale		1-5	73	13%	
	15				
	20				Groundwater @ 20'
		1-6	100	12.1%	
Bottom of Boring @ 22'					Refusal
	25				

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Project: GEOTECHNICAL INVESTIGATION
 188 Bothin Road
 Fairfax, California
 Date: November 5, 2013

Figure: 3

BORING: 2Location: **CENTER OF PROPOSED ADDITION**







DESCRIPTION	DEPTH FEET	SAMPLE NUMBER	BLOW COUNT	MOISTURE CONTENT	COMMENTS
tan brown fine Sandy Clayey SILT with Sandstone fragments (loose- medium dense)					Colluvium
tan brown fine Sandy Clayey SILT with increasing rock structure (very stiff-hard)	5	2-1	40	10.4%	Highly Weathered Bedrock
	10				
Sheared Shale		2-2	30	15.60%	Less Weathered
	15	2-3	50/1"	N/A	
Bottom of Boring @ 15'					Refusal
					No Groundwater
	20				
	25				
	30				

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Project: **GEOTECHNICAL INVESTIGATION**
 188 Bothin Road
 Fairfax, California
 Date: **November 5, 2013**

Figure: 4

Location: BEHIND EXISTING GARAGE NEAR SWALE

DAVE      

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Project: GEOTECHNICAL INVESTIGATION
 188 Bothin Road
 Fairfax, California

Date: November 5, 2013

Figure: 5

APR 21 2015

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DAVE    
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GEOTECHNICAL MEMORANDUM:

To: Cheryl Tatum
RE: Review of Civil Plans
188 Bothin Road, Fairfax
Date: March 24, 2015

As Geotechnical Engineer of Record I have reviewed the Civil plans for the proposed improvements to your residential property, located at 188 Bothin Road in Fairfax. Specifically I have reviewed plans prepared by Glen Dearth, dated April 1, 2015. This review is relative to my Geotechnical Report for the project, dated December 9, 2013.

The key feature of this plan is the implementation of my recommendations for the placement of debris flow deflection walls to protect the proposed improvements on your property, as well as the existing improvements on the neighboring property to the south, from the potential of a debris flow landslide derived from the natural drainage ravine located above your property. The plan calls for the construction of 50 feet of wall at the upper portion of the lot, which would deflect the flow toward the eastern side of the lot, away from the areas of existing and proposed improvements on your property. Apparently there was some confusion regarding the length of this wall, due to misprint on the scaling of my schematic drawing. My schematic (figure 2 of my report) is actually at a scale of 1"=30' as the title states, not at 1"=20' as the title block incorrectly states. I visited the site today, and I believe that 50 feet of wall is appropriate for the upper segment, although exact positioning of the wall should be confirmed by myself in the field.

A second section of deflection wall is to be constructed along the common property line, above the neighbor's house. My schematic had shown this wall running the length of the neighbor's house. However, after further discussion with the Civil Engineer, it was decided that the wall could stop at a point opposite the garage of the subject property, as the flow will have been directed in the right orientation at that point, and constructing a substantial wall in the restricted space might actually tend to impede the flow. Thus I believe lengths of the debris walls are appropriate as depicted on the Civil plan.

The Civil plan calls for the existing earth swale to feed into a formed concrete channel which will pass through the narrow space between the garage and the property line. This swale has apparently been sized to the appropriate storm magnitude, based on an analysis

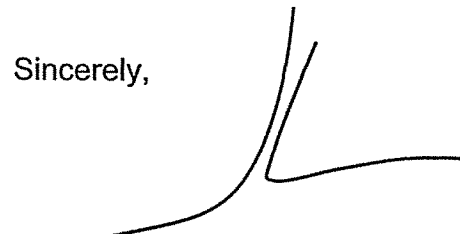
Geotechnical Review of Civil Plans
188 Bothin Road, Fairfax
March 24, 2015
Page 2

of the water shed which feeds it. The plan shows a sedimentation basin at the beginning of this channel, which will serve as a point of connection for the drain lines for the remodel. It should be understood that if a significant debris flow event does occur, the capacity of the channel could be exceeded, depending on the amount of debris which is carried. However, the deflection walls should be sufficient to direct the flow between the two structures and out to the street.

In summary, it is my opinion that the Civil plans meet the intent of my recommendations with regard to the debris flow issue. It is my opinion that the plans be approved as submitted.

If there are any questions regarding this matter, please contact my office.

Sincerely,



Dave Olnes, GE



LTD Engineering, Inc.

1050 Northgate Drive, Suite 315
San Rafael, CA 94903
Tel: 415-446-7402
Fax: 415-446-7419
gdearth@LTDengineering.com

April 16, 2015

TOWN OF FAIRFAX

Linda Neal
Principal Planner
Town of Fairfax
142 Bolinas Road
Fairfax, CA 94930

APR 21 2015

RECEIVED

Subject: **188 Bothin Road Planning Application**
Response to Comments date March 9, 2015

Dear Ms. Neal:

LTD Engineering modified the civil drawings as follows in response to the specific comments that apply to the drawings in the subject review letter.

3. Figure 2 in the geotechnical report shows approximately a 50 foot debris wall at the center of the site but the plan only shows a 35 foot wall. The geotechnical engineer must indicate in writing that the wall as shown satisfies his requirements. ~~Drawing C-2 has been updated to show the wall to be consistent with the revised geotechnical report.~~ **SEE DAVE OLVES LETTER DATED 3/24/15**

4. The geotechnical report also calls for a debris wall/fence along the eastern side of the property that would extend to the street but the drainage plan shows only a wall that ends at the rear of the garage. This appears to leave the adjacent property vulnerable to flooding. The plan must either be modified to extend the wall or the project engineer must indicate in a signed and wet stamped letter that the debris wall as designed on page C-2 of the plans dated 2/6/15 satisfies his requirements. The wall and channel construction must be shown and noted as not requiring work to trespass onto the adjoining easterly property. ~~The geotechnical report has been updated to match the civil drawings.~~

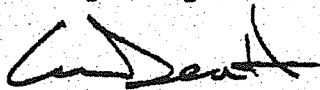
SEE DAVE OLVES LETTER DATED 3/24/15

6. The site surface drainage design must be based on acceptable calculations which must be submitted with this application for drainage flows based on a 100 year storm recurrence. The Town Engineer must be able to verify that the site drainage design has sufficient capacity to carry the site flows to the street. The flow design to the street must not be in a form that will not create a jet of water that will cause problems for traffic in the street. **Calculations for the 100-year storm attached to this letter.**

7. Provide information to confirm that the ponds that will be created by the proposed sediment trap and sill step will not create areas that will become mosquito breeding areas. **Drain holes and drain rock below the structures will allow accumulated water to infiltrate into the ground as shown on the revised Drawing C-2.**

The trash rack has been eliminated from the entrance to the sediment basin with the concurrence of the project geotechnical engineer. The trash rack would create a maintenance requirement during small storms. The drainage system downstream is an open channel rather than a pipe, and therefore there is no need to trap debris to prevent pipe blockage. If a major debris flow were to occur, the debris walls will direct the material between the buildings. A trash rack could block the debris flow and deflect it away from the intended flow path.

