

March 2, 2020

Brooks Mitchell, Sarah Jackson, and City Council Members
605 School St
Loyalton, CA 96118

RE: Civil Engineering Opinion on Drainage Issues at 308 Main Street and 201 Patton Street

Dear Mr. Mitchell:

On January 24, 2020, the City of Loyalton (City) requested Farr West Engineering (Farr West) provide a Civil Engineering opinion of a current dispute over drainage infrastructure located at 308 Main Street and 201 Patton Street. Farr West has since made a visit to inspect existing conditions of the area and has reviewed multiple historic documents and subdivision maps in preparation of this opinion. It is important to note that Farr West Engineering is not the designated Floodplain Administrator for the City of Loyalton.

Floodplain management in the City of Loyalton is governed by the regulations of the City of Loyalton Ordinance No. 414 Chapter 14.01 – Floodplain Management (Ordinance 414). Farr West has reviewed this ordinance and has collaborated with the Sierra County Assistant Planning Director, Brandon Pangman, to develop the following conclusions:

1. Section 14.01.14 of Ordinance 414 appoints the Sierra County Director of Planning and Public Works as the Floodplain Administrator for the City. According to Brandon Pangman of the Sierra County Planning Dept., this delegation of Sierra County authority as the Floodplain Administrator was subject to a contract between the City and County that was rescinded in 2013. Farr West does not know who currently serves as the City Floodplain Administrator but assumes that this responsibility would fall to the City Council or Mayor, however, Farr West defers to the City attorney to provide an opinion on this assumption.
2. Section 14.01.05.060 of Ordinance 414 defines “Development” as, “any man-made change to improved or unimproved real estate...” It is the opinion of Farr West that the fence located on the south edge of properties 308 Main St. and 201 Patton St. may qualify as development as defined in this section.
3. Section 14.01.13 of Ordinance 414 states that, “A development permit shall be obtained before any construction or other development begins within any area of special flood hazard...” Farr West reviewed the Federal Emergency Management Agency (FEMA) FIRM 06091C0236C effective 2/2/2012 and concluded that properties 308 Main St. and 201 Patton St. are located within the special flood hazard area Zone AE. Per Brandon Pangman of Sierra County, “a development permit may be required (by the County) even if the activity is otherwise exempt

from building or grading permits” if the development is located within a special flood hazard area. To the best of our knowledge, the Mr. Neilson of 308 Main St. and 201 Patton St. did not submit a development permit before construction of the fence on the south edge of his properties.

4. Section 14.01.15.001 of Ordinance 414 gives the Floodplain Administrator the power to, “Review all development permits to determine that, “(a) the permit requirements of this ordinance [Ordinance 414] have been satisfied; [...] (c) the site is reasonably safe from flooding; [and] (d) the proposed development [...] will not increase the water surface elevation of the base flood more than one foot at any point within Sierra County...”

Farr West advises the City Floodplain Administrator to notify Mr. Neilson that the fence on his property may meet the definition of “development” as described Ordinance 414 and therefore may not be exempt from a development permit as described in Section 14.01.13 of Ordinance 414 because his property is located within FEMA special flood hazard area Zone AE. To the best of our knowledge, Mr. Neilson did not submit a development permit for the fence and therefore may be in violation of Section 14.01.13 of Ordinance 414.

Farr West recommends that the City Floodplain Administrator require Mr. Neilson to either a) remove the bottom one foot of fencing to allow for flow during the 1 percent (i.e. 100-year storm event) annual chance event, b) remove the fence completely or; c) apply for a development permit and provide clear plans of the man-made changes accompanied with an engineering analysis stamped by a professional engineer which certifies and demonstrates that the proposed development will not adversely affect the carrying capacity of the floodplain in that area, or increase the depth of flooding in the vicinity by more than one foot. Details of development permit requirements are included in Section 14.01.13 of Ordinance 414.

Per Section 14.01.15.001 part (e) if it is found that the fence has the potential to divert floodwaters or raise the base flood elevation by more than a foot during a 1% annual chance event (as mapped by FEMA), then the property owner must submit a Conditional Letter of Map Revision (CLOMR) for consideration and, if approved by the City Floodplain Administrator, be followed by a successful Letter of Map Revision (LOMR) approved by FEMA before a permit will be issued to abate the violation.

Farr West did not conduct any floodplain studies of the area and therefore cannot conclude with certainty if the fence raises the base flood elevation water surface level by more than one foot, however, in my opinion it appears that the fence would not raise the base flood elevation by more than one foot. If Mr. Neilson would prefer to keep the fence intact, Farr West recommends that he submit a development permit as detailed in Section 14.01.13 of Ordinance 414 which should include an engineering analysis of flood plain impacts as a result of the improvements. The dirt berms constructed on the northern side of Mr. Neilson’s property appear to have been built to reestablish the existing berm that runs parallel with Smithneck Creek but should also be included in the flood plain engineering analysis. In Farr West’s opinion there is no evidence that the dirt berms would redirect flows towards 54 Patterson Circle and adjacent properties. Instead, it appears that the berms serve the function of keeping flows in Smithneck Creek.

Lastly, Farr West recommends the City establish a formal Floodplain Administrator qualified to oversee the duties as outlined in Section 14.01.15 of Ordinance 414. During discussions with Brandon Pangman of Sierra County, he offered that the County may be willing to meet with the City to discuss the potential

options for reissuing the responsibilities of City Floodplain Administrator to the Sierra County Director of Planning and Public Works. Farr West recommends that the City work with Sierra County to potentially reassign the Floodplain Administrator position to the County. This reissuance of responsibilities would remove the burden from the City to enforce Floodplain Administrator duties in the future.

Attached to this document is Ordinance 414 and the FEMA FIRM 06091C0236C effective 2/2/2012 for reference. Please feel free to contact me at lucas@farrwestengineering.com if you have any questions.

Sincerely,



Lucas Tipton, P.E.
Principal Engineer
CA lic. no. 76284

Encls: City of Loyalton Ordinance 414 Chapter 14.01 Floodplain Management and FEMA FIRM 06091C0236C effective 2/2/2012

Cc: City of Loyalton Attorney, Steve Gross

ORDINANCE NO. 414
THE CITY COUNCIL OF THE CITY OF LOYALTON
DOES ORDAIN AS FOLLOWS:
AMENDED
CHAPTER 14.01 – FLOODPLAIN MANAGEMENT

PART 14 – FLOODPLAIN MANAGEMENT

14.01 - Statutory Authorization

The Legislature of the State of California has in Government Code Sections 65302, 65560, and 65800 *et seq.*, conferred upon local government units authority to adopt regulations designed to promote the public health, safety, and general welfare of its citizenry. Therefore, Loyalton City Council of the City of Loyalton does hereby adopt the following floodplain management regulations.

14.02 - Findings of Fact

- (a) The flood hazard areas of the City of Loyalton are subject to periodic inundation which can result in loss of life and property, health and safety hazards, disruption of commerce and governmental services, extraordinary public expenditures for flood protection and relief, and impairment of the tax base, all of which adversely affect the public health, safety, and general welfare.
- (b) These flood losses are caused by uses that are inadequately elevated, flood proofed, or protected from flood damage. The cumulative effect of obstructions in areas of special flood hazards which increase flood heights and velocities also contribute to the flood loss.

14.03 - Statement of Purpose

It is the purpose of this ordinance to promote the public health, safety, and general welfare, and to minimize public and private losses due to flood conditions in specific areas by provisions designed to:

- (a) Protect human life and health;
- (b) Minimize expenditure of public money for costly flood control projects;
- (c) Minimize the need for rescue and relief efforts associated with flooding and generally undertaken at the expense of the general public;
- (d) Minimize prolonged business interruptions;
- (e) Minimize damage to public facilities and utilities such as water and gas mains; electric, telephone and sewer lines, and streets and bridges located in areas of special flood hazard;
- (f) Help maintain a stable tax base by providing for the sound use and development of areas of special flood hazard so as to minimize future blighted areas caused by flood damage;
- (g) Ensure that potential buyers are notified that property is in an area of special flood hazard;
and
- (h) Ensure that those who occupy the areas of special flood hazard assume responsibility for their actions.

14.04 - Methods of Reducing Flood Losses

In order to accomplish its purposes, this ordinance includes methods and provisions to:

- (a) Restrict or prohibit uses which are dangerous to health, safety, and property due to water or erosion hazards, or which result in damaging increases in erosion, flood heights or velocities;
- (b) Require that uses vulnerable to floods, including facilities which serve such uses, be protected against flood damage at the time of initial construction;
- (c) Control the alteration of natural floodplains, stream channels, and natural protective barriers, which help accommodate or channel flood waters;
- (d) Control filling, grading, dredging, and other development which may increase flood damage; and
- (e) Prevent or regulate the construction of flood barriers which will unnaturally divert flood waters or which may increase flood hazards in other areas.

14.05 - Definitions

Unless specifically defined below, words or phrases used in this ordinance shall be interpreted so as to give them the meaning they have in common usage and to give this ordinance its most reasonable application.

14.05.010 - "Accessory structure" means a non-habitable structure that is used solely for the parking of cars, limited storage of materials and other similar accessory uses.

14.05.020 - "Accessory use" means a use which is incidental and subordinate to the principal use of the parcel of land on which it is located.

14.05.030 - "Appeal" means a request for a review of the Floodplain Administrator's interpretation of any provision of this ordinance.

14.05.040 - "Base flood" means a flood which has a one percent chance of being equaled or exceeded in any one year (also called the "100-year flood"). Base flood is the term used throughout this ordinance.

14.05.050 - "Basement" means any area of the building having its floor subgrade - i.e., below ground level - on all sides.

14.05.060 - "Development" means any man-made change to improved or unimproved real estate, including but not limited to buildings or other structures, mining, dredging, filling, grading, paving, excavation or drilling operations or storage of equipment or materials.

14.05.070 - "Encroachment" means the advance or infringement of uses, plant growth, fill, excavation, buildings, permanent structures or development into a floodplain which may impede or alter the flow capacity of a floodplain.

14.05.080 - "Existing manufactured home park or subdivision" means a manufactured home park or subdivision for which the construction of facilities for servicing the lots on which the manufactured homes are to be affixed (including, at a minimum, the installation of utilities, the construction of streets, and either final site grading or the pouring of concrete pads) is completed before the effective date of the floodplain management regulations adopted by a community.

14.05.090 - "Expansion to an existing manufactured home park or subdivision" means the preparation of additional sites by the construction of facilities for servicing the lots on which the manufactured homes are to be affixed (including the installation of utilities, the construction of streets, and either final site grading or the pouring of concrete pads).

14.05.100 - "Flood, flooding, or flood water" means a general and temporary condition of partial or complete inundation of normally dry land areas from the overflow of inland waters; the unusual and rapid accumulation or runoff of surface waters from any source.

14.05.110 - "Flood Boundary and Floodway Map (FBFM)" means the official map on which the Federal Emergency Management Agency or Federal Insurance Administration has delineated both the areas of special flood hazards and the floodway.

14.05.120 - "Flood Hazard Boundary Map" means the official map on which the Federal Emergency Management Agency or Federal Insurance Administration has delineated the areas of flood hazards.

14.05.130 - "Flood Insurance Rate Map" means the official map on which the Federal Emergency Management Agency or Federal Insurance Administration has delineated both the areas of special flood hazards and the risk premium zones applicable to the community.

14.05.140 - "Flood Insurance Study" means the official report provided by the Federal Insurance Administration that includes flood profiles, the Flood Insurance Rate Map, the Flood Boundary and Floodway Map, and the water surface elevation of the base flood.

14.05.150 - "Floodplain or flood-prone area" means any land area susceptible to being inundated by water from any source - see "Flooding."

14.05.160 - "Floodplain Administrator" is the individual appointed to administer and enforce the floodplain management regulations.

14.05.170 - "Floodplain management" means the operation of an overall program of corrective and preventive measures for reducing flood damage and preserving and enhancing, where possible, natural resources in the floodplain, including but not limited to emergency preparedness plans, flood control works, floodplain management regulations, and open space plans.

14.05.180 - "Floodplain management regulations" means this ordinance and other zoning ordinances, subdivision regulations, building codes, health regulations, special purpose ordinances (such as grading and erosion control) and other application of police power which control development in flood-prone areas. This term describes federal, state or local regulations in any combination thereof which provide standards for preventing and reducing flood loss and damage.

14.05.190 - "Floodproofing" means any combination of structural and nonstructural additions, changes, or adjustments to structures which reduce or eliminate flood damage to real estate or improved real property, water and sanitary facilities, structures, and their contents.

14.05.200 - "Floodway" means the channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than one foot. Also referred to as "Regulatory Floodway."

14.05.210 - "Floodway fringe" is that area of the floodplain on either side of the "Regulatory Floodway" where encroachment may be permitted.

14.05.220 - "Fraud and victimization" as related to Section 14.23 of this ordinance, means that the variance granted must not cause fraud on or victimization of the public. In examining this requirement, the Loyalton City Council will consider the fact that every newly constructed building adds to government responsibilities and remains a part of the community for fifty to one-hundred years. Buildings that are permitted to be constructed below the base flood elevation are subject during all those years to increased risk of damage from floods, while future owners of the property and the community as a whole are subject to all the costs, inconvenience, danger, and suffering that those increased flood damages bring. In addition, future owners may purchase the property, unaware that it is subject to potential flood damage, and can be insured only at very high flood insurance rates.

