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Date Filed:	September 14, 2004
49th Day:	November 2, 2004
180th Day:	March 13, 2004
Staff:	Robert S. Merrill
Staff Report:	April 1, 2005
Hearing Date:	April 15, 2005
Commission Action:	

STAFF REPORT: REGULAR CALENDAR

APPLICATION NO.:	**1-04-055**
APPLICANTS:	**GREG & LAURA WILLISTON**
PROJECT LOCATION:	At 2888 Spears Road, east of Eureka, Humboldt County (APNs 403-022-035, 403-022-036, and 403-022-055)
PROJECT DESCRIPTION:	Repair an on-site septic wastewater disposal system serving an existing single-family residence by replacing a failing leachfield with a new mound leachfield system.
GENERAL PLAN DESIGNATION:	Rural Residential (RR)
ZONING DESIGNATION:	Rural Residential Agriculture (RA)
LOCAL APPROVALS REQUIRED:	Humboldt County Division of Environmental Health
OTHER APPROVALS REQUIRED:	None

SUBSTANTIVE FILE DOCUMENTS: Humboldt County Local Coastal Program

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SUMMARY OF STAFF RECOMMENDATION:

Staff recommends that the Commission approve with conditions the coastal development permit for the proposed project.

The proposed project is the repair of an on-site septic wastewater disposal system serving an existing single-family residence located off of Spears Road in an area near the inland boundary of the coastal zone east of Eureka. The repairs involve replacing a failing leachfield with a new mound leachfield system. The existing and the replacement leachfields are located adjacent to an unnamed creek that bisects the property and forms a narrow environmentally sensitive habitat area. As much of the subject property is composed of steep forested hillsides and the few relatively level areas suitable for a leachfield other than the proposed site are covered by existing residential development, there is no opportunity to locate the replacement leachfield system farther away from the creek. However, as the proposed system includes a pre-treatment component, replaces a leachfield that is currently failing, and meets current regulatory requirements for septic disposal fields, the use of the proposed replacement leachfield as proposed will not have significant adverse effects on the water quality of the creek. To ensure that the system is properly maintained to minimize failures and unanticipated discharge of untreated effluent, staff recommends Special Condition No. 1, which requires that the replacement leach field system be properly maintained. Staff is also recommending a special condition which requires the use of certain best management practices to mitigate erosion and sedimentation during the construction process.

As conditioned, staff believes the project is consistent with Sections 30240(b) and 30230 of the Coastal Act, as the project is sited and designed to protect public health and water quality and will prevent impacts which would significantly degrade the creek riparian corridor ESHA and is compatible with the continuance of the habitat. Therefore, staff believes the proposed development is fully consistent with the water quality, ESHA protection, and all other applicable policies of Chapter 3 of the Coastal Act.

The Motion to adopt the Staff Recommendation of Approval with Conditions is found on page 3.

STAFF NOTES:

1. Standard of Review

The proposed project is located in Humboldt County within the Commission's area of retained permit jurisdiction. Humboldt County has a certified LCP, but the proposed project is within an area shown on State Lands Commission maps over which the state retains a public trust interest. Therefore, the standard of review that the Commission must apply to the project is the Chapter 3 policies of the Coastal Act.

2. Commission Action Necessary

The Commission must act on the application at the April 15, 2005 meeting to meet the requirements of the Permit Streamlining Act.

I. MOTION, STAFF RECOMMENDATION AND RESOLUTION:

The staff recommends that the Commission adopt the following resolution:

Motion:

I move that the Commission approve Coastal Development Permit No. 1-04-055 pursuant to the staff recommendation.

STAFF RECOMMENDATION OF APPROVAL:

Staff recommends a **YES** vote. Passage of this motion will result in approval of the permit as conditioned and adoption of the following resolution and findings. The motion passes only by affirmative vote of a majority of the Commissioners present.

RESOLUTION TO APPROVE THE PERMIT:

The Commission hereby approves a coastal development permit for the proposed development and adopts the findings set forth below on grounds that the development as conditioned will be in conformity with the policies of Chapter 3 of the Coastal Act. Approval of the permit complies with the California Environmental Quality Act because feasible mitigation measures and/or alternatives have been incorporated to substantially lessen any significant adverse effects of the development on the environment.

II. STANDARD CONDITIONS: See Attachment A.

III. SPECIAL CONDITIONS:

1. Maintenance of Replacement Leach Field System

The permittee shall properly maintain all components of the replacement leach field system including the pre-treatment facility in accordance with the manufacturer's standards over the life of the project.

2. Best Management Practices and Construction Responsibilities

The permittee shall comply with the following construction-related requirements:

(a) No construction materials, debris, or waste shall be placed or stored where it may be subject to entering the creek on the property;

(b) No machinery shall be allowed at any time in the creek;

(c) Any and all excess excavated material resulting from construction activities shall be removed and disposed of at a disposal site outside the coastal zone or placed within the coastal zone pursuant to a valid coastal development permit;

(d) Straw bales, coir rolls, or silt fencing structures shall be installed prior to and maintained throughout the construction period to contain runoff from construction areas, trap entrained sediment and other pollutants, and prevent discharge of sediment and pollutants into the creek running through the property. These structures shall be placed between any construction on the project site and the top of the creek bank;

(e) On-site vegetation shall be maintained to the maximum extent possible during construction activities;

(f) Any disturbed areas shall be replanted or seeded with native vegetation following project completion. No invasive exotic vegetation shall be used;

(g) All on-site stockpiles of construction debris shall be covered and contained at all times to prevent polluted water runoff; and

(h) Development authorized by this permit shall only be performed during the dry season, from April 15 through October 15.

IV. FINDINGS AND DECLARATIONS:

The Commission hereby finds and declares:

A. Site Description

The approximately one-acre project site is located approximately one mile east of Eureka along an unnamed creek at 2888 Spears Road in Humboldt County (see Exhibits 1-3). The creek is a tributary of Freshwater Slough, which in turn is a tributary of Humboldt Bay. The subject property is within a small forested valley and is located approximately ½ mile south of Freshwater Slough and nearly two miles from the Bay shoreline near the inland edge of the coastal zone. No views of the bay or coast are available from the property or the surrounding portions of the valley.

The property extends west of Spears Road and straddles the creek. The wooded area of the property west of the creek rises steeply from the creek and is part of the forested hillside that forms the east side of the valley. An existing 1,125-square-foot, two bedroom residence with a detached 500-square-foot garage, septic tank, secondary leachfield and gravel driveway have been developed on a bench in the hillside that exists near the east side of the property. The residence is served by a public water system but relies on an on-site septic system for wastewater disposal.