Sincerely,
LTD Engineering, Inc.



Glenn Dearth, PE
Principal (CE No. 39124)

C:\Users\Glenn\Documents\Tatum Res Fairfax (389.001) Drainage Plan\Response to comments letter 4-16-15.docx

EXHIBIT #

C

Tatum Res

188 Bothin, Fairfax

GLENN D. BEARTH
1-19-15

1/7

DRAINAGE BASIN HYDROLOGY



TIME OF CONCENTRATION

$$\text{Watershed slope} = \frac{530' - 240'}{630'} = 0.46 \quad \text{see slt } \underline{3}$$

Travel time:

$$\text{Velocity} = 1.7 \text{ fps} \quad \text{see slt } \underline{4}$$

$$t_c = 630 / 1.7 = 370 \text{ sec} = 6.2 \text{ min.}$$

PRECIPITATION

Use $t_c = 10 \text{ min.}$

$$i_{100} = 4.15 \text{ in/hr.} \quad \text{see slt. } \underline{5}$$

RUNOFF COEFF.

Undeveloped woodland

assume $C = 0.65$

WATERSHED AREA

$$A = 3.2 \text{ ac} = 139,400 \text{ sq ft}$$

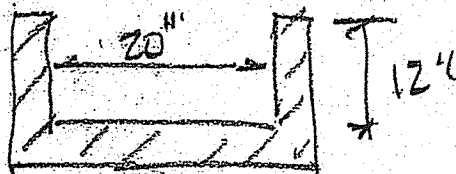
PEAK FLOW

$$Q = C i A$$

$$Q_{100} = 0.65 \times 4.15 \times 139,400 \text{ sq ft} \times \frac{1}{43,200}$$