14.05.230 - "Functionally dependent use" means a use which cannot perform its intended purpose unless it is located or carried out in close proximity to water. The term includes only docking facilities, port facilities that are necessary for the loading and unloading of cargo or passengers, and ship building and ship repair facilities, and does not include long-term storage or related manufacturing facilities.

14.05.240 - "Governing body" is the local governing unit, i.e., county or municipality, that is empowered to adopt and implement regulations to provide for the public health, safety and general welfare of its citizenry.

14.05.250- "Habitable area" is living and/or sleeping quarters, or enclosed conditioned spaces suitable for overnight occupation and eligible for classification under the California Building Code as Residential Group R.

14.05.260 - "Hardship" as related to Section 14.23 of this ordinance means the exceptional hardship that would result from a failure to grant the requested variance. The Sierra County Board of Supervisors requires that the variance be exceptional, unusual, and peculiar to the property involved. Mere economic or financial hardship alone is not exceptional. Inconvenience, aesthetic considerations, physical handicaps, personal preferences, or the disapproval of one's neighbors likewise cannot, as a rule, qualify as an exceptional hardship. All of these problems can be resolved through other means without granting a variance, even if the alternative is more expensive, or requires the property owner to build elsewhere or put the parcel to a different use than originally intended.

14.05.270 - "Highest adjacent grade" means the highest natural elevation of the ground surface prior to construction next to the proposed walls of a structure.

14.05.280 - "Historic structure" means any structure that is

- (a) Listed individually in the National Register of Historic Places (a listing maintained by the Department of Interior) or preliminarily determined by the Secretary of the Interior as meeting the requirements for individual listing on the National Register;
- (b) certified or preliminarily determined by the Secretary of the Interior as contributing to the historical significance of a registered historic district or a district preliminarily determined by the Secretary to qualify as a registered historic district;
- (c) individually listed on a state inventory of historic places in states with historic preservation programs which have been approved by the Secretary of Interior; or

- (d) individually listed on a local inventory of historic places in communities with historic preservation programs that have been certified either by an approved state program as determined by the Secretary of the Interior or directly by the Secretary of the Interior in states with approved programs.

14.05.290 - "Levee" means a man-made structure, usually an earthen embankment, designed and constructed in accordance with sound engineering practices to contain, control or divert the flow of water so as to provide protection from temporary flooding.

14.05.300 - "Levee system" means a flood protection system which consists of a levee, or levees, and associated structures, such as closure and drainage devices, which are constructed and operated in accord with sound engineering practices.

14.05.310 - "Lowest floor" means the lowest floor of the lowest enclosed area, including basement (see "Basement" definition).

- (a) An unfinished or flood resistant enclosure below the lowest floor that is usable solely for parking of vehicles, building access or storage in an area other than a basement area, is not considered a building's lowest floor provided it conforms to applicable non-elevated design requirements, including, but not limited to:
1. the wet floodproofing standard in Subsection 14.17.003;
 2. the anchoring standards in Subsection 14.17.001;
 3. the construction materials and methods standards in Subsection 14.17.002; and
 4. the standards for utilities in Section 14.18.
- (b) For residential structures, all subgrade enclosed areas are prohibited as they are considered to be basements (see "Basement" definition). This prohibition includes below-grade garages and storage areas.

14.05.140 - "Manufactured home" means a structure, transportable in one or more sections, which is built on a permanent chassis and is designed for use with or without a permanent foundation when attached to the required utilities. The term "manufactured home" does not include a "recreational vehicle."

14.05.330 - "Manufactured home park or subdivision" means a parcel (or contiguous parcels) of land divided into two or more manufactured home lots for rent or sale.

14.05.340 - "Mean sea level" means, for purposes of the National Flood Insurance Program, the National Geodetic Vertical Datum (NGVD) of 1929 or other datum, to which base flood elevations shown on a community's Flood Insurance Rate Map are referenced.

14.05.350- "Mixed-Use construction" means buildings, structures or other improvements containing design elements or spaces suitable for both commercial, non-residential uses and residential-type uses including but not limited to habitable areas. Living quarters accessory to permitted commercial uses.

14.05.360 - "New construction," for floodplain management purposes, means structures for which the "start of construction" commenced on or after the effective date of floodplain management regulations adopted by this community, and includes any subsequent improvements to such structures.

14.05.370 - "New manufactured home park or subdivision" means a manufactured home park or subdivision for which the construction of facilities for servicing the lots on which the manufactured homes are to be affixed (including at a minimum, the installation of utilities, the construction of streets, and either final site grading or the pouring of concrete pads) is completed on or after the effective date of floodplain management regulations adopted by this community.

14.05.380 - "Obstruction" includes, but is not limited to, any dam, wall, wharf, embankment, levee, dike, pile, abutment, protection, excavation, channelization, bridge, conduit, culvert, building, wire, fence, rock, gravel, refuse, fill, structure, vegetation or other material in, along, across or projecting into any watercourse which may alter, impede, retard or change the direction and/or velocity of the flow of water, or due to its location, its propensity to snare or collect debris carried by the flow of water, or its likelihood of being carried downstream.

14.05.390 - "One-hundred-year flood" or "100-year flood" - see "Base flood."

14.05.400 - "Public safety and nuisance" as related to Section 14.25 of this ordinance means that the granting of a variance must not result in anything which is injurious to safety or health of an entire community or neighborhood, or any considerable number of persons, or unlawfully obstructs the free passage or use, in the customary manner, of any navigable lake, river, bay, stream, canal, or basin.

14.05.410 - "Recreational vehicle" means a vehicle which is

- (a) Built on a single chassis;
- (b) 400 square feet or less when measured at the largest horizontal projection;
- (c) Designed to be self-propelled or permanently towable by a light-duty truck; and
- (d) Designed primarily not for use as a permanent dwelling but as temporary living quarters for recreational, camping, travel, or seasonal use.

14.05.420 - "Regulatory floodway" means the channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than one foot.

14.05.430 - "Remedy a violation" means to bring the structure or other development into compliance with state or local floodplain management regulations or, if this is not possible, to reduce the impacts of its noncompliance. Ways that impacts may be reduced include protecting the structure or other affected development from flood damages, implementing the enforcement provisions of the ordinance or otherwise deterring future similar violations, or reducing State or Federal financial exposure with regard to the structure or other development.

14.05.440 - "Riverine" means relating to, formed by, or resembling a river (including tributaries), stream, brook, etc.

14.05.450 - "Sheet flow area" - see "Area of shallow flooding."

14.05.460 - "Special flood hazard area (SFHA)" means an area having special flood hazards and shown on an FHBM or FIRM as Zone A, AI-A30, AE, A99, E, or M.

14.05.470 - "Start of construction" includes substantial improvement and other proposed new development and means the date the building permit was issued, provided the actual start of construction, repair, reconstruction, rehabilitation, addition, placement,

or other improvement was within 180 days from the date of the permit. The actual start means either the first placement of permanent construction of a structure on a site, such as the pouring of slab or footings, the installation of piles, the construction of columns, or any work beyond the stage of excavation; or the placement of a manufacture home on a foundation. Permanent construction does not include land preparation, such as clearing, grading, and filling; nor does it include the installation of streets and/or walkways; nor does it include excavation for a basement, footings, piers, or foundations or the erection of temporary forms. For a substantial improvement, the actual start of construction means the first alteration of any wall, ceiling, floor, or other structural part of a building, whether or not that alteration affects the external dimensions of the building.

14.05.480 - "Structure" means a walled and/or roofed building that is principally above ground; this includes a gas or liquid storage tank or a manufactured home.

14.05.490 - "Substantial damage" means damage of any origin sustained by a structure whereby the cost of restoring the structure to its before damaged condition would equal or exceed 50 percent of the market value of the structure before the damage occurred.

14.05.500 - "Substantial improvement" means any reconstruction, rehabilitation, addition, or other proposed new development of a structure, the cost of which equals or exceeds 50 percent of the market value of the structure before the "start of construction" of the improvement. This term includes structures which have incurred "substantial damage," regardless of the actual repair work performed. The term does not, however, include either:

- (a) Any project for improvement of a structure to correct existing violations or state or local health, sanitary, or safety code specifications which have been identified by the local code enforcement official and which are the minimum necessary to assure safe living conditions; or
- (b) Any alteration of a "historic structure," provided that the alteration will not preclude the structure's continued designation as a "historic structure."

14.05.510 - "Variance" means a grant of relief from the requirements of this ordinance which permits construction in a manner that would otherwise be prohibited by this ordinance.

14.05.520 - "Violation" means the failure of any structure or other development to be fully compliant with the community's floodplain management regulations. A structure or other development without the elevation certificate, other certifications, or other evidence of compliance required in this ordinance is presumed to be in violation until such time as that documentation is provided.

14.05.530 - "Water surface elevation" means the height, in relation to the National Geodetic Vertical Datum (NGVD) of 1929 (or other datum, where specified), of floods of various magnitudes and frequencies in the floodplains of coastal or riverine areas.

14.05.540 - "Watercourse" means a lake, river, creek, stream, wash, arroyo, channel or other topographic feature on or over which waters flow at least periodically. Watercourse includes specifically designated areas in which substantial flood damage may occur.

14.06 - Lands to Which this Ordinance Applies

This ordinance shall apply to all areas of special flood hazards within the jurisdiction of the City of Loyalton.

14.07 - Basis for Establishing the Areas of Special Flood Hazard

The areas of special flood hazard identified by the Federal Emergency Management Agency (FEMA) in the "Flood Insurance Study (FIS) for Sierra County, California and incorporated areas" dated September 1, 1988 and accompanying Flood Insurance Rate Maps (FIRM's) and Flood Boundary and Floodway Maps (FBFM's) dated September 1, 1988, and all subsequent amendments and/or revisions, are hereby adopted by reference and declared to be a part of this ordinance. This FIS and attendant mapping is the minimum area of applicability of this ordinance and may be supplemented by studies for other areas which allow implementation of this ordinance and which are recommended to the Loyalton City Council by the Floodplain Administrator. The study, FIRM's and FBFM's are on file at the City of Loyalton City Hall Office, 210 Front Street, Loyalton, California, 96118.

14.08 - Compliance

No development, structure or land shall hereafter be constructed, located, extended, converted, or altered without full compliance with the term of this ordinance and other applicable regulations. Violation of the requirements (including violations of conditions and safeguards established in connection with conditions) shall constitute a misdemeanor. Nothing herein shall prevent the City Council of the City of Loyalton from taking such lawful action as is necessary to prevent or remedy any violation.

14.09 - Abrogation and Greater Restrictions

This ordinance is not intended to repeal, abrogate, or impair any existing easements, covenants, or deed restrictions. However, where this ordinance and another ordinance, easement, covenant, or deed restriction conflict or overlap, whichever imposes the more stringent restrictions shall prevail.

14.10 - Interpretation

In the interpretation and application of this ordinance, all provisions shall be:

- (a) Considered as minimum requirements;
- (b) Liberally construed in favor of the governing body; and
- (c) Deemed neither to limit nor repeal any other powers granted under state statutes.

14.11 - Warning and Disclaimer of Liability

The degree of flood protection required by this ordinance is considered reasonable for regulatory purposes and is based on scientific and engineering considerations. Larger floods can and will occur on rare occasions. Flood heights may be increased by man-made or natural causes. This ordinance does not imply that land outside the areas of special flood hazards or uses permitted within such areas will be free from flooding or flood damages. This ordinance shall not create liability on the part of the Loyalton City Council, any officer or employee thereof, the State of California, or the Federal Insurance Administration, Federal Emergency Management Agency, for any flood damages that result from reliance on this ordinance or any administrative decision lawfully made hereunder.

14.12 - Severability

This ordinance and the various parts thereof are hereby declared to be severable. Should any section of this ordinance be declared by the courts to be unconstitutional or invalid, such decision shall not affect the validity of the ordinance as a whole, or any portion thereof other than the section so declared to be unconstitutional or invalid.

