

- APPLICANT INSTRUCTIONS:**
1. MEASURE ENTIRE FRONT YARD AREA. SUBTRACT HARDSCAPE AREAS TO GET THE TOTAL SQUARE FEET OF PLANTED AND IRRIGATED AREA. ENTER THIS NUMBER IN THE PLANT WATER USE TABLE ON THIS SHEET.
 2. IF NEEDED USE A RED PEN TO ADJUST THE LAYOUT OF DRIVEWAY, PATHS AND PLANTING AREAS TO FIT YOUR YARD.
 3. ADJUST ORIENTATION OF NORTH ARROW TO SITE CONDITION.
 4. ADD ANY EXISTING TREES IN RED ON THE PLAN. ADJUST TREE LOCATIONS IF NEEDED TO FIT YOUR SITE.
 5. FILL IN PLANT WATER USE TABLE.
 6. INSURE LESS THAN 25% OF PLANTED AREA IS MEDIUM WATER USE PLANTINGS.
 7. IN THE LEGEND, CIRCLE THE HARDSCAPE MATERIALS YOU WILL BE USING AND ON DETAIL SHEETS L3.0, L3.1 & L3.2.
 8. INDICATE ANY SUBSTITUTIONS TO THE PLANTINGS BY CROSSING OUT THE LISTED PLANTS AND WRITING THE SUBSTITUTION BELOW IN RED INK. MAKE SURE THE PLANTS USED HAVE MATCHING WATER USE AND ARE ROUGHLY THE SAME SIZE (SEE SONOMA-MARIN SAVING WATER PARTNERSHIP <http://www.savingwaterpartnership.org> FOR SUBSTITUTIONS).
 9. MOVE TO THE IRRIGATION PLAN AND FILL IN THE AREAS INDICATED ON THAT SHEET.
- NOTE:**
1. PLANTING DESIGN FOR FULL COVER WITHIN 3 YEARS.
 2. THE GARDEN IS DESIGNED TO CAPTURE AND INFILTRATE SOME STORM WATER ON SITE. WHEN THE FLOW IS DIRECTED TO A SWALE OR RAIN GARDEN, IT NEEDS AN OVERFLOW OUTLET THAT WON'T ERODE. OPTIONS ARE PROVIDED ON THE DETAIL SHEETS. SPLASHBLOCKS AND OUTLETS IN PLANTING BEDS ARE MEANT TO SPREAD THE FLOW TO SHEETFLOW OVER PLANTING AREAS AND NO OVERFLOW DEVICE IS NEEDED.
 3. REVIEW IRRIGATION SHEETS AND INSTALL SLEEVES UNDER PAVING SURFACES IN THEIR CORRECT LOCATION.

PLANT WATER USE TABLE			
WATER USE	PLAN SF (%)	PERMIT SF (FILL IN)	PERMIT % (FILL IN)
LOW	857 (79%)		
MED	229 (21%)		
TOTAL	1,086 (100%)		

MOPTIONAL ATERIALS LEGEND

VEHICULAR PAVING

- CONCRETE

UNITS

PLAN QUANTITY

PERMIT QUANTITY (FILL IN)

450

PEDESTRIAN PAVING

- AGGREGATE PAVING, CHOOSE FROM DETAILS 1-5 ON SHEET L3.0

UNITS

PLAN QUANTITY

PERMIT QUANTITY (FILL IN)

332

- MULCH

SEE DETAIL 5 ON SHEET L3.2

UNITS

PLAN QUANTITY

PERMIT QUANTITY (FILL IN)

STORM WATER ELEMENTS (OPTIONAL)

- SWALE/CASCADE: COBBLE & TRINITY GRAVEL WITH PLANTINGS

SEE DETAILS #8 & 9 ON SHEET L3.1

UNITS

PLAN QUANTITY

PERMIT QUANTITY (FILL IN)

43

- RAIN GARDEN: 3/8" GRAVEL MULCH OR PEA GRAVEL, SEE DETAIL 3 ON SHEET L3.1

UNITS

PLAN QUANTITY

PERMIT QUANTITY (FILL IN)

40

- STORM DRAINAGE ACROSS/UNDER PATH, SEE DETAIL 5-7 ON SHEET L3.1

UNITS

PLAN QUANTITY

PERMIT QUANTITY (FILL IN)

1

- STORM DRAIN PIPE

SEE DETAIL 2 ON SHEET L3.1

UNITS

PLAN QUANTITY

PERMIT QUANTITY (FILL IN)

12

*SEE SHEETS L3.0-3.2 FOR MATERIALS OPTIONS

PLANTING LEGEND

AREA

BOTANICAL NAME

SIZE

SPACING

PLAN QUANTITY

PERMIT QUANTITY (FILL IN)

PLANTING LOW WATER USE

LARGE TREE

QUERCUS TOMENTELLA (ISLAND OAK)

15G

20'-50' O.C.

1

MEDIUM TREE

NYSSA SYLVATICA (TUPELO)

15G

20'-50' O.C.

2

GROUNDCOVER

- SATURAJA DOUGLASII (YERBA BUENA)

4"

18" O.C.

18

GRASSES/SEDGES/RUSHES

- FESTUCA CALIFORNICA, SEED WILDFLOWERS: POPPIES, BABY BLUE EYES, COLLINSIA

2"

30" O.C.

120

- FESTUCA IDAHOENSIS 'STONY CREEK' (IDAHO FESCUE)

4"

18" O.C.

9

- CAREX TUMULICOLA (FOOTHILL SEDGE)

4"

2' O.C.

24

PERENNIALS 0-2' SUN

- EPILOBIUM SEPTENTRIONALE 'WAYNE'S SILVER' (CALIFORNIA FUCHSIA)

4"

3' O.C.

11

PERENNIALS 2-4' SUN

- ACHILLEA MILLEFOLIUM (YARROW) 'CALISTOGA' OR 'A. FILIPENDULA'

4"

3' O.C.

9

- ACHILLEA TOMENTOSA (WOOLY YARROW)

4"

3' O.C.

4

- ASCLEPIAS SPECIOSA (SHOWY MILKWEED)

4"

4' O.C.

3

SHRUBS 1-3' SUN

- ARCTOSTAPHYLOS 'JOHN DOURLEY' (MANZANITA)

1G

4' O.C.

5

- MONARDELLA VILLOSA

4"

3' O.C.

8

SHRUBS 3-6' SUN

- CEANOTHUS 'CONCHA' (CALIFORNIA LILAC)

1G

6' O.C.

3

- SALVIA 'HOT LIPS' (HOT LIPS SAGE)

1G

4' O.C.

4

VINE PLANTING

- ARISTOLOCHIA CALIFORNICA (CALIFORNIA PIPEVINE)

1G

1

PLANTING MEDIUM WATER USE

- RED FESCUE (NATIVE)

2"

18" O.C.

142 SF

- SOLIDAGO CANADENSIS (CANADA GOLDENROD)

4"

18" O.C.

3

- JUNCUS EFFUSUS 'CHARMAN'S JAPAN' (CHARMAN'S SACRED JAPANESE RUSH)

4"

3' O.C.

10

- ASTER CHILENSIS 'POINT SAINT GEORGE' (DWARF CALIFORNIA ASTER)

4"

3' O.C.

3

*SEE MASTER PLANT LIST FOR PLANT SUBSTITUTIONS AND SHADE ALTERNATES, AVAILABLE FROM SONOMA-MARIN SAVING WATER PARTNERSHIP <http://www.savingwaterpartnership.org>.

PLANTING NOTES:

1. REFER TO PLANTING DETAILS ON SHEET L3.2.

BY USING THESE PLANS, I AGREE TO DEFEND, INDEMNIFY, AND HOLD HARMLESS THE SONOMA-MARIN SAVING WATER PARTNERSHIP, ITS MEMBERS (SONOMA COUNTY WATER AGENCY, CITY OF SAN RAFAEL, MARIN COUNTY WATER AGENCY, CITY OF PETALUMA, CITY OF COFAL, CITY OF SONOMA, VALLEY OF THE MOON WATER DISTRICT) AND TOWN OF WINDSOR AND THEIR DIRECTORS, OFFICERS, AGENTS, EMPLOYEES AND LANDSCAPE DESIGN CONSULTANTS AGAINST ANY AND ALL LOSS, LIABILITY, EXPENSE, CLAIMS, SUITS AND DAMAGES, INCLUDING ATTORNEY'S FEES, ARISING OUT OF OR RESULTING FROM THE USE OF THE LANDSCAPE PLAN. I UNDERSTAND THAT IT IS MY RESPONSIBILITY AS THE PROJECT OWNER TO ENSURE THAT PLAN ELEMENTS ARE IMPLEMENTED SAFELY AND ACCORDING TO APPLICABLE STATUTES, RULES, REGULATIONS, ORDINANCES AND/OR AGREEMENTS.

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SITE ADDRESS: _____

SONOMA-MARIN SAVING WATER PARTNERSHIP

SAVING WATER

DIHSBNE

SHEET TITLE:

LAYOUT & PLANTING PLAN

NATIVE ADAPTIVE A

DATE

PERMIT PLAN

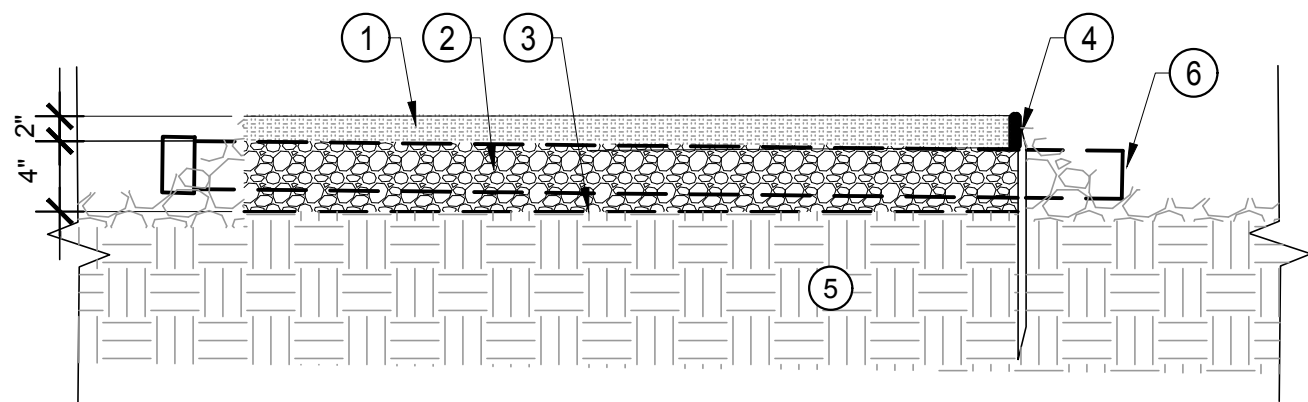
APRIL 2, 2019

L-1.0

SHEET OF

- 1 2" THICK OF 3/8" OR SMALLER AGGREGATE (NO FINES)
- 2 4" CLASS II PERMEABLE AGGREGATE BASE ROCK, COMPACT TO 95%.
- 3 FILTER FABRIC (OPTIONAL)
- 4 EDGING AND STAKE (OPTIONAL)
- 5 UNDISTURBED SUBGRADE OR COMPACTED TO 90%
- 6 RECTANGULAR DRAINAGE SLEEVE THRU PATHWAY BASE (OPTIONAL) SEE DETAIL #11 THIS PAGE

NOTE: FOR CLAY SOILS, HOLD 10' AWAY FROM FOUNDATION, AND PROVIDE SUBDRAINAGE. REVIEW WITH GEOTECH. & CIVIL ENGINEER.