$$Q_{100} = \underline{\underline{2.8 \text{ cfs}}}$$

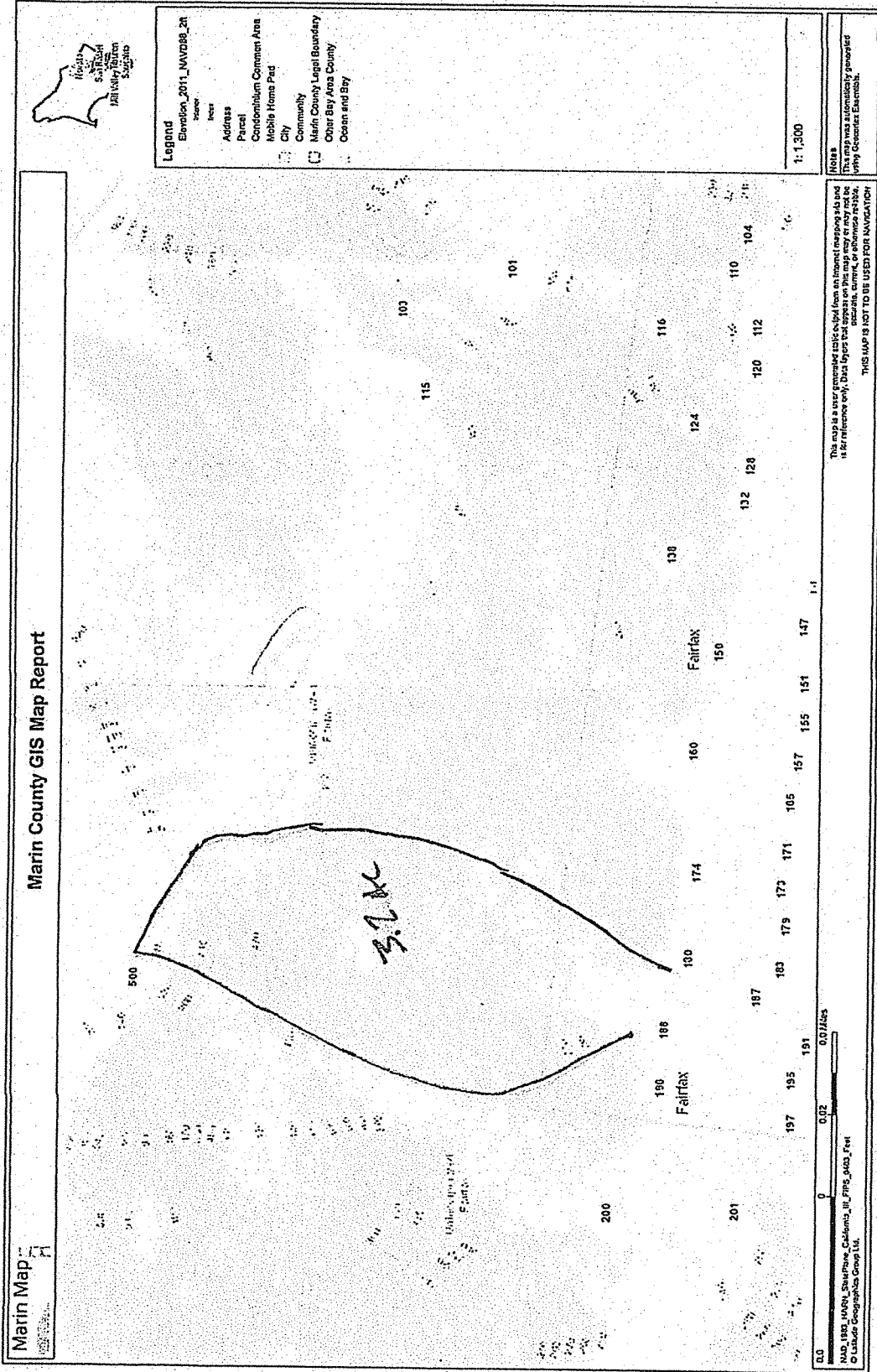
RECTANGULAR CHANNEL HYDRAULICS



$$S = 0.025 \quad Q = 9.8 \text{ cfs } 100-42$$

$$\text{Depth Flow} = 8" \quad \text{see skt } \underline{6}$$

$$S = 0.013 \quad \text{Depth} = 10" \quad \text{see skt } \underline{7}$$



4/57

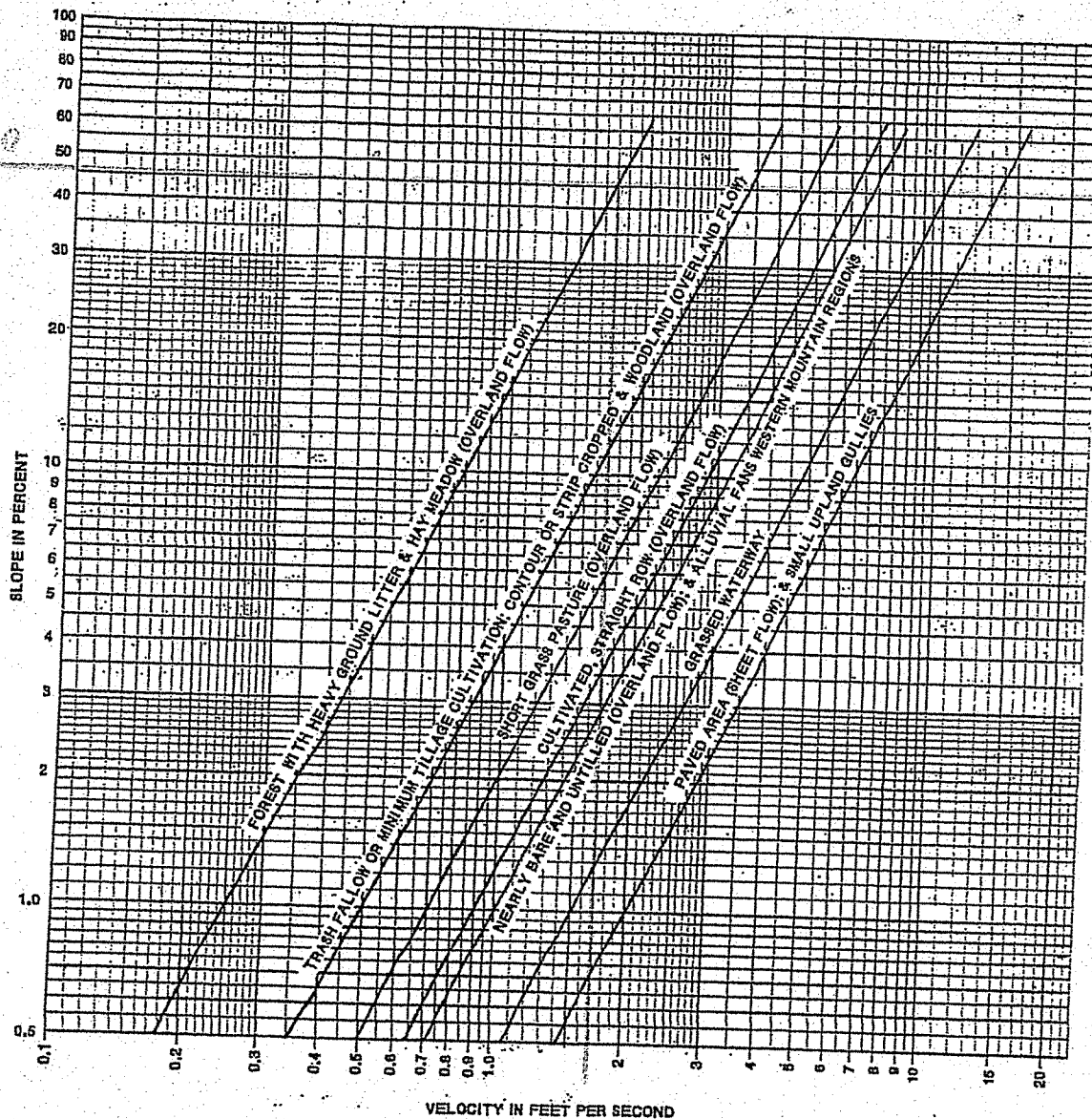


Figure 15.2.—Velocities for upland method of estimating T_c

5/17

NOAA Atlas 14, Volume 6, Version 2 LAGUNITAS

LAKE

Station ID: 84-4652

Location name: California, US*

Latitude: 37.9400°, Longitude: -122.5950°

Elevation:

Elevation (station metadata): 785 ft*

* source: Google Maps



POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic,
 Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel
 Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchon

NOAA, National Weather Service, Silver Spring, Maryland

[PF tabular](#) | [PF graphical](#) | [Maps & arials](#)