The approximately ¼-acre area east of the creek comprises a relatively flat area that is currently developed with a 400-square-foot accessory shop building and the existing buried septic system leachfield that is proposed to be replaced. The leachfield lies underneath a landscaped yard area that extends from Spears Road to the banks of the creek.

The creek and its banks form a narrow riparian corridor that constitutes an environmentally sensitive habitat area.

B. Project Description

The proposed project is the repair of the existing on-site septic wastewater disposal system serving the residence, and involves replacing a failing leachfield with a new mound leachfield system with greater capacity.

The new system is designed for a four bedroom residence to accommodate the applicants desire to add on to the small residence in the future. According to Humboldt County sewage disposal regulations, a four-bedroom residence requires a 1,800-gallon septic tank and would have an expected daily sewage flow of 525 gallons per day (gpd).

Because of a lack of suitable space, replacement of the existing failing leachfield with a conventional leachfield system is not feasible. The failing existing leachfield and a secondary leachfield that is already in use occupy the only uncovered gently sloping areas of the property of sufficient size that could accommodate a leachfield. The soils around the existing failing leachfield are no longer suitable to accommodate a replacement conventional leachfield. Therefore, the applicants propose a modified mound system leachfield that would be equipped with an innovative pretreatment system known as an Advantex AX 20 Series-Mode 1b pretreatment system. The replacement leachfield system would utilize the existing 1,200-gallon septic tank, a new 1,500-gallong watertight septic tank and a new 750-gallon watertight pump chamber.

The primarily leachfield would consist of a single 80-foot-long by 17-foot-wide mound containing four 33-foot-long leachline laterals. The laterals would be made of 1.5-inch schedule 40 PVC pipe with orifices every two feet. The mound would have a maximum height of approximately 2-1/2 feet above the adjoining ground surface.

The pretreatment system would be contained in the proposed 1,500-gallon watertight septic tank. Within the tank, wastewater separates into three distinct layers: a floating scum layer, a bottom sludge layer, and a clear zone in between. A pump vault draws effluent from the clear zone and the effluent is passed through a filter. The filter is a fiberglass basin filed with an engineered textile material which treats a tremendous volume of wastewater in a small space.

The proposed leachfield system was designed based on an on-site septic wastewater disposal repair evaluation prepared by a consulting geotechnical engineering firm (See Exhibit 5). The evaluation and proposed replacement septic leachfield system has been reviewed by the Humboldt County Division of Environmental Health (DEH) in accordance with current regulatory requirements (See Exhibit 6). DEH found the system to be suitable for the specific site conditions encountered and has no objection to the installation of the wastewater treatment system as proposed.

C. Environmentally Sensitive Habitat Area and Water Quality

Section 30107.5 of the Coastal Act defines "environmentally sensitive habitat area" as:

> *any area in which plant or animal life or their habitats are either rare or especially valuable because of their special nature or role in an ecosystem and which could be easily disturbed or degraded by human activities and developments.*

Section 30240 of the Coastal Act states in part that:

> (a) *Environmentally sensitive habitat areas shall be protected against any significant disruption of habitat values, and only uses dependent on such resources shall be allowed within such areas.*
>
> *(b) Development in areas adjacent to environmentally sensitive habitat areas and parks and recreation areas shall be sited and designed to prevent impacts which would significantly degrade those areas, and shall be compatible with the continuance of those habitat and recreation areas.*

Section 30231of the Coastal Act states as follows:

> *The biological productivity and the quality of coastal waters, streams, wetlands, estuaries, and lakes appropriate to maintain optimum populations of marine organisms and for the protection of human health shall be maintained and, where feasible, restored through, among other means, minimizing adverse effects of waste water discharges and entrainment, controlling runoff, preventing depletion of ground water supplies and substantial interference with surface water flow, encouraging waste water reclamation, maintaining natural vegetation buffer areas that protect riparian habitats, and minimizing alteration of natural streams.*

Section 30240(b) of the Coastal Act requires that environmentally sensitive habitat areas (ESHAs) be protected against any significant disruption of habitat values potentially resulting from adjacent development. Section 30230 requires the protection of coastal waters to ensure biological productivity, protect public health and water quality. New development must not adversely affect these values and should help to restore them when possible.

The unnamed creek which bisects the property forms a narrow riparian corridor that constitutes an environmentally sensitive habitat area. Both the failing leach field and the proposed replacement leach field are located within a landscaped yard area that lies adjacent to the creek. The existing failing leach field is approximately 30 feet from the creek bank and the proposed replacement leach field mound would extend somewhat closer.

Buffers between development and ESHA are often required to be a minimum of 100 feet in width. In this case, no buffer currently exists between the existing residential yard and the creek and it is not feasible to locate the new replacement leach field further away from the creek. As discussed above, the failing existing leachfield and a secondary leachfield that is already in use occupy the only uncovered gently sloping areas of the property of sufficient size that could accommodate a leachfield. The replacement leachfield cannot be located further east towards Spears Road because of zoning setback requirements and septic system regulations that require leachfields to be located at least 10 feet from property lines. The leachfield cannot be located anywhere to the west of the creek because all portions of the property west of the creek are composed of steep slopes that are unsuitable for leachfields or are occupied by the existing residential development.

As noted above, the design of the proposed leachfield system is based on an on-site septic wastewater disposal repair evaluation prepared by a consulting geotechnical engineering firm (See Exhibit 5). Unlike conventional systems or most other mound systems, the proposed leach field system includes a pre-treatment component as described above that provides secondary treatment of the effluent. In addition, the new leachfield will replace a leachfield that is currently failing and having unknown impacts on the water quality of the creek. The evaluation report and the proposed replacement septic leachfield system has been reviewed by the Humboldt County Division of Environmental Health (DEH) in accordance with current regulatory requirements, and DEH found the new system to be suitable for the specific site conditions encountered and has no objection to the installation of the wastewater treatment system as proposed (See Exhibit 6). As the proposed system includes a pre-treatment component, replaces a leachfield that is currently failing, and meets current regulatory requirements for septic disposal fields, the use of the proposed replacement leachfield as proposed will not have significant adverse effects on the water quality of the creek. To ensure that the system is properly maintained to minimize failures and unanticipated discharge of untreated effluent, the Commission attaches Special Condition No. 1, which requires that the replacement leach field system be properly maintained.

Excavation and construction associated with the installation of the new leach field system, however, could cause sedimentation of the creek during the construction period. The excavation work will expose soils to stormwater runoff which could erode and convey soil into the creek. To avoid sedimentation impacts, the Commission attaches Special Condition No. 2 which requires the use of certain best management practices to mitigate erosion and sedimentation during the construction process. Among other requirements, the special condition requires that all construction occur only during the dry season, that a silt curtain or similar barrier that would trap sediment in dry season rain runoff be installed between the construction area and the creek bank, that all construction materials and equipment be placed and used where it will not enter the creek and adequately covered and contained to prevent polluted runoff, that on-site vegetation be maintained to the maximum extent possible during the construction process, and that any disturbed areas be replanted and seeded with native vegetation (no invasive exotics

allowed) following project completion. As conditioned, the project will avoid significant adverse construction related impacts on the water quality and riparian habitat of the creek.

