ATTACHMENT G

GEOTECHNICAL INVESTIGATION

Proposed Addition to Residence
338 Kings Road
Brisbane, California

Prepared for:

Roy and Lany Miller

February 27, 2018

Michelucci & Associates, Inc.
Geotechnical Consultants

Joseph Michelucci, G.E.
joe@michelucci.com

Richard Quarry
rich@michelucci.com

February 27, 2018
Job No. 18-4751

via mail and e-mail: muller@trussworks.com

Roy and Lany Muller
338 Kings Road
Brisbane, CA 94005

Re: Geotechnical Investigation
Proposed Addition to Residence
338 Kings Road
Brisbane, California

Dear Mr. and Mrs. Muller:

As authorized, we have completed a geotechnical investigation of the site of the proposed addition to the residence located at 338 Kings Road in Brisbane, California.

It is our basic conclusion that the project is feasible from a geotechnical viewpoint, provided that the recommendations contained in the accompanying report are incorporated into the final plans and followed during construction.

We are pleased to have been of service to you on this project, and will be available to review our findings with you and your other consultants as needed.

Very truly yours,
MICHELUCCI & ASSOCIATES, INC.

John Petroff
Project Geologist

Joseph Michelucci
Geotechnical Engineer #593
(Expires 3/31/19)

REGISTERED PROFESSIONAL ENGINEER
JOSEPH M. MICHELUCCI
No. GE 000593
Exp. 3/31/19
GEOTECHNICAL
STATE OF CALIFORNIA

cc: Ben Newcomb, Designer (finehomes@bennewcomb.com)

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GEOTECHNICAL ENGINEERING INVESTIGATION

Proposed Addition to Residence
338 Kings Road
Brisbane, California

INTRODUCTION

This report covers our investigation of the soil and bedrock conditions that occur at the site of the proposed addition to the residence located at 338 Kings Road in Brisbane, California (Site Vicinity Map, Figure 1). An overview of the property, including the location of test borings performed in conjunction with this study, is included on the attached Site Plan, Figure 2. A photo of the front of the residence follows.

Photo 1: View of the front of the residence from Kings Road. The garage addition is planned on the right side of the residence (on the right side of the photo).

The purpose of our study was to evaluate the soil and bedrock conditions that occur at the site, and to provide geotechnical recommendations and design criteria pertaining to building foundations, site grading, retaining walls, drainage, and other items that relate to the site soil and geologic conditions.

DESCRIPTION OF PROJECT

The project is to involve an addition to the existing structure at the location indicated on the attached Site Plan, Figure 2. This will require removal of an existing stairway and concrete block wall along the right side of the residence (when viewed from the street) and the removal of fencing and decking further up the slope. We also understand that the structure is to be remodeled and an additional story is to be added. A new retaining wall is also planned below the driveway adjacent to the street, which will create a space for street parking below the property.

SCOPE OF SERVICES

Our study included:

1. Detailed site inspections by our geotechnical personnel;

2. A review of our files for other projects our firm has completed in the site vicinity;

3. The review of plans, titled "338 Kings Road, Addition and Remodel", prepared by Ben Newcomb, Designer, dated June 19, 2017;

4. Discussions with Ben Newcomb;

5. The performance of a relative floor elevation survey on the existing structure with a water-filled manometer (to aid in evaluating foundation performance);

6. A review of available published geologic maps and literature;

7. Marking the street and sidewalk in front of the property and then contacting USA (Utility Service Alert) to locate where buried utilities enter the property prior to logging test borings;

8. Filing appropriate forms with San Mateo County in accordance with our Annual Drilling Permit, as required by the County Department of Health;

9. The excavation of 3 exploratory test borings with minuteman power augering and sampling equipment;

10. The recovery of samples from the borings, and the performance of a variety of engineering tests upon the various soil layers encountered;

11. Backfilling the boreholes with appropriate grout (by Access Soil Drilling of San Mateo)

12. The excavation of a test pit beneath the residence's foundation to determine the depth of the foundation and the material upon which it bears;

13. The performance of geotechnical engineering analysis utilizing the above items; and,

14. The preparation of this report.

FIELD INVESTIGATION AND LABORATORY TESTS

In order to evaluate the geotechnical engineering characteristics of the soil and bedrock layers which underlie the site, 3 borings were drilled at the approximate locations indicated on the attached Site Plan, Figure 2. The borings were drilled by Access Soil Drilling of San Mateo on February 7, 2018 with minuteman power augering equipment. Relatively undisturbed samples were recovered in thin brass tubes from the borings at selected intervals with a free-falling, 140-pound hammer (with a 30-inch drop) advancing modified California, and in some cases standard penetration, drive samplers up to 24 inches into the subsurface soil and bedrock layers. The brass tube encased samples were labeled in the field and carefully sealed to preserve their in-situ moisture content. They were ultimately transported to our laboratory.

As the borings were excavated, logs of the materials encountered were prepared based upon an inspection of the recovered samples and close observation of the auger cuttings as they emerged from the borehole. The final Boring Logs, as presented on the attached Figures 3 through 5, are based upon the field logs with occasional modifications based upon further close laboratory examinations of the recovered samples as well as the laboratory test results.

Laboratory tests were performed upon samples that were extruded from the brass tubes. These tests, which are useful in evaluation of the general strength properties of the materials tested, included the determinations of moisture content, dry density and unconfined compressive strength of selected samples. The results of these tests, along with the resistance to penetration of the sampler, are listed opposite the corresponding sample location on the final Boring Logs, Figures 3 through 5. A Boring Log Key is also included as Figure 6.

Our investigation also included a relative floor elevation survey on the main entry level of the existing home. The survey, made with a water-filled manometer aids in evaluating how well the foundation has performed. The results of the survey are included on Figure 7.

We also excavated a test pit to excavate the foundation depth and the material it bears upon. The approximate location of the test pit is shown on Figure 2.

SITE CONDITIONS

The site topography slopes generally upward towards the west at an average inclination that is on the order of 1.75 horizontal to 1 vertical with some locally steeper areas just above the driveway and on the slope above the residence.

The property is improved with an existing residence that was constructed on a stepped building pad that was created by cut and fill operations. Excavations were made into the slope and some fill was placed along the downslope sides of the excavations to accommodate the building pad.

The concrete driveway that extends along the east side of the property currently services only the residence immediately to the north of the subject property. It appears that the driveway will become a "shared" improvement after the garage is constructed on the subject property.