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches/hour) ¹										
Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	1.99 (1.78-2.26)	2.41 (2.14-2.74)	3.01 (2.66-3.43)	3.55 (3.12-4.08)	4.37 (3.68-5.23)	5.05 (4.15-6.22)	5.82 (4.64-7.37)	6.68 (5.16-8.75)	7.97 (5.86-11.0)	9.07 (6.40-13.0)
10-min	1.43 (1.27-1.61)	1.72 (1.54-1.96)	2.16 (1.91-2.46)	2.54 (2.23-2.93)	3.13 (2.63-3.75)	3.62 (2.98-4.45)	4.18 (3.33-5.29)	4.79 (3.70-6.27)	5.71 (4.19-7.86)	6.50 (4.58-9.32)
15-min	1.15 (1.02-1.30)	1.39 (1.24-1.58)	1.74 (1.54-1.98)	2.05 (1.80-2.36)	2.52 (2.12-3.02)	2.92 (2.40-3.59)	3.36 (2.68-4.26)	3.86 (2.98-5.06)	4.60 (3.38-6.34)	5.24 (3.70-7.51)
30-min	0.954 (0.850-1.08)	1.15 (1.03-1.31)	1.44 (1.28-1.64)	1.70 (1.49-1.96)	2.09 (1.76-2.51)	2.42 (1.99-2.98)	2.79 (2.23-3.53)	3.20 (2.47-4.19)	3.82 (2.80-5.25)	4.35 (3.06-6.23)
60-min	0.683 (0.608-0.774)	0.826 (0.735-0.938)	1.03 (0.916-1.18)	1.22 (1.07-1.40)	1.50 (1.26-1.79)	1.74 (1.43-2.13)	2.00 (1.59-2.53)	2.29 (1.77-3.00)	2.73 (2.01-3.76)	3.11 (2.19-4.46)
2-hr	0.500 (0.448-0.568)	0.614 (0.546-0.697)	0.778 (0.690-0.886)	0.926 (0.812-1.06)	1.15 (0.966-1.37)	1.33 (1.10-1.64)	1.54 (1.23-1.95)	1.78 (1.37-2.33)	2.13 (1.56-2.92)	2.42 (1.71-3.47)
3-hr	0.434 (0.386-0.492)	0.534 (0.476-0.606)	0.680 (0.603-0.774)	0.809 (0.710-0.931)	1.00 (0.844-1.20)	1.17 (0.957-1.43)	1.34 (1.07-1.70)	1.54 (1.19-2.02)	1.84 (1.35-2.53)	2.09 (1.48-3.00)
6-hr	0.331 (0.295-0.375)	0.411 (0.366-0.467)	0.524 (0.465-0.597)	0.621 (0.545-0.715)	0.763 (0.643-0.914)	0.879 (0.722-1.08)	1.00 (0.801-1.27)	1.14 (0.879-1.49)	1.33 (0.980-1.84)	1.50 (1.05-2.15)
12-hr	0.241 (0.214-0.273)	0.303 (0.269-0.343)	0.385 (0.342-0.439)	0.454 (0.398-0.522)	0.548 (0.462-0.657)	0.623 (0.512-0.765)	0.699 (0.558-0.885)	0.779 (0.601-1.02)	0.889 (0.653-1.22)	0.976 (0.688-1.40)
24-hr	0.179 (0.161-0.203)	0.227 (0.204-0.257)	0.288 (0.259-0.328)	0.338 (0.301-0.387)	0.404 (0.349-0.478)	0.454 (0.385-0.547)	0.505 (0.418-0.621)	0.556 (0.449-0.702)	0.623 (0.484-0.818)	0.675 (0.508-0.914)
2-day	0.115 (0.103-0.130)	0.144 (0.130-0.163)	0.182 (0.163-0.207)	0.213 (0.190-0.244)	0.255 (0.220-0.301)	0.286 (0.243-0.345)	0.318 (0.264-0.392)	0.351 (0.283-0.443)	0.394 (0.306-0.518)	0.427 (0.322-0.579)
3-day	0.088 (0.079-0.100)	0.110 (0.099-0.124)	0.138 (0.124-0.157)	0.161 (0.144-0.185)	0.193 (0.167-0.228)	0.217 (0.184-0.261)	0.241 (0.200-0.297)	0.266 (0.215-0.336)	0.300 (0.233-0.393)	0.325 (0.245-0.441)
4-day	0.072 (0.065-0.082)	0.090 (0.081-0.103)	0.114 (0.102-0.129)	0.133 (0.118-0.152)	0.158 (0.136-0.186)	0.177 (0.150-0.213)	0.196 (0.163-0.242)	0.216 (0.174-0.273)	0.242 (0.188-0.318)	0.262 (0.197-0.355)
7-day	0.050 (0.045-0.057)	0.063 (0.057-0.072)	0.079 (0.071-0.090)	0.092 (0.082-0.106)	0.109 (0.094-0.128)	0.121 (0.102-0.145)	0.132 (0.110-0.163)	0.144 (0.116-0.182)	0.159 (0.123-0.208)	0.169 (0.127-0.229)
10-day	0.041 (0.037-0.047)	0.052 (0.047-0.059)	0.066 (0.059-0.075)	0.076 (0.068-0.087)	0.089 (0.077-0.106)	0.099 (0.084-0.119)	0.108 (0.089-0.133)	0.116 (0.094-0.147)	0.127 (0.099-0.167)	0.135 (0.101-0.182)
20-day	0.027 (0.024-0.030)	0.035 (0.031-0.039)	0.044 (0.039-0.050)	0.051 (0.045-0.058)	0.059 (0.051-0.070)	0.065 (0.055-0.078)	0.070 (0.058-0.087)	0.076 (0.061-0.095)	0.082 (0.064-0.107)	0.086 (0.065-0.117)
30-day	0.022 (0.020-0.025)	0.028 (0.025-0.032)	0.035 (0.032-0.040)	0.041 (0.036-0.047)	0.048 (0.041-0.056)	0.052 (0.044-0.063)	0.057 (0.047-0.070)	0.061 (0.049-0.077)	0.066 (0.051-0.086)	0.069 (0.052-0.094)
45-day	0.018 (0.016-0.020)	0.023 (0.021-0.026)	0.029 (0.026-0.033)	0.033 (0.030-0.038)	0.039 (0.034-0.045)	0.043 (0.036-0.051)	0.046 (0.038-0.057)	0.049 (0.040-0.062)	0.053 (0.041-0.070)	0.056 (0.042-0.076)
60-day	0.016 (0.014-0.018)	0.020 (0.018-0.023)	0.026 (0.023-0.029)	0.030 (0.026-0.034)	0.034 (0.030-0.040)	0.037 (0.032-0.045)	0.041 (0.034-0.050)	0.043 (0.035-0.055)	0.047 (0.036-0.061)	0.049 (0.037-0.067)

¹ Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

[Back to Top](#)

TRAPEZOIDAL CHANNEL FLOW

Mannings Equation

LTD Engineering, Inc.

G. Dearth

February 5, 2015

Bottom Width (ft) 1.67
 Side Slope (H/1) 0.00
 Mannings n 0.015
 Energy Slope 0.02500
 Channel Invert Elevation (ft) 0