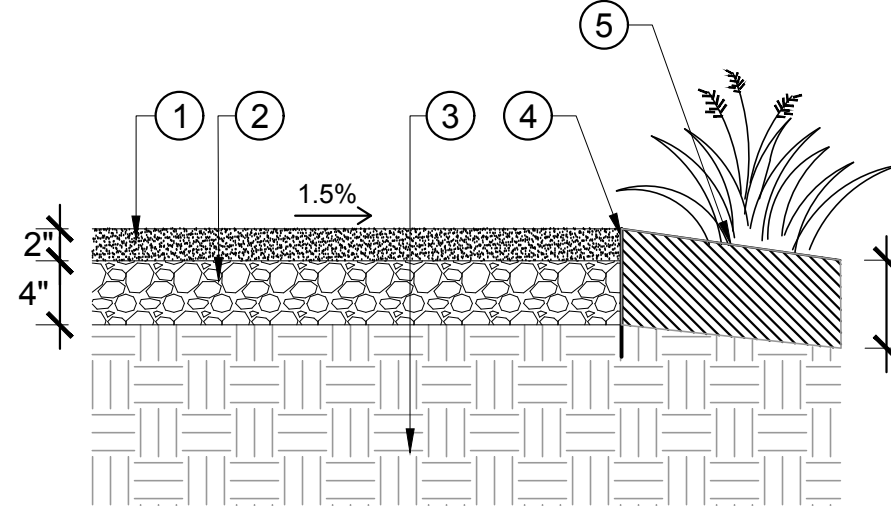


1 PERMEABLE AGGREGATE PAVING - PATH OR PATIO

SCALE: 1"=1'-0"

- 1 STABILIZED 3/8-" AGGREGATE; TERRAPAVE, ECO-PAVE OR EQUAL STABILIZING PRODUCT APPLIED PER MANUFACTURER SPECIFICATION. SLOPE TO PLANTINGS @ 1.5%.
- 2 CLASS II RECYCLED AGGREGATE BASE, COMPACT TO 95%
- 3 SUBGRADE; UNDISTURBED OR COMPACTED TO 95%
- 4 METAL EDGE, 1/8" X 4", ALUMINUM, STEEL OR ALTERNATE
- 5 AMENDED SOIL OF ADJACENT PLANTING; SLOPE AWAY FROM PATH 2% MIN.

NOTES:
1. THIS PAVING IS IMPERVIOUS AND SHOULD HAVE POSITIVE DRAINAGE AWAY FROM BUILDING FOUNDATIONS.
2. FOR DRAINAGE THRU PATH SEE CURB O LET DETAIL #11 THIS PAGE AND SECTION VIEW IN DETAIL #1

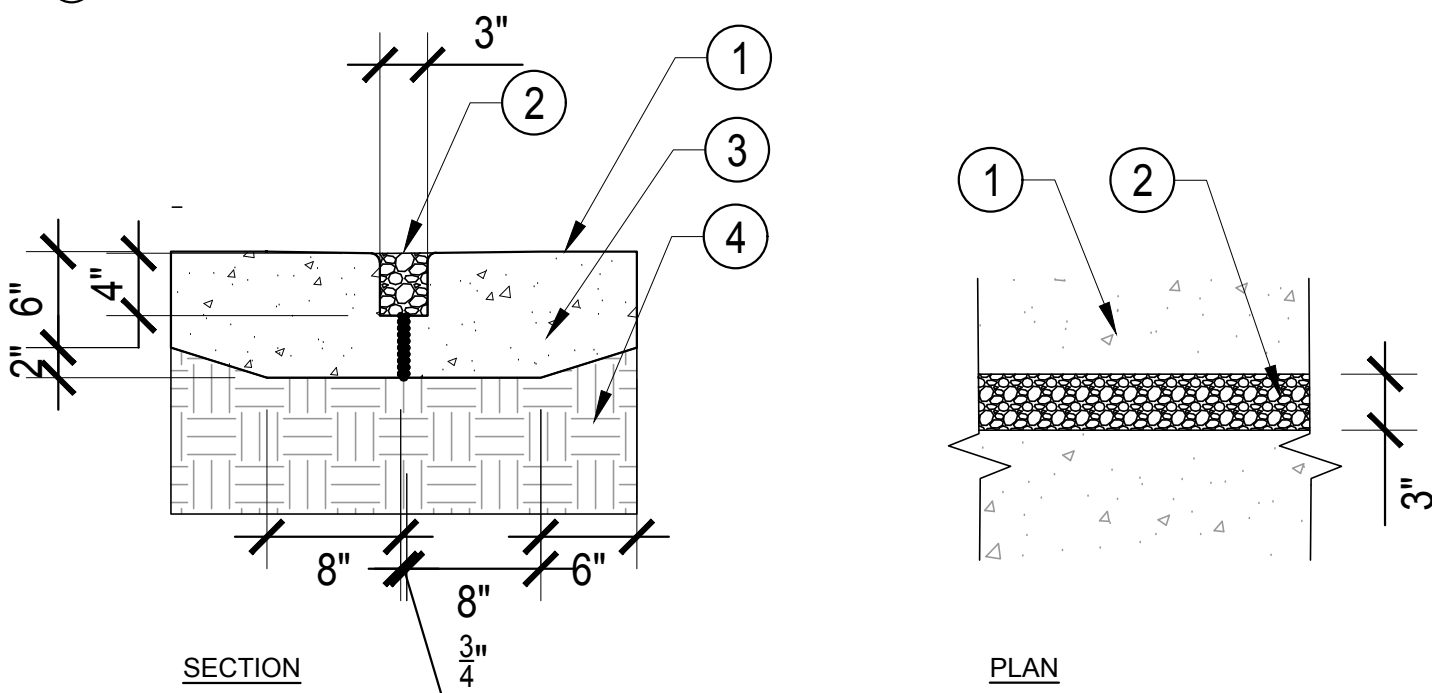


5 STABILIZED AGGREGATE - PATH OR PATIO

SCALE: 1"=1'-0"

- 1 CONCRETE DRIVEWAY - DESIGN BY OTHERS. SEE NOTE 1.
- 2 GRAVEL DRAINAGE SEAM
- 3 EXPANSION JOINT
- 4 COMPACTED SUBGRADE - DEPTH DETERMINED BY GEOTECH ENG.

NOTES:
1. DRIVEWAY ENGINEERING BY OTHERS TO INSURE PROPER DESIGN FOR LOAD AND SOILS.
2. EXPANSION AND CONTRACTION CONTROL JOINTS AND REINFORCEMENT RECOMMENDED.

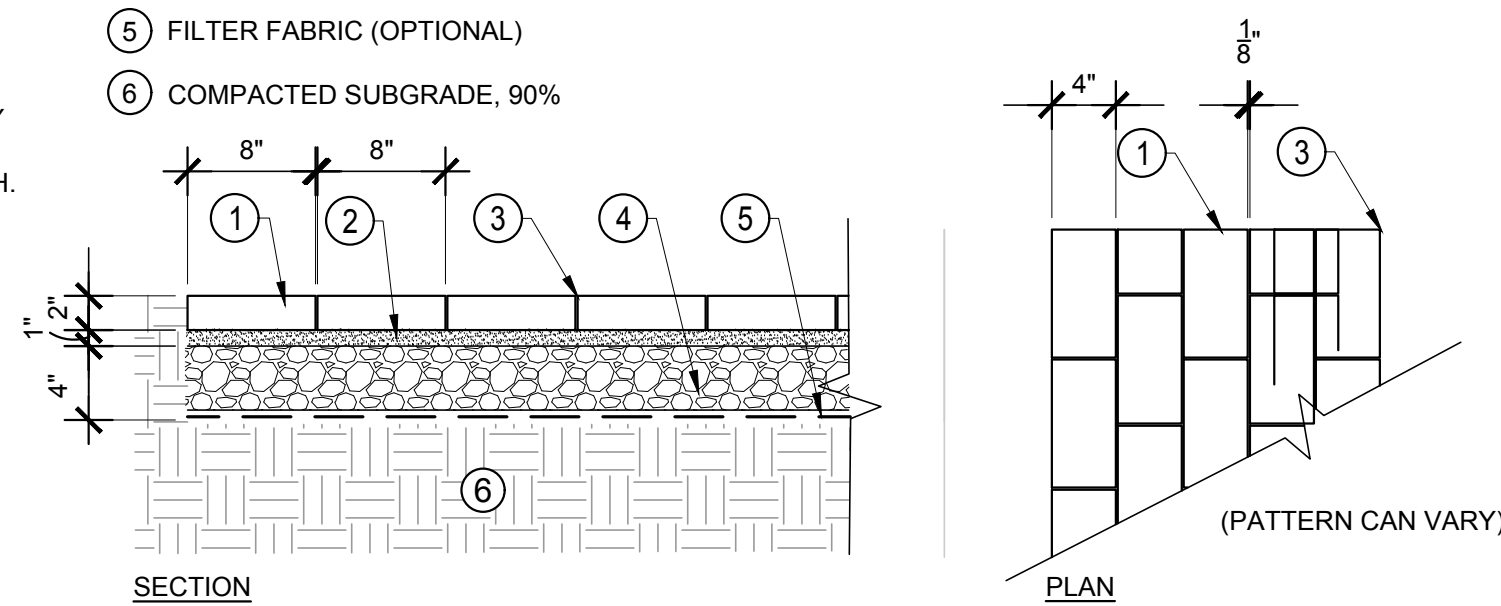


9 CONCRETE - VEHICLE - GRAVEL DRAINAGE SEAMS

SCALE: 1"=1'-0"

- 1 CONCRETE OR BRICK PAVERS (L" x W" x THK" VARIES). PAVERS CAN BE PERVIOUS OR PERMEABLE. SELECT PAVER PATTERN.
- 2 1" SAND SETTING BED PER MANUFACTURER, ASTM #8
- 3 JOINT FILL PER MANUFACTURER, ASTM #8
- 4 CLASS 2 PERMEABLE AGGREGATE BASE ROCK
- 5 FILTER FABRIC (OPTIONAL)
- 6 COMPACTED SUBGRADE, 90%

NOTE:
1. FOR CLAY SOILS, HOLD 10' AWAY FROM FOUNDATION, AND PROVIDE SUBDRAINAGE. REVIEW WITH GEOTECH. & CIVIL ENGINEER.
2. FOR DRAINAGE THRU PATH SEE CURB O LET DETAIL #11 THIS PAGE AND SECTION VIEW IN DETAIL #1

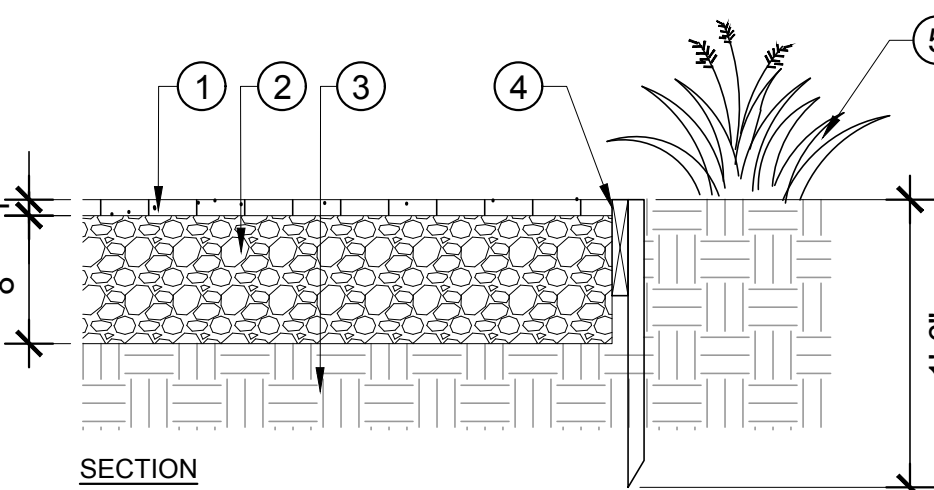


2 PERMEABLE PAVERS - PATH OR PATIO

SCALE: 1"=1'-0"

- 1 GRAVEL PAVE XL PAVING SYSTEM. OR APPROVED EQUAL. AGGREGATE FILL SELECTED BY OWNER. INSTALL PER MANUFACTURER'S INSTRUCTIONS.
- 2 PERMEABLE CLASS 2 AGGREGATE BASE ROCK. COMPACT TO 95%
- 3 SUBGRADE UNDISTURBED OR COMPACTED TO 90%
- 4 2X6 RDW HEADER, 18" STAKES @ 6' O.C., SCAB AT OVERLAPPING ENDS AND STAKE AT 3' O.C. OPTIONAL CONCRETE CURB.
- 5 ADJACENT PLANTING AREA

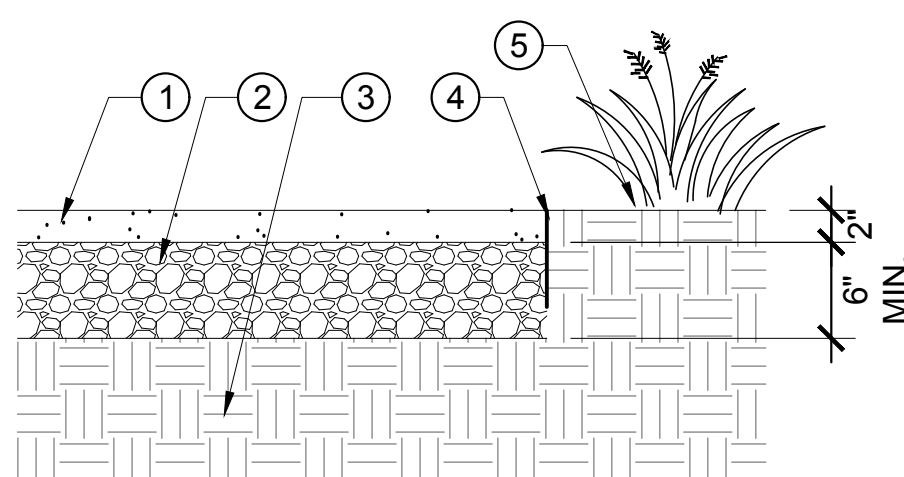
NOTE: CONSULT WITH GEOTECHNICAL & CIVIL ENGINEER FOR AGGREGATE DEPTH, PERFORMANCE IN CLAY SOILS AND NEED FOR SUBDRAINS.