The addition is planned along the east side of the residence, which is currently occupied by a low wood deck and lush landscaping.

SOIL AND BEDROCK CONDITIONS

The soil and bedrock conditions encountered at the site consisted generally of a thin surface soil layer of man-placed fill and/or colluvium, which was underlain by dense Franciscan sandstone bedrock. In general, the thickness of soil above the rock was greater at the front of the residence.

Groundwater was **not** encountered in any of the borings at the time of drilling. Groundwater and perched groundwater levels, however, tend to fluctuate seasonally, and could rise to the depths explored in the future.

A sketch of the general site features is included on the Site Plan, Figure 2. For a more complete description of the soil and bedrock layers encountered in the borings, refer to the final Boring Logs included as Figures 3 through 5 and the Boring Log Key included as Figure 6.

SITE GEOLOGY

The site has been mapped by Brabb, Graymer and Jones (1998) and Bonilla (1998) to be underlain by Franciscan sandstone and shale (Kjsk). Brabb, Graymer and Jones describe the sandstone as *dark-gray to yellowish-brown greywacke interbedded with shale, in approximately equal amounts*. As noted, dense Franciscan sandstone was encountered in all of our test borings for the project. A scan of Bonilla's geologic map follows.

Bolilla (1998)

There are no indications of active faulting at the site. The closest mapped active fault to the site is the San Andreas Fault located approximately 4.2 miles (6.8 kilometers) to the southwest. The San Andreas Fault, and numerous active and potentially active Bay Area faults are capable of producing moderate to major earthquakes that could cause severe ground shaking at the subject site in the future. This hazard is shared in some degree by all land and structures in the San Francisco Bay Area.

GEOTECHNICAL CONDITION OF RESIDENCE

In order to help evaluate the performance of the existing foundation and the compatibility with a new foundation, we conducted a relative floor elevation survey on the floors of the main entry level using a water-filled manometer. The results of the survey, which are included on the attached Figure 7, indicate that the existing residence is on the order of 4.0 inches out-of-level. This suggests that greater than normal foundation settlement has occurred.

We also inspected the accessible portions of the foundation crawl space as part of our study. In general, the foundation appeared to be in serviceable condition from a geotechnical viewpoint. We did observe a 1/16 to ¼ inch wide diagonal crack in a continuous interior footing that extended just upslope of the lower level of the residence, but for the most part the foundation looked good. The crack is visible from the crawl space entry just beyond the hot water heater and the furnace and the associated small diameter copper piping. Our observations suggest that the continuous interior footing where the crack was observed may have been the original front footing for the house before an addition was done along the front of the residence after the original construction was completed. The crack in the foundation is visible in the following photo.

Photo 2: View within the foundation crawl space. Note the diagonal crack in the continuous interior footing near the left side of the photo.

We excavated a test pit along the front of the residence just to the left of the chimney (when looking upslope) and found that the foundation extended about 9 to 10 inches below nearest adjacent grade and was bearing upon artificial fill that consisted of light olive brown medium dense silty clayey fine sand with brownish yellow mottling and scattered rootlets. We should point out that our test pit location corresponds to the area where the house was measured to be most out of level.

CONCLUSIONS

Based upon our study, it is our opinion that the project can be developed as planned, provided that the recommendations contained within this report are followed. The primary geotechnical consideration will involve embedding the new addition foundation into the dense sandstone bedrock that was encountered in our test borings. Since the existing foundation has been affected by excessive settlement, portions (or all of the residence) should be underpinned or replaced and also supported in bedrock.

It may also be necessary to shore portions of the existing residence to protect the structure from movement when the garage excavation is made.

Specific recommendations follow.

RECOMMENDATIONS

The following recommendations are contingent upon our firm being retained to review the development plans and to observe the geotechnical aspects of construction. We should also be provided the opportunity to "fine-tune" our recommendations as plans are being prepared.

A. Seismic Criteria Per 2016 CBC

As of January 1, 2017, the 2016 CBC is being utilized for projects in California. This new code is based upon the 2015 International Building Code.

It is our opinion that the subject site can be classified as Site Class "C" for the purpose of structural engineering calculations as defined in Section 1613 of the 2016 CBC.

B. Grading

It is anticipated that significant grading other than excavation will *not* take place. If areas of fill are proposed, they should be brought to our attention so that specific recommendations can be provided.

C. Foundations

In our opinion, underpinning the settled portions of the existing residence is feasible from a geotechnical viewpoint. The underpinning should consist of either drilled or hand excavated reinforced concrete piers that are designed to resist both vertical as well as lateral loading (that could be imposed by creeping soil). The structural engineer should utilize the relative floor elevation surveys that we provided as well as there own observations of the foundation elements to determine underpinning locations.

Drilled piers should be designed on the basis of an allowable skin friction value of 500 psf beginning at the top of supporting material, which should be assumed to be the top of bedrock, or in accordance with the Rule of Ten, which is included on the attached Figure 8, whichever is deeper.

If hand excavated piers are utilized, they should be design on the basis of an allowable bearing pressure of 4,000 psf, beginning at least 4 feet below the top of supporting material as defined above.

Piers should also be designed to resist a horizontal creep load equivalent to a fluid weighing 50 pounds per cubic foot projected over 2-½ pier diameters. The creep load should extend to the top of supporting material, as described above.

Passive resistance may begin at the top of supporting material, as defined above. An allowable passive value of 400 pounds per cubic foot may be assumed in the design. This value may be projected over 2 pier diameters.

Reinforcing for the piers should be determined by the structural engineer based upon anticipated loading.

It is possible that water may accumulate in the pier excavations. Therefore, provisions for casing may be necessary. Any water that accumulates in the piers should be pumped out prior to concrete placement. Alternatively, concrete may be placed by the "tremmie technique".

D. Retaining Walls

Retaining walls should be constructed upon foundations designed in accordance with Section C above. All retaining walls should be designed to resist the active equivalent fluid pressures tabulated as follows.

WALL BACKSLOPE INCLINATION (H:V)	EQUIVALENT FLUID PRESSURE (pcf)
Level	45
4h: 1v	50
3h: 1v	55
2h: 1v	60

Interpolation can be used to determine pressures for intermediate inclinations. When walls are to be rigidly restrained from rotation, a uniform surcharge pressure of 75 psf should be added to the design values.