Depth (ft)	Water Surface Elev (ft)	Area (sf)	Hydraulic Radius (ft)	Flow (cfs)	Velocity (fps)	Topwidth (ft)	Shear Stress (psf)
0.00	0.0						
0.10	0.1	0.2	0.09	0.5	3.1	1.7	0.14
0.20	0.2	0.3	0.16	1.6	4.7	1.7	0.25
0.30	0.3	0.5	0.22	2.9	5.7	1.7	0.34
0.40	0.4	0.7	0.27	4.4	6.6	1.7	0.42
0.50	0.5	0.8	0.31	6.0	7.2	1.7	0.49
0.60	0.6	1.0	0.35	7.8	7.8	1.7	0.54
0.70	0.7	1.2	0.38	9.6	8.3	1.7	0.59
0.80	0.8	1.3	0.41	11.6	8.6	1.7	0.64
0.90	0.9	1.5	0.43	13.5	9.0	1.7	0.68
1.00	1.0	1.7	0.46	15.5	9.3	1.7	0.71
1.10	1.1	1.8	0.47	17.6	9.6	1.7	0.74
1.20	1.2	2.0	0.49	19.6	9.8	1.7	0.77
1.30	1.3	2.2	0.51	21.7	10.0	1.7	0.79
1.40	1.4	2.3	0.52	23.8	10.2	1.7	0.82
1.50	1.5	2.5	0.54	26.0	10.4	1.7	0.84
1.60	1.6	2.7	0.55	28.1	10.5	1.7	0.86
1.70	1.7	2.8	0.56	30.3	10.7	1.7	0.87
1.80	1.8	3.0	0.57	32.5	10.8	1.7	0.89
2.00	2.0	3.3	0.59	36.9	11.0	1.7	0.92
2.50	2.5	4.2	0.63	48.0	11.5	1.7	0.98
3.00	3.0	5.0	0.65	59.2	11.8	1.7	1.02
3.20	3.2	5.3	0.66	63.8	11.9	1.7	1.03
3.40	3.4	5.7	0.67	68.3	12.0	1.7	1.05
3.60	3.6	6.0	0.68	72.9	12.1	1.7	1.06
3.80	3.8	6.3	0.68	77.4	12.2	1.7	1.07
4.00	4.0	6.7	0.69	82.0	12.3	1.7	1.08
4.20	4.2	7.0	0.70	86.6	12.3	1.7	1.09
4.40	4.4	7.3	0.70	91.1	12.4	1.7	1.09
4.60	4.6	7.7	0.71	95.7	12.5	1.7	1.10
4.80	4.8	8.0	0.71	100.3	12.5	1.7	1.11
5.00	5.0	8.4	0.72	104.9	12.6	1.7	1.12
5.20	5.2	8.7	0.72	109.5	12.6	1.7	1.12
5.40	5.4	9.0	0.72	114.1	12.7	1.7	1.13
5.60	5.6	9.4	0.73	118.7	12.7	1.7	1.13
5.80	5.8	9.7	0.73	123.3	12.7	1.7	1.14
6.00	6.0	10.0	0.73	127.9	12.8	1.7	1.14

Mannings n

0.015 Concrete
 0.016 Asphalt
 0.020 Bare soil
 0.025 Coarse gravel
 0.033 Grass
 0.060 Riprap

Allowable Velocity and Shear Stress

	Clear Water		Silty Water	
	Velocity (fps)	Shear (psf)	Velocity (fps)	Shear (psf)
Fine sand	1.50	0.027	2.50	0.075
Alluvial silt	2.00	0.048	3.50	0.15
Stiff clay	3.75	0.26	5.00	0.46
Fine gravel 1/4"	2.50	0.075	5.00	0.32
Coarse gravel 3/4"	4.00	0.30	6.00	0.67

TRAPEZOIDAL CHANNEL FLOW

Mannings Equation

LTD Engineering, Inc.

G. Dearth

February 5, 2015

Bottom Width (ft) 1.67
 Side Slope (H/1) 0.00
 Mannings n 0.015
 Energy Slope 0.01300
 Channel Invert Elevation (ft) 0

Depth (ft)	Water Surface Elev (ft)	Area (sf)	Hydraulic Radius (ft)	Flow (cfs)	Velocity (fps)	Topwidth (ft)	Shear Stress (psf)
0.00	0.0						
0.10	0.1	0.2	0.09	0.4	2.3	1.7	0.07
0.20	0.2	0.3	0.16	1.1	3.4	1.7	0.13
0.30	0.3	0.5	0.22	2.1	4.1	1.7	0.18
0.40	0.4	0.7	0.27	3.2	4.7	1.7	0.22
0.50	0.5	0.8	0.31	4.4	5.2	1.7	0.25
0.60	0.6	1.0	0.35	5.6	5.6	1.7	0.28
0.70	0.7	1.2	0.38	7.0	5.9	1.7	0.31
0.80	0.8	1.3	0.41	8.3	6.2	1.7	0.33
0.90	0.9	1.5	0.43	9.7	6.5	1.7	0.35
1.00	1.0	1.7	0.46	11.2	6.7	1.7	0.37
1.10	1.1	1.8	0.47	12.7	6.9	1.7	0.39
1.20	1.2	2.0	0.49	14.2	7.1	1.7	0.40
1.30	1.3	2.2	0.51	15.7	7.2	1.7	0.41
1.40	1.4	2.3	0.52	17.2	7.4	1.7	0.42
1.50	1.5	2.5	0.54	18.7	7.5	1.7	0.44
1.60	1.6	2.7	0.55	20.3	7.6	1.7	0.45
1.70	1.7	2.8	0.56	21.8	7.7	1.7	0.45
1.80	1.8	3.0	0.57	23.4	7.8	1.7	0.46
2.00	2.0	3.3	0.59	26.6	8.0	1.7	0.48
2.50	2.5	4.2	0.63	34.6	8.3	1.7	0.51
3.00	3.0	5.0	0.65	42.7	8.5	1.7	0.53
3.20	3.2	5.3	0.66	46.0	8.6	1.7	0.54
3.40	3.4	5.7	0.67	49.3	8.7	1.7	0.54
3.60	3.6	6.0	0.68	52.5	8.7	1.7	0.55
3.80	3.8	6.3	0.68	55.8	8.8	1.7	0.56
4.00	4.0	6.7	0.69	59.1	8.9	1.7	0.56
4.20	4.2	7.0	0.70	62.4	8.9	1.7	0.57
4.40	4.4	7.3	0.70	65.7	8.9	1.7	0.57
4.60	4.6	7.7	0.71	69.0	9.0	1.7	0.57
4.80	4.8	8.0	0.71	72.3	9.0	1.7	0.58
5.00	5.0	8.4	0.72	75.7	9.1	1.7	0.58
5.20	5.2	8.7	0.72	79.0	9.1	1.7	0.58
5.40	5.4	9.0	0.72	82.3	9.1	1.7	0.59
5.60	5.6	9.4	0.73	85.6	9.2	1.7	0.59
5.80	5.8	9.7	0.73	88.9	9.2	1.7	0.59
6.00	6.0	10.0	0.73	92.3	9.2	1.7	0.59

0.85'
10.2'