6 GRAVELPAVE PAVING - VEHICLE

SCALE: 1"=1'-0"

- 1 STABILIZED 3/8-" AGGREGATE, STABILIZER: ECO-PAVE OR EQUAL. CONTROL RUNNING AND CROSS SLOPES FOR ACCESSIBILITY.
- 2 RECYCLED CLASS II AGGREGATE BASE ROCK, COMPACT TO 95%. CONFIRM AGGREGATE DEPTH W/ GEOTECH. ENG.
- 3 SUBGRADE UNDISTURBED OR COMPACTED TO 95%. CONFIRM SUBGRADE TREATMENT W/ GEOTECH. ENG.
- 4 PAVEMENT EDGE, 1/4" X 6" STEEL OR ALUMINUM, OR CONCRETE CURB
- 5 ADJACENT PLANTING AREA, SLOPE AWAY FROM PAVING

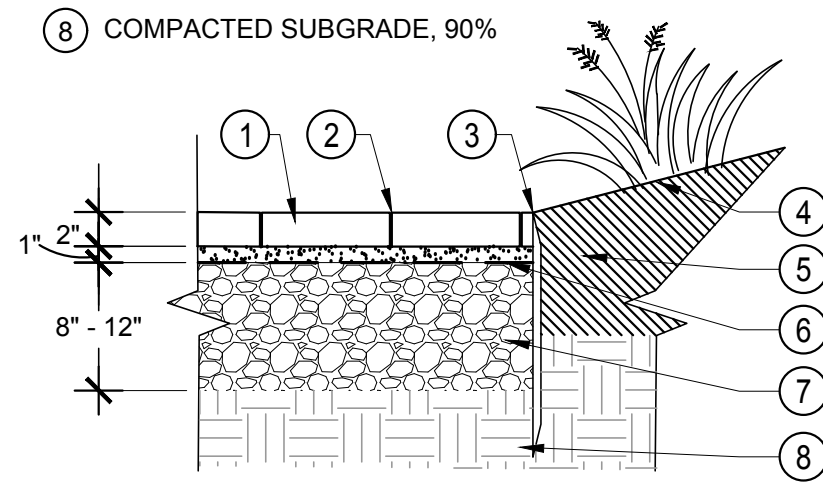


10 STABILIZED AGGREGATE - VEHICLE

SCALE: 1"=1'-0"

- 1 PERVIOUS PAVES OR PERVIOUS AGGREGATE
- 2 HANDTIGHT JOINTS, SAND SWEEP
- 3 METAL EDGING
- 4 AMENDED PLANTING BED; FINISH GRADE CAN SLOPE TOWARD PAVING TO INFILTRATE
- 5 1" SAND SETTING BED
- 6 FILTER FABRIC
- 7 CLASS II PERMEABLE AGGREGATE BASE ROCK, OR LARGER CRUSHED DRAIN ROCK
- 8 COMPACTED SUBGRADE, 90%

NOTES:
1. FOR CLAY SOILS, HOLD 10' AWAY FROM FOUNDATION, AND PROVIDE SUBDRAINAGE. REVIEW WITH GEOTECH & CIVIL ENGINEER.
2. FOR DRAINAGE THRU PATH SEE CURB O LET DETAIL #11 THIS PAGE AND SECTION VIEW IN DETAIL #1

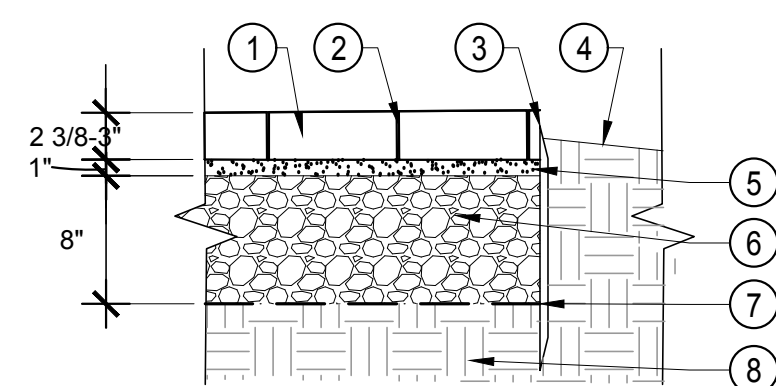


3 PERMEABLE INFILTRATION - PEDESTRIAN

SCALE: 1"=1'-0"

- 1 CONCRETE UNIT PAVES: SELECT PERVIOUS PAVERS OR PERMEABLE PAVERS. INSTALL PER MANUFACTURER'S INSTRUCTIONS.
- 2 JOINTS PER MANUFACTURER'S INSTRUCTIONS.
- 3 METAL EDGING. OPTIONAL CONCRETE CURB.
- 4 SHOULDER, FINISH GRADE
- 5 SAND SETTING BED PER MANUFACTURER'S INSTRUCTIONS
- 6 PERMEABLE CLASS II AGGREGATE BASE ROCK, COMPACTED TO 95%
- 7 FILTER FABRIC
- 8 COMPACTED SUBGRADE TO 90%

NOTE: CONSULT WITH GEOTECHNICAL & CIVIL ENGINEER FOR AGGREGATE BASE DEPTH, PERFORMANCE IN CLAY SOILS AND NEED FOR SUBDRAINS

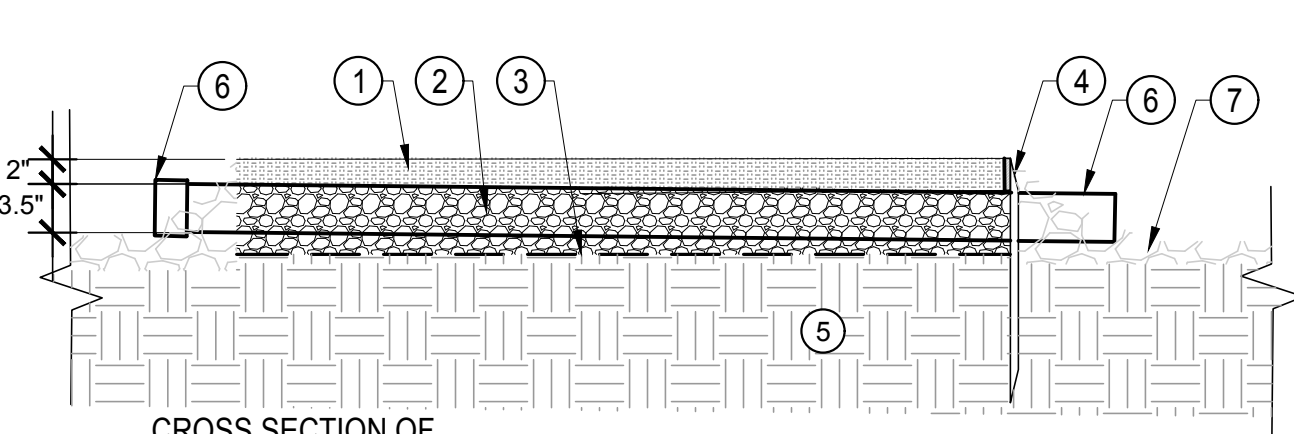


7 PERVIOUS OR PERMEABLE UNIT PAVES - VEHICLE

SCALE: 1"=1'-0"

- 1 PATHWAY PAVING MATERIAL, PROVIDE 2" SURFACING MATERIAL OVER CURB O LET SLEEVE.
- 2 AGGREGATE BASE ROCK MATERIAL PROVIDE MIN. .5" UNDER CURB O LET SLEEVE.
- 3 FILTER FABRIC (OPTIONAL)
- 4 EDGING AND STAKE (OPTIONAL)
- 5 UNDISTURBED SUBGRADE OR COMPACTED TO 90%
- 6 CURB O LET RECTANGULAR DRAINAGE SLEEVE THRU PATHWAY BASE OR EQUAL. SLOPE SLEEVE 1-2%.
- 7 PROTECT INLET AND OUTLET OF DRAINAGE SLEEVE WITH 1.5-6" RIVER COBBLE.

NOTE: MAINTAIN CHIP/BARK MULCH AWAY FROM RAINWATER SYSTEMS BY USING PEA GRAVEL AND COBBLE.

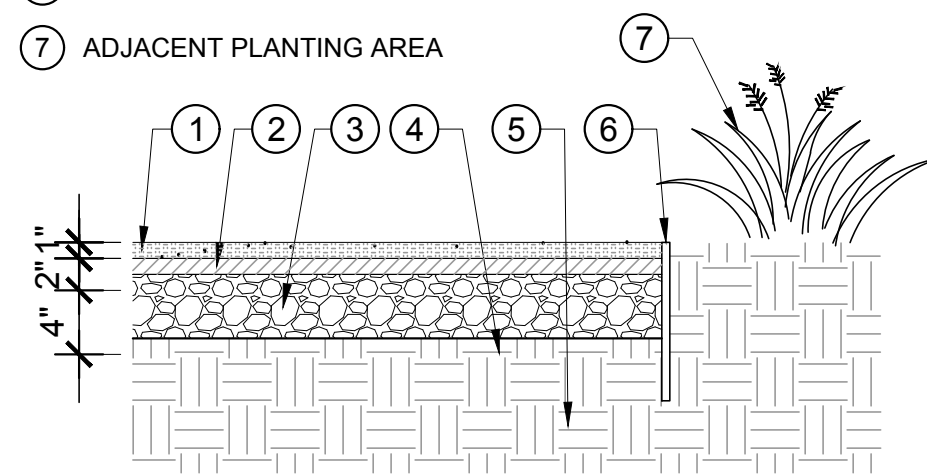


11 RECTANGULAR DRAINAGE SLEEVE IN PATHS

SCALE: NOT TO SCALE

- 1 1" OF 3/8" OR SMALLER PATHWAY AGGREGATE
- 2 1" OF DECOMPOSED GRANITE W/ STABILIZER PRODUCT
- 3 4" RECYCLED CLASS II AGGREGATE BASE ROCK. COMPACT TO 95%
- 4 FILTER FABRIC (OPTIONAL)
- 5 SUBGRADE UNDISTURBED OR COMPACTED TO 90%
- 6 1/8" METAL EDGER, BLACK
- 7 ADJACENT PLANTING AREA

NOTES:
1. THIS PAVING IS SEMI-PERVIOUS AND SHOULD HAVE POSITIVE DRAINAGE ON SURFACE OF BASE ROCK AWAY FROM BUILDING FOUNDATIONS.
2. FOR DRAINAGE THRU PATH SEE CURB O LET DETAIL #11 THIS PAGE AND SECTION VIEW IN DETAIL #1