Therefore, the Commission finds that the proposed project, as conditioned, is consistent with Sections 30240(b) and 30230of the Coastal Act, as the project is sited and designed to protect public health and water quality and will prevent impacts which would significantly degrade the creek riparian corridor ESHA and is compatible with the continuance of the habitat.

D. California Environmental Quality Act

Section 13906 of the California Code of Regulation requires Coastal Commission approval of a coastal development permit application to be supported by findings showing that the application, as modified by any conditions of approval, is consistent with any applicable requirements of the California Environmental Quality Act (CEQA). Public Resources Code Section 21080.5(d)(2)(A) of CEQA prohibits a proposed development from being approved if there are feasible alternatives or feasible mitigation measures available, which would significantly lessen any significant effect that the activity may have on the environment.

The Commission incorporates its findings on conformity with Coastal Act policies at this point as if set forth in full. These findings address and respond to all public comments regarding potential significant adverse environmental effects of the project that were received prior to preparation of the staff report. As discussed herein in the findings addressing the consistency of the proposed project with the Coastal Act, the proposed project has been conditioned in order to be found consistent with the policies of the Coastal Act. As specifically discussed in these above findings which are hereby incorporated by reference, mitigation measures which will minimize all adverse environmental impact have been required. As conditioned, there are no feasible alternatives or feasible mitigation measures available, beyond those required, which would substantially lessen any significant adverse impact that the activity would have on the environment. Therefore, the Commission finds that the proposed project, as conditioned to mitigate the identified impacts, can be found consistent with the requirements of the Coastal Act and to conform to CEQA.

EXHIBITS:

1. Regional Location Map
2. Vicinity Map
3. Plot Plan

4. Mound Details
5. Engineering Evaluation
6. County Health Department Approval

ATTACHMENT A.

Standard Conditions:

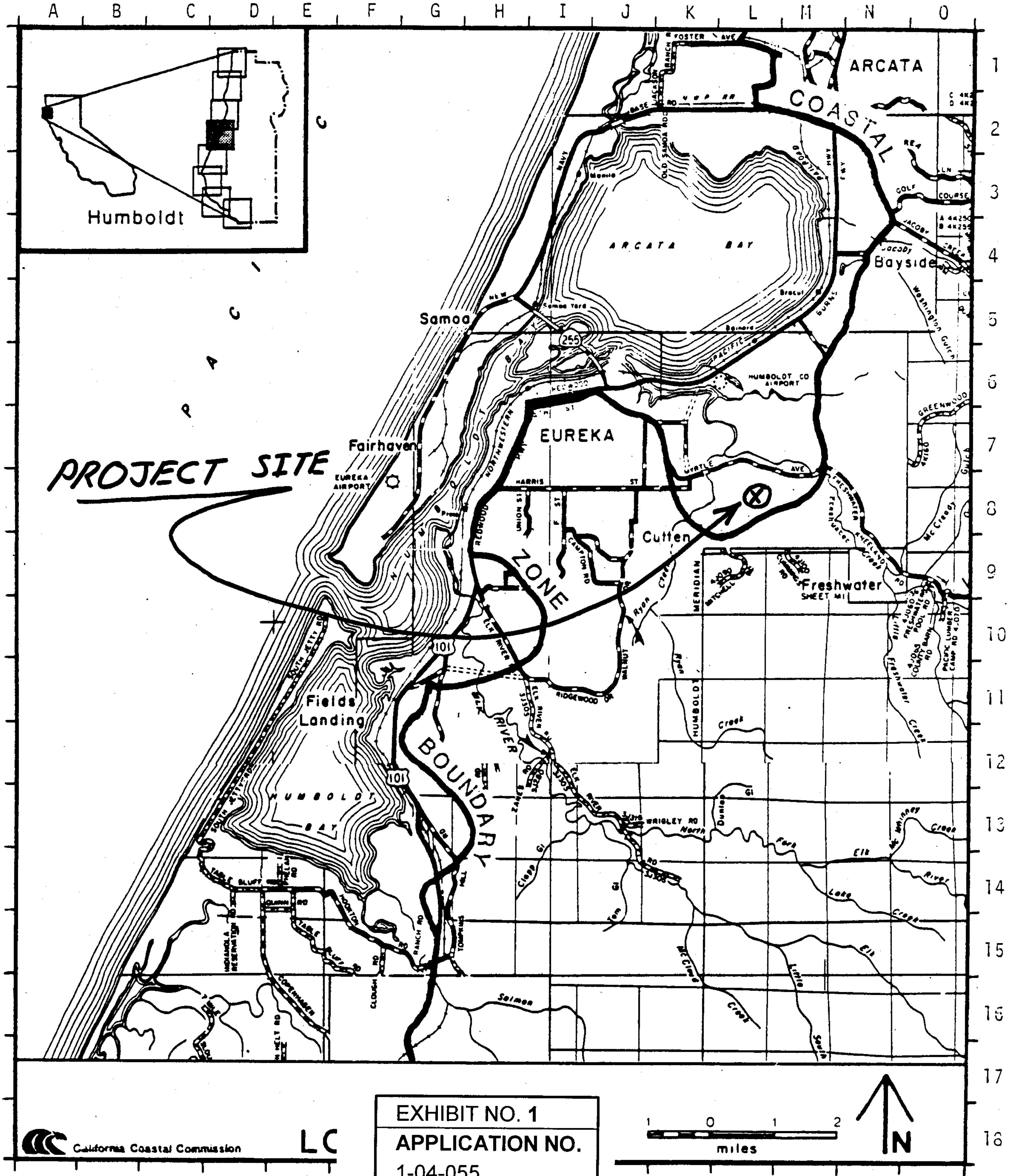
1. Notice of Receipt and Acknowledgment. The permit is not valid and development shall not commence until a copy of the permit, signed by the permittee or authorized agent, acknowledging receipt of the permit and acceptance of the terms and conditions, is returned to the Commission office.

2. Expiration. If development has not commenced, the permit will expire two years from the date on which the Commission voted on the application. Development shall be pursued in a diligent manner and completed in a reasonable period of time. Application for extension of the permit must be made prior to the expiration date.

3. Interpretation. Any questions of intent of interpretation of any condition will be resolved by the Executive Director or the Commission.

4. Assignment. The permit may be assigned to any qualified person, provided assignee files with the Commission an affidavit accepting all terms and conditions of the permit.