Mannings n

0.015 Concrete
 0.016 Asphalt
 0.020 Bare soil
 0.025 Coarse gravel
 0.033 Grass
 0.060 Riprap

Allowable Velocity and Shear Stress

	Clear Water		Silty Water	
	Velocity (fps)	Shear (psf)	Velocity (fps)	Shear (psf)
Fine sand	1.50	0.027	2.50	0.075
Alluvial silt	2.00	0.048	3.50	0.15
Stiff clay	3.75	0.26	5.00	0.46
Fine gravel 1/4"	2.50	0.075	5.00	0.32
Coarse gravel 3/4"	4.00	0.30	6.00	0.67



TOWN OF FAIRFAX

142 BOLINAS ROAD, FAIRFAX, CALIFORNIA 94930
PHONE (415) 453-1584 / FAX (415) 453-1618

MEMORANDUM

To: Linda Neal – Principal Planner

Date: May 13, 2015

Page 1 of 2

From: Ray Wrysinski
Town Engineer

Subject: Single Family Residence – Remodel, Addition
188 Bothin Road
Fairfax, CA

A.P. 001-082-56

I have reviewed the documents enclosed with your 4/22/15 and 5/7/15 transmittals. The items reviewed include a copy of a 2/16/07 grant deed, a 12/23/14 title report, a 3/24/15 letter by Geotechnical Engineer Dave Olnes, a 4/16/15 letter by LTD Engineering which includes hydrology and hydraulic calculations, a 4/15/15 letter by arleo architects, a 3/14/15 letter by the owner of 180 Bothin Road, two sheets of topographic survey with boundary, dated 3/25/15, by J. L. Engineering, a one sheet site plan, dated 3/9/15, by arleo architects and a four sheet plan set, dated 4/1/15, by LTD Engineering

This information was checked to determine if it resolved requirements in the 3/6/15 Town Engineer review memorandum for this site.

The requirement to satisfy the Town Code 17.072.080 provision for a topographic survey with the boundary shown for this site was noted. This document must bear the signature and seal of the Surveyor or Civil Engineer licensed to do land surveying who is responsible for the survey. This survey must show easements both existing and proposed with a notation that all easements are shown or if none exist a notation of this must be made on the survey. The copies, provided, of the survey have the needed signature and seal and easement note. These most recent copies of the survey do not have the required property line dimensions but those dimensions are shown on the previously submitted copies of the survey so by combining the information on the two submittals, all the requirements for the survey have been provided.

A copy of a recent title report that showed the same owner as the current deed and that showed easement and other property restriction information was required. The grant deed submitted shows the owner to be Cheryl L. Tatum. The above noted title report provided the needed information.

A revised grading and drainage plan was required to be submitted. This plan must show the debris walls to be in conformance with the requirements of the geotechnical engineer. The 3/24/15 letter from the Geotechnical Engineer indicates that the revised grading and drainage plan is acceptable to the Geotechnical Engineer.

EXHIBIT #

D

The plan indicates fence removal and other work, may be needed, on the 180 Bothin Road property along the easterly boundary of this project site. Resolution of a possible trespassing problem has been provided by the 3/14/15 letter by the 180 Bothin Road owner.

The site surface drainage design volume must be based on acceptable calculations, submitted for this application, for site drainage flows based on a 100 year storm recurrence. The submitted calculation provide the needed information. Concern was expressed that the drainage channel flow to the street may create a water jet out onto the street pavement. The calculations do not indicate a real high velocity for the design flow and that design flow occurrence should be a rare event so I find that the water jet flow to the street has been resolved. It was noted that the drainage channel to the street will likely deposit some debris on the street. This debris flow will create a street cleaning maintenance problem. Most of the time it will probably not be a lot of debris but I recommend that a condition be placed on this project requiring the property owner to clean the street of any debris that comes out of the drainage channel from this property. This drainage channel may create a persistent wet area on the street that may become a problem. The degree that this will be a problem is unknown but the Town should obtain an agreement to run with this property that requires the property owner to resolve water flow and debris problems, that become apparent, on the street that come from this property.

Concern was expressed that ponding areas in the drainage channel may become a problem as mosquito breeding areas. As noted in the, 4/16/15 LTD letter, drain holes and drain rock are to be constructed to prevent this ponding problem.

There was a requirement that the grading and drainage plan must be on a base map, at the same scale as the topographic survey with boundary. The newly submitted topographic survey is at the same scale as the grading and drainage plan so comparing the information on those drawing can be done by overlaying one plan sheet on the other. This issue is resolved.

There are some moderately complex design issues, on this project, for debris wall and drainage construction. The need for field review of the construction is apparent in my review of the 3/24/15 letter by Dave Olmes and the 4/16/15 letter by LTD Engineering. The elimination of a trash rack and some of the originally proposed debris wall increase the necessity that the final construction must be checked for conformance with the requirements of the project Geotechnical Engineer and the project Civil Engineer. The project building permit should not be finalized until letters are received from both of these engineers. These letters must indicate that the finished construction satisfies the requirements of these project engineers.

I recommend that the processing of this project proceed.



Ray Wrynski, P. E.
Town Engineer



TOWN OF FAIRFAX

142 BOLINAS ROAD, FAIRFAX, CALIFORNIA 94930
PHONE (415) 453-1584 / FAX (415) 453-1618

MEMORANDUM

To: Linda Neal – Principal Planner

Date: March 6, 2015

From: Ray Wrysinski
Town Engineer

Page 1 of 3

Subject: Single Family Residence – Remodel, Addition
188 Bothin Road
Fairfax, CA

A.P. 001-082-56

I have reviewed the documents enclosed with your 2/9/15 transmittal. The items reviewed include a copy of a recorded record of survey for this site by J. L. Engineering (recorded November 8, 2013) and a four sheet set of drawings by LTD Engineering, Inc., dated 2/6/15.

This information was checked to determine if it resolved requirements in the 12/2/14 Town Engineer review memorandum for this site.

The requirement to satisfy the Town Code 17.072.080 provision for a topographic survey with the boundary shown for this site was noted. This document was not provided and is still required. It was noted that the survey must be signed by the Surveyor or Civil Engineer licensed to do land surveying who is responsible for the survey. Copies of that survey, with the signature and seal of the person responsible for it, must be provided. This survey must show easements both existing and proposed with a notation that all easements are shown or if none exist a notation of this must be made on the survey. This survey must provide the Town Code required information. The survey provided with the previous submittal had most of the required information but the above noted information must be added to the copies submitted to fully satisfy the requirements.