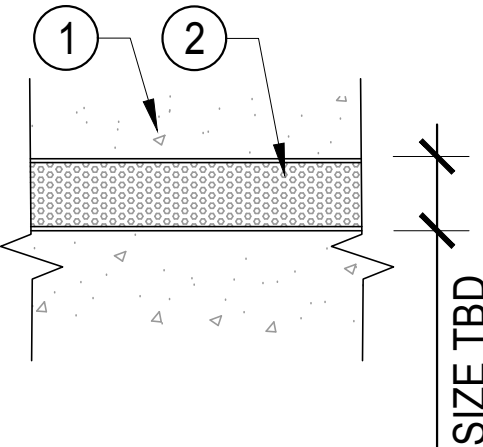
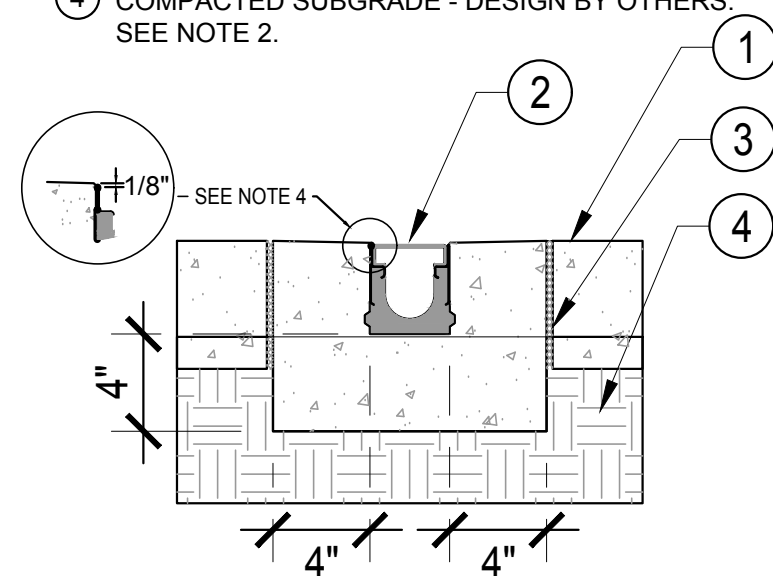


4 AGGREGATE PAVING - PEDESTRIAN

SCALE: 1"=1'-0"

- 1 CONCRETE DRIVEWAY - DESIGN BY OTHERS. SEE NOTE 2 AND GENERAL NOTES THIS PAGE.
- 2 TRENCH DRAIN, SIZE TBD BY OTHERS. SEE NOTE 1.
- 3 EXPANSION JOINT REQUIRED. SEE NOTE 2.
- 4 COMPACTED SUBGRADE - DESIGN BY OTHERS. SEE NOTE 2.

NOTES:
1. TRENCH DRAIN: K50 BY ACO POLYMER PRODUCTS, INC. OR EQUAL. REFER TO MANUFACTURER'S LATEST INSTALLATION INSTRUCTIONS FOR DETAILS.
2. DRIVEWAY ENGINEERING BY OTHERS. INSURE PROPER DESIGN FOR LOAD AND SOILS. PLACEMENT OF EXPANSION JOINTS AND REINFORCEMENT.



8 CONCRETE - VEHICLE - TRENCH DRAIN

SCALE: 1"=1'-0"

GENERAL NOTES :

1. DESIGN STRATEGY: THESE DETAILS ARE PROVIDED TO CREATE OPTIONS FOR PERMEABLE PAVING, AND PAVING STRATEGIES THAT PROMOTE STORMWATER INFILTRATION IN LANDSCAPE SPACES. THESE STRATEGIES HELP CLEAN WATER, INFILTRATE RUN OFF INTO GROUNDWATER, AND PROVIDE MORE SOIL MOISTURE AVAILABILITY FOR LANDSCAPE PLANTINGS.
2. THESE DETAILS SHOULD BE EVALUATED BY THE SITE ENGINEER AND ADJUSTED TO SITE CONDITIONS.
3. PAVING DEPTH, DEPTH OF BASE GRAVEL, SUB-BASE PREPARATION AND CONCRETE REINFORCEMENT SHOULD ALL BE EVALUATED AND ADJUSTED AS NEEDED BY A GEOTECHNICAL ENGINEER.
4. SOIL TYPE AFFECTS THE PERFORMANCE OF THESE DETAILS. CLAY SOILS DO NOT INFILTRATE WELL, SO THERE IS A NEED TO EVALUATE WHETHER THE PERMEABLE/PERVIOUS PAVING DETAILS ARE APPROPRIATE FOR SPECIFIC SITES AND ADJUST THEM AS APPROPRIATE TO PROTECT BUILDINGS AND OTHER IMPROVEMENTS.
5. ACCESSIBLE PAVING IS SMOOTH, FIRM, AND HAS A CROSS SLOPE NOT TO EXCEED 2%. RUNNING SLOPE SHOULD BE 5% OR LESS UNLESS PAVING RAMP WITH HANDRAILS. SEE TITLE 24 OF CALIFORNIA CODE FOR ACCESSIBILITY REQUIREMENTS AND STANDARDS

BY USING THESE PLANS, I AGREE TO RELEASE, INDEMNIFY AND HOLD HARMLESS THE SONOMA-MARIN SAVING WATER PARTNERSHIP, ITS MEMBERS (SONOMA COUNTY WATER AGENCY, CITY OF SANTA ROSA, MARIN MUNICIPAL WATER DISTRICT, NORTH BAY WATER DISTRICT, CITY OF SONOMA, CITY OF PETALUMA, CITY OF TIBURON, CITY OF SONOMA, VALLEY OF THE MOON WATER DISTRICT AND TOWN OF WINDSOR) AND THEIR DIRECTORS, OFFICERS, AGENTS, EMPLOYEES AND LANDSCAPE DESIGN CONSULTANTS AGAINST ANY AND ALL LOSS, LIABILITY, EXPENSE, CLAIMS, SUITS AND DAMAGES, INCLUDING ATTORNEY'S FEES, ARISING OUT OF OR RESULTING FROM THE USE OF THIS LANDSCAPE PLAN, UNDERSTANDING THAT IT IS MY RESPONSIBILITY AS THE PROJECT OWNER TO ENSURE THAT ALL ELEMENTS ARE IMPLEMENTED SAFELY AND ACCORDING TO APPLICABLE STATUTES, RULES, REGULATIONS, ORDINANCES AND/OR CODES.

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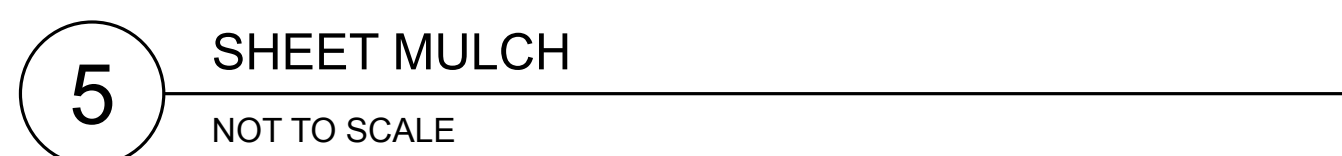
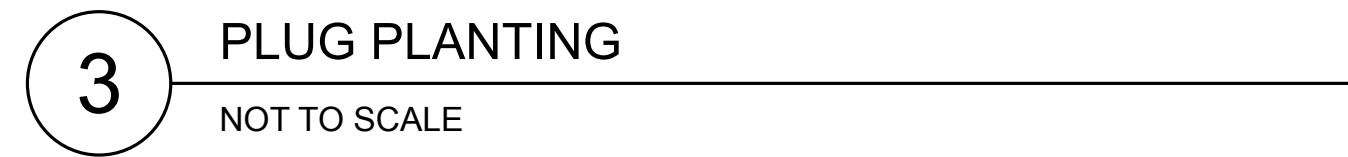
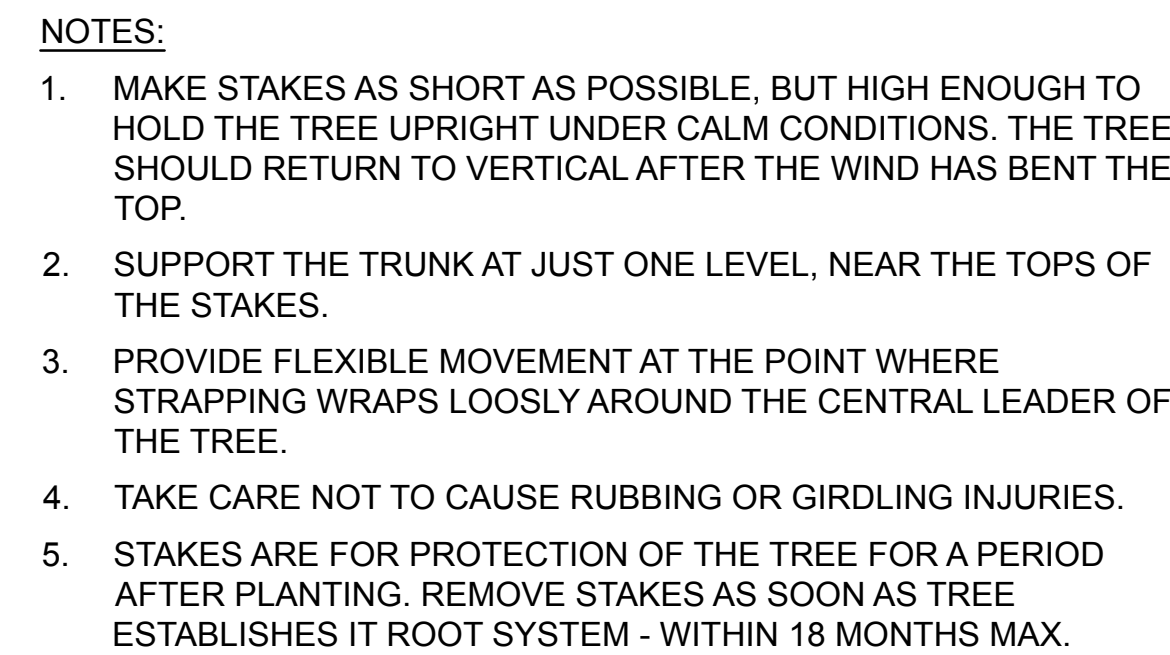
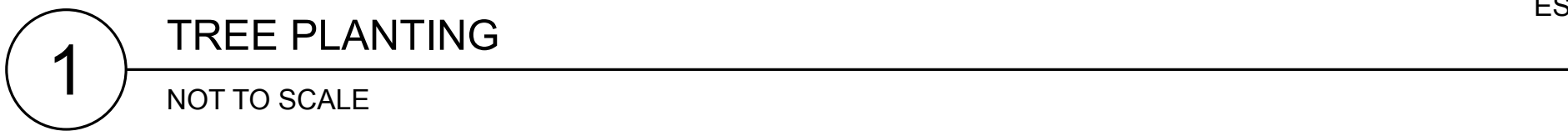
SONOMA-MARIN SAVING WATER PARTNERSHIP

SHEET TITLE:
L.I.D.
PAVING
DETAILS

DATE
PERMIT PLAN
MAY 18, 2018

L-3.0

SHEET
OF



CONTAINER SIZE	PLANT PIT DIAMETER	WATERING BERM HEIGHT	WATERING BERM DIAMETER
1 GAL CAN	18" MIN	3" MIN	18" MIN
5 GAL CAN	30" MIN	4" MIN	30" MIN
15 GAL CAN	3' MIN	5" MIN	3' MIN
24" BOX	5' MIN	6" MIN	5' MIN

SHEET
OF

APPLICANT INFORMATION:

LANDSCAPE TO LAUNDRY SYSTEM OVERVIEW:
 A LAUNDRY-TO-LANDSCAPE GRAYWATER SYSTEM CAPTURES LIGHTLY USED WATER FROM THE DISCHARGE HOSE OF YOUR WASHING MACHINE AND PUMPS IT OUT TO THE LANDSCAPE THROUGH 1-INCH TUBING. THE SYSTEM DOES NOT ALTER THE EXISTING PLUMBING AND THEREFORE DOES NOT REQUIRE A PERMIT. A THREE-WAY DIVERTER VALVE IS A NECESSARY COMPONENT, ALLOWING YOU TO SEND DISCHARGE WATER BACK TO THE SEWER SYSTEM WHEN NEEDED OR DURING THE RAINY SEASON.