14.13 - Establishment of Development Permit

A development permit shall be obtained before any construction or other development begins within any area of special flood hazard established in Section 14.07. Application for a development permit shall be made on forms furnished by the Floodplain Administrator. The applicant shall provide the following minimum information:

- (a) Plans in duplicate, drawn to scale, showing:
 - 1. The nature, location, dimensions, and elevation of the area in question; existing or proposed structures, storage of materials and equipment and their location;
 - 2. Proposed locations of water supply, sanitary sewer, and other facilities;
 - 3. Grading information showing existing and proposed contours, any proposed fill, and drainage facilities;
 - 4. Location of the regulatory floodway when applicable;
 - 5. Base Flood Elevation information. The applicant shall provide a flood elevation certificate as certified by a registered professional engineer or surveyor.
 - 6. Proposed elevation in relation to mean sea level, of the lowest floor (including basement) of all structures; and
 - 7. Proposed elevation in relation to mean sea level to which any nonresidential structure will be floodproofed, as required in Section 14.17.003.b. of this ordinance and detailed in FEMA Technical Bulletin TB 3-93.
- (b) Certification from a registered professional engineer or surveyor that the foundation for the construction is built to the correct elevation standard per the preliminary elevation certificate.
- (c) Prior to final approval of the development permit: the applicant shall provide certification from a registered professional engineer or surveyor, in the form of a final elevation certificate, that the final construction meets the correct elevation standard per the preliminary elevation certificate and the requirements of this part.
- (d) Certification from a registered professional engineer or architect that the nonresidential floodproofed building meets the floodproofing criteria in Section 14.17.003.b.
- (e) For a crawl-space foundation, location and total net area of foundation openings as required in Section 14.17.004. of this ordinance and detailed in FEMA Technical Bulletins 1-93 and 7-93.
- (f) Description of the extent to which any watercourse will be altered or relocated as a result of proposed development.
- (g) All appropriate certifications listed in Section 14.15.004.

14.14 - Designation of the Floodplain Administrator

The Sierra County Director of Planning and Public Works is hereby appointed to administer, implement, and enforce this Part by granting or denying development permits in accord with its provisions.

14.15 - Duties and Responsibilities of the Floodplain Administrator

The duties and responsibilities of the Floodplain Administrator shall include, but not be limited to the following.

14.15.001 - Permit Review

Review all development permits to determine that

- (a) permit requirements of this ordinance have been satisfied;
- (b) all other required state and federal permits have been obtained;
- (c) the site is reasonably safe from flooding;
- (d) the proposed development does not adversely affect the carrying capacity of areas where base flood elevations have been determined but a floodway has not been designated. This means that the cumulative effect of the proposed development when combined with all other existing and anticipated development will not increase the water surface elevation of the base flood more than one foot at any point within Sierra County; and
- (e) All Letters of Map Revision (LOMR's) for flood control projects are approved prior to the issuance of building permits. Building permits must not be issued based on Conditional Letters of Map Revision (CLOMR's). Approved CLOMR's allow construction of the proposed flood control project and land preparation as specified in the "start of construction" definition.

14.15.002 - Review, Use and Development of Other Base Flood Data

When base flood elevation data has not been provided in accordance with Section 14.07, the Floodplain Administrator shall obtain, review, and reasonably utilize any base flood elevation and floodway data available from a federal or state agency, or other source, in order to administer Sections 14.17 through 14.22. Any such information shall be submitted to the City Council of the City of Loyalton for adoption.

NOTE: A base flood elevation may be obtained using one of two methods from the FEMA publication, FEMA 265. "Managing Floodplain Development in Approximate Zone A Areas - A Guide for Obtaining and Developing Base (100-year) Flood Elevation" dated July 1995.

14.15.003 - Notification of Other Agencies

In alteration or relocation of a watercourse:

- (a) notify adjacent communities and the California Department of Water Resources prior to alteration or relocation;
- (b) submit evidence of such notification to the Federal Insurance Administration, Federal Emergency Management Agency; and
- (c) assure that the flood carrying capacity within the altered or relocated portion of said watercourse is maintained.

14.15.004 - Documentation of Floodplain Development

Obtain and maintain for public inspection and make available as needed the following:

- (a) certification required by Subsection 14.17.003(a) (floor elevations);
- (b) certification required by Subsection 14.17.003(b) (elevation or floodproofing of nonresidential structures);
- (c) certification required by Subsection 14.17.004 (floodproofing standard);
- (d) certification of elevation required by Section 14.19(b) (subdivision standards);

- (e) certification required by Section 14.22(a) (floodway encroachments).

14.15.005 - Map Determinations

Make interpretations where needed, as to the exact location of the boundaries of the areas of special flood hazard, for example, where there appears to be a conflict between a mapped boundary and actual field conditions. The person contesting the location of the boundary shall be given a reasonable opportunity to appeal the interpretation as provided in Sections 14.23 through 14.25.

14.15.006 - Remedial Action

Take action to remedy violations of this ordinance as specified in Section 14.08.

14.16 - Appeals

The City Council of the City of Loyalton shall hear and decide appeals when it is alleged there is an error in any requirement, decision, or determination made by the Floodplain Administrator in the enforcement or administration of this ordinance.

14.17 - Standards of Construction

In all areas of special flood hazards the following standards are required.

14.17.001 - Anchoring

- (a) All new construction and substantial improvements shall be adequately anchored to prevent flotation, collapse or lateral movement of the structure resulting from hydrodynamic and hydrostatic loads, including the effects of buoyancy; and
- (b) All manufactured homes shall meet the anchoring standards of Section 14.20.

14.17.002 - Construction Materials and Methods

All new construction and substantial improvement shall be constructed

- (a) with materials and utility equipment resistant to flood damage;
- (b) using methods and practices that minimize flood damage;
- (c) with electrical, heating, ventilation, plumbing and air conditioning equipment and other service facilities that are designed and/or located so as to prevent water from entering or accumulating within the components during conditions of flooding; and
- (d) within Zones AH or AO, so that there are adequate drainage paths around structures on slopes to guide flood waters around and away from proposed structures.

14.17.003 - Elevation and Floodproofing

(See Section 14.05, Definitions, for "basement," "lowest floor," "new construction," "substantial damage" and "substantial improvement".)

- (a) **Residential Construction.**

All new construction or substantial improvements of residential structures shall have the lowest floor, including basement:

1. In AE, AH, A1-30 Zones, elevated to at least *one foot* above the base flood elevation.
2. In an AO zone, elevated above the highest adjacent grade to a height at least *one foot* above the depth number specified in feet on the FIRM, or elevated at least 2 feet above the highest adjacent grade if no depth number is specified.
3. In an A zone, without BFE's specified on the FIRM [unnumbered A zone], elevated to at least *one foot* above the base flood elevation; as determined under Section 14.15.002.

Upon the completion of the structure, the elevation of the lowest floor including basement shall be certified by a registered professional engineer or surveyor, and verified by the building inspector to be properly elevated. Such certification or verification shall be provided to the Floodplain Administrator.

(b) Nonresidential Construction.

All new construction or substantial improvements of nonresidential construction shall either be elevated to conform with Subsection 14.17.003(a), or

1. be floodproofed, together with attendant utility and sanitary facilities, below the elevation recommended under Subsection 14.17.003(a) so that the structure is watertight with walls substantially impermeable to the passage of water; and
2. have structural components capable of resisting hydrostatic and hydrodynamic loads and effects of buoyancy; and
3. be certified by a registered professional engineer or architect that the standards of this Subsection 14.17.003(b) are satisfied. Such certification shall be provided to the Floodplain Administrator.

(c) Garages and low cost accessory structures.

1. Attached garages.

- (A.) A garage attached to a residential structure, constructed with the garage floor slab below the BFE, must be designed to allow for the automatic entry of flood waters. See Section 14.17.004. Areas of the garage below the BFE must be constructed with flood resistant materials. See Section 14.17.002
- (B.) A garage attached to a nonresidential structure must meet the above requirements or be dry floodproofed. For guidance on below grade parking areas, see FEMA Technical Bulletin TB-6

2. Detached garages and accessory structures.

- (A.) An "accessory structure," as defined in section 14.05., may be constructed such that its lowest floor is below the base flood elevation (BFE), provided the structure is designed and constructed in accordance with the following requirements:
 - i.) Accessory structures shall be no larger than 1000 square feet, except in the case of barns located on lands in the Agriculture zoning district.
 - ii.) The portions of the accessory structure located below the BFE must be built using flood-resistant materials;

- iii.) The accessory structure must be adequately anchored to prevent flotation, collapse and lateral movement;
- iv.) Any mechanical and utility equipment in the accessory structure must be elevated or floodproofed to or above the BFE;
- v.) The accessory structure must be designed to allow for the automatic entry and exit of flood waters in accordance with Section 14.17.004.

(B.) Detached garages and accessory structures not meeting the above standards must be constructed in accordance with all applicable standards in Section 14.17.003(a).

(d) Mixed-Use Construction and Hotels/Motels

All new construction or substantial improvement of mixed-use structures or hotel/motels shall either be:

- 1. elevated to conform with Section 14.17.003(a), or
- 2. designed and constructed such that the lowest floor of habitable areas are elevated to at least *one foot* above the base flood elevation while non-habitable areas below the base flood elevation may be treated either as non-residential construction under the provisions of Section 14.17.003(b) or as a fully enclosed area below the base flood elevation used solely for the parking of vehicles or building access/storage under the provisions of Section 14.17.004.

(e) Manufactured Homes

See section 14.20.

14.17.004 - Flood Openings.

All new construction and substantial improvements of structures with fully enclosed areas below the lowest floor (excluding basements) that are usable solely for parking of vehicles, building access or storage, and which are subject to flooding, shall be designed to automatically equalize hydrostatic and hydrodynamic flood forces on exterior walls by allowing for the automatic entry and exit of floodwater. Designs for meeting this requirement must meet or exceed the following minimum criteria:

- (a) For non-engineered openings:
 - 1. have a minimum of two openings on two different sides having a total net area of not less than one square inch for every square foot of enclosed area subject to flooding; and
 - 2. the bottom of all openings shall be no higher than one foot above grade; and
 - 3. openings may be equipped with screens, louvers, valves or other coverings or devices provided that they permit the automatic entry and exit of floodwater; and
 - 4. buildings with more than one enclosed area must have openings on exterior walls for each area to allow flood water to directly enter; or
- (b) Be certified by a registered civil engineer or architect.

14.18 - Standards for Utilities

- (a) All new and replacement water supply and sanitary sewage systems shall be designed to minimize

or eliminate:

1. infiltration of flood waters into the systems; and
 2. discharge from the systems into flood waters.
- (b) On-site waste disposal systems shall be located to avoid impairment to them, or contamination from them during flooding.

14.19 - Standards for Subdivisions

- (a) All preliminary subdivision proposals shall identify the flood hazard area and the elevation of the base flood.
- (b) All subdivision plans will provide the elevation of proposed structure(s) and pad(s). If the site is filled above the base flood elevation, the lowest floor and pad elevations shall be certified by a registered professional engineer or surveyor and provided to the Floodplain Administrator.
- (c) All subdivision proposals shall be consistent with the need to minimize flood damage.
- (d) All subdivision proposals shall have public utilities and facilities such as sewer, gas, electrical and water systems located and constructed to minimize flood damage.
- (e) All subdivisions shall provide adequate drainage to reduce exposure to flood hazards.

14.20 - Standards for Manufactured Homes

- (a) All manufactured homes that are placed or substantially improved, within Zones A1-30, AH, and AE on the community's Flood Insurance Rate Map, on sites located:
 1. outside of a manufactured home park or subdivision;
 2. in a new manufactured home park or subdivision;
 3. in an expansion to an existing manufactured home park or subdivision; or
 4. in an existing manufactured home park or subdivision on a site upon which a manufactured home has incurred "substantial damage" as the result of a flood,shall be elevated on a permanent foundation such that the lowest floor of the manufactured home is elevated to at least *one foot* above the base flood elevation and be securely fastened to an adequately anchored foundation system to resist flotation, collapse and lateral movement.
- (b) All manufactured homes to be placed or substantially improved on sites in an existing manufactured home park or subdivision within Zones A1-30, AH, AE, V1-30, V, and VE on the community's Flood Insurance Rate Map that are not subject to the provisions of Section 14.20(a) will be securely fastened to an adequately anchored foundation system to resist flotation, collapse, and lateral movement, and be elevated so that either the:
 1. lowest floor of the manufactured home is at least *one foot* above the base flood elevation, or
 2. manufactured home chassis is supported by reinforced piers or other foundation elements of at least equivalent strength that are no less than 36 inches in height above grade so long as the BFE is no higher than 24 inches above grade.

Additional guidance may be found in FEMA Technical Bulletins TB 1-93 and TB 7-93.

14.21 - Standards for Recreational Vehicles

All recreational vehicles placed on sites within Zones AI-30, AH, and AE on the community's Flood Insurance Rate Map will either:

- (a) be on the site for fewer than 180 consecutive days, and be fully licensed and ready for highway use -- a recreational vehicle is ready for highway use if it is on its wheels or jacking system, is attached to the site only by quick disconnect type utilities and security devices) and has no permanently attached additions; or
- (b) meet the permit requirements of Sections 14.13 through 14.16 of this ordinance and the elevation and anchoring requirements for manufactured homes in Section 14.20(a).

14.22 - Floodways

Located within areas of special flood hazard established in Section 14.07 may be areas designated as floodways. Since the floodway is an extremely hazardous area due to the velocity of flood waters which carry debris, potential projectiles, and erosion potential, the following provisions apply.

- (a) Within an adopted regulatory floodway, the City of Loyalton shall prohibit encroachments, including fill, new construction, substantial improvement, and other new development unless certification by a registered professional engineer is provided demonstrating that encroachments shall not result in any increase in [the base] flood elevation during the occurrence of the base flood discharge.
- (b) If Section 14.22(a) is satisfied, all new construction, substantial improvement, and other proposed new development shall comply with all other applicable flood hazard reduction provisions of Sections 14.13 through 14.16.