5. Terms and Conditions Run with the Land. These terms and conditions shall be perpetual, and it is the intention of the Commission and the permittee to bind all future owners and possessors of the subject property to the terms and conditions.



California Coastal Commission

County of Humboldt

EXHIBIT NO. 1

APPLICATION NO.

1-04-055

REGIONAL

LOCATION MAP

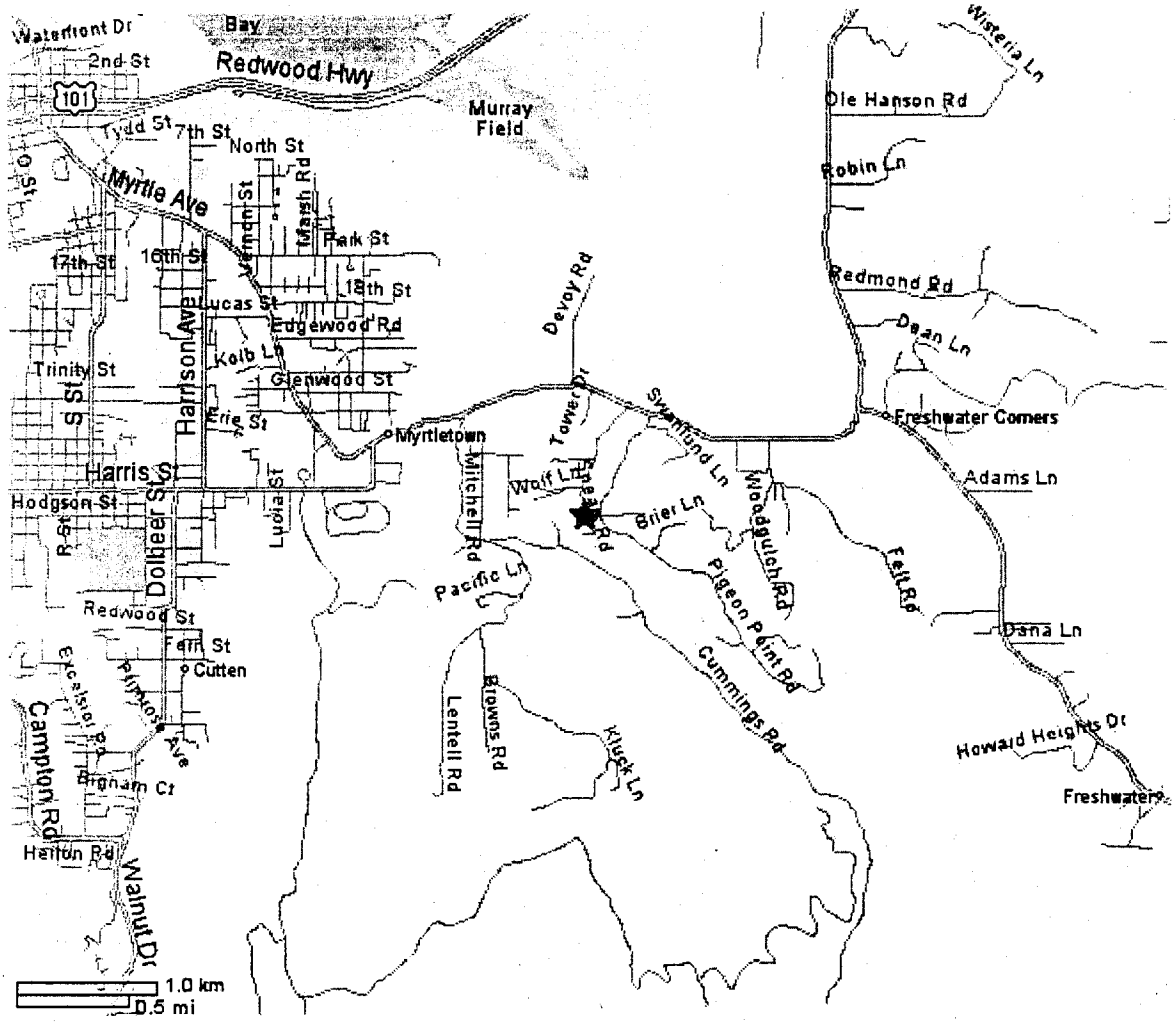


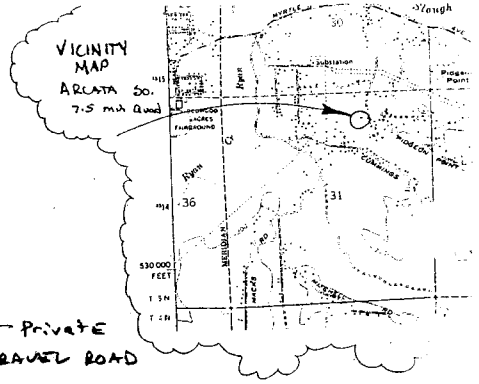