INSTALLATION & DESIGN CONSIDERATIONS:
 LAUNDRY TO LANDSCAPE GRAYWATER SYSTEMS ARE EASY TO INSTALL FOR THE DO-IT-YOURSELF OR A PROFESSIONAL, ESPECIALLY IF THE WASHING MACHINE IS LOCATED ON AN EXTERNAL WALL AND IS IN CLOSE PROXIMITY TO THE LANDSCAPE AREA BEING IRRIGATED. NOTE, THE WASHING MACHINE PUMP WILL PROVIDE SUFFICIENT PRESSURE THROUGH A 1-INCH IRRIGATION LINE FOR 100-FEET ON FLAT GROUND. IF THE SYSTEM IS DESIGNED TO IRRIGATE UPHILL FROM THE WASHING MACHINE, THE DISTANCE SHOULD BE REDUCED TO 30-50 FEET WITH NO MORE THAN A 5% SLOPE. IF THE SYSTEM IS DESIGNED TO IRRIGATE DOWNHILL FROM THE WASHING MACHINE, THE DISTANCE MAY INCREASE TO 150-FEET DEPENDING ON SLOPE.

GRAYWATER REQUIREMENTS TO COMPLY WITH CALIFORNIA PLUMBING CODE ("CPC") STANDARDS:

- o NOTIFY ENFORCING AGENCY
- o BE ABLE TO REDIRECT TO SEWER
- o NO POTABLE WATER CONNECTION
- o CONTAIN GRAYWATER ON SITE
- o DIRECT AND CONTAIN GRAYWATER WITHIN MULCH BASINS (IRRIGATION OR DISPOSAL FIELD) BELOW THE GROUND SURFACE
- o NO PONDING OR RUNOFF
- o OUTLETS COVERED BY AT LEAST 2-INCHES OF MULCH, ROCK, OR A SHIELD (E.G. VALVE BOX LID)
- o MINIMIZE CONTACT WITH HUMANS AND ANIMALS
- o DIVERT WATER TO THE SEWER IF IT CONTAINS DIAPERS, OIL, OTHER CHEMICALS
- o GRAYWATER DIVERTED TO LANDSCAPE SHALL NOT CONTAIN HAZARDOUS CHEMICALS
- o PERMIT EXEMPTION DOES NOT GRANT INSTALLATION THAT VIOLATES OTHER CODE OR LAWS
- o POST OPERATION AND MAINTENANCE MANUAL

CPC Table 1502.4 — LOCATION OF GREY WATER SYSTEM

MINIMUM HORIZONTAL DISTANCE IN CLEAR REQUIRED FROM	SUBSURFACE AND SUBSOIL IRRIGATION FIELD AND MULCH BASIN (feet)
Building structures	2
Property line adjoining private property	1.5
Water supply wells	100
Streams and lakes	100
Sewage pits or cesspools	5
Sewage disposal field	4
Septic tank	5
On-site domestic water service line	0
Pressurized public water main	10

CALCULATIONS SECTION

1. Estimate Daily Graywater Production

Calculation Method (choose one and check box)

☐ California Plumbing Code Estimate (Assign 2 occupants to master bedroom and 1 occupant to each additional bedroom)

Laundry: _____ occupants x 15 gallons/day _____ gal/day

☐ Estimate of graywater produced from winter (Dec-Feb) water use records (reference utility bill)

Laundry: _____ (gallons/load*) x _____ (loads/week) ÷ 7 (days/week) _____ gal/day

*Typical gals/per load: Front loader 15, Top loader 40 **TOTAL** _____ gal/day

2. Determine Minimum Mulch Basin Size

Minimum Mulch Basin Size:

_____ (gal/day) ÷ _____ gal/ft²/day = _____ ft²
 From 1 above Maximum Absorption Capacity (from column 3 in table below)

*Dig mulch basin to a depth of 1 ft to ensure sufficient surge capacity for water leaving the laundry machine.

Design of Six Soil Types	Min SQ. FT. of Irrigation/ Leaching Area Per 100 Gallons of Estimated Graywater Discharge Per Day	Max Absorption Capacity in Gallons Per SQ. FT. of Irrigation/ Leaching Area for an 24-Hour Period
Coarse sand or gravel	30	5.0
Fine Sand	25	4.0
Sandy Loam	40	2.5
Sandy Clay	60	1.7
Clay with considerable sand or gravel	90	1.1
Clay with small amounts of sand or gravel	120	0.8

3. Determining Weekly Water Needs

Weekly Water needs = (0.62 x Area x Eto x Pf) / 4 weeks = _____ *0.62 = (# of gal in 1" of water covering 1 ft²)

- Area = π r² = 3.14 x (canopy radius of existing plant)² OR = (Length x Width) for number of garden beds
- Evapotranspiration rates (Eto) - Choose Eto for hottest month - July = 6.51"/month for Santa Rosa
- Plant factor (Pf) = 0.3 (Low water use), 0.5 (Moderate water use) *check landscape plan for water use of plants in the hydrozone

ADDITIONAL INFORMATION

GRAYWATER IS RECEIVED BEST BY TREES, BUSHES, SHRUBS, SMALL PERENNIALS AND LARGER ANNUALS, BUT IS PROHIBITED ON LAWN, RAISED BEDS, ROOT AND LEAFY VEGETABLES. MODERATE WATER USERS SUCH AS FRUIT TREES ARE ALSO AN IDEAL APPLICATION. GRAYWATER IS SOMEWHAT ALKALINE (HIGH pH) AND NOT RECOMMENDED FOR PLANTS THAT PREFER ACIDIC SOILS (LOW pH) LIKE BLUEBERRIES AND RHODEDENDRONS SOIL TYPE WILL DETERMINE BOTH HOW QUICKLY GRAYWATER IS ABSORBED IN YOUR LANDSCAPE AND THE SIZE OF THE MULCH BASINS NEEDED TO INFILTRATE THE GRAYWATER..

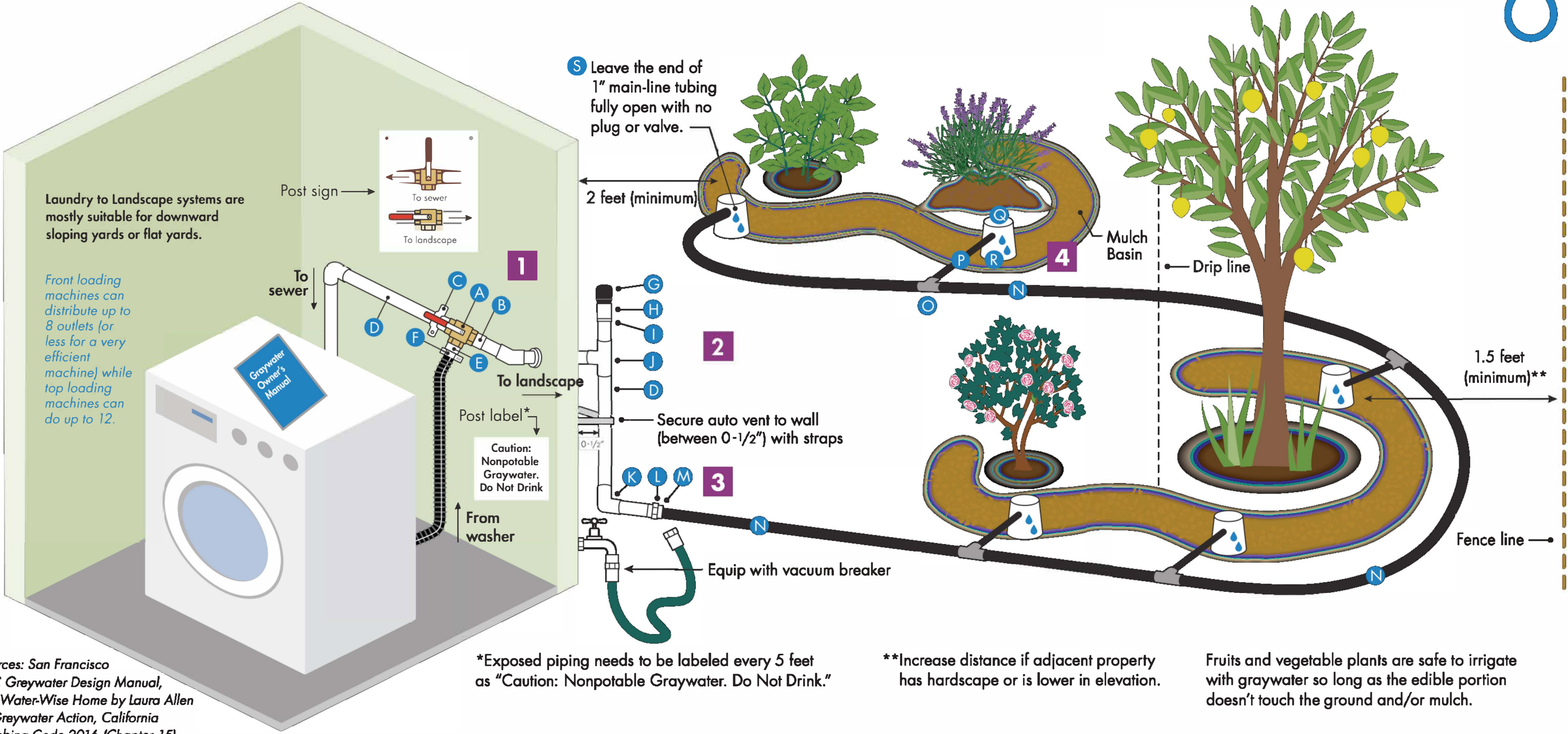
THE KEY TO PROPER IRRIGATION WITH GRAYWATER IS TO KNOW HOW MUCH THE CHOSEN PLANTS NEED GIVEN EVAPOTRANSPIRATION RATES, PLANT WATERING NEEDS, AND EXISTING CANOPY.

RECOMMENDED DETERGENTS:

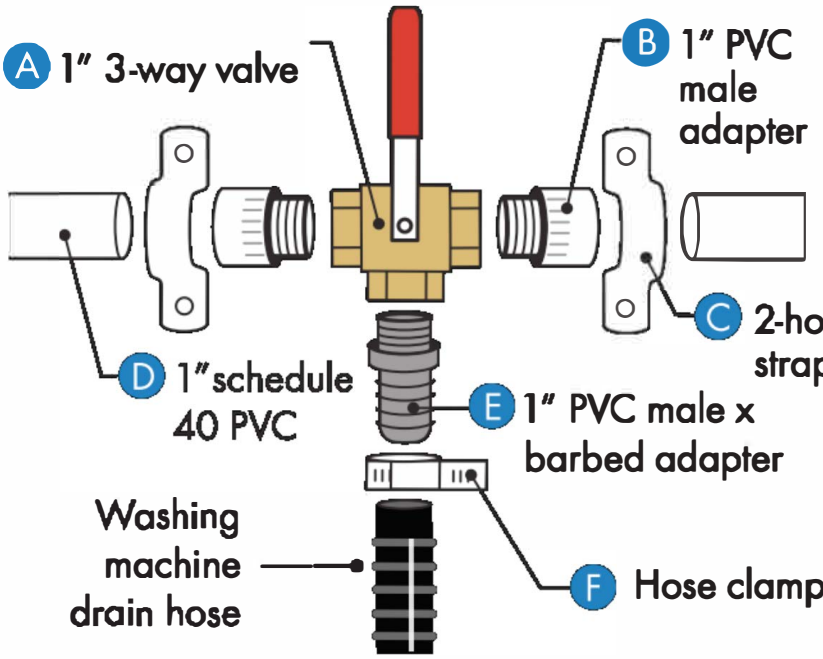
TO ENSURE PLANT SURVIVAL AVOID SOAPS AND DETERGENTS THAT CONTAIN BORON, SODIUM AND CHLORINE COMPOUNDS. THE FOLLOWING LIST OF COMMERCIAL DETERGENTS ARE RECOMMENDED FOR USE WITH LAUNDRY TO LANDSCAPE GRAYWATER SYSTEMS.