14.23 - Nature Of Variances

The variance criteria set forth in this Section of the ordinance are based on the general principle of zoning law that variances pertain to a piece of property and are not personal in nature. A variance may be granted for a parcel of property with physical characteristics so unusual that complying with the requirements of this ordinance would create an exceptional hardship to the applicant or the surrounding property owners. The characteristics must be unique to the property and not be shared by adjacent parcels. The unique characteristic must pertain to the land itself, not to the structure, its inhabitants, or the property owners.

It is the duty of the Loyalton City Council to help protect its citizens from flooding. This need is so compelling and the implications of the cost of insuring a structure built below flood level are so serious that variances from the flood elevation or from other requirements in the flood ordinance are quite rare. The long term goal of preventing and reducing flood loss and damage can only be met if variances are strictly limited. Therefore, the variance guidelines provided in this ordinance are more detailed and contain multiple provisions that must be met before a variance can be properly granted. The criteria are designed to screen out those situations in which alternatives other than a variance are more appropriate.

14.24 - Conditions for Variances

- (a) Generally, variances may be issued for new construction, substantial improvement, and other proposed new development to be erected on a lot of one-half acre or less in size contiguous to and surrounded by lots with existing structures constructed below the base flood level, providing that the procedures of Sections 14.13 through 14.22 of this ordinance have been fully considered. As the lot size increases beyond one-half acre, the technical justification required for issuing the variance increases.
- (b) Variances may also be issued for the repair or rehabilitation of "historic structures" (as defined in Subsection 14.05.027 of this ordinance) upon a determination that the proposed repair or rehabilitation will not preclude the structure's continued designation as an historic structure and the variance is the minimum necessary to preserve the historic character and design of the structure.

- (c) Variances shall not be issued within any mapped regulatory floodway if any increase in flood levels during the base flood discharge would result.
- (d) Variances shall only be issued upon a determination that the variance is the "minimum necessary" considering the flood hazard, to afford relief. "Minimum necessary" means to afford relief with a minimum of deviation from the requirements of this ordinance. For example, in the case of variances to an elevation requirement, this means the Loyalton City Council or the Flood Plain Administrator need not grant permission for the applicant to build at grade, or even to whatever elevation the applicant proposes, but only to that elevation which the Flood Plain Administrator or the Loyalton City Council believes will both provide relief and preserve the integrity of the local ordinance.
- (e) Variances shall only be issued upon a:
 - 1. showing of good and sufficient cause;
 - 2. determination that failure to grant the variance would result in exceptional "hardship" (as defined in Subsection 14.05.024 of this ordinance) to the applicant; and
 - 3. determination that the granting of a variance will not result in increased flood heights, additional threats to public safety, or extraordinary public expense, create a nuisance (as defined in Section 14.05 - see "public safety or nuisance"), cause fraud or victimization (as defined in Section 14.05) of the public, or conflict with existing local laws or ordinances.
- (f) Variances may be issued for new construction, substantial improvement, and other proposed new development necessary for the conduct of a functionally dependent use provided that the provisions of Sections 14.25(a) through 14.25(c) are satisfied and that the structure or other development is protected by methods that minimize flood damages during the base flood and does not result in additional threats to public safety and does not create a public nuisance.
- (g) Upon consideration of the factors of Section 14.24(a) and the purposes of this ordinance, the Flood Plain Administrator or the Loyalton City Council may attach such conditions to the granting of variances as it deems necessary to further the purposes of this ordinance.

14.25 – Considerations for Approval of Variances

- (a) In reviewing requests for variances, the Flood plain administrator or the Loyalton City Council shall consider all technical evaluations, all relevant factors, and standards specified in other sections of this ordinance, and the:
 - 1. danger that materials may be swept onto other lands to the injury of others;
 - 2. danger of life and property due to flooding or erosion damage;
 - 3. susceptibility of the proposed facility and its contents to flood damage and the effect of such damage on the existing individual owner and future owners of the property;
 - 4. importance of the services provided by the proposed facility to the community;
 - 5. necessity to the facility of a waterfront location, where applicable;
 - 6. availability of alternative locations for the proposed use which are not subject to flooding or erosion damage;
 - 7. compatibility of the proposed use with existing and anticipated development;
 - 8. relationship of the proposed use to the comprehensive plan and floodplain management program for that area;

9. safety of access to the property in time of flood for ordinary and emergency vehicles;
 10. expected heights, velocity, duration, rate of rise, and sediment transport of the flood waters expected at the site; and
 11. costs of providing governmental services during and after flood conditions, including maintenance and repair of public utilities and facilities such as sewer, gas, electrical, and water system, and streets and bridges.
- (b) Any applicant to whom a variance is granted shall be given written notice, upon the signature of the Floodplain Administrator that:
1. the issuance of a variance to construct a structure below the base flood level will result in increased premium rates for flood insurance up to amounts as high as \$25 for \$100 of insurance coverage; and
 2. such construction below the base flood level increases risks to life and property. It is recommended that a copy of the notice shall be recorded by the Floodplain Administrator in the Office of the Sierra County Recorder and shall be recorded in a manner so that it appears in the chain of title of the affected parcel of land.
- (c) The Floodplain Administrator will maintain a record and send a duplicate record to Loyalton City Hall of all variance actions, including justification for their issuance, and report such variances issued in its biennial report submitted to the Federal Insurance Administration, Federal Emergency Management Agency.

14.26 – Appeal Process

The City Council of the City of Loyalton shall hear and decide appeals when it is alleged there is an error in any requirement, decision, or determination made by the Floodplain Administrator in the enforcement or administration of this ordinance.

ORDINANCE NO. 388

THE CITY COUNCIL OF THE CITY OF LOYALTON DOES ORDAIN as follows:

Ordinance Section One: Part 14, Chapter 1, Sections 010 through 250 of the Loyalton Municipal Code is hereby added to read as follows:

CHAPTER 14.01 - FLOODPLAIN MANAGEMENT

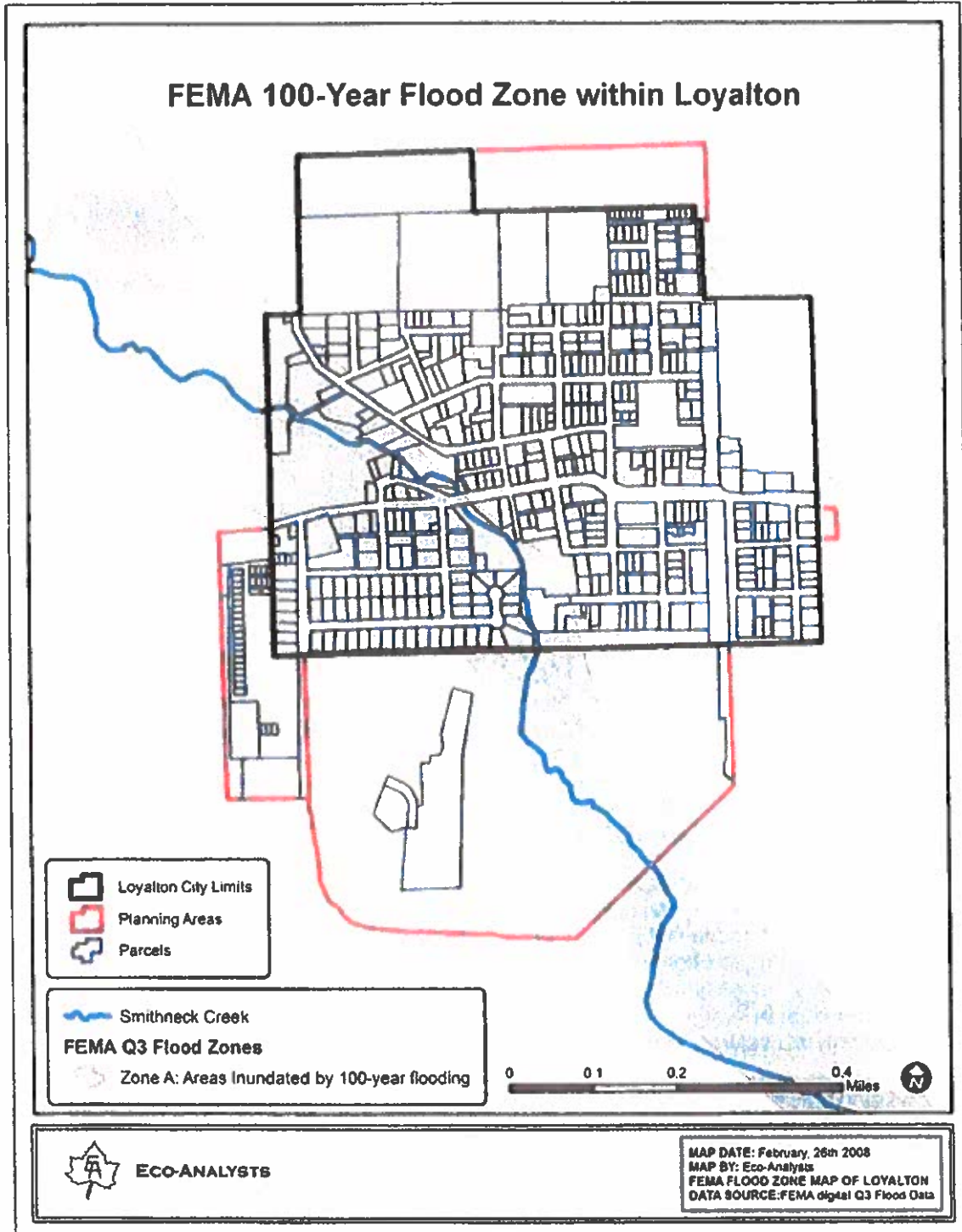
Sections:

- 14.01.010 Statutory Authorization**
- 14.01.020 Findings Of Fact**
- 14.01.030 Statement Of Purpose**
- 14.01.040 Methods Of Reducing Flood Losses**
- 14.01.050 Definitions**
- 14.01.060 Lands To Which This Ordinance Applies**
- 14.01.070 Basis For Establishing The Areas Of Special Flood Hazard**
- 14.01.080 Compliance**
- 14.01.090 Abrogation And Greater Restrictions**
- 14.01.100 Interpretation**
- 14.01.110 Warning And Disclaimer Of Liability**
- 14.01.120 Severability**
- 14.01.130 Establishment Of Development Permit**
- 14.01.140 Designation Of The Floodplain Administration**
- 14.01.150 Duties And Responsibilities Of The Floodplain Administrator**
- 14.01.160 Appeals**
- 14.01.170 Standards Of Construction**
- 14.01.180 Standards For Utilities**
- 14.01.190 Standards For Subdivisions**
- 14.01.200 Standards For Manufactured Homes**
- 14.01.210 Standards For Recreational Vehicles**
- 14.01.220 Floodways**
- 14.01.230 Nature Of Variances**
- 14.01.240 Appeal Board**
- 14.01.250 Conditions For Variances**

14.01.010 Statutory Authorization

The Legislature of the State of California has in Government Code Sections 65300, 65560, et seq., and 65800, et seq. conferred upon local government units authority to adopt regulations designed to promote the public health, safety, and general welfare of its citizenry. Therefore, the City Council of the City of Loyalton does hereby adopt the following floodplain management regulations.

Health and Safety Element



14.01.020 Findings Of Fact

- A. The flood hazard areas of the City of Loyaltan are subject to periodic inundation which may result in loss of life and property, health and safety hazards, disruption of commerce and governmental services, extraordinary public expenditures for flood protection and relief, and impairment of the tax base, all of which adversely affect the public health, safety, and general welfare.
- B. These flood losses are caused by uses that are inadequately elevated, floodproofed, or protected from flood damage. The cumulative effect of obstructions in areas of special flood hazards which increase flood heights and velocities also contribute to the flood loss.

14.01.030 Statement Of Purpose

It is the purpose of this ordinance to promote the public health, safety, and general welfare, and to minimize public and private losses due to flood conditions in specific areas by provisions designed to:

- A. protect human life and health;
- B. minimize expenditure of public money for costly flood control projects;
- C. minimize the need for rescue and relief efforts associated with flooding and generally undertaken at the expense of the general public;
- D. minimize prolonged business interruptions;
- E. minimize damage to public facilities and utilities such as water and gas mains; electric, telephone and sewer lines; and streets and bridges located in areas of special flood hazard;
- F. help maintain a stable tax base by providing for the sound use and development of areas of special flood hazard so as to minimize future blighted areas caused by flood damage;
- G. ensure that potential buyers are notified that property is in an area of special flood hazard; and
- H. ensure that those who occupy the areas of special flood hazard assume responsibility for their actions.

14.01.040 Methods Of Reducing Flood Losses

In order to accomplish its purposes, this ordinance includes methods and provisions to

- A. restrict or prohibit uses which are dangerous to health, safety, and property due to water or erosion hazards, or which result in damaging increases in erosion or flood heights or velocities;
- B. require that uses vulnerable to floods, including facilities which serve such uses, be protected against flood damage at the time of initial construction;
- C. control the alteration of natural floodplains, stream channels, and natural protective barriers, which help accommodate or channel flood waters;
- D. control filling, grading, dredging, and other development which may increase flood damage; and
- E. prevent or regulate the construction of flood barriers which will unnaturally divert flood waters or which may increase flood hazards in other areas.