EXHIBIT NO. **2**
APPLICATION NO. 1-04-055 PROJECT VICINITY MAP

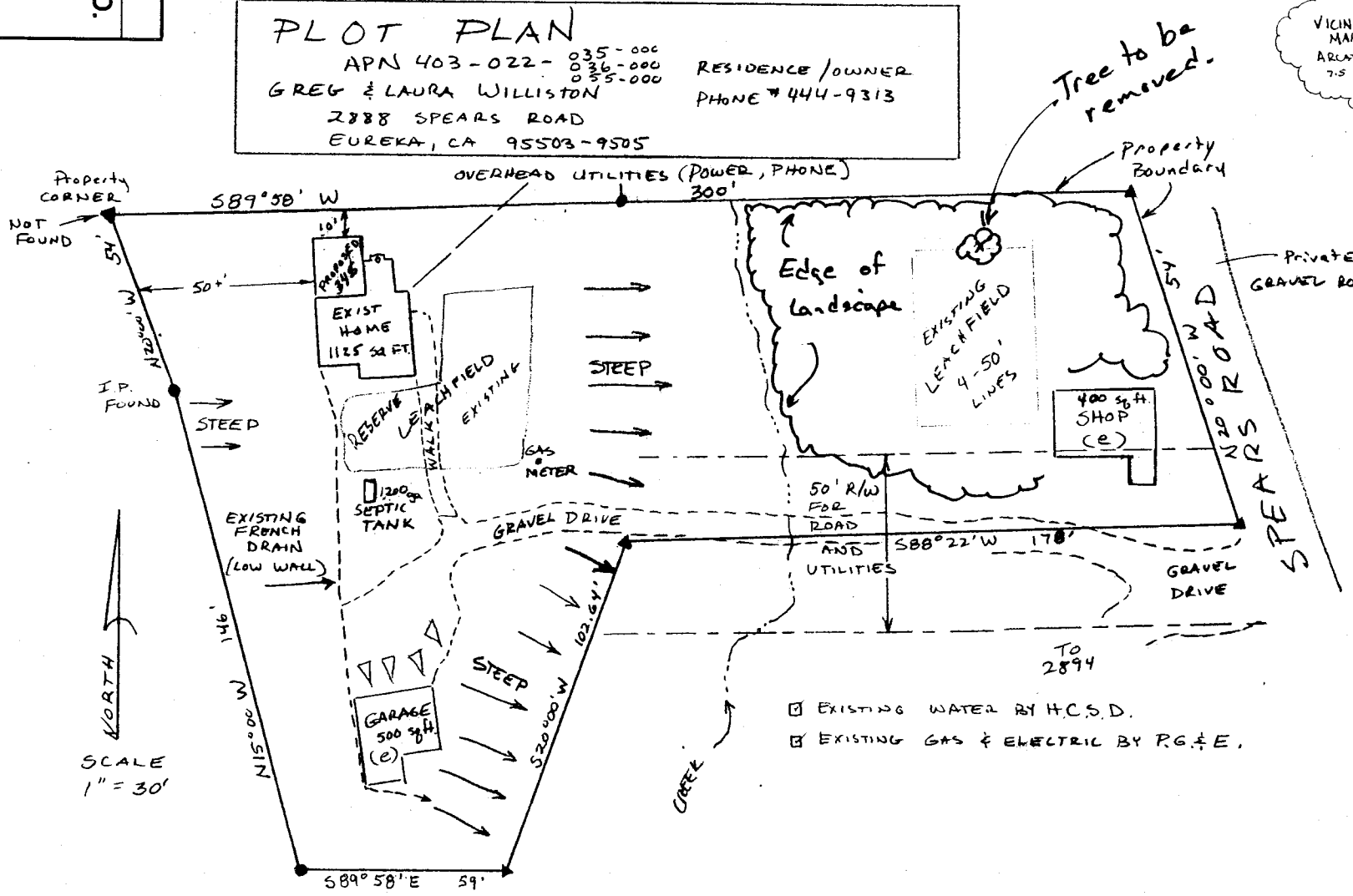
EXHIBIT NO. 3
APPLICATION NO.
1-04-055
PLOT PLAN

PLOT PLAN

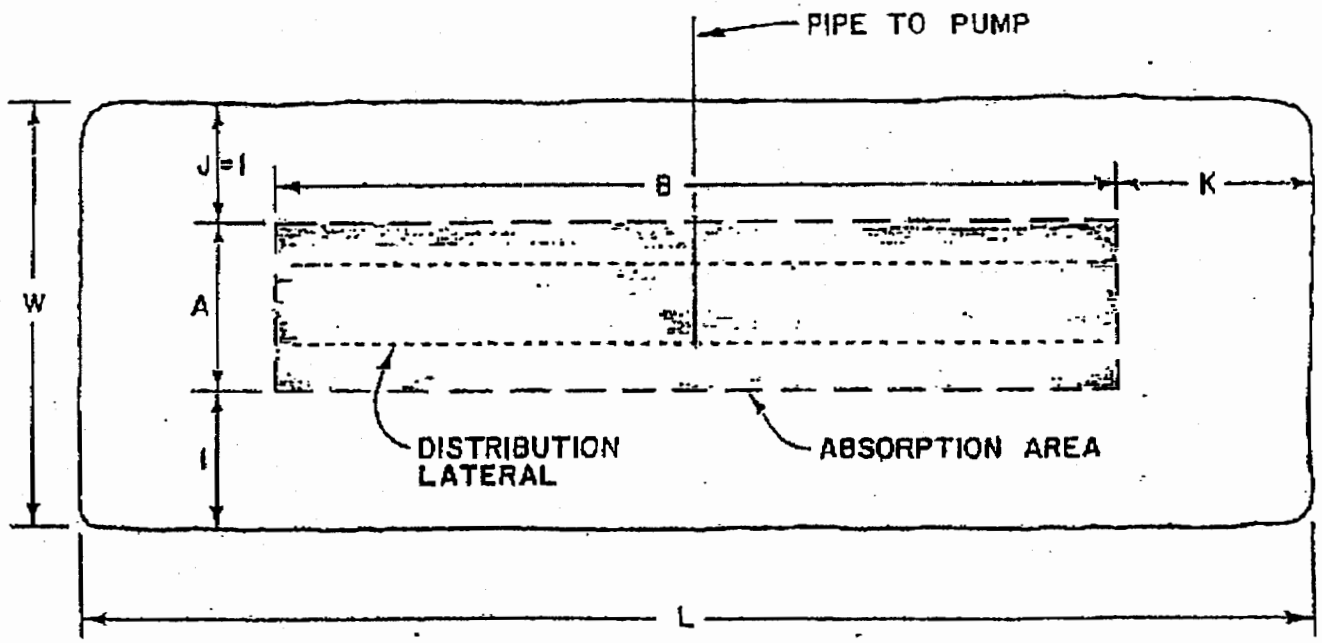
APN 403-022-035-000
036-000
055-000
GREG & LAURA WILLISTON
2888 SPEARS ROAD
EUREKA, CA 95503-9505

RESIDENCE / OWNER
PHONE # 444-9313

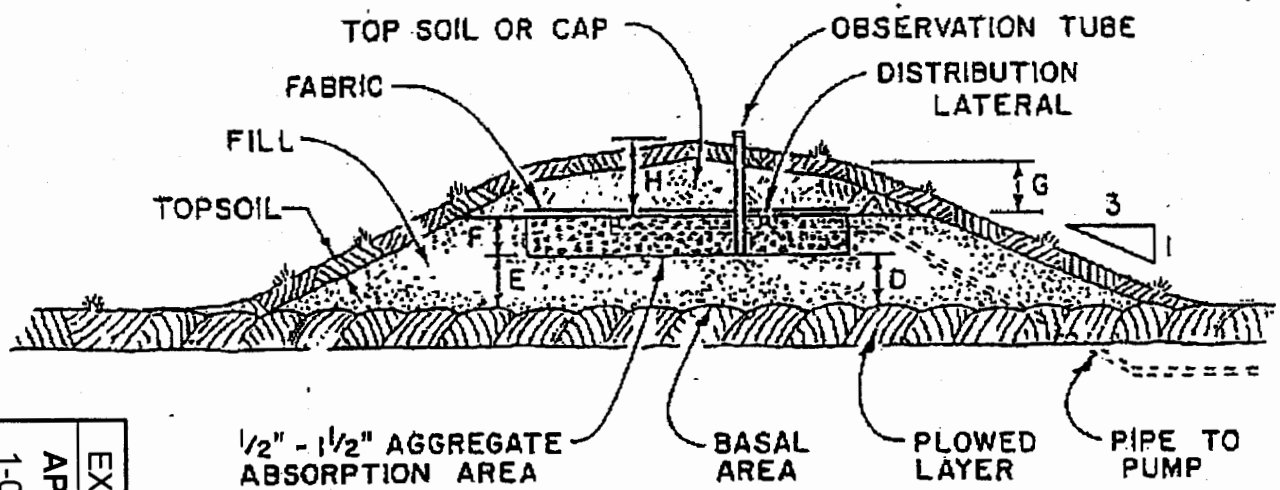




☑ EXISTING WATER BY H.C.S.D.
☑ EXISTING GAS & ELECTRIC BY P.G.&E.