- OASIS LAUNDRY
- BIO PAC LAUNDRY LIQUID
- BIOKLEEN LAUNDRY LIQUID
- ECOVER LAUNDRY WASH (SOME SALT)
- LIQUID ECOS LIQUID DETERGENT
- LIFE TREE LAUNDRY LIQUID
- MOUNTAIN GREEN LAUNDRY DETERGENT
- VASKA HERBATERGENT

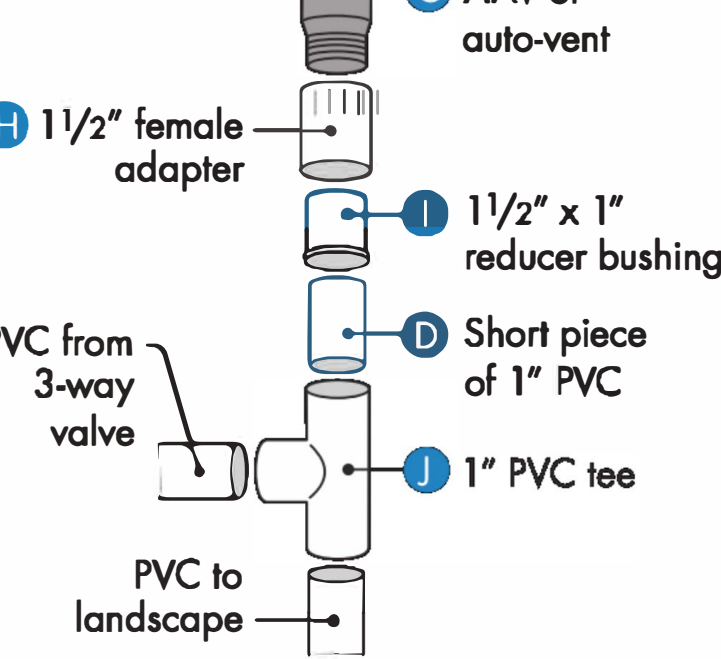
Laundry to Landscape: Graywater System Example



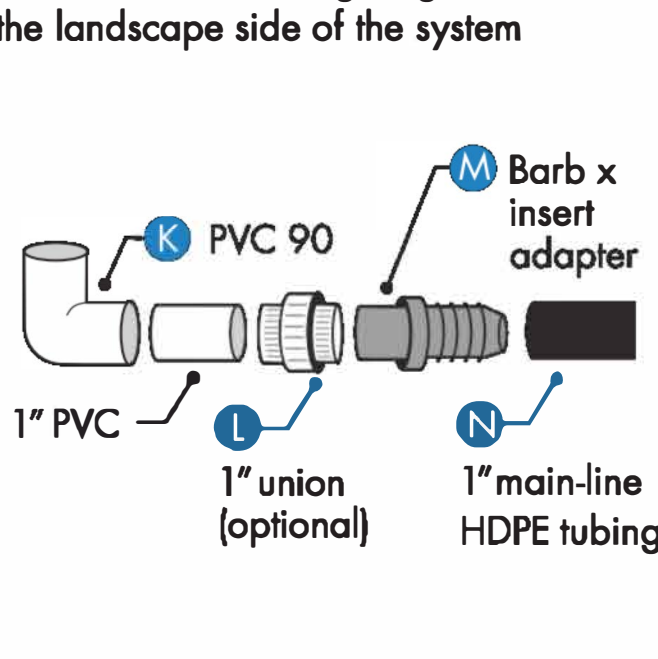
1 Diverter (3-way) Valve



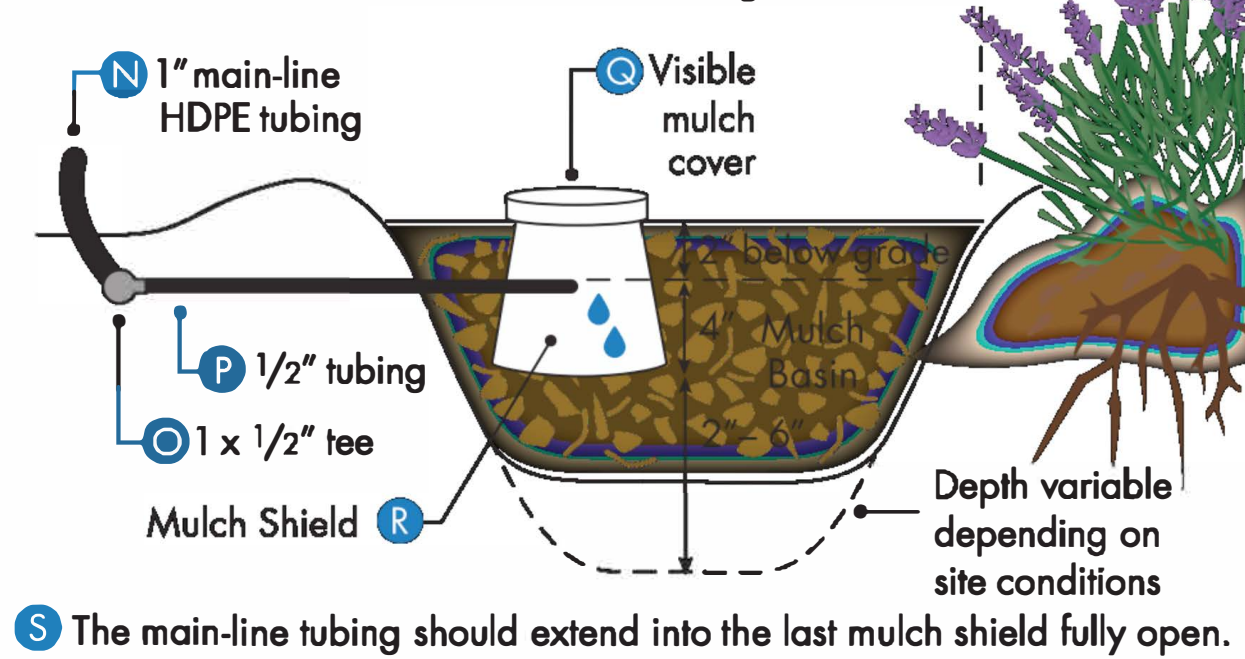
2 Auto Vent



3 System Clean-out



4 Mulch Basin



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SHEET TITLE:
 GREYWATER -
 LAUNDRY TO
 LANDSCAPE

DATE
 PERMIT PLAN
 MAY 18, 2018

GW-1.0

SHEET
 OF

APPLICANT INFORMATION:

BRANCHED DRAIN SYSTEM OVERVIEW:

A BRANCHED-DRAIN SYSTEM DISTRIBUTES GRAYWATER FROM SHOWERS AND/OR BATHROOM SINKS THROUGH A SERIES OF BRANCHING 1.5-INCH OR 2-INCH PIPES AND IS DISPERSED INTO THE LANDSCAPE VIA MULCH BASIN OUTLETS. PLUMBING FOR GRAYWATER SOURCES MUST BE SEPARATED FROM BLACK WATER SOURCES (TOILET, KITCHEN SINK). IF POSSIBLE DUE TO CLOSE PROXIMITY, A LAUNDRY MACHINE CAN ALSO BE ADDED INTO THE DISTRIBUTION PIPING. THIS SYSTEM IS DRIVEN BY GRAVITY FLOW AS NO PRESSURE IS PROVIDED BY A WASHING MACHINE PUMP OR ANY OTHER PUMP. AS THIS SYSTEM REQUIRES CUTTING INTO EXISTING SEWER PIPES FROM SHOWER DRAINS OR SINKS, IT DOES REQUIRE A SIMPLE OVER THE COUNTER PLUMBING PERMIT. IF INSTALLING AS PART OF NEW BUILDING CONSTRUCTION OR REMODEL, SHOW SEPERATED PLUMBING IN PLAN SETS AND STUB OUT PIPING FOR EXTERIOR GRAYWATER SYSTEM COMPONENTS DURING BUILDING CONSTRUCTION.

BRANCHED DRAIN GRAYWATER REQUIREMENTS TO COMPLY WITH CALIFORNIA PLUMBING CODE (CPC) STANDARDS:

- NOTIFY ENFORCING AGENCY AND SECURE PERMIT FOR INTERIOR PLUMBING COMPONENTS
- BE ABLE TO REDIRECT TO SEWER
- NO POTABLE WATER CONNECTION
- CONTAIN GRAYWATER ONSITE
- DIRECT AND CONTAIN GRAYWATER WITHIN MULCH BASINS (IRRIGATION OR DISPOSAL FIELD) BELOW THE GROUND SURFACE
- NO PONDING OR RUNOFF
- OUTLETS COVERED BY AT LEAST 2-INCHES OF MULCH, ROCK, OR A SHIELD (E.G. VALVE BOX LID)
- MINIMIZE CONTACT WITH HUMANS AND ANIMALS
- DIVERT WATER TO THE SEWER IF IT CONTAINS DIAPERS, OIL, OTHER CHEMICALS
- GRAYWATER DIVERTED TO LANDSCAPE SHALL NOT CONTAIN HAZARDOUS CHEMICALS
- FOLLOW ALL APPLICABLE CODE OR LAWS
- POST OPERATION AND MAINTENANCE MANUAL
- THE SYSTEM SHALL HAVE A DISCHARGE CAPACITY OF 250 GALLONS PER DAY OR LESS

INSTALLATION & DESIGN CONSIDERATIONS:

WITH A HIGHER POTENTIAL VOLUME OF WATER COMING FROM A SHOWER AND SINK, A BRANCHED DRAIN SYSTEM IS BEST SUITED FOR IRRIGATING TREES, BUSHES, SHRUBS, AND OTHER LARGER PERENNIAL PLANTS. THIS IS A SIMPLE SYSTEM AND DOES NOT REQUIRE ELECTRICITY OR A PUMP. HOWEVER, THE LANDSCAPE AREA MUST BE LOWER IN ELEVATION THAN THE GRAYWATER SOURCE,

AND THE ENTIRE SYSTEM MUST HAVE A DOWNWARD SLOPE OF 2 % (¼ INCH PER FOOT) TO ENSURE EVEN DISTRIBUTION. INSTALLATION DIFFICULTY DEPENDS ON THE EXISTING HOUSEHOLD PLUMBING, ACCESS TO PIPES AND THE SLOPE OF LANDSCAPE. WHILE OUTDOOR COMPONENTS CAN BE INSTALLED BY A HOMEOWNER, A PROFESSIONAL PLUMBER IS NEEDED FOR INSTALLATION OF 3-WAY DIVERTER VALVE ON THE SEWER LINE. THE HOMEOWNER HAS THE OPTION TO INSTALL AN ACTUATOR, WHICH ALLOWS EASY DIVERSION OF GRAYWATER BETWEEN LANDSCAPE AND THE SEWER LINE.

SYSTEM COSTS & REBATES: THE COSTS CAN RANGE FROM A THOUSAND DOLLARS WHEN PRIMARILY INSTALLED BY A HOMEOWNER TO SEVERAL THOUSAND IF INSTALLED BY A PROFESSIONAL. WHILE MORE COSTLY TO CONSTRUCT THAN A LAUNDRY TO LANDSCAPE SYSTEM, A BRANCHED DRAIN SYSTEM REQUIRES LITTLE MAINTENANCE AND LASTS A LONG TIME, SINCE IT HAS NO MOVING PARTS TO BREAK.