14.01.050 Definitions

Unless specifically defined below, words or phrases used in this ordinance shall be interpreted so as to give them the meaning they have in common usage and to give this ordinance its most reasonable application.

14.01.050.01 "Accessory use" means a use which is incidental and subordinate to the principal use of the parcel of land on which it is located.

14.01.050.02 "Appeal" means a request for a review of the Floodplain Administrator's interpretation of any provision of this ordinance.

14.01.050.03 "Base flood" means a flood which has a one percent chance of being equalled or exceeded in any given year (also called the "100-year flood"). Base flood is the term used throughout this ordinance.

14.01.050.04 "Basement" means any area of the building having its floor subgrade - i.e., below ground level - on all sides.

14.01.050.05 "Development" means any man-made change to improved or unimproved real estate, including but not limited to buildings or other structures, mining, dredging, filling, grading, paving, excavation or drilling operations or storage of equipment or materials.

14.01.050.06 "Encroachment" means the advance or infringement of uses, plant growth, fill, excavation, buildings, permanent structures or development into a floodplain which may impede or alter the flow capacity of a floodplain.

14.01.050.07 "Existing manufactured home park or subdivision" means a manufactured home park or subdivision for which the construction of facilities for servicing the lots on which the manufactured homes are to be affixed (including, at a minimum, the installation of utilities, the construction of streets, and either final site grading or the pouring of concrete pads) is completed before the effective date of the floodplain management regulations adopted by a community.

14.01.050.08 "Expansion to an existing manufactured home park or subdivision" means the preparation of additional sites by the construction of facilities for servicing the lots on which the manufactured homes are to be affixed (including the installation of utilities, the construction of streets, and either final site grading or the pouring of concrete pads).

14.01.050.09 "Flood, flooding, or flood water" means a general and temporary condition of partial or complete inundation of normally dry land areas from the overflow of inland or tidal waters; the unusual and rapid accumulation or runoff of surface waters from any source.

14.01.050.10 "Flood Boundary and Floodway Map (FBFM)" means the official map on which the Federal Emergency Management Agency or Federal Insurance Administration has delineated both the areas of special flood hazards and the floodway.

14.01.050.11 "Flood Hazard Boundary Map" means the official map on which the Federal Emergency Management Agency or Federal Insurance Administration has delineated the areas of flood hazards.

14.01.050.12 "Flood Insurance Rate Map (FIRM)" means the official map on which the Federal Emergency Management Agency or Federal Insurance Administration has delineated both the areas of special flood hazards and the risk premium zones applicable to the community.

14.01.050.13 "Flood Insurance Study" means the official report provided by the Federal Insurance Administration that includes flood profiles, the Flood Insurance Rate Map, the Flood Boundary and Floodway Map, and the water surface elevation of the base flood.

14.01.050.14 "Floodplain or flood-prone area" means any land area susceptible to being inundated by water from any source - see "Flooding".

14.01.050.15 "Floodplain Administrator" is the individual appointed to administer and enforce the floodplain management regulations.

14.01.050.16 "Floodplain management" means the operation of an overall program of corrective and preventive measures for reducing flood damage and preserving and enhancing, where possible, natural resources in the floodplain, including but not limited to emergency preparedness plans, flood control works, floodplain management regulations, and open space plans.

14.01.050.17 "Floodplain management regulations" means this ordinance and other zoning ordinances, subdivision regulations, building codes, health regulations, special purpose ordinances (such as grading and erosion control) and other application of police power which control development in flood-prone areas. This term describes federal, state or local regulations in any combination thereof which provide standards for preventing and reducing flood loss and damage.

14.01.050.18 "Floodproofing" means any combination of structural and nonstructural additions, changes, or adjustments to structures which reduce or eliminate flood damage to real estate or improved real property, water and sanitary facilities, structures, and their contents.

14.01.050.19 "Floodway" means the channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than one foot. Also referred to as "Regulatory Floodway".

14.01.050.20 "Floodway encroachment lines" means the lines marking the limits of floodways on Federal, state and local floodplain maps.

14.01.050.21 "Floodway fringe" is that area of the floodplain on either side of the "Regulatory Floodway" where encroachment may be permitted.

14.01.050.22 "Fraud and victimization" as related to Section 14.01.250, **Conditions For Variances**, of this ordinance, means that the variance granted must not cause fraud on or victimization of the public. In examining this requirement, the City Council of the City of Loyalton will consider the fact that every newly constructed building adds to government responsibilities and remains a part of the community for fifty to one-hundred years. Buildings that are permitted to be constructed below the base flood elevation are subject during all those years to increased risk of damage from floods, while future owners of the property and the community as a whole are subject to all the costs, inconvenience, danger, and suffering that those increased flood damages bring. In addition, future owners may purchase the property, unaware that it is subject to potential flood damage, and can be insured only at very high flood insurance rates.

14.01.050.23 "Functionally dependent use" means a use which cannot perform its intended purpose unless it is located or carried out in close proximity to water. The term includes only docking facilities, port facilities that are necessary for the loading and unloading of cargo or passengers, and ship building and ship repair facilities, and does not include long-term storage or related manufacturing facilities.

14.01.050.24 "Governing body" is the local governing unit, i.e. county or municipality, that is empowered to adopt and implement regulations to provide for the public health, safety and general welfare of its citizenry.

14.01.050.25 "Hardship" as related to Section 14.01.250, **Conditions For Variances**, of this ordinance means the hardship that would result from a failure to grant the requested variance. The City Council of the City of Loyaltan requires that the variance be exceptional, unusual, and peculiar to the property involved. Mere economic or financial hardship alone is not exceptional. Inconvenience, aesthetic considerations, physical handicaps, personal preferences, or the disapproval of one's neighbors likewise cannot, as a rule, qualify as an exceptional hardship. All of these problems can be resolved through other means without granting a variance, even if the alternative is more expensive, or requires the property owner to build elsewhere or put the parcel to a different use than originally intended.

14.01.050.26 "Highest adjacent grade" means the highest natural elevation of the ground surface prior to construction next to the proposed walls of a structure.

14.01.050.27 "Historic structure" means any structure that is

1. listed individually in the National Register of Historic Places (a listing maintained by the Department of Interior) or preliminarily determined by the Secretary of the Interior as meeting the requirements for individual listing on the National Register;
2. certified or preliminarily determined by the Secretary of the Interior as contributing to the historical significance of a registered historic district or a district preliminarily determined by the Secretary to qualify as a registered historic district;
3. individually listed on a state inventory of historic places in states with historic preservation programs which have been approved by the Secretary of Interior; or
4. individually listed on a local inventory of historic places in communities with historic preservation programs that have been certified either by an approved state program as determined by the Secretary of the Interior or directly by the Secretary of the Interior in states with approved programs.

14.01.050.28 "Levee" means a man-made structure, usually an earthen embankment, designed and constructed in accordance with sound engineering practices to contain, control or divert the flow of water so as to provide protection from temporary flooding.

14.01.050.29 "Levee system" means a flood protection system which consists of a levee, or levees, and associated structures, such as closure and drainage devices, which are constructed and operated in accord with sound engineering practices.

14.01.050.30 "Lowest floor" means the lowest floor of the lowest enclosed area, including basement. An unfinished or flood resistant enclosure, usable solely for parking of vehicles, building access or storage in an area other than a basement area (see "Basement") is not considered a building's lowest floor, provided that such enclosure is not built so as to render the structure in violation of the applicable non-elevation design requirements of this ordinance. (Note: This definition allows attached garages to be built at grade. Below grade garages are not allowed as they are considered to be basements.)

14.01.050.31 "Manufactured home" means a structure, transportable in one or more sections, which is built on a permanent chassis and is designed for use with or without a permanent foundation when attached to the required utilities. The term "manufactured home" does not include a "recreational vehicle".

14.01.050.32 "Manufactured home park or subdivision" means a parcel (or contiguous parcels) of land divided into two or more manufactured home lots for rent or sale.

14.01.050.33 "Mean sea level" means, for purposes of the National Flood Insurance Program, the National Geodetic Vertical Datum (NGVD) of 1929 or other datum, to which base flood elevations shown on a community's Flood Insurance Rate Map are referenced.

14.01.050.34 "New construction", for floodplain management purposes, means structures for which the "start of construction" commenced on or after the effective date of floodplain management regulations adopted by this community, and includes any subsequent improvements to such structures.

14.01.050.35 "New manufactured home park or subdivision" means a manufactured home park or subdivision for which the construction of facilities for servicing the lots on which the manufactured homes are to be affixed (including at a minimum, the installation of utilities, the construction of streets, and either final site grading or the pouring of concrete pads) is completed on or after the effective date of floodplain management regulations adopted by this community.

14.01.050.36 "Obstruction" includes, but is not limited to, any dam, wall, wharf, embankment, levee, dike, pile, abutment, protection, excavation, channelization, bridge, conduit, culvert, building, wire, fence, rock, gravel, refuse, fill, structure, vegetation or other material in, along, across or projecting into any watercourse which may alter, impede, retard or change the direction and/or velocity of the flow of water, or due to its location, its propensity to snare or collect debris carried by the flow of water, or its likelihood of being carried downstream.

14.01.050.37 "One-hundred-year flood" or "100-year flood" - see "Base flood."

14.01.050.38 "Principal structure" means a structure used for the principal use of the property as distinguished from an accessory use.

14.01.050.39 "Public safety and nuisance" as related to Section 14.01.250, **Conditions For Variances**, of this ordinance means that the granting of a variance must not result in anything which is injurious to safety or health of an entire community or neighborhood, or any considerable number of persons, or unlawfully obstructs the free passage or use, in the customary manner, of any navigable lake, or river, bay, stream, canal, or basin.

14.01.050.40 "Recreational vehicle" means a vehicle which is

1. built on a single chassis;
2. 400 square feet or less when measured at the largest horizontal projection;
3. designed to be self-propelled or permanently towable by a light-duty truck; and
4. designed primarily not for use as a permanent dwelling but as temporary living quarters for recreational, camping, travel, or seasonal use.

14.01.050.41 "Regulatory floodway" means the channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than one foot.

14.01.050.42 "Riverine" means relating to, formed by, or resembling a river (including tributaries), stream, brook, etc.

14.01.050.43 "Sheet flow area" - see "Area of shallow flooding".

14.01.050.44 "Special flood hazard area (SFHA)" means an area having special flood hazards and shown on an FHBM or FIRM as Zone A, A1-A30, AE, A99, E, or M.

14.01.050.45 "Start of construction" includes substantial improvement and other proposed new development and means the date the building permit was issued, provided the actual start of construction, repair, reconstruction, rehabilitation, addition, placement, or other improvement was within 180 days from the date of the permit. The actual start means either the first placement of permanent construction of a structure on a site, such as the pouring of slab or footings, the installation of piles, the construction of columns, or any work beyond the stage of excavation; or the placement of a manufacture home on a foundation. Permanent construction does not include land preparation, such as clearing, grading, and filling; nor does it include the installation of streets and/or walkways; nor does it include excavation for a basement, footings, piers, or foundations or the erection of temporary forms; nor does it include the installation on the property of accessory buildings, such as garages or sheds not occupied as dwelling units or not part of the main structure. For a substantial improvement, the actual start of construction means the first alteration of any wall, ceiling, floor, or other structural part of a building, whether or not that alteration affects the external dimensions of the building.

14.01.050.46 "Structure" means a walled and roofed building that is principally above ground; this includes a gas or liquid storage tank or a manufactured home.

14.01.050.47 "Substantial damage" means damage of any origin sustained by a structure whereby the cost of restoring the structure to its before damaged condition would equal or exceed 50 percent of the market value of the structure before the damage occurred.

14.01.050.48 "Substantial Improvement" means any reconstruction, rehabilitation, addition, or other proposed new development of a structure, the cost of which equals or exceeds 50 percent of the market value of the structure before the "start of construction" of the improvement. This term includes structures which have incurred "substantial damage", regardless of the actual repair work performed. The term does not, however, include either

1. any project for improvement of a structure to correct existing violations or state or local health, sanitary, or safety code specifications which have been identified by the local code enforcement official and which are the minimum necessary to assure safe living conditions, or
2. any alteration of a "historic structure", provided that the alteration will not preclude the structure's continued designation as a "historic structure".

14.01.050.49 "Variance" means a grant of relief from the requirements of this ordinance which permits construction in a manner that would otherwise be prohibited by this ordinance.

14.01.050.50 "Violation" means the failure of any structure or other development to be fully compliant with the community's floodplain management regulations. A structure or other development without the elevation certificate, other certifications, or other evidence of compliance required in this ordinance is presumed to be in violation until such time as that documentation is provided.

14.01.050.51 "Water surface elevation" means the height, in relation to the National Geodetic Vertical Datum (NGVD) of 1929, (or other datum, where specified) of floods of various magnitudes and frequencies in the floodplains of coastal or riverine areas.

14.01.050.52 "Watercourse" means a lake, river, creek, stream, wash, arroyo, channel or other topographic feature on or over which waters flow at least periodically. Watercourse includes specifically designated areas in which substantial flood damage may occur.