In addition to static soil earth pressure as outlined above, the retaining walls should be designed to resist short-term seismic loading. The retaining walls should be designed for a seismic loading increment (in pounds per foot) equal to 10 times the height of the wall (in feet) squared. The seismic component, as defined above, should be considered as a line load acting at a point 0.33 times H above the base of the retaining wall, where H is the wall height. It is noted that the seismic component should be added to the static earth pressure loading. In our opinion, it is acceptable to use a factor of safety of 1.1 for overturning when considering the combined effect of static and seismic loading.

Passive resistance can begin at the top of supporting material, as defined above, and can be taken as a value of 400 pcf. This value can be projected over 2 pier diameters.

It is important that adequate subdrainage be constructed behind retaining walls. We have included a Typical Subdrain Detail on Figure 9. In addition, moisture proofing should be provided in areas where moisture migration through retaining walls would be undesirable.

E. Slab-On-Grade Construction

It is anticipated that the only slab-on-grade construction will be for the garage floor. The slabs should be reinforced with steel bars and cast upon rock, or engineered fill. (We anticipate that bedrock will be exposed at the garage elevation. If bedrock is not exposed, we will be available to provide supplemental recommendations.) It is recommended that some type of moisture retardant be provided beneath the slabs. We have included a commonly used treatment on the attached Figure 10, however the project architect, or moisture control consultant should provide the final plan.

F. Surface Drainage

We recommend that the site be fine-graded to direct water to flow away from the building foundations. As a general requirement, storm water should not be allowed to pond or flow in concentrated streams or channels on the site. Such ponding or flows and the resulting saturation can weaken the soils and perhaps cause some minor site erosion.

It is further recommended that all roof downspouts be led into tightline disposal pipes that deposit water well away from building foundations and into a suitable disposal area. *Disposal requirements vary from building department to building department and some require disposal into on site "dry well" or other facilities. We should be further consulted if there is such a requirement for this project.*

G. Subdrainage

As noted, subdrainage should be constructed behind retaining walls as illustrated on Figure 9.

In order to mitigate the potential for water to seep into the building "crawl areas", it is also recommended that a foundation drain be constructed along all sides of the structure, as is illustrated on Figure 11. Material specifications are included on Figure 9. If the uphill foundation wall is a retaining wall, the wall subdrain will serve this purpose.

H. Review of Plans and Construction Observations

It is important that all of the plans related to our recommendations be submitted to our office for review. The purpose of our review will be to verify that our recommendations are understood and reflected on the plans, and to allow us to provide supplemental recommendations, if necessary. We should be provided the plans well in advance of construction. We will provide plan review letters as appropriate.

It is important that our firm be retained to provide observation services during construction. Our observations will allow us to verify that the materials encountered are consistent with those found during our study, and will allow us to provide supplemental, on-site recommendations, as necessary. *We will require at least 48 hours notice so that the appropriate personnel may be scheduled.*

LIMITATIONS

The conclusions and opinions expressed in this report are based upon the exploratory borings that were drilled on the site, spaced as shown on the Site Plan, Figure 2. While in our opinion these borings adequately disclose the soil conditions across the site, the possibility exists that abnormalities or changes in the soil conditions, which were not discovered by this investigation, could occur between borings.

This study was not intended to disclose the locations of any existing utilities, septic tanks, leaching fields, hazardous wastes, or other buried structures. The contractor or other people should locate these items, if necessary.

Michelucci & Associates, Inc. does not practice in the field of moisture vapor transmission evaluation/mitigation. Therefore, we recommend that a qualified person/firm be engaged/consulted with to evaluate the general and specific moisture vapor transmission paths and any impact on the proposed construction. This person/firm should provide recommendations for mitigation of potential adverse impact of moisture vapor transmission on various components of the structure as deemed appropriate,

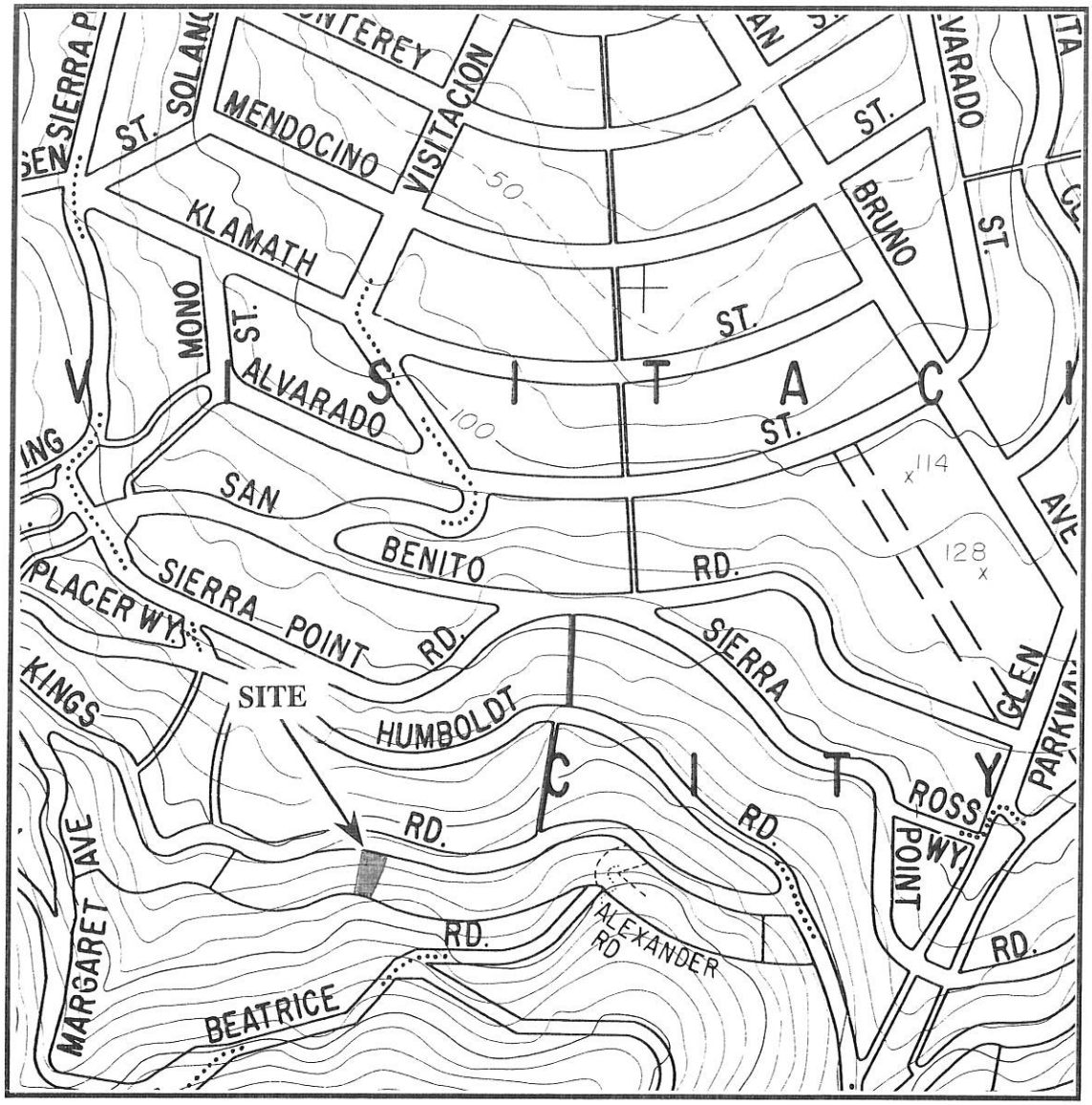
The passage of time may result in significant changes in technology, economic conditions, or site variations that could render this report inaccurate. Accordingly, neither Roy and Lany Muller nor any other party shall rely on the information or conclusions contained in this report after 12 months from its date of issuance without the express written consent of Michelucci & Associates, Inc. Reliance on this report after such period of time shall be at the user's sole risk. Should Michelucci & Associates, Inc. be required to review the report after 12 months from its date of issuance, Michelucci & Associates, Inc. shall be entitled to additional compensation at then-existing rates or such other terms as may be agreed upon between Michelucci & Associates, Inc. and Roy and Lany Muller.