A = 6 feet
B = 66 feet
I = 5.3 feet
J = 5.3 feet
K = 6.8 feet
L = 80 feet
W = 17 feet
# of laterals = 4
lateral length = 33 feet
lateral spacing = 3 feet
orifice spacing = 2 feet
# of perforations per lateral = 17



D = 6 inches
E = 6 inches
F = 9 inches
G = 6 inches
H = 12 inches
I = 5.3 feet

EXHIBIT NO. 4
APPLICATION NO. 1-04-055
MOUND DETAILS

Consulting Engineers & Geologists, Inc.

Williston
APN 403-022-035
2888 Spears Road, Eureka, California

Plan View and Cross Section of Modified Mound
SHN 0404028

June 2004 | Note: All locations approximate | Figure 4

CONSULTING ENGINEERS & GEOLOGISTS, INC.
812 W. Wabash • Eureka, CA 95501-2138 • 707-441-8855 • Fax 707-441-8877 • info@shn-eureka.com

Reference: 004028

June 29, 2004

Greg Williston
2888 Spears Road
Eureka, CA 95503-9505

Subject: **On-Site Septic Wastewater Disposal Repair Evaluation for APN 403-022-035, Located at 2888 Spears Road, Eureka, Humboldt County, California**

Dear Greg:

Introduction

At your request, an on-site septic wastewater disposal repair evaluation for the parcel at 2888 Spears Road in Eureka, Humboldt County, California (APN 403-022-035) was conducted in general accordance with current North Coast Regional Water Quality Control Board (NCRWQCB) and Humboldt County Division of Environmental Health (HCDEH) regulations. The location of the subject site is illustrated on the Site Location Map (Figure 1). The existing house is a two-bedroom residence and the design allows for an up four-bedroom residence to be constructed at the approximate location shown on the Site Plan (Figure 2).

A subsurface investigation was conducted under wet weather testing conditions on March 10, 2004. Three subsurface exploration test holes were excavated by hand auger and soil profiles were logged according to the United States Department of Agriculture (USDA) soil classification system (see boring logs). Three observation wells (consisting of 1-inch diameter slotted PVC pipe wrapped in filter fabric) were installed in the excavated test holes and were labeled WM-1, WM-2, and WM-3 (see Figure 2). Notification of water monitor installation and a site map were delivered to the Health Department on March 18, 2004. Representative samples were collected from each test hole and a textural analysis was conducted (see attached test results). Wet weather percolation tests were conducted on March 31, 2004.

Site Conditions

The proposed primary and reserve leachfield areas are located in a flat area and are shown on the attached Site Plan (Figure 2). Three test holes were excavated in the proximity of the future primary and/or reserve leachfield areas. Texture analyses conducted on samples B-1 at 12 inches and B-3 at 24 to 30 inches plotted in the LOAM Zone 2 area, B-2 at 9.6 to 12 inches plotted in the LOAM to SANDY LOAM Zone 2 area, and B-3 at 6 to 12 inches plotted in the SANDY LOAM Zone 2 area on the Soil Percolation Suitability Chart (see attached test results). Percent combined silt and clay for B-1 at 12 inches, B-2 at 9.6 to 12 inches, B-3 at 6 to 12 inches, and B-3 at 24 to 30 inches are 51.8%, 47.5%, 23.7% and 59.4%, respectively.

Wet weather percolation tests were conducted on March 31, 2004, and resulted in approximately 40 minutes per inch (mpi) at Perc-1 from 6 to 12 inches and Perc-3 from 6 to 12 inches; and 24 mpi at

Perc-2 from 6 to 12 inches. Three observation wells were installed to approximately 6.5 feet in B-1, 4.5 feet in B-2 and 10 feet in depth in B-3 on March 10, 2004. The observation wells were monitored for three weeks during the 2004 wet weather testing period. Measurements were taken at least once a week for three consecutive weeks, including at least one substantial (>0.5 inches) rainfall event. The highest recorded water level was at 1.3 feet below existing ground surface for WM-1, 1.1 feet for WM-2 and 1.7 feet for WM-3 on March 26, 2004.

Discussion and Specifications

According to Humboldt County Sewage Disposal Regulations, a four-bedroom residence requires a 1,800-gallon septic tank, and the expected daily sewage flow is 525-gallons per day (gpd). Since the property is supplied by a public water system, the septic tank and disposal field should be located at least 5 feet from the foundation of any building and 10 feet from property lines.

Design

We recommend using a modified mound system with an Advantex AX 20 Series-Mode 1b pretreatment system (Figure 3). This system is sized using both the soil texture analysis and the percolation rates. We recommend using the existing 1,200-gallon septic tank, one 1,500-gallon watertight septic tank and one 750-gallon watertight pump chamber. The primary leachefield shall consist of an 80-foot by 17-foot mound with four 33-feet long leachline laterals, feed from the center (Figure 4). The laterals shall be made of 1.5-inch schedule 40 PVC pipe with orifices every 2 feet. An equal sized reserve area shall also be designated. All materials and construction shall conform to the requirements of the HCDEH regulations, the Wisconsin Mound Manual, the Uniform Building Code (UBC), National Electrical Code (NEC), and the Uniform Plumbing Code (UPC).

Calculations

The modified mound design was calculated and designed using NCRWQCB regulations; HCDEH regulations; Wisconsin Mound Soil Absorption System: Siting Design and Construction Manual by Converse and Tyler, 2000; Pressure Distribution Network Design by Converse, 2000; and Design Aid CD-Rom and Advantax Treatment System manual by Orenco Systems, Incorporated.

A. Sizing the modified mound using the Wisconsin Mound Soil Absorption System: Siting Design and Construction Manual by Converse and Tyler, 2000.