14.01.060 Lands To Which This Ordinance Applies

This ordinance shall apply to all areas of special flood hazards within the jurisdiction of the City of Loyalton.

14.01.070 Basis For Establishing The Areas Of Special Flood Hazard

The areas of special flood hazard identified by the Federal Insurance Administration (FIA) of the Federal Emergency Management Agency (FEMA) in the Flood Insurance Study (FIS) dated September 1, 1988 and accompanying Flood Insurance Rate Maps (FIRMs) dated September 1, 1988, and all subsequent amendments and/or revisions, are hereby adopted by reference and declared to be a part of this ordinance. This FIS and attendant mapping is the minimum area of applicability of this ordinance and may be supplemented by studies for other areas which allow implementation of this ordinance and which are recommended to the City Council of the City of Loyalton by the Floodplain Administrator. The study and FIRMs are on file at the Sierra County Planning Department, P.O. Box 530, Downieville, California, 95936.

14.01.080 Compliance

No structure or land shall hereafter be constructed, located, extended, converted, or altered without full compliance with the term of this ordinance and other applicable regulations. Violation of the requirements (including violations of conditions and safeguards established in connection with conditions) shall constitute a misdemeanor. Nothing herein shall prevent the Loyalton City Council from taking such lawful action as is necessary to prevent or remedy any violation.

14.01.090 Abrogation And Greater Restrictions

This ordinance is not intended to repeal, abrogate, or impair any existing easements, covenants, or deed restrictions. However, where this ordinance and another ordinance, easement, covenant, or deed restriction conflict or overlap, whichever imposes the more stringent restrictions shall prevail.

14.01.100 Interpretation

In the interpretation and application of this ordinance, all provisions shall be

- A. considered as minimum requirements;
- B. liberally construed in favor of the governing body; and
- C. deemed neither to limit nor repeal any other powers granted under state statutes.

14.01.110 Warning And Disclaimer Of Liability

The degree of flood protection required by this ordinance is considered reasonable for regulatory purposes and is based on scientific and engineering considerations. Larger floods can and will occur on rare occasions. Flood heights may be increased by man-made or natural causes. This ordinance does not imply that land outside the areas of special flood hazards or uses permitted within such areas will be free from flooding or flood damages. This ordinance shall not create liability on the part of the Loyalton City Council, any officer or employee thereof, the State of California, or the Federal Insurance Administration, Federal Emergency Management Agency, for any flood damages that result from reliance on this ordinance or any administrative decision lawfully made hereunder.

14.01.120 Severability

This ordinance and the various parts thereof are hereby declared to be severable. Should any section of this ordinance be declared by the courts to be unconstitutional or invalid, such decision shall not affect the validity of the ordinance as a whole, or any portion thereof other than the section so declared to be unconstitutional or invalid.

14.01.130 Establishment Of Development Permit

A development permit shall be obtained before any construction or other development begins within any area of special flood hazard established in Section 14.01.070. Application for a development permit shall be made on forms furnished by the Floodplain Administrator and may include, but not be limited to: plans in duplicate drawn to scale showing the nature, location, dimensions, and elevation of the area in question; existing

or proposed structures, fill, storage of materials, drainage facilities; and the location of the foregoing. Specifically, the following information is required.

- A. proposed elevation in relation to mean sea level, of the lowest floor (including basement) of all structures ; or
- B. proposed elevation in relation to mean sea level to which any structure will be floodproofed, if required in Section 14.01.170.03.3; and
- C. all appropriate certifications listed in Section 14.01.150.04 of this ordinance; and
- D. description of the extent to which any watercourse will be altered or relocated as a result of proposed development.

14.01.140 Designation Of The Floodplain Administration

The Sierra County Director of Planning and Public Works, who pursuant to contract, serves as the Planning Director for the City of Loyalton, is hereby appointed as the Floodplain Administrator to administer, implement, and enforce this ordinance by granting or denying development permits in accord with its provisions.

14.01.150 Duties And Responsibilities Of The Floodplain Administrator

The duties and responsibilities of the Floodplain Administrator shall include, but not be limited to the following.

14.01.150.01 Permit Review. Review all development permits to determine that

- 1. permit requirements of this ordinance have been satisfied,
- 2. all other required state and federal permits have been obtained,
- 3. the site is reasonably safe from flooding, and
- 4. the proposed development does not adversely affect the carrying capacity of areas where base flood elevations have been determined but a floodway has not been designated. For purposes of this ordinance, "adversely affects" means that the cumulative effect of the proposed development when combined with all other existing and anticipated development will increase the water surface elevation of the base flood more than one foot at any point.

14.01.150.02 Review and Use of Any Other Base Flood Data. When base flood elevation data has not been provided in accordance with Section 14.01.070, the

Floodplain Administrator shall obtain, review, and reasonably utilize any base flood elevation and floodway data available from a federal or state agency, or other source, in order to administer Sections 14.01.170 through 14.01.220. Any such information shall be submitted to the Loyalton City Council for adoption.

14.01.150.03 Notification of Other Agencies. In alteration or relocation of a watercourse:

1. notify adjacent communities and the California Department of Water Resources prior to alteration or relocation;
2. submit evidence of such notification to the Federal Insurance Administration, Federal Emergency Management Agency; and
3. assure that the flood carrying capacity within the altered or relocated portion of said watercourse is maintained.

14.01.150.04 Documentation of Floodplain Development. Obtain and maintain for public inspection and make available as needed the following:

1. certification required by Section 14.01.170.03.1 (floor elevations),
2. certification required by Section 14.01.170.03.2 (elevation or floodproofing of nonresidential structures),
3. certification required by Sections 14.01.170.03.3 (wet floodproofing standard),
4. certification of elevation required by Section 14.01.190.B (subdivision standards),
5. certification required by Section 14.01.220.A (floodway encroachments),

14.01.150.05 Map Determinations. Make interpretations where needed, as to the exact location of the boundaries of the areas of special flood hazard, for example, where there appears to be a conflict between a mapped boundary and actual field conditions.

14.01.150.06 Remedial Action. Take action to remedy violations of this ordinance as specified in Section 14.01.080.

14.01.160 Appeals

The City Council shall hear and decide appeals when it is alleged there is an error in any requirement, decision, or determination made by the Floodplain Administrator in the enforcement or administration of this ordinance.

14.01.170 Standards Of Construction

In all areas of special flood hazards the following standards are required:

14.01.170.01 Anchoring

1. All new construction and substantial improvements shall be adequately anchored to prevent flotation, collapse or lateral movement of the structure resulting from hydrodynamic and hydrostatic loads, including the effects of buoyancy.
2. All manufactured homes shall meet the anchoring standards of Sections 14.01.200.

14.01.170.02 Construction materials and methods. All new construction and substantial improvement shall be constructed

1. with materials and utility equipment resistant to flood damage;
2. using methods and practices that minimize flood damage;
3. with electrical, heating, ventilation, plumbing and air conditioning equipment and other service facilities that are designed and/or located so as to prevent water from entering or accumulating within the components during conditions of flooding; and if
4. within Zones AH or AO, so that there are adequate drainage paths around structures on slopes to guide flood waters around and away from proposed structures.

14.01.170.03 Elevation and floodproofing. (See Section 14.01.050, Definitions, for "new construction," "substantial damage" and "substantial improvement".)

- I. Residential construction, new or substantial improvement, shall have the lowest floor, including basement,
 - a. in an A zone, elevated to or above the base flood elevation, as determined by this community.

- b. in all other Zones, elevated to or above the base flood elevation.

Upon the completion of the structure, the elevation of the lowest floor including basement shall be certified by a registered professional engineer or surveyor, or verified by the community building inspector to be properly elevated. Such certification or verification shall be provided to the Floodplain Administrator.

- 2. Nonresidential construction shall either be elevated to conform with Section 14.01.170.03.1 or together with attendant utility and sanitary facilities

- a. be floodproofed below the elevation recommended under Section 14.01.170.03.1 so that the structure is watertight with walls substantially impermeable to the passage of water;
- b. have structural components capable of resisting hydrostatic and hydrodynamic loads and effects of buoyancy; and
- c. be certified by a registered professional engineer or architect that the standards of this section (14.01.170.03.2) are satisfied. Such certification shall be provided to the Floodplain Administrator.

- 3. All new construction and substantial improvement with fully enclosed areas below the lowest floor (excluding basements) that are usable solely for parking of vehicles, building access or storage, and which are subject to flooding, shall be designed to automatically equalize hydrostatic flood forces on exterior walls by allowing for the entry and exit of floodwater. Designs for meeting this requirement must meet the following minimum criteria:

- a. be certified by a registered professional engineer or architect;
or
- b. be certified to comply with a local floodproofing standard approved by the Federal Insurance Administration, Federal Emergency Management Agency, or
- c. have a minimum of two openings having a total net area of not less than one square inch for every square foot of enclosed area subject to flooding. The bottom of all openings shall be no higher than one foot above grade. Openings may be equipped with screens, louvers, valves or other coverings

or devices provided that they permit the automatic entry and exit of floodwater.

4. Manufactured homes shall also meet the standards in Section 14.01.200.

14.01.180 Standards For Utilities

- A. All new and replacement water supply and sanitary sewage systems shall be designed to minimize or eliminate:
 1. infiltration of flood waters into the systems, and
 2. discharge from the systems into flood waters.
- B. On-site waste disposal systems shall be located to avoid impairment to them, or contamination from them during flooding.

14.01.190 Standards For Subdivisions

- A. All preliminary subdivision proposals shall identify the flood hazard area and the elevation of the base flood.
- B. All subdivision plans will provide the elevation of proposed structure(s) and pad(s). If the site is filled above the base flood elevation, the final first floor and pad elevations shall be certified by a registered professional engineer or surveyor and provided to the Floodplain Administrator.
- C. All subdivision proposals shall be consistent with the need to minimize flood damage.
- D. All subdivision proposals shall have public utilities and facilities such as sewer, gas, electrical and water systems located and constructed to minimize flood damage.
- E. All subdivisions shall provide adequate drainage to reduce exposure to flood hazards.

14.01.200 Standards For Manufactured Homes

- A. All manufactured homes that are placed or substantially improved, within Zones A1-30, AH, and AE on the community's Flood Insurance Rate Map, on sites located
 1. outside of a manufactured home park or subdivision,

2. in a new manufactured home park or subdivision,
3. in an expansion to an existing manufactured home park or subdivision, or
4. in an existing manufactured home park or subdivision on a site upon which a manufactured home has incurred "substantial damage" as the result of a flood,

shall be elevated on a permanent foundation such that the lowest floor of the manufactured home is elevated to or above the base flood elevation and be securely anchored to an adequately anchored foundation system to resist flotation collapse and lateral movement.

B. All manufactured homes to be placed or substantially improved on sites in an existing manufactured home park or subdivision within Zones A1-30, AH, AE on the community's Flood Insurance Rate Map that are not subject to the provisions of Section 14.01.200.A will be elevated so that either the

1. lowest floor of the manufactured home is at or above the base flood elevation, or
2. manufactured home chassis is supported by reinforced piers or other foundation elements of at least equivalent strength that are no less than 36 inches in height above grade and be securely anchored to an adequately anchored foundation system to resist flotation, collapse, and lateral movement.

14.01.210 Standards For Recreational Vehicles

A. All recreational vehicles placed on sites within Zones A1-30, AH, and AE on the community's Flood Insurance Rate Map will either:

1. be on the site for fewer than 180 consecutive days,
2. be fully licensed and ready for highway use -- a recreational vehicle is ready for highway use if it is on its wheels or jacking system, is attached to the site only by quick disconnect type utilities and security devices, and has no permanently attached additions, or
3. meet the permit requirements of Sections 14.01.130 through 14.01.160 of this ordinance and the elevation and anchoring requirements for manufactured homes in Section 14.01.200.A.

14.01.220 Floodways

Located within areas of special flood hazard established in Section 14.01.070 are areas designated as floodways. Since the floodway is an extremely hazardous area due to the velocity of flood waters which carry debris, potential projectiles, and erosion potential, the following provisions apply.

- A. Prohibit encroachments, including fill, new construction, substantial improvement, and other new development unless certification by a registered professional engineer or architect is provided demonstrating that encroachments shall not result in any increase in the base flood elevation during the occurrence of the base flood discharge.
- B. If Section 14.01.220.A is satisfied, all new construction, substantial improvement, and other proposed new development shall comply with all other applicable flood hazard reduction provisions of Sections 14.01.130 through 14.01.160.

14.01.230 Nature Of Variances

The variance criteria set forth in this section of the ordinance are based on the general principle of zoning law that variances pertain to a piece of property and are not personal in nature. A variance may be granted for a parcel of property with physical characteristics so unusual that complying with the requirements of this ordinance would create an exceptional hardship to the applicant or the surrounding property owners. The characteristics must be unique to the property and not be shared by adjacent parcels. The unique characteristic must pertain to the land itself, not to the structure, its inhabitants, or the property owners.