This report was prepared to provide engineering opinions and recommendations only. It should not be construed to be any type of guarantee or insurance.

ATTACHMENT G

SITE VICINITY MAP*

338 Kings Road
Brisbane, California



*BASE MAP FROM COUNTY OF SAN MATEO CADASTRAL TOPOGRAPHIC SERIES, SHEET 2D, 1973, (REVISED 1-1-86).

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EXPLANATION

B-1 — Boring Location & Number (Michelucci & Associates, Inc.)

TP-1 — Test Pit Location & Number (Michelucci & Associates, Inc.)

APPROXIMATE LOCATION OF PROPOSED NEW ADDITION

APPROXIMATE LOCATION OF PROPOSED NEW RETAINING WALL

KING ROAD (40' R/W)

S 07°41'00" W

100.00'

S22°21'00"W 100.00'

EXISTING WOOD FRAME HOUSE LOT 33

LOT 34

POND

(N) FISH POND

(N) RETAINING WALL

HOT TUB

SHED

CONC. SLAB

CONC. PATH

CONC. STEPS

CONC. LANDING

WOOD STEPS

WOOD DECK

CONCRETE

BRICK

DRIVEWAY

WALKWAY

FENCE

L=51.20', D=14°40', R=200'

L=76.79', D=14°40', R=300'

B-1

B-2

B-3

TP-1

Feet 0 10 20

Scale

N

* Base map from a site plan prepared by American Engineering Co., titled, "Site Retaining Wall & Arbor, Muller Residence, 338 Kings Road" (Sheet S1), dated February 20, 2011.

SITE PLAN*

338 Kings Road
Brisbane, California

Scale: 1"=10'±	Approved: J. M.	Prepared By: J. P.
Date: 2-26-18		Revised:

Michelucci & Associates, Inc.

Job No. 18-4751		Figure 2

ATTACHMENT G

Project: **338 Kings Road** Project Location: **Brisbane, California** Project Number: **18-4751**	Log of Boring 1 **Sheet 1 of 1**

Date(s) Drilled **2/7/18**	Logged By **JL**	Checked By **JM**
Drilling Method **Continuous Sampling**	Drill Bit Size/Type **4-inch Diameter**	Total Depth of Borehole **8 feet**
Drill Rig Type **Minuteman**	Drilling Contractor **Access Soil Drilling**	Approximate Surface Elevation
Groundwater Level and Date Measured **Dry**	Sampling Method(s) **2.5", 2.0" & spt**	Hammer Data **140 lb: 30-inch drop**

Depth (feet)	Graphic Log	Material Type	MATERIAL DESCRIPTION	Sample Type	Sample Number	Driving Resistance, blows/ft	Dry Unit Weight, pcf	Water Content, %	UC, psf	Deg. of Saturation (%)
0		SM-SC	Loose to medium dense, dark yellowish brown, silty clayey fine sand, damp to moist (Colluvium)		1-1 (2.5")	9	95.2	14.2	2,435	49.8
		Sandstone	Deeply weathered, yellowish brown, silty clayey fine sanadstone, damp (Franciscan Sandstone Bedrock)		1-2 (2.0")	28	104.5	11.4	2,151	50.4
5					1-3 (spt)	46				
					1-4 (spt)	50/6"				
			Boring terminated at 8 feet below grade							
10										

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Macintosh HD:Users:user:Desktop:338 Kings Road:338 Kings Road Boring Data.bg4[Company.tpl]

Figure 3

ATTACHMENT G

Project: **338 Kings Road** Project Location: **Brisbane, California** Project Number: **18-4751**	Log of Boring 2 **Sheet 1 of 1**

Date(s) Drilled **2/7/18**	Logged By **JL**	Checked By **JM**
Drilling Method **Continuous Sampling**	Drill Bit Size/Type **4-inch Diameter**	Total Depth of Borehole **2 feet 8 inches**
Drill Rig Type **Minuteman**	Drilling Contractor **Access Soil Drilling**	Approximate Surface Elevation
Groundwater Level and Date Measured **Dry**	Sampling Method(s) **2.5", 2.0" & spt**	Hammer Data **140 lb: 30-inch drop**

Depth (feet)	Graphic Log	Material Type	MATERIAL DESCRIPTION	Sample Type	Sample Number	Driving Resistance, blows/ft	Dry Unit Weight, pcf	Water Content, %	UC, psf	Deg. of Saturation (%)
0		SM	Soft to medium dense, dark yellowish brown, silty fine sand with gravel, moist (Fill)							
		Sandstone	Deeply weathered, yellowish brown, silty clayey fine sandstone, damp (Framciscan Sandstone Bedrock)		2-1 (2.5")	50/5"	121.8	8.9		62.6
					2-2 (2.0")	50/5"				
					2-3 (spt)	50/4"				
			Boring terminated at 2 feet 8 inches below grade							
5										
10										