   1. Design Flow Rate (DFR) = **525 gallon per day (gpd)**
   2. Linear Loading Rate (LLR) = **4 gpd/feet (ft)**

      Basal Loading Rate (BLR) = **0.6 gpd/square feet (sf)**
   3. Sand Loading Rate (SLR) = **2 gpd/sf** (recommended by text when using pretreatment)
   4. Absorption Area Width (A) = LLR/SLR = 4 gpd/ft / 2 gpd/sf = 2 ft (double absorption width, so decrease absorption length by one half) absorption width is 2ft X 2 = 4ft (Recommended to be 6 ft by text) so A = **6 ft**

5. Absorption Area Length (B) = DFR/LLR = 525 gpd/4 gpd/ft ~ 131 ft (decrease absorption length by one half because doubled absorption width) absorption length is 131 ft/2 ~ **66 ft**
6. Basal Width (A+I) = LLR/BLR = 4 gpd/ft / 0.6 gpd/sf ~ **6.7ft**
   Since A = 6 ft, I = 6.7 ft – 6 ft ~ **0.7 ft** ("I" will also be calculated based on side slope, use higher of the two calculated "I")
7. Mound Fill Depth (D) = 24"-18"= **6"**
8. Mound Fill Depth (E) = D for 0% slope = **6"**
9. Mound Depths (F)(G)(H)
   a. F = **9"**
   b. G = **6"**
   c. H = **12"**
10. Determine the up slope width (J) = 3(D+F+G)(slope correction factor) = 3(6"+9"+12")(1) = 63" or ~ **5.3 ft**
11. Determine the end slope length (K) = 3(((D+E)/2)+F+H) = 3(((6"+6")/2)+9"+12") = 81" or **~6.8 ft**
12. Determine the down slope width (I) = 3(E+F+G)(slope correction factor) = 3(6"+9"+6")(1) = 63" or **5.3 ft**
13. Overall length and width (L+W)
    a. L = B+2K = 66+2(6.8) ~ **80 ft**
    b. W= I+A+J = 5.3+6+5.3 ~ **17 ft**

B. Design the Distribution Network using the Pressure Distribution Network Design Manual by Converse, 2000:

1. Configuration of the network ~ **80 ft X 17 ft**
2. Determine the length of laterals = **33 ft (center feed)**
3. Determine the perforation size, spacing, and position
   a. Size = **5/32" (recommended)**
   b. Spacing = **2 ft**
   c. Positioning = **downwards**
4. Determine the lateral pipe diameter = **1.5"**
5. Determine the number of perforations per lateral = **17 perforations per lateral**
   Number of perforations = 4 lateral x 17 perforations/lateral = 68 perforations
   Check: Maximum of 6 sf/perforation = 66 ft x 6 ft / 6 sf = 66 so ok
6. Determine the lateral discharge rate = 0.58 gallons per minute (gpm)/perforation X 17 perforation/lateral = **9.86 gpm/lateral**
7. Determine the number of laterals and the spacing between laterals = 4 **laterals spaced 3 feet apart**

8. Calculate the manifold size and length = **manifold size is 1.5" and length is 3 ft**
9. Determine the network discharge rate (NDR) = LDR X #laterals = 4 laterals X 9.86 gpm/lateral = 39.5 or 40 **gpm**
10. Total Dynamic Head = 19 feet (Figure 5)
11. Pump Summary = Pump must discharge 40 gpm against a head of 19 feet with a 1.5" force main (Figure 5)

Limitations

The geotechnical investigations were conducted to evaluate subsurface soil conditions for leachfield feasibility and leachfield design, in general accordance with the current NCRWQCB and HCDEH regulations. Our firm has prepared this report for your use on this project in substantial accordance with generally accepted leachfield feasibility practice, as it exists in the site area at the time of our study. No warranty is expressed or implied.

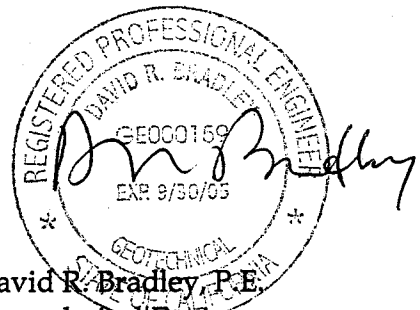
The analyses, conclusions, and recommendations contained in this report are based on site conditions that we observed at the time of our investigation, data from our subsurface explorations and laboratory tests, our current understanding of proposed project elements, and on our experience with similar project elements in similar geologic environments. We have assumed that the information obtained from our limited subsurface explorations is representative of the subsurface conditions throughout the site.

The field and laboratory work was conducted to investigate the site characteristics specifically addressed by this report. Assumptions about other site characteristics, such as hazardous materials contamination or geologic hazards, should not be made from this report.

If you should have any questions, please call me at (707) 441-8855.

Sincerely,

SHN Consulting Engineers & Geologists, Inc.

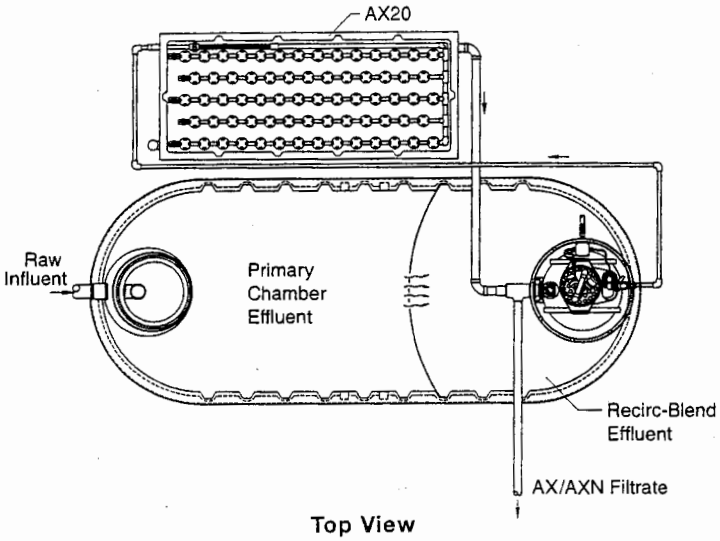


Vicki Hayler
Staff Geologist

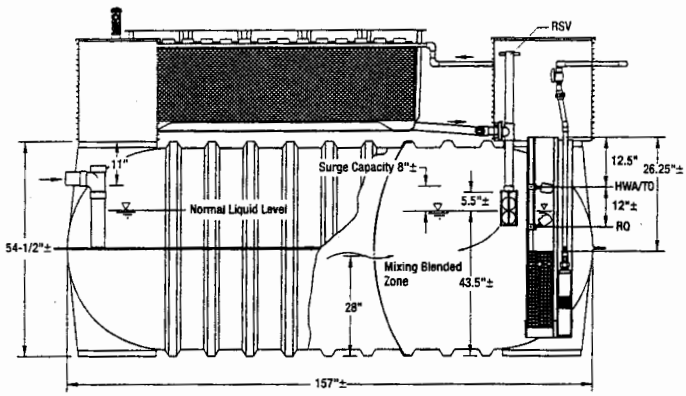
David R. Bradley, P.E.
Geotechnical Engineer

VMH/DRB:med:tla
Attachments: 1. Figures and Detail
2. Boring Logs
3. Test Results

Treatment Process/Performance Expectations



Top View



Side View

Processing Tank

The processing tank provides primary wastewater treatment. The tank is an enclosed, watertight receptacle designed to collect wastewater; segregate settleable and floatable solids (sludge and scum); accumulate, consolidate, and store solids; digest organic matter; and discharge treated effluent. BOD (biochemical oxygen demand) removals of greater than 65% and TSS (total suspended solids) removals of greater than 70% are easily accomplished.