It is the duty of the Loyalton City Council to help protect its citizens from flooding. This need is so compelling and the implications of the cost of insuring a structure built below flood level are so serious that variances from the flood elevation or from other requirements in the flood ordinance are quite rare. The long term goal of preventing and reducing flood loss and damage can only be met if variances are strictly limited. Therefore, the variance guidelines provided in this ordinance are more detailed and contain multiple provisions that must be met before a variance can be properly granted. The criteria are designed to screen out those situations in which alternatives other than a variance are more appropriate.

14.01.240 Appeal Board

- A. In passing upon requests for variances, the Loyalton City Council shall consider all technical evaluations, all relevant factors, standards specified in other sections of this ordinance, and the

1. danger that materials may be swept onto other lands to the injury of others;
 2. danger of life and property due to flooding or erosion damage;
 3. susceptibility of the proposed facility and its contents to flood damage and the effect of such damage on the existing individual owner and future owners of the property;
 4. importance of the services provided by the proposed facility to the community;
 5. necessity to the facility of a waterfront location, where applicable;
 6. availability of alternative locations for the proposed use which are not subject to flooding or erosion damage;
 7. compatibility of the proposed use with existing and anticipated development;
 8. relationship of the proposed use to the comprehensive plan and floodplain management program for that area;
 9. safety of access to the property in time of flood for ordinary and emergency vehicles;
 10. expected heights, velocity, duration, rate of rise, and sediment transport of the flood waters expected at the site; and
 11. costs of providing governmental services during and after flood conditions, including maintenance and repair of public utilities and facilities such as sewer, gas, electrical, and water system, and streets and bridges.
- B. Any applicant to whom a variance is granted shall be given written notice over the signature of a community official that**
1. the issuance of a variance to construct a structure below the base flood level will result in increased premium rates for flood insurance up to amounts as high as \$25 for \$100 of insurance coverage, and
 2. such construction below the base flood level increases risks to life and property. It is recommended that a copy of the notice shall be recorded by the Floodplain Administrator in the Office of the City of

Loyalton Recorder and shall be recorded in a manner so that it appears in the chain of title of the affected parcel of land.

- C. The Floodplain Administrator will maintain a record of all variance actions, including justification for their issuance, and report such variances issued in its biennial report submitted to the Federal Insurance Administration, Federal Emergency Management Agency.

14.01.250 Conditions For Variances

- A. Generally, variances may be issued for new construction, substantial improvement, and other proposed new development to be erected on a lot of one-half acre or less in size contiguous to and surrounded by lots with existing structures constructed below the base flood level, providing that the procedures of Sections 14.01.130 through 14.01.220 of this ordinance have been fully considered. As the lot size increases beyond one-half acre, the technical justification required for issuing the variance increases.
- B. Variances may be issued for the repair or rehabilitation of "historic structures" (as defined in Section 14.01.050.27 of this ordinance) upon a determination that the proposed repair or rehabilitation will not preclude the structure's continued designation as an historic structure and the variance is the minimum necessary to preserve the historic character and design of the structure.
- C. Variances shall not be issued within any mapped regulatory floodway if any increase in flood levels during the base flood discharge would result.
- D. Variances shall only be issued upon a determination that the variance is the "minimum necessary" considering the flood hazard, to afford relief. "Minimum necessary" means to afford relief with a minimum of deviation from the requirements of this ordinance. For example, in the case of variances to an elevation requirement, this means the Loyalton City Council need not grant permission for the applicant to build at grade, or even to whatever elevation the applicant proposes, but only to that elevation which the Loyalton City Council believes will both provide relief and preserve the integrity of the local ordinance.
- E. Variances shall only be issued upon a
 - 1. showing of good and sufficient cause;
 - 2. determination that failure to grant the variance would result in exceptional "hardship" (as defined in Section 14.01.050.25 of this ordinance) to the applicant; and

3. determination that the granting of a variance will not result in increased flood heights, additional threats to public safety, or extraordinary public expense, create a nuisance (as defined in Section 14.01.050.39 - see "Public safety or nuisance"), cause fraud or victimization (as defined in Section 14.01.050.22) of the public, or conflict with existing local laws or ordinances.

- F. Variances may be issued for new construction, substantial improvement, and other proposed new development necessary for the conduct of a functionally dependent use provided that the provisions of Sections 14.01.250.A through 14.01.250.E are satisfied and that the structure or other development is protected by methods that minimize flood damages during the base flood and does not result in additional threats to public safety and does not create a public nuisance.
- G. Upon consideration of the factors of Section 14.01.240.A and the purposes of this ordinance, the Loyalton City Council may attach such conditions to the granting of variances as it deems necessary to further the purposes of this ordinance.

Ordinance Section Two: This ordinance shall take effect thirty (30) days after its passage. Within 15 days after its passage, the City Clerk shall cause this ordinance to be posted with the names of those City Council members voting for and against the ordinance in at least three public places in the City, as authorized by Government Code §36933.

Introduced at a regular meeting of the City Council held on the 9th day of November, 1993, and passed and adopted by the City Council of the City of Loyalton, State of California, on the 16th day of Nov, 1993, by the following roll call vote, to-wit:

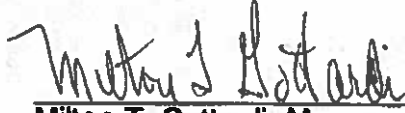
AYES: Milton Gottardi, Katie Peterson, Michael Hudson, Patricia Whitley, Terry LeBlanc

NOES: None

ABSTAIN: None

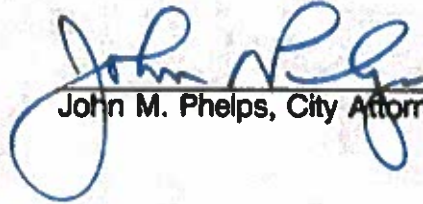
ABSENT: None

CITY OF LOYALTON



Milton T. Gottardi, Mayor

APPROVED AS TO FORM:



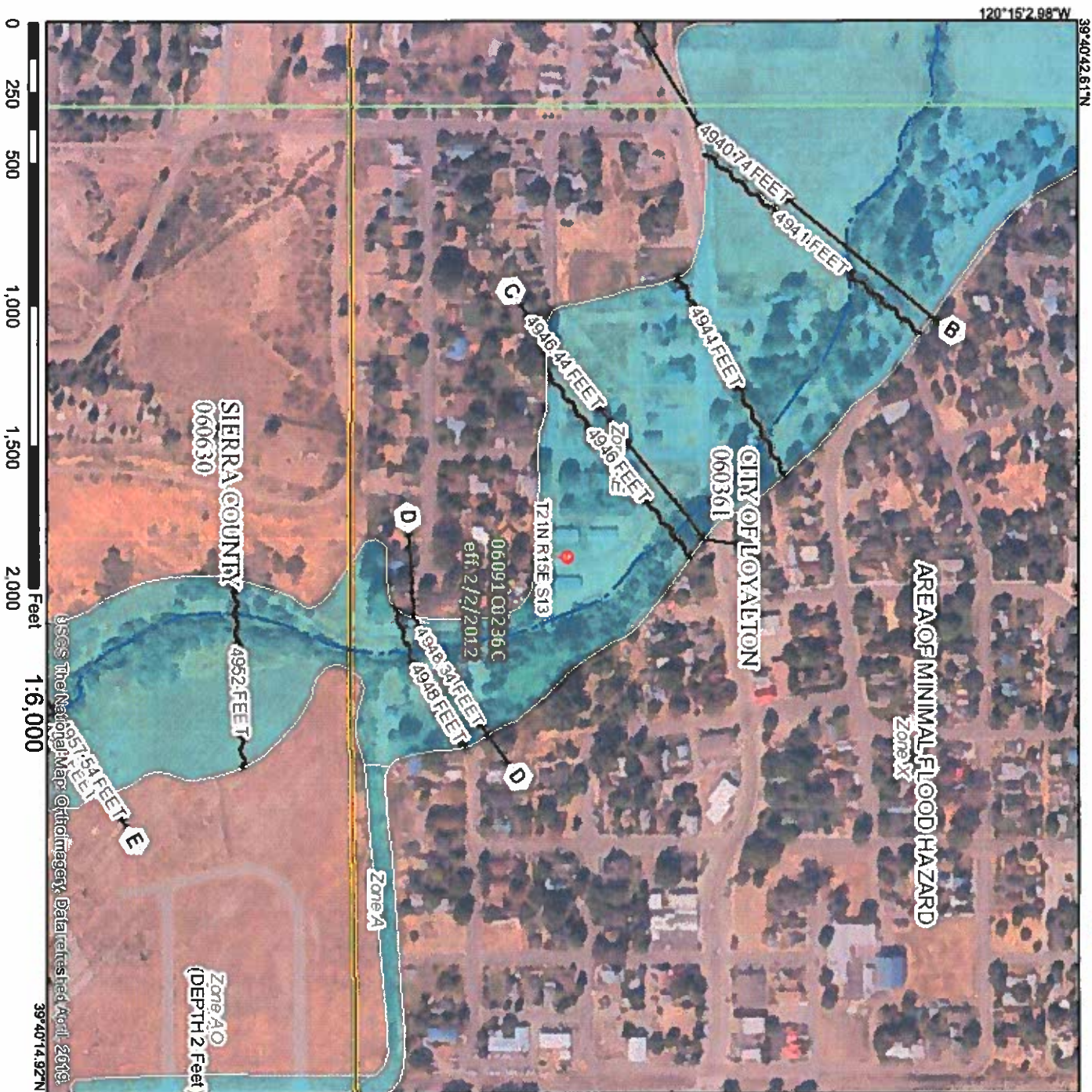
John M. Phelps, City Attorney

ATTEST:



Patsy Jardin, City Clerk

National Flood Hazard Layer FIRMette



Legend

SEE THIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS

- Without Base Flood Elevation (BFE) Zone A, V, AE, AH, VE, AR
- With BFE or Depth Zone AE, AO, AH, VE, AR
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD

- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
- Future Conditions 1% Annual Chance Flood Hazard Zone X
- Area with Reduced Flood Risk due to Levees. See Notes. Zone X
- Area with Flood Risk due to Levees Zone D

OTHER AREAS

- NO SCREEN
- Area of Minimal Flood Hazard Zone X
- Effective LDMRs
- Area of Undetermined Flood Hazard Zone D

GENERAL STRUCTURES

- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES

- 20.2 Cross Sections with 1% Annual Chance Water Surface Elevation
- 17.5 Coastal Transact
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transact Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS

- Digital Data Available
- No Digital Data Available
- Unmapped

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards. The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 3/7/2020 at 7:24:52 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and undetermined areas cannot be used for regulatory purposes.

Task Order

Task Order Number: #06

Date: March 9, 2020

Title: Fiscal Year 2020 and 2021 General Services

Project Description: Provide on-call professional engineering services to the City of Loyalton ("City").

The Master Services Agreement is amended and supplemented to include the following agreement of the parties.

PART 1 – SERVICES

Task 1 - Basic Services

Objective

Provide professional engineering services on an on-call basis as requested by the City.

Approach

The following approach applies:

- Farr West will respond to requests generated by the City.
- Farr West will attend meetings or make site visits as requested by the City.
- Farr West will develop Scopes of Work for larger projects and generate individual task orders for significant projects as requested by the City.
- Farr West will prepare Contract Documents and Technical Specifications for the bidding of improvement projects as requested by the City.
- Farr West will review product submittals and provide construction engineering as requested by the City.

Deliverables

The following will be delivered under this task:

- Monthly status updates and invoices.
- Maps, exhibits, and permit applications.

Assumptions

The following assumptions apply:

- Any amendment to the Project budget will be executed in writing between the City and Farr West with Exhibit F of the Master Services Agreement.
- A new General Services Task Order shall be executed every year.

PART 2 – COMPENSATION

The City of Loyalton shall pay Farr West on a time and materials basis, including travel, not to exceed Ten Thousand Dollars (\$10,000.00). Hourly rates and other expenses shall be in accordance with Exhibit C of

the Master Services Agreement (Standard Hourly Rates). A breakdown of the individual task budgets is as follows:

Task 1	Basic Services	\$10,000
	TOTAL:	\$10,000

PART 3 – SCHEDULE

The following is a proposed schedule to be used as a general guideline only.

Notice to Proceed: March 18, 2020

End of Contract: June 30, 2021

Owner: City of Loyalton

Engineer: Farr West Engineering

By: Sarah Jackson

By: Lucas Tipton

Print Name: Sarah Jackson

Print Name: Lucas Tipton, P.E.

Title: City Mayor

Title: Principal

Date Signed: 3/26/2020

Date Signed: 3/11/20

**AMENDMENT TO OWNER-ENGINEER AGREEMENT
Amendment No. 1**

The Effective Date of this Amendment is: March 18, 2020

Background Data

Effective Date of Task Order #5: October 24, 2019

Owner: *City of Loyalton*

Engineer: *Farr West Engineering*

Project: *1781*

Nature of Amendment:

Additional subconsultant services to complete leak detection testing and liner repairs on the south and north effluent storage ponds.

Description of Modifications:

See Item 3 in the attached Proposal 20E250 V1. Amendment amount includes Farr West standard 15% markup.