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Figure 4

ATTACHMENT G

Project: **338 Kings Road** Project Location: **Brisbane, California** Project Number: **18-4751**	Log of Boring 3 **Sheet 1 of 1**

Date(s) Drilled **2/7/18**	Logged By **JL**	Checked By **JM**
Drilling Method **Continuous Sampling**	Drill Bit Size/Type **4-inch Diameter**	Total Depth of Borehole **5 feet 3 inches**
Drill Rig Type **Minuteman**	Drilling Contractor **Access Soil Drilling**	Approximate Surface Elevation
Groundwater Level and Date Measured **Dry**	Sampling Method(s) **2.5", 2.0" & spt**	Hammer Data **140 lb: 30-inch drop**

Depth (feet)	Graphic Log	Material Type	MATERIAL DESCRIPTION	Sample Type	Sample Number	Driving Resistance, blows/ft	Dry Unit Weight, pcf	Water Content, %	UC, psf	Deg. of Saturation (%)
0		SC	Loose, dark yellowish brown, clayey fine sand, moist (Colluvium)							
		ML-CL	Stiff, yellowish brown, abundantly fine sandy silty clay with sandstone fragments, damp to moist (Residual Soil)		3-1 (2.5")	10	101.6	21.6	1,782	88.7
		Sandstone	Deeply weathered, yellowish brown, silty clayey fine sandstone, damp (Franciscan Sandstone Bedrock		3-2 (2.0")	72	118.0	10.8	3,574	68.0
5					3-3 (spt)	50/3"				
			Boring terminated at 5 feet 3 inches below grade							
10										

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Figure 5

ATTACHMENT G

Project: **338 Kings Road**
Project Location: **Brisbane, California**
Project Number: **18-4751**

Key to Log of Boring
Sheet 1 of 1

Depth (feet)	Graphic Log	Material Type	MATERIAL DESCRIPTION	Sample Type	Sample Number	Driving Resistance, blows/ft	Dry Unit Weight, pcf	Water Content, %	UC, psf	Deg. of Saturation (%)
1	2	3	4	5	6	7	8	9	10	11

COLUMN DESCRIPTIONS

1. Depth (feet): Depth in feet below the ground surface.
2. Graphic Log: Graphic depiction of the subsurface material encountered.
3. Material Type: Type of material encountered.
4. MATERIAL DESCRIPTION: Description of material encountered. May include consistency, moisture, color, and other descriptive text.
5. Sample Type: Type of soil sample collected at the depth interval shown.
6. Sample Number: Sample identification number.
7. Driving Resistance, blows/ft: Number of blows to advance driven sampler one foot (or distance shown) beyond seating interval using the hammer identified on the boring log.
8. Dry Unit Weight, pcf: Dry weight per unit volume of soil sample measured in laboratory, in pounds per cubic foot.
9. Water Content, %: Water content of the soil sample, expressed as percentage of dry weight of sample.
10. UC, psf: Unconfined compressive strength, in pounds per square foot.
11. Deg. of Saturation (%): Deg. of Saturation (%)

FIELD AND LABORATORY TEST ABBREVIATIONS

CHEM: Chemical tests to assess corrosivity
COMP: Compaction test
CONS: One-dimensional consolidation test
LL: Liquid Limit, percent
PI: Plasticity Index, percent
SA: Sieve analysis (percent passing No. 200 Sieve)
UC: Unconfined compressive strength test, Qu, in ksf
WA: Wash sieve (percent passing No. 200 Sieve)

MATERIAL GRAPHIC SYMBOLS

Sandstone

Silty to Clayey SAND (SM-SC)

TYPICAL SAMPLER GRAPHIC SYMBOLS

Auger sampler
Bulk Sample
3-inch-OD California w/ brass rings
CME Sampler
Grab Sample
2.5-inch-OD Modified California w/ brass liners
Pitcher Sample
2-inch-OD unlined split spoon (SPT)
Shelby Tube (Thin-walled, fixed head)

OTHER GRAPHIC SYMBOLS

Water level (at time of drilling, ATD)
Water level (after waiting)
Minor change in material properties within a stratum
Inferred/gradational contact between strata
Queried contact between strata

GENERAL NOTES

1: Soil classifications are based on the Unified Soil Classification System. Descriptions and stratum lines are interpretive, and actual lithologic changes may be gradual. Field descriptions may have been modified to reflect results of lab tests.
2: Descriptions on these logs apply only at the specific boring locations and at the time the borings were advanced. They are not warranted to be representative of subsurface conditions at other locations or times.

Macintosh HD:Users:user:Desktop:338 Kings Road:338 Kings Road Boring Data.bg4[Company.tpl]