The 12/2/14 memorandum noted that to check the survey boundary information, a copy of a recent title report must be submitted. The grant deed submitted shows the owner to be Cheryl L. Tatum. The preliminary title report to be submitted must show that same owner. The title report previously submitted does not provide a property description and it does not provide the information on easements and other restriction on the property use that is usually found in the title reports we receive. An up to date title report must be submitted that shows the owner to match the current fee title deed and it must have a property description. The title report should show the normal easement and other title restrictions that we typically get in a title report. We normally accept the title report as giving an adequate indication, that can be referenced by the surveyor, of the easements that must be shown on the topographic survey as required by the Town Code. If the next submitted title report does not have that easement information then we will be asking the project surveyor to provide the Town with adequate information to show that the Code requirement to show all easements has been resolved.

The submitted recorded record of survey satisfies the requirement for that document.

A grading and drainage plan was required and has been submitted. This plan shows most of the needed information. The grading excavation quantity of 115 cubic yards is shown. This looks like a reasonable estimate. This quantity of material movement requires Planning Commission approval as called for in Code Section 12.20.080

The debris walls called for in the geotechnical report were required to be shown for location, height and materials so that their finished appearance can be understood. Most of this has been done. There is a debris wall called for along the easterly property line. The geotechnical report calls for this wall to extend to the front property line and the wall is shown to end near the northeasterly corner of the existing garage. This appears to leave the adjoining property vulnerable. This debris wall extent must be resolved and appears to require written approval, for that area of the design, by the Geotechnical Engineer. That information is required for this stage of plan review. That wall construction and the drainage channel by the garage looks like it will require removal of the common fence in that area. That fence will also be removed by the debris wall construction uphill of the garage. That fence removal must be shown on the plan. That wall and channel construction must be shown and noted as not requiring the work to trespass onto the adjoining easterly property. This avoidance of work on the adjoining property can be modified if written permission, from the owner of that property, that allows this construction work, is provided to the Town. The debris wall design shown on the plan must be confirmed by the project geotechnical engineer to be satisfying his requirements at this stage of review. The geotechnical report calls for about 50 lineal feet of debris barrier wall in the central part of the site and about 35 lineal feet is shown. The full extent of this wall must be shown on the plan so its construction limit will be clear for the Planning Commission review.

The drainage plan was required to show where surface drains and where subsurface drains will discharge. Construction of drainage in the public street right of way must be approved by the Town Director of Public Works. There is a concrete channel and some drain pipes shown to be constructed in the street right of way. This drainage work must not be done until approval and a permit from the Town Director of Public Works is obtained.

As previously noted, the site surface drainage design volume must be based on acceptable calculations, submitted for this application, for site drainage flows based on a 100 year storm recurrence. These calculations were not submitted and are still required. There is a substantial watershed that drains to this site and a majority of the stormwater flow is diverted in an existing graded channel to direct the flow toward the easterly property line. This flow diversion and the flooding from these flows that exceed the flow area capacity cause water and debris to go into the adjoining property. The drainage design must show that the site drainage will have sufficient capacity to carry the site flows to the street. The flow design to the street must not be in a form that will create a jet of water that will cause problems for vehicle traffic in the street. The debris that will, likely, come along with the water flow may become a maintenance problem that will have to be worked out between the Town and this property owner.

The proposed drainage design appears likely to put strong stormwater flows and debris flow onto the street and probably will put persistent low flows on the street. The degree that this will be a problem is unknown but the Town should obtain an agreement to run with this property that requires the property owner to resolve water flow and debris problems on the street that come from this property.

The drainage design includes resolving the issue of the channel capacity uphill of the garage. The drainage channel along the easterly side of the garage has a sediment trap and a sill step that will pond water. Information must be provided to confirm that these ponds will not become a problem as mosquito breeding areas. This drainage design must include resolution of the drainage problems discussed in the geotechnical report.

The project site grading and drainage plans must be done on a base map of the topographic survey with the boundary shown on it. The submitted grading and drainage plan generally is in that form. When the final topographic survey drawings are submitted to the Town, they will be compared to the information on the grading and drainage plan to see if sufficient existing topography information is on the grading and drainage plan. The copies, submitted, of that survey are at a scale of 1"=16' and 1"=8'. The grading and drainage plans should be done at one of those scales so that the existing topographic map can be overlaid on that new plan so dimensions and other site topographic features can be easily seen and compared to the grading and drainage design. If the grading and drainage plan is done at a scale different from the topographic survey sheets, submitted, then a copy of the topographic survey with the boundary shown at the same scale as the grading and drainage plan must be submitted so that survey can be overlaid on the design plan so the fit with existing features can be checked.

An erosion control and stormwater pollution prevention plan was required to be submitted for this project and that has been done.

I see that I missed the Bay trees shown to be removed, in the previous review so a Fairfax Tree Committee report and permit is required.

I recommend that the processing of this project be delayed until the above, noted, information is provided.



Ray Wrynski, P. E.
Town Engineer



TOWN OF FAIRFAX

142 BOLINAS ROAD, FAIRFAX, CALIFORNIA 94930
PHONE (415) 453-1584 / FAX (415) 453-1618

MEMORANDUM

To: Linda Neal – Principal Planner

Date: December 2, 2014
Page 1 of 3

From: Ray Wrynski
Town Engineer

Subject: Single Family Residence – Remodel, Addition
188 Bothin Road
Fairfax, CA

A.P. 001-082-56

I have reviewed the documents enclosed with your 11/6/14 transmittal. The items reviewed include a 15 sheet plan set which contained drawings by Arleo Architects, 12 sheets dated 10/30/14, drawings by J. L. Engineering, 2 sheets dated July, 2013, and a drawing by Studio Green Landscape Architecture, dated 10/29/14, a geotechnical report by Dave Olnes Civil and Soil Engineer, dated 12/9/13, a grant deed that was recorded 2/16/07 and a preliminary title report dated 01/05/07.

A site review was done 12/01/14.

Town Code Section 17.072.080 provides a list of submittal requirements for Hill Area Residential Development. A topographic survey with the boundary shown, signed by the Surveyor or Civil Engineer licensed to do land surveying, who is responsible for the survey, is required. Copies of that survey, with the signature and seal of the person responsible for it, must be provided. This survey must show easements both existing and proposed or if none exist a notation of this must be made on the survey. The survey normally must show existing and new sanitary sewer, water and storm drain lines with their sizes. Since this is an existing residence and no excavation in the public street is expected, showing those utility lines is not required.