RECOMMENDED SOAPS:

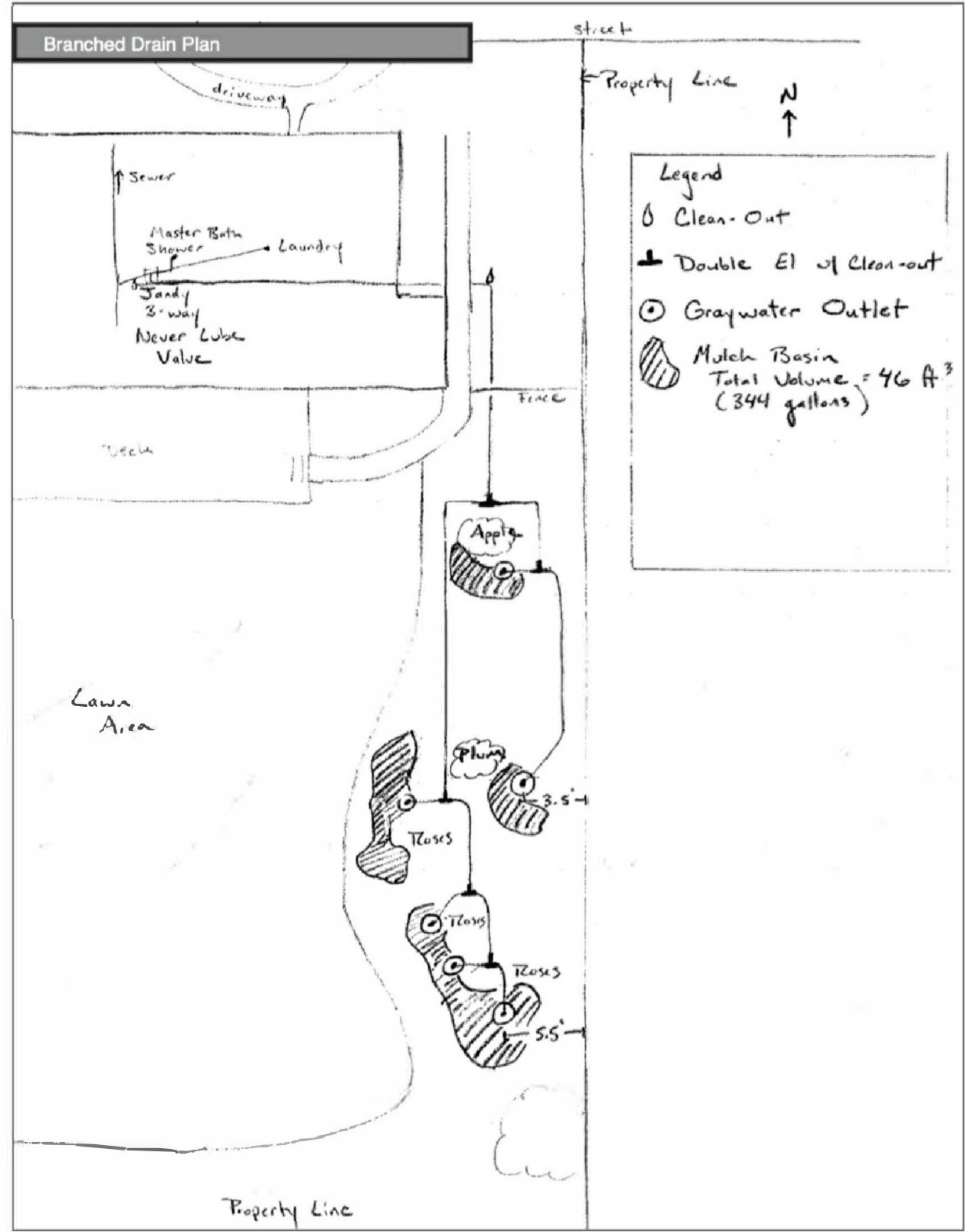
MORE SOAPS ARE COMING OUT ALL THE TIME, BUT IT IS ALWAYS IMPORTANT TO READ THE INGREDIENTS LIST. BELOW ARE SEVERAL THAT ARE KNOWN TO BE GRAYWATER COMPLIANT.

- OASIS - ALL-PURPOSE CLEANER FOR HAND-WASHING, BODY & SHAMPOO
- DR. BRONNER'S MAGIC SOAPS (LIQUID)
- AUBREY ORGANICS SHAMPOOS
-

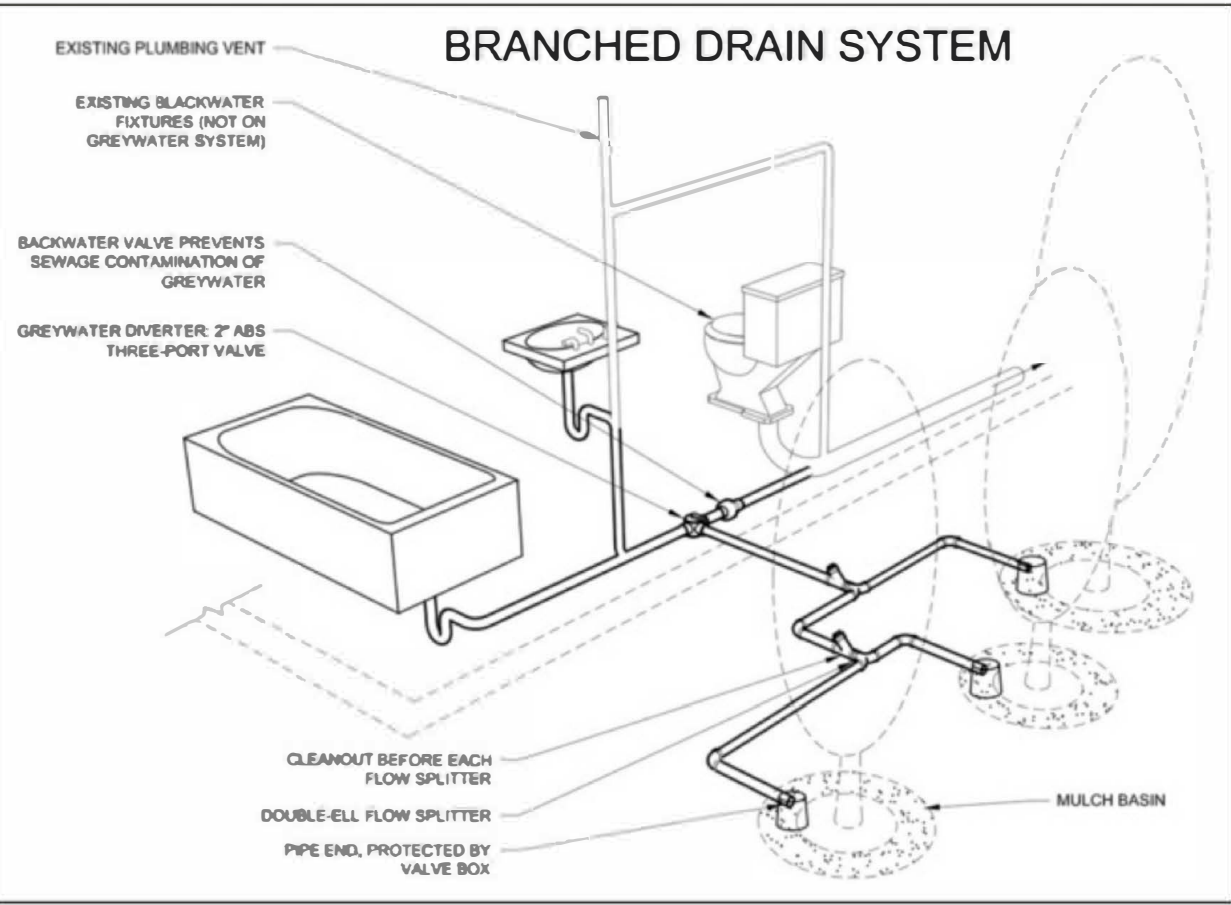
APPLICANT INSTRUCTIONS:

1. ESTIMATE YOUR GRAYWATER SUPPLY USING THE CALCULATION SECTION THIS SHEET.
2. ESTIMATE MULCH BASIN SIZES, AREA AND VOLUME USING TABLE 3.
3. DEVELOP A GRAYWATER SITE PLAN SHOWING THE SYSTEM LAYOUT FOR THE PERMIT APPLICATION. SHOW ALL THE PLAN ELEMENTS LISTED IN #4 -GRAYWATER PLAN BELOW. REVIEW THE SAMPLE PLAN SHOWN IN DETAIL #1 THIS SHEET. SHOW TREE AND PLANT LOCATIONS TO BENEFIT FROM GREYWATER.
4. SUBMIT FOR BUILDING PERMIT EITHER WITH FULL SITE DRAWINGS OR AS A SEPARATE SUBMITTAL.
5. REVIEW PIPE AND VALVE LOCATIONS WITH ARCHITECT, ENGINEER AND CONTRACTOR TO INSURE THERE ARE NO CONFLICTS WITH OTHER SITE ELEMENTS. CONFIRM COMPONENTS TO BE INSTALLED AT TIME OF FOUNDATION SYSTEM CONSTRUCTION, INCLUDING PIPE STUB OUT FOR EXTERIOR GRAYWATER SYSTEM DEVELOPMENT.

Example Greywater Irrigation Plan



1 BRANCHED DRAIN SAMPLE SITE PLAN NTS



2 BRANCHED DRAIN SYSTEM DIAGRAM AND INSTALL PHOTO NTS

CALCULATIONS SECTION

1. Estimate Daily Graywater Production

Calculation Method (choose one and check box)

☐ California Plumbing Code Estimate (Assign 2 occupants to master bedroom and 1 occupant to each additional bedroom)

Laundry: _____ occupants x 15 gallons/day _____ gals/day

Shower/Sink: _____ occupants x 25 gallons/day ÷ 7(days/week) _____ gals/day

TOTAL _____ gals/day

☐ Estimate of graywater produced from winter (Dec-Feb) water use records (attach utility bill)

Laundry: Avg. water use <30 days _____ (gals/day) X .22 _____ (gals/day)

Shower: Avg. water use <30 days _____ (gals/day) X .17 _____ (gals/day)

Sink: Avg. water use <30 days _____ (gals/day) X .22 _____ (gals/day)

TOTAL _____ (gals/day)

2. Determine Minimum Mulch Basin Size

Minimum Mulch Basin Area:

_____ (gal/day) ÷ _____ gal/ft²/day = _____ ft²

From 1 above Maximum Absorption Capacity (from column 3 in table below)

*Dig mulch basin to a depth of 1 ft to ensure sufficient surge capacity for water leaving the laundry machine.

Design of Six Soil Types	Min SQ Ft of Irrigation/ Leaching Area Per 100 Gallons of Estimated Graywater Discharge Per Day	Max Absorption Capacity in Gallons Per SQ Ft of Irrigation/ Leaching Area for an 24-Hour Period
Coarse sand or gravel	20	5.0
Fine Sand	25	4.0
Sandy Loam	40	2.5
Sandy Clay	60	1.7
Clay with considerable sand or gravel	90	1.1
Clay with small amounts of sand or gravel	120	0.8

3. Determine Mulch Basin Required Volume (Complete section below)

Gravity to Mulch Basins (Branched Drain)

Total mulch basin surge capacity: _____ gal/day ÷ 7.48 gal/ft³ ÷ 0.80 = _____ ft³

From Section 1

4. Graywater Plan

Using graph paper, or a copy of your site plan, draw a map and legend of graywater system components that shows the pathway of piping from the fixture(s) inside the building to the landscape/irrigation field. If graywater is directed to the front yard, show the street frontage and your driveway. In your drawing, include the location of all:

- Graywater valves
- Graywater pipes and fittings (indicate material and size)
- Clean-outs
- Graywater outlets and mulch basins
- Setback of graywater outlets to property lines and buildings*
- Setback of graywater outlets to onsite wastewater treatment system tanks and leachfields* (if applicable).
- Setback of greywater outlets to wells and drainages* (if applicable).

*See table below for required setbacks. See the California Plumbing Code for additional notes about setbacks.

CPC Table 1502.4 -- LOCATION OF GREY WATER SYSTEM

MINIMUM HORIZONTAL DISTANCE IN CLEAR REQUIRED FROM	SUBSURFACE AND SUBSOIL IRRIGATION FIELD AND MULCH BASIN (feet)
Building structures	2
Property line adjoining private property	1.5
Water supply wells	100
Streams and lakes	100
Sewage pits or cesspools	5
Sewage disposal field	4
Septic tank	5
On-site domestic water service line	0
Pressurized public water main	10

BY USING THESE PLANS, I AGREE TO DEFEND, INDEMNIFY AND HOLD HARMLESS THE SONOMA-MARIN SAVING WATER PARTNERSHIP ITS MEMBERS (SONOMA COUNTY WATER AGENCY, CITY OF SAN ANGELES, JARVIS MARSH, WATER DISTRICT, NORTH BAY AREA WATER DISTRICT, CITY OF RICHMOND PARK, CITY OF PETAUMA, CITY OF COVIL, CITY OF SONOMA, WALES OF THE BAY AREA DISTRICT AND THE CITY OF SAN ANGELES) AND THEIR DIRECTORS, OFFICERS, AGENTS, EMPLOYEES AND LANDSCAPE DESIGN CONSULTANTS FROM ANY AND ALL LOSSES, LIABILITY, EXPENSE, CLAIMS, SUITS AND DAMAGES, INCLUDING ATTORNEY'S FEES, ARISING OUT OF OR FROM THE USE OF THESE PLANS. I UNDERSTAND THAT IT IS MY RESPONSIBILITY AS THE PROJECT OWNER TO ENSURE THE PLANS ARE SAFELY AND IMPLEMENTED SAFELY AND ACCORDING TO APPLICABLE STATUTES, RULES, REGULATIONS, ORDINANCES AND/OR CODES.