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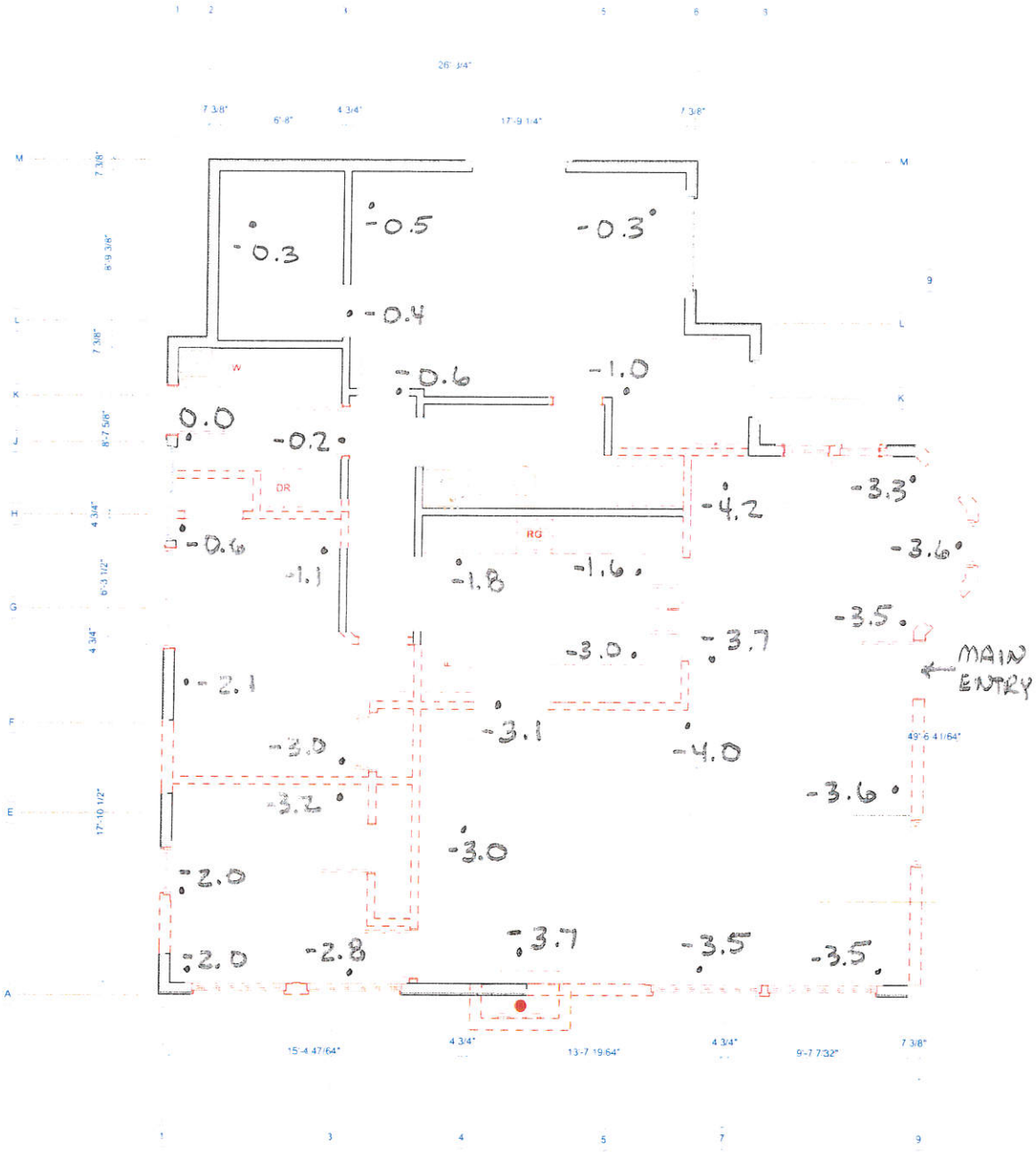
Figure 6

RELATIVE FLOOR ELEVATION SURVEY

ATTACHMENT G

338 Kings Road
Brisbane, California
UNKNOWN SCALE



NOTES

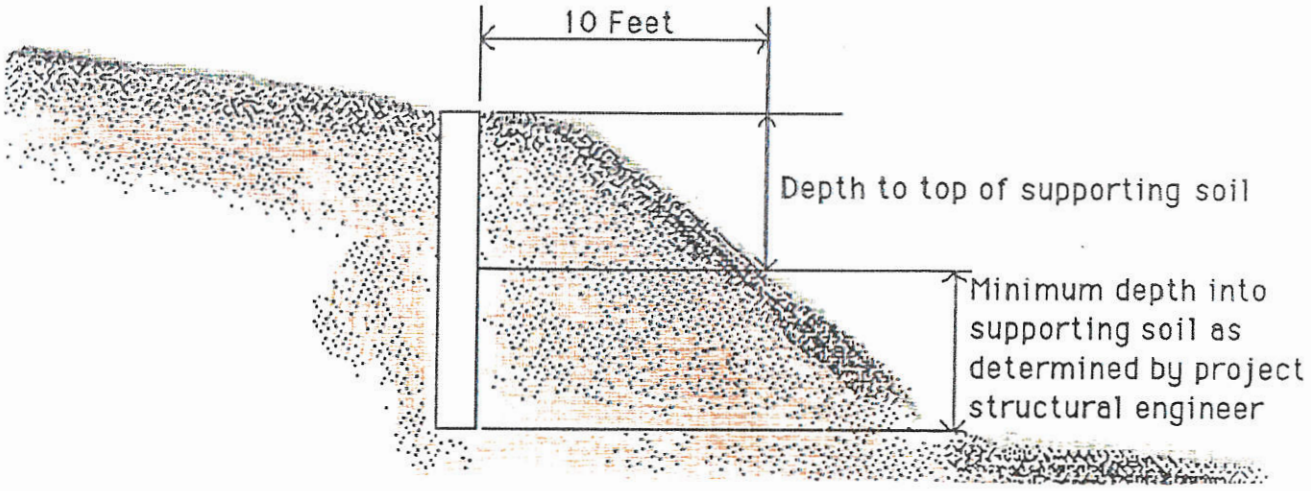
1) **Survey performed on 1-29-18**
2) **Readings are in inches**
3) **0.0 indicates high point**

* Base map from a 2nd floor existing and demo plan prepared by Ben Newcomb, Designer, titled, "338 Kings Road Addition & Remodel," (Sheet A-2) dated June 19, 2017.