To check the survey boundary information, a copy of a recent title report, a copy of the current fee title deed and a copy of a recorded record of survey normally must be submitted. The grant deed submitted satisfies the requirement for that document. It shows the owner to be Cheryl L. Tatum. The preliminary title report submitted does not provide the information needed with that document. That report indicates the owners are Donald and Catherine Hawker. That report does not provide a property description and it does not provide the information on easements and other restriction on the property use that is usually found in the title reports we receive. An up to date title report must be submitted that shows the owner to match the current fee title deed and it must have a property description. The title report should show the normal easement and other title restrictions that we typically get in a title report. We normally accept the title report as giving an adequate indication, that can be referenced by the surveyor, of the easements that must be shown on the topographic survey as required by the Town Code. If the next submitted title report does not have that easement information then we will be asking the project surveyor to provide the Town with adequate information to show that the Code requirement to show all easements has been resolved.

The above noted recorded survey that must be submitted appears to be an existing document so a copy of that existing recorded record of survey for this property must be submitted for use in review of this projects boundary information on the submitted topographic survey with the boundary shown.

A report by a registered civil engineer specializing in soils and foundation design is required. The submitted report by Dave Olnes, dated 12/9/13, provides the information required for that report. That geotechnical report discusses debris flow and drainage issues that must be shown to be dealt with on the project plans for this submittal.

A grading and drainage plan must be submitted that shows where grading will occur. It must show the location of new foundations and where those foundations will abut existing foundations and where those new foundations will abut existing improvements that are to remain. This plan must show finished floor elevations and finished deck elevations for the new construction and must show existing finished floor elevations where new construction will be connecting to existing structures. Foundation and other retaining walls must be shown. The soil under new floors and under new decks will normally be graded to a crawl space elevation that works in these new construction areas. The graded crawl space elevations for the floor and deck areas must be shown so that a reasonable calculation of the volume of this type of grading can be done and so that the calculation can be easily checked by the Town. The plan must show the total volume (in cubic yards) of material movement for site excavation, site fill and material to be removed from the site. These volumes will include quantities for excavation of footings, grade beams, drilled piers and noted crawl space grading. This includes debris wall excavation and debris wall footings and pier supports. The piers must be indicated to look like reasonable spacing and locations. They do not have to be final design locations. The geotechnical report indicates piers that will produce about one cubic yard of excavation for each pier.

The debris walls called for in the geotechnical report must be shown for location, height and materials so that their finished appearance can be understood. The debris wall called for along the easterly property line looks like it will have pier support or foundation support that will encroach on the property to the east. That wall construction looks like it will require removal of the common fence in that area. That wall must be shown in sufficient detail so that it is clear that construction of the wall, the wall foundation support and the excavation for the wall and foundation will not trespass onto that adjoining easterly property. This avoidance of work on the adjoining property can be modified if written permission, from the owner of that property, that allows this construction work, is provided to the Town. The debris wall design shown on the plan must be confirmed by the project geotechnical engineer to be satisfying his requirements. The grading and drainage plan must be prepared by the project licensed civil engineer.

The drainage plan must show where surface drains and where subsurface drains will discharge. Construction of drainage in the public street right of way must be approved by the Town Director of Public Works. The site surface drainage design volume must be based on acceptable calculations, submitted for this application, for site drainage flows based on a 100 year storm recurrence. There is a substantial watershed that drains to this site and a majority of the stormwater flow is diverted in an existing graded channel to direct the flow toward the easterly property line. This flow diversion and the flooding from flows that exceed the flow area capacity cause water and debris to go into the adjoining property. The drainage design must show that the site drainage will have sufficient capacity to carry the

site flows to the street. The flow design to the street must not be in a form that will create a jet of water that will cause problems for vehicle traffic in the street. The debris that will, likely, come along with the water flow may become a maintenance problem that will have to be worked out between the Town and this property owner. A drainage design that took the majority of the stormwater and other flows to the westerly side of the existing garage would resolve the diversion and other issues with the property to the east and a discharge in that area probably could be set up to allow the flow to slow down and spread out before it hit the street so a jet of stormwater flow and debris would not become a traffic problem.

The project site grading and drainage plans must be done on a base map of the topographic survey with the boundary shown on it. The copies, submitted, of that survey are at a scale of 1"=16' and 1"=8'. The grading and drainage plans should be done at one of those scales so that the existing topographic map can be overlaid on that new plan so dimensions and other site topographic features can be easily seen and compared to the grading and drainage design. If the grading and drainage plan is done at a scale different from the topographic survey sheets submitted then a copy of the topographic survey with the boundary shown at the same scale as the grading and drainage plan must be submitted so that survey can be overlaid on the design plan so the fit with existing features can be checked.

The geotechnical report discusses possible construction of a swimming pool but I do not see that shown as part of this proposal

An erosion control and stormwater pollution prevention plan must be submitted for this project. This plan must satisfy current State Water Resources Control Board requirements, and must satisfy the requirements of Town Code Sections 8.28 (Watercourses) and 8.32 (Urban Runoff Pollution Prevention).

I did not see trees shown to be removed so a Fairfax Tree Committee report and permit is not required.

I recommend that the processing of this project be delayed until the above, noted, information is provided.



Ray Wrysinski, P. E.
Town Engineer

180 Bothin Road
Fairfax, CA 94930

March 14, 2015

Town of Fairfax
Building Department
142 Bolinas Road
Fairfax, CA 94930

TOWN OF FAIRFAX

APR 21 2015

RECEIVED

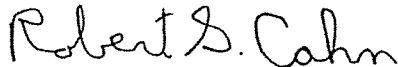
To Whom It May Concern,

We are writing this letter to grant permission for access to our property to build a debris diversion wall, a spill gutter and associated drainage structures between our house at 180 Bothin Road and our neighbor's house at 188 Bothin Road.

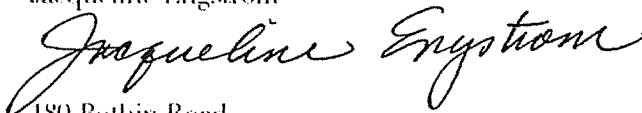
Based on our initial review of the engineering drawings on the project at 188 Bothin Road by LTD Engineering dated 2/2/15, we are aware of the proposed features of the project for which access to our property is needed.

Sincerely,

Robert S. Cahn



Jacqueline Engstrom



180 Bothin Road

Fairfax, CA 94930

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robertscahn@yahoo.com

jacengstrom@gmail.com

EXHIBIT # E