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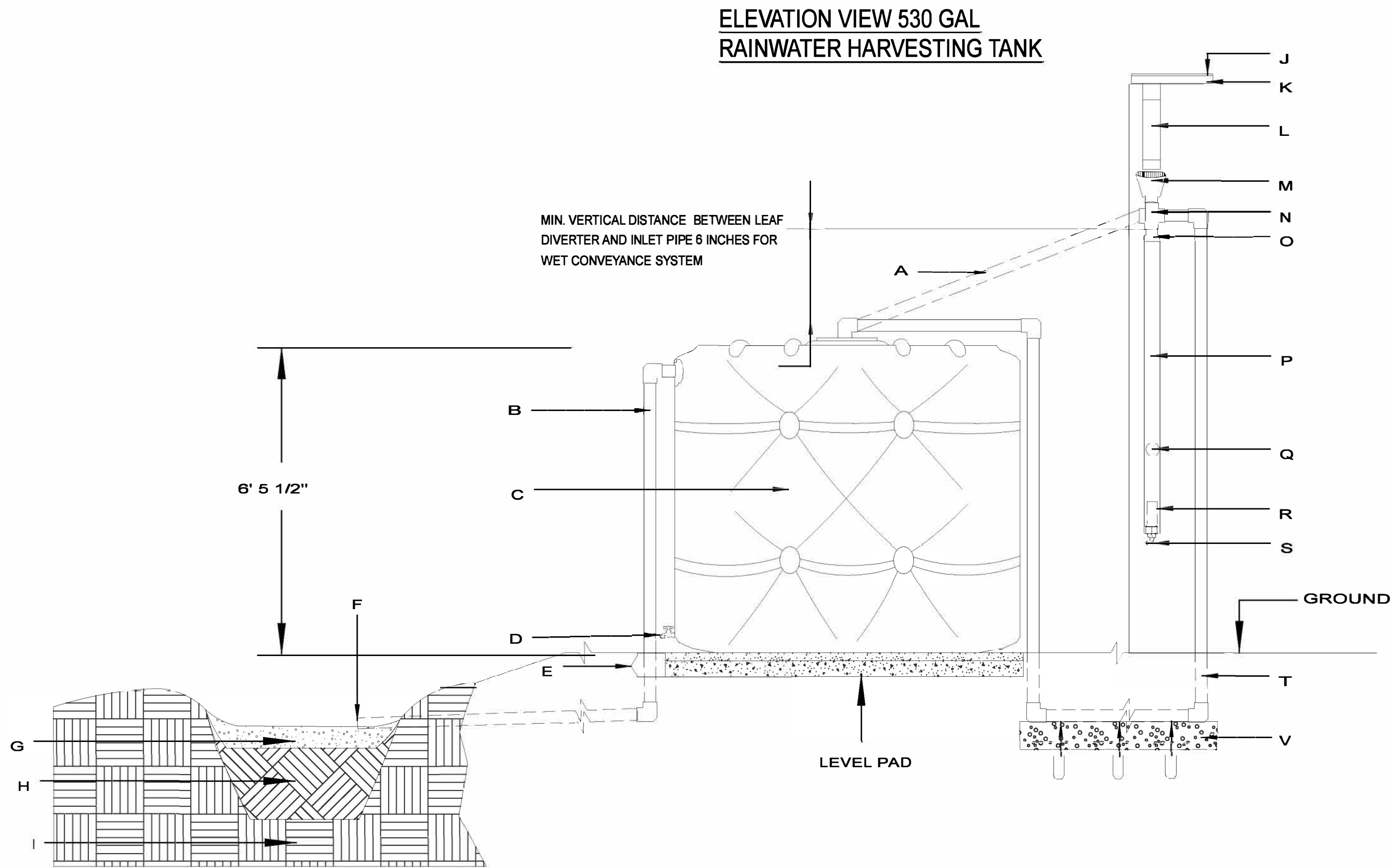
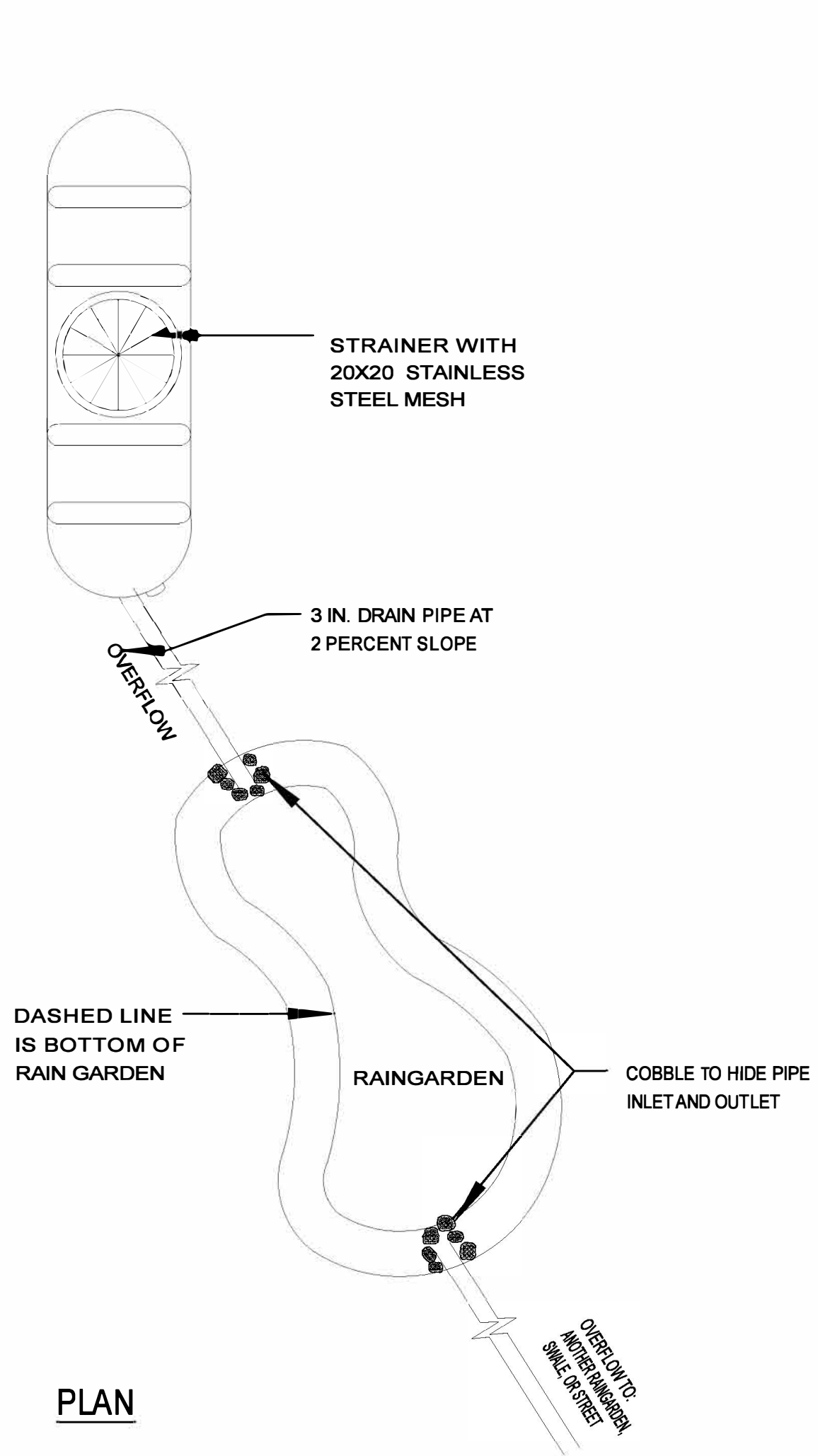
SHEET TITLE:

GREYWATER -
BRANCHED
DRAIN SYSTEM

DATE
PERMIT PLAN
MAY 18, 2018

GW-1.1

SHEET
OF



SECTION VIEW RAIN GARDEN

- NOTES:
1. A RAINWATER CATCHMENT SYSTEM MAY NOT REQUIRE A BUILDING PERMIT PROVIDED ALL OF THE FOLLOWING ARE MET (CALIFORNIA PLUMBING CODE 1601.3 (1)):
 - WATER WILL BE USED FOR OUTDOOR NON-SPRAY IRRIGATION
 - MAXIMUM STORAGE CAPACITY OF 5,000 GALLONS
 - TANK IS SUPPORTED DIRECTLY UPON GRADE
 - RATIO OF HEIGHT TO DIAMETER OR WIDTH DOES NOT EXCEED 2 TO 1
 - DOES NOT REQUIRE ELECTRICAL POWER OR MAKEUP WATER SUPPLY CONNECTION (SEE NOTE 2 AND 3)
 2. ALL OTHER RAINWATER CATCHMENT SYSTEMS MUST BE SUBMITTED FOR BUILDING PERMIT.
 3. PUMP AND PRESSURE TANK LIKELY REQUIRE INEXPENSIVE, OVER-THE-COUNTER, ELECTRICAL PERMIT.
 4. IF CITY WATER PLUMBED TO TANK FOR MAKE UP USING FLOAT VALVE OR MANUALLY OPERATED VALVE, THEN A PERMIT IS REQUIRED AND AN AIR GAP IS REQUIRED BETWEEN RAINWATER HARVESTING SYSTEM AND DOMESTIC WATER SYSTEM.
 5. TANKS CAN BE DAISY CHAINED AT POINT "D" USING FLEXIBLE PIPE ONLY TO REDUCE CHANCE OF LEAKAGE IN EARTHQUAKES.
 6. THERE ARE NO REQUIRED SETBACKS FROM BUILDINGS OR SIDE/BACK PROPERTY LINES, THOUGH A CONVERSATION WITH YOUR NEIGHBOR COULD BE HELPFUL.

- A. PREFERRED DRY CONVEYANCE IF TANKS ARE NEXT TO DOWNSPOUT
- B. OVERFLOW: 3 IN. DRAINAGE PIPE: SLOPED 2 PERCENT FOR HORIZONTAL SECTIONS
- C. 530 GALLON BUSHMAN SLIMLINE RAIN HARVESTING TANK OR EQUIVALENT
- D. HOSE BIB OR OPTIONAL CONNECTION TO PUMP AND PRESSURE TANK (SEE NOTE 2)
- E. 4 INCHES COMPACTED BASEROCK WITH 2 INCHES OF PEA GRAVEL ON TOP
- F. OVERFLOW TO RAINGARDEN (SHOWN)/SWALE/SPLASHBLOCK
- G. 5 INCHES OF DECORATIVE GRAVEL WITH 2 INCHES OF PONDED WATER ABOVE
- H. 12 INCHES AMENDED SOIL: 1/2 COMPOST, 1/2 NATIVE SOIL
- I. UNDISTURBED NATIVE SOIL
- J. FIRE SAFER LEAF GUARD
- K. GUTTER
- L. NORMAL DOWNSPOUT
- M. OPTIONAL BUSHMAN LEAF DIVERTER (WITH 20X20 SCREEN IF USING WET CONVEYANCE) (REDUNDANT WITH LEAF GUARD ON GUTTERS)
- N. 3 IN. PVC DRAINAGE TEE
- O. 4 IN. TO 3 IN. PVC DRAINAGE REDUCER
- P. 4 IN. DRAINAGE PIPE FOR THE FIRST FLUSH (THIS REMOVES THE FIRST, DIRTY WATER FROM A RAINSTORM)
- Q. BUSHMAN FLOAT BALL
- R. BUSHMAN FIRST FLUSH FILTERS (TO KEEP EMITTER FROM CLOGGING)
- S. BUSHMAN DRIP EMITTER TO DRAIN DIRTY WATER BETWEEN STORMS
- T. "WET" CONVEYANCE 3 IN. DRAINAGE PIPE (WATER STAYS IN PIPE BETWEEN STORMS)
- U. THREE SEPARATE 3/32 INCH HOLES TO DRAIN WATER FOR MOSQUITO CONTROL
- V. CLEAN GRAVEL TO IMPROVE DRAINAGE FROM DRILLED HOLES