Job No. **18-4751**	Michelucci & Associates, Inc.	Figure **7**

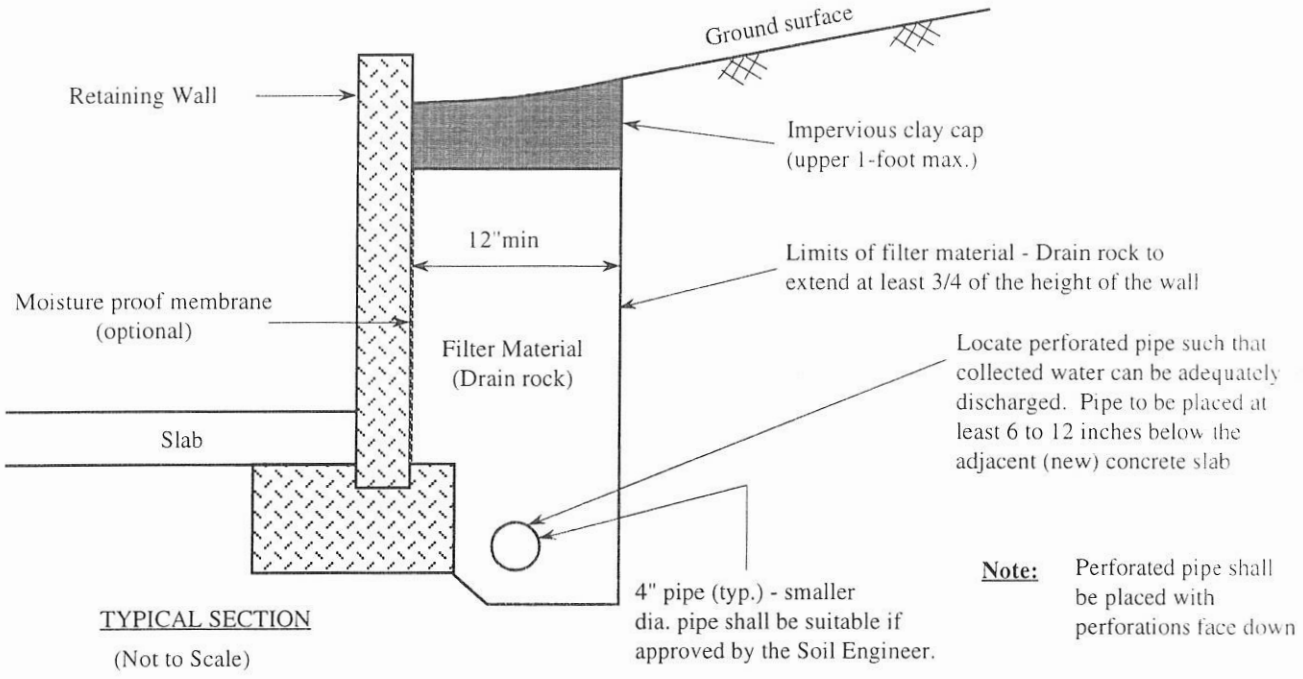
THE "RULE OF TEN"
HORIZONTAL CONFINEMENT FOR FOUNDATIONS ON OR NEAR SLOPES

DRILLED PIER FOUNDATIONS



Job No. 18-4751	Michelucci & Associates, Inc.	Figure 8

GUIDE SPECIFICATIONS FOR SUBDRAINS BEHIND RETAINING WALLS



TYPICAL SECTION

(Not to Scale)

Subdrain pipe shall be manufactured in accordance with the following requirements:

a. Acrylonitrile-butadiene-styrene (ABS) plastic pipe shall conform to the specifications for ABS plastic pipe given in ASTM Designation D2282 and ASTM Designation D2751. ABS pipe shall have a minimum pipe stiffness of 45 psi at 5% deflection when measured in accordance with ASTM Method D2412.

b. Polyvinyl chloride (PVC) pipe shall conform to AASHTO Designation M278. PVC pipe shall have a minimum pipe stiffness of 50 psi at 5% deflection when measured in accordance with ASTM Method D2412 except that pipe conforming to F758 shall be suitable. Schedule 40 PVC pipe shall be suitable. SDR-35 PVC pipe conforming to ASTM D3034 shall be suitable when the thickness of pipe cover does not exceed 12 feet.

Filter material for use in backfilling trenches around and over subdrain pipes and behind retaining walls shall consist of clean coarse sand and gravel or crushed stone conforming to the following requirements:

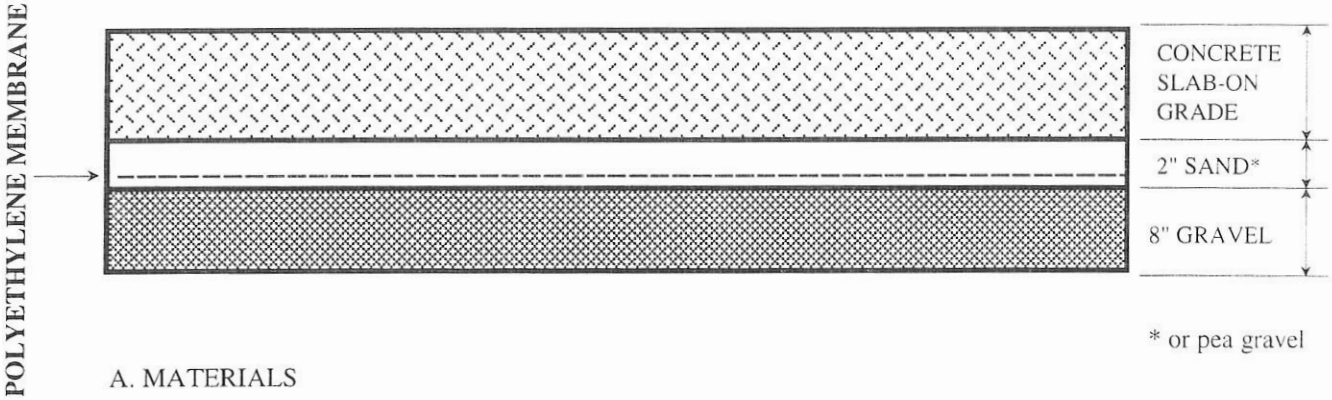
Sieve Size	% Passing Sieve
2"	100
3/4"	70 to 100
3/8"	40 to 100
#4	25 to 50
#8	15 to 45
#30	5 to 25
#50	0 to 20
#200	0 to 3

a. Class 2 " Permeable Material" conforming to the State of California Department of Transportation Standard Specifications, latest edition, Section 68-1.025 shall be suitable.

b. Clean, coarse gravel ("drain rock") shall also be suitable, provided that it is wrapped in an acceptable geotextile ("filter fabric") such as Mirafi 140 N.

MOISTURE RETARDANT BENEATH CONCRETE SLABS

TYPICAL SECTION



* or pea gravel

A. MATERIALS

The mineral aggregate for use under floor slabs shall consist of clean rounded gravel and sand. The aggregate shall be free from clay, organic matter, loam, volcanic tuff, and other deleterious substances.

B. GRADATIONAL REQUIREMENTS

The mineral aggregate shall consist of such sizes that the percentage composition by dry weight as determined by laboratory sieve (U.S. Series) will conform to the following gradation:

	Percentage Passing	
Sieve Size	**Gravel**	**Sand**
1"	**100**	
3/4"	**90-100**	
No. 4	**0-5**	**100**
No. 50		**0-30**