The tank operates as a plug-flow type of reactor (fluid and particles enter and exit the tank in progressive sequence). Wastewater separates into three distinct layers: a floating scum layer, a bottom sludge layer, and a clear zone in between, which is relatively free of large solids. A pump vault with effluent filter located at the outlet end of the tank draws liquid effluent from the clear zone, and the filtered effluent is dosed to the next step in the treatment process . . . the AdvanTex® Textile Filter.

Because the AdvanTex® Treatment System operates in the recirculating mode, the filtrate from the Textile Filter returns to the processing tank in one of two ways: to the back (outlet end) of the tank in Mode 1 and to the front (inlet end) of the tank in Mode 3. This plumbing configuration affects effluent quality. Effluent quality is also contingent upon a number of other conditions inside the tank:

- strength and characteristics of incoming waste (see "Raw Influent," page 7)
- average flows within design range (typically 40-60 gallons per person per day)
- adequate long-term solids retention for thorough digestion
- watertightness of tank (for proper stratification of incoming waste to prevent treatment short circuiting and hydraulic overloading)
- proper size of tank (for minimum 24-hour hydraulic retention time through the tank's clear zone, at average flow rates and when sludge and scum are developed fully)

If the above conditions are met, you can expect treatment performance per the table on p. 7.

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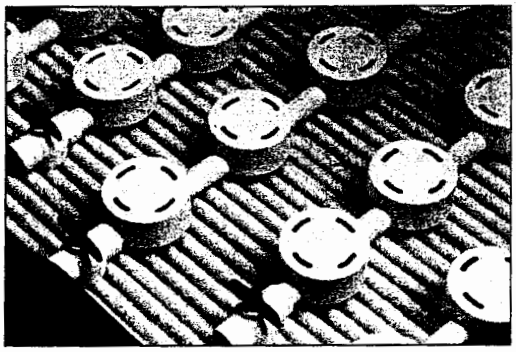
Treatment Process/Performance Expectations
(continued)



AdvanTex® Textile Filter

The AdvanTex® textile filter provides secondary wastewater treatment. The filter is a sturdy, watertight fiberglass basin filled with an engineered textile material. This lightweight, highly absorbent textile material treats a tremendous amount of wastewater in a small space.

The AdvanTex® filter operates in the recirculating mode, just like a recirculating sand or gravel filter, but loading rates are typically 5-20 times higher, for a number of reasons. For one thing, the textile media has a very large surface area—about 5 times greater than that of an equivalent volume of sand. Textile also has a greater void volume (for free-flow of oxygen) and greater water-holding capacity.

Wastewater percolates both through and between the textile media. A visible biological film normally develops on the filter medium within a few days. BOD_5 and TSS reductions occur almost immediately.

Within the filter, aerobic conditions exist that are ideal for microbes that convert ammonia to nitrate (nitrification). Other conditions exist, too, that result in further nitrogen reduction within the media. Some AdvanTex® filters are configured (Mode 3) so that the filtrate recirculates back to the high-carbon, low-oxygen environment at the inlet end of the processing tank, which is ideal for microbes that reduce nitrates to nitrogen gas (denitrification). Harmless nitrogen gas is then released freely back into the atmosphere. The acclimation period for nitrification may range from four to eight weeks, or longer in colder climates.

AdvanTex® filtrate effluent quality is dependent upon proper management of the recirc/blend effluent flowing into the filter (which, in turn, is dependent on the conditions described on the previous page). If proper conditions are met, and with typical average daily flows of 40-60 gallons per capita per day, you can expect the following treatment performance:

Performance Expectations

	BOD_5 mg/L	TSS mg/L	TKN mg/L
Raw Influent[1]	450	500	70
Primary Chamber Effluent	150	40	65
Processing Tank Recirc/Blend Effluent[2]	15-40	10-20	—[4]
AXN Filtrate[3]	5	5	—[4]

[1] *Source: Crites & Tchobanoglous. Small and Decentralized Wastewater Management Systems, p. 180, 183, 1998. McGraw-Hill. Based on 50 gpcd.*

[2] *Will vary with recirc ratios and mode configuration. The numbers here represent a recirc ratio between 2:1 and 4:1 and are derived from Orenco and third-party testing in Mode 1.*

[3] *Actual performance results, based on a six-month accumulative average from NSF (National Sanitation Foundation) testing on the AX20N at 500 gpd, using composite sampling. See p. 17 for additional information on treatment performance.*

Performance and servicing frequencies will tend to vary relative to the mass load being treated. Procedures for treating excessively high loads will require engineering review. For more information, please review AdvanTex® Design Criteria.

[4] *Dependant on treatment system configuration and recirc ratios.*

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Humboldt County Department of Health and Human Services
DIVISION OF ENVIRONMENTAL HEALTH
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envhealth@co.humboldt.ca.us

September 15, 2004

Bob Merril
California Coastal Commission
Northern California District Office
P. O. Box 4908
Eureka, CA 95502-4908

RE: Onsite Sewage Disposal System Repair/Replacement at 2888 Spears Road, Eureka, CA
AP #403-022-035

Dear Mr. Merril:

The Humboldt County Division of Environmental Health (DEH) has completed a review of the onsite wastewater treatment system design (prepared by SHN Consulting Engineers) for the residence on the aforementioned parcel. The proposed system design was evaluated in accordance with current regulatory requirements and found to be suitable for the specific site conditions encountered. The Humboldt County Division of Environmental Health has no objection to the installation of the wastewater treatment system as proposed.

Please notify DEH once the Coastal Commission has made a determination regarding the status of the proposed project. If you have any questions regarding this matter please contact me at (707) 268-2209.

Sincerely,

David Spinosa, R.E.H.S.
Senior Registered Environmental Health Specialist

DS/se

EXHIBIT NO. 6
APPLICATION NO.
1-04-055
COUNTY HEALTH
DEPT. APPROVAL