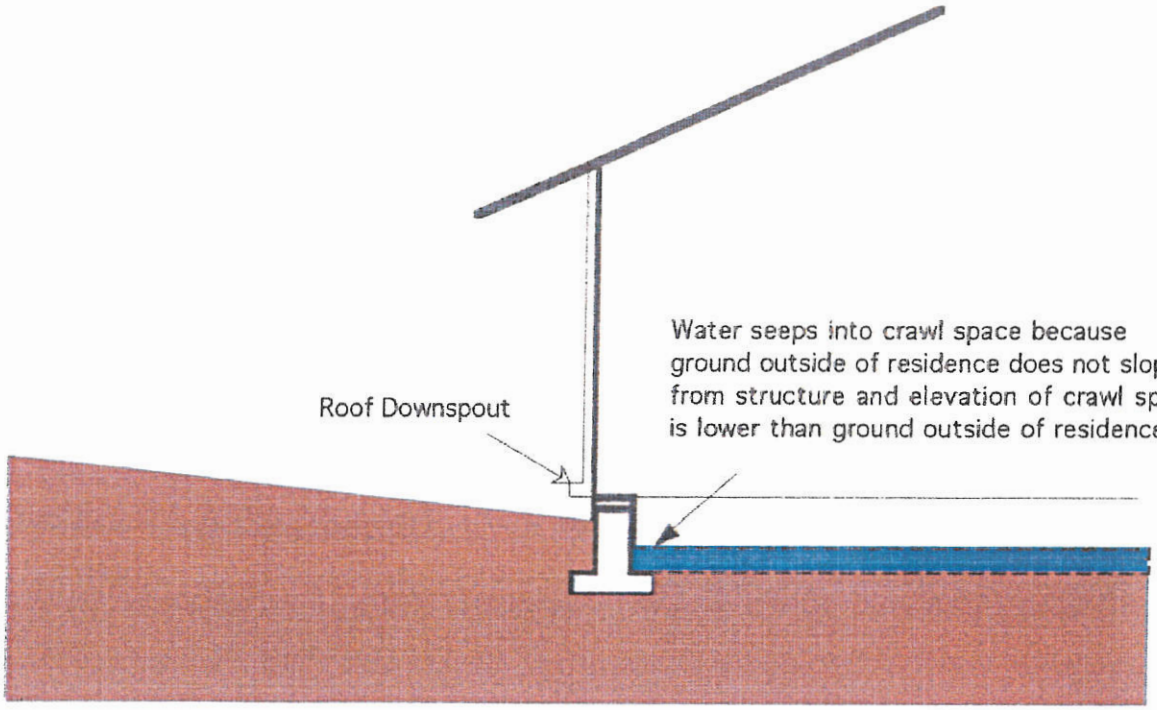
NOTES:

1. The polyethylene membrane should be adequately thick so that it will not be easily damaged during construction. It should be adequately detailed so that there are little or no openings around plumbing at conduit points and near foundations. The membrane should be adequately lapped and sealed at any seams.

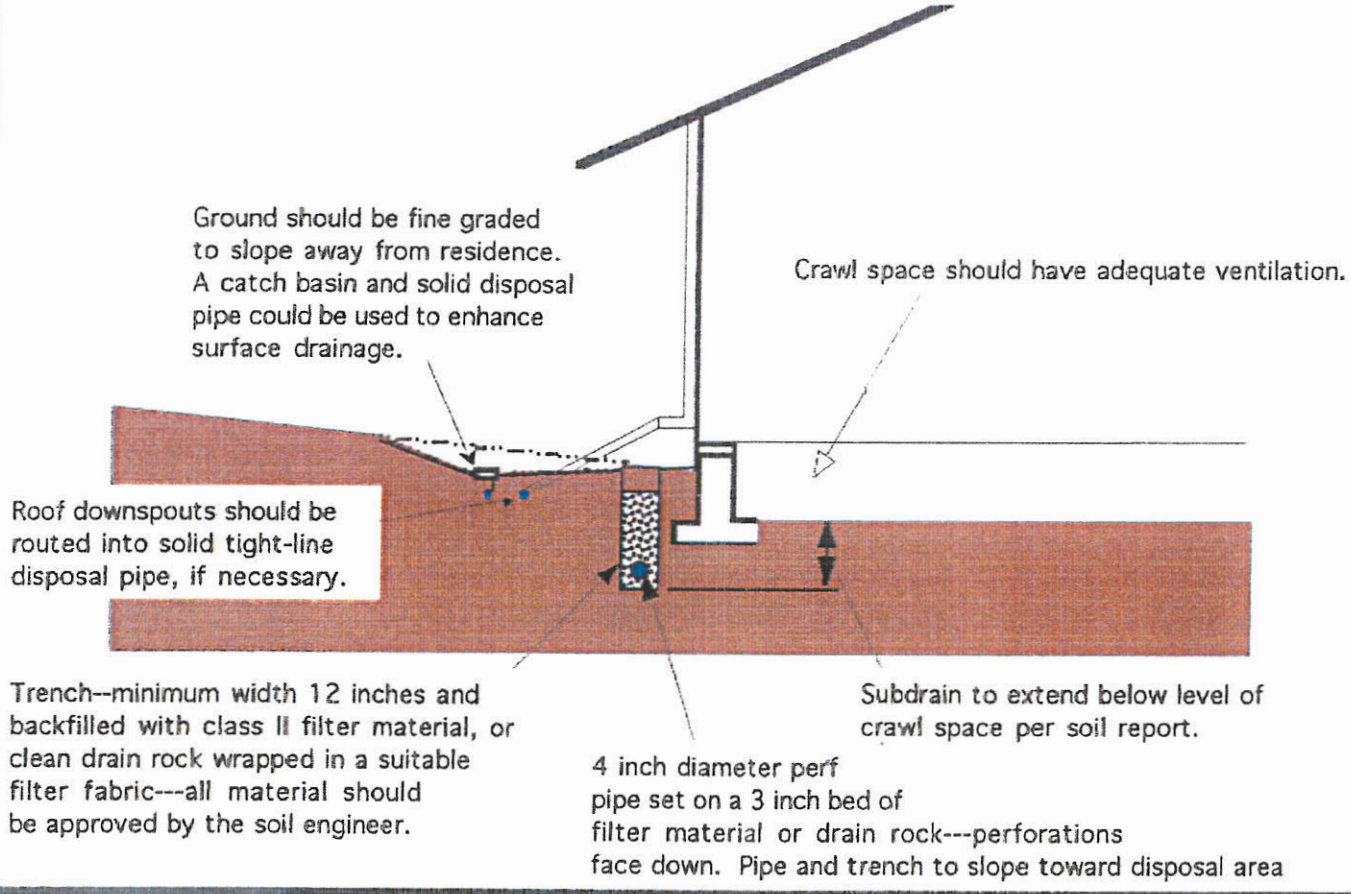
2. The sand covering is not a part of the moisture retardant treatment. It is a normally used optional component that gives some protection to the membrane and also aids in curing the concrete. Pea gravel may be used as a substitute for sand.

3. The final moisture retardant detail is to be determined by the project architect.

EXCESSIVE MOISTURE IN FOUNDATION CRAWL SPACE



RECOMMENDED METHOD TO MITIGATE EXCESSIVE MOISTURE



Job No. 18-4751	MICHELUCCI & ASSOCIATES	Figure 11