Agreement Summary:

Original agreement amount:	<i>\$157,000.00</i>
Net change for prior amendments:	<i>\$00.00</i>
This amendment amount:	<i>\$70,921.00</i>
Adjusted Agreement amount:	<i>\$227,921.00</i>

Change in time for services (days or date, as applicable): *No change*

Owner and Engineer hereby agree to modify the above-referenced Agreement as set forth in this Amendment. All provisions of the Agreement not modified by this or previous Amendments remain in effect.

OWNER: CITY OF LOYALTON

ENGINEER: FARR WEST ENGINEERING

Sarah Jackson

LT

By: Sarah Jackson

By: Lucas Tipton, P.E.

Title: Mayor

Title: Principal Engineer

Date Signed: 3/26/2020

Date Signed: 3/11/20

Address for giving notices:

Address for giving notices:

PO Box 128

5510 Longley Lane

Loyalton, CA 96118

Reno, NV 89511

TECHNICAL MEMORANDUM #3
CITY OF LOYALTON
CAO REPORTING – POND LINER 2020 UPDATE

Prepared For: City of Loyalton
Prepared By: Alexa Kinsinger, E.I.
Reviewed By: Lucas Tipton, P.E.
Date: March 9, 2020
Subject: Pond Liner Alternatives – 2020 Update

1.0 BACKGROUND

This 2020 update technical memorandum (TM) builds from past efforts taken to settle the two outstanding items¹ on the Cleanup and Abatement Order (CAO) R5-2009-0108 issued to the City of Loyalton (City) wastewater treatment plant (WWTP). This TM builds off information presented in the following documents included in Appendix A:

1. “Technical Memorandum #1 – Pond Liner Alternatives” Farr West Engineering, June 12, 2019
2. “Cleanup and Abatement Order R5-2013-0700 – Interim Corrective Action Measures” letter to Sarah Jackson, Farr West Engineering, September 20, 2019
3. “CAO Reporting – Quarter 4 2019” Report submitted to Brendan Kenny of the Regional Water Quality Control Board (RWQCB), Farr West Engineering, January 30, 2020

The purpose of this TM is to provide an update to the City about the status of the outstanding items in the CAO and recommend steps for completing the leak detection and repair work on the north and south effluent ponds.

1.1 LAYFIELD PROPOSAL FOR COMPLETING WORK

In November 2019, Layfield Group (Layfield) mobilized to the wastewater treatment plant (WWTP) to work on the south pond. During their time onsite, they worked on desludging and cleaning the pond liner and utilized geotubes to store the sludge removed from the pond. After the pond was desludged, they intended to complete a leak detection survey and liner repairs of the south pond but were unable to complete their work due to weather issues. They repaired one large liner gash near the inlet pipe, then demobilized from the site with plans to complete work at the end of irrigation season when the weather will be better.

In January 2020, Layfield submitted Proposal 20E250 V1 to Farr West that proposes two plans and two bid alternates for completing the leak detection survey and repairs on both the north and south ponds in

¹ CAO Item 7: Submission of a corrective action plan for repair of the effluent storage pond liners.

CAO Item 8: Submission of as-builts and certification that the effluent storage ponds have been reconstructed and have a storage capacity of 120-acre feet while maintaining 2-feet of freeboard.

September 2020. The bid options and associated costs are shown in Table 1 and the full Layfield proposal is included in Appendix B for reference. The proceeding sections will provide further details of each option.

Table 1: Layfield Proposal 20E250 V1 Bid Options and Cost

Item #	Description	Cost
1	South Pond Completion	Remainder of Task Order 5 Budget ⁱ
2	Plan A: Testing and repairs of north with single mobilization	\$54,110.00
3	Plan B: Testing and repairs of North with double mobilization	\$61,670.00
A	Alternative A: Desludging north pond with existing geotubes	\$48,903.00
B	Alternative B: Ballast Install	\$66,997.50

i – Layfield will complete the leak detection survey and repairs on the south pond within the existing Task Order 5 budget of \$36,229.40. This will be at no additional cost to the City.

1.2 Item # 2: Plan A – Single Mobilization

Plan A is the ideal plan in which Layfield would only need to mobilize to the WWTP once in September 2020 to complete work on both the south and north ponds, thus reducing travel costs. In order to achieve Plan A, both ponds need to be nearly empty before Layfield arrives onsite. In order to empty the ponds, the following operational changes must take place:

1. Begin land application irrigation as early as the WDR R5-2009-0108 permits to lower pond water levels
2. Divert settling basin effluent to the emergency storage pond as needed (if permitted by the RWQCB) to lower effluent pond levels
3. Pump north to south pond as needed to empty north pond first
4. Pump south pond to grasslands as needed to empty south pond

Achieving Plan A is contingent on the weather because discharge to the land application area can only take place if the Grandi Ranch fields are dry and if no storms are expected in the next 24-hours. Additionally, if Loyaltan experiences an abnormally wet spring, then the water levels in both ponds may be too high to empty in time for Layfield to complete work on both ponds. Farr West and operating staff will keep a close eye on the weather and pond water levels throughout the spring and summer and will communicate with Layfield as September 2020 approaches.

1.3 Item # 3: Plan B – Double Mobilization

Plan B is the backup plan if weather does not cooperate and operating staff is not able to empty *both* ponds in time for Layfield to complete work in September 2020. Under plan B, Layfield would mobilize to the WWTP on two separate occasions. The following sequence of events would take place:

1. Pump water from the north to south pond as needed to empty the north pond first.
2. Layfield mobilizes to the site to complete the north pond work in September 2020 then demobilizes to allow time for operating staff to prep the south pond.
3. Pump water from the south pond to the north pond and grasslands to empty to south pond.
4. Layfield mobilizes to the site a second time approximately two to three weeks later to complete work on the south pond.

1.4 Item #4: Alternative A – Desludging North Ponds with Existing Geotubes

During the Layfield south pond effort in November 2019, Layfield desludged (or cleaned) the south pond utilizing two geotubes for sludge storage. The desludging process requires pumping the sludge and water present at the bottom of the ponds into a piping system that injects a polymer into the sludge then into the

geotubes for storage. The polymer acts as a coagulant that solidifies the sludge and solids within the geotube thus facilitating excess water to seep out of the geotube over time. Once the desludging process is completed, the geotubes will dry out over the next few months. Once they are completely dry, the operators will break down the geotube material utilizing a back hoe and place the material in a dumpster to be disposed of in the normal waste stream at the WWTP.

The two geotubes utilized in the November 2019 effort (Figure 1) are still present at the WWTP and could be utilized in the September 2020 effort. During debriefing of the issues faced by Layfield while onsite in November 2019, it was decided that if the north pond only has a small amount of sludge present, then the desludging process with the geotubes may not be necessary to complete the north pond work. Since the amount of sludge present in the north pond is unknown at this time, Layfield has included the north pond desludging process as a proposal alternative A. If it is determined that north pond desludging is necessary, then Layfield will amend their contract to include alternative A at a cost of \$48,903 to cover the pumping, labor, and polymer costs for desludging the north pond.



Figure 1: Geotubes currently present at the WWTP. Left shows the empty geotubes before the desludging activities took place on the south pond in November 2019, right shows the geotubes filled with sludge and seeping water during the desludging of the south pond. These geotubes will be utilized to desludge the north pond in September 2020, if needed.

1.5 Item #5: Alternative B – Ballast Install

The south pond has significant air bubbles trapped under the liner surface that cause the liner to uplift. These air bubbles are referred to as liner whales. Whales can stretch and weaken the liner thus contributing to liner tears. Additionally, the whales reduce the water storage volume available in the pond. Historically, the south pond has experienced more whaling issues than the north pond. One idea to mitigate the whales is to install sand tube ballasts along the bottom of the pond floor. The concept is that the weight of the ballasts would keep the pond liner down and facilitate air entrapped under the liner to travel out towards the liner vents present along the outside edge of the liner, thus preventing the air from uplifting the liner and forming a whale.

Farr West does not have experience in designing ballast systems and given the extent of the whaling issues present in the south pond, we did not feel qualified to determine the number of ballasts needed to mitigate the whales. A budgetary number of 250 ballasts was proposed to Layfield as a placeholder for Proposal 20E205 V1. Alternative B in the Layfield proposal includes freight and manhours needed to install the 250 ballasts in the south pond and totals \$66,997.50. In order to determine a more accurate values for the number of ballasts needed in the south pond, Farr West reviewed past litigation documents on the storage ponds system and contacted a ballast designer for an opinion and proposal for the work.

Farr West reviewed multiple litigation documents (included in Appendix C) that include engineering recommendations about the storage ponds system and whaling issues. The documents suggest the following:

- Air present underneath the liner is ambient air. The absence of methane gas suggests that there is not decomposing organic material beneath the liner contributing to the air buildup.
- Inadequate sloping of the pond bottoms at approximately 0.2% causes water to gather around the perimeter of the ponds and forces air to travel to the middle of the ponds.
- Ground water levels fluctuate above the design elevation of the center of the south pond and are typically within one foot of the south pond bottom elevation.
- Exterior berm slopes, interior berm slopes, and the berm dividing the two ponds are failing.
- To ballast against the groundwater present under the pond liners, Applied Soil Water Technologies (ASWT) provided a preliminary design for a ballasting system in January 2014. The ASWT design calls for 6-inch diameter sand tubes stacked continuously with no space between them. The design for the south pond entails tube stacking of 8 high on the east end of the pond that gradually decreases to 1 tube high on the west end. The design for the north pond entails tube stacking of 5 high on the east end of the north pond gradually decreasing to 1 high on the west end. ASWT estimates that this amount of ballasts would decrease the storage capacity of the south and north ponds by 11.12 and 6.38 acre-feet (AF), respectively.

Outstanding item 8 of the CAO requires certification that the ponds have a storage capacity of 120 AF. Installing the ballast system suggested by ASWT would compromise the 120 AF storage requirement and therefore cannot be considered a viable alternative for satisfying the CAO.

Next, Layfield recommended Doug Hilts of Hilts Consulting Group (HCG) to provide a ballast design for the south pond. Doug is a civil and structural engineer that has over 17 years of experience in liner system design. Farr West contacted Doug and provided him with the past litigation reference documents that detail the extent of the issues present in the storage ponds system.

Doug's recommendation was two-fold. First, he provided three options and opinions for ballasting against the groundwater present under the pond liner:

1. Permanently maintain a water level in the ponds higher than the groundwater level, thus eliminating the upward hydrostatic force under the pond liner.
2. Add permanent ballast (i.e., gravel or concrete fill) over the entire pond floor to prevent liner uplift. This would reduce the overall pond storage and provisions would be required to prevent liner damage, especially during construction.
3. Another option would be to provide spot ballast over the *entire* reservoir floor. This would limit but not eliminate the amount of liner uplift. The liner material would also be subject to tensile stresses during these periods. Given the heightened interest and scrutiny of this project it appears this may not be an acceptable solution. This should only be pursued if the owner and other involved parties can accept a certain level of liner uplift. This option would involve a significant amount of liner removal on the pond floor and or vehicular traffic which could damage the existing liner.

Secondly, Doug provided a recommendation and preliminary cost estimate for his design services for a new geomembrane liner with an air ventilation system and ballast system. His response was as follows:

"Regardless of the liner issues, the [litigation] reference documents allude to issues with the steep interior side slopes and soil sloughing. This issue cannot be ignored and must be resolved before a liner solution is viable. Based on the side slope soil stability issue and anticipating extensive earthwork it is not unreasonable to assume the all or a large majority of the existing geomembrane liner will be damaged or removed to the point where an entire liner replacement will be necessary. The fact the liner is sitting directly on unstable soil presents many liner performance

deficiencies including inadequate venting and no liner puncture protection. At a minimum I would anticipate a 2 layer liner system.

HCG has done a quick estimate on the design effort to provide a new geomembrane liner with an air venting system, ballast system (wind uplift and possible limited ground water). I have estimated approximately 12 design drawings and CSI technical specification sections for those geomembrane liner related items. HCG's rough professional fee for the geomembrane liner design portion of work is estimated to be \$70,000. A more formal letter proposal can be provided if you would like to further pursue this option. This estimate is based on adequate and stable earthen side slopes and floor. Geotechnical investigations, and groundwater remediation, earthwork design work, and contract bid documents to be completed by others."

Given these responses from Doug and the recommendations presented in the litigation documents, in order to mitigate the whaling issues present in the ponds and ensure a more sustainable system, Farr West recommends that the City consider pursuing full redesign of the storage pond system including the side berms, regrading of the pond bottoms, a ventilation system, and a new liner. This recommendation is the most costly alternative available to the City and is estimated at approximately \$2,000,000 to \$4,000,000, however an updated comprehensive cost estimate analysis was not completed.

Farr West is aware that the primary goals of the City are to satisfy the CAO and minimize costs. In order to achieve these goals, Farr West recommends that the City not pursue ballast installation within the pond. This is recommended because the large amount of ballasts required to eliminate the whales would reduce the available storage volume in the ponds and therefore not satisfy the terms of the CAO.

2.0 CONCLUSION AND RECOMMENDATIONS

Due to the large cost associated with a full redesign of the storage ponds system, Farr West recommends that the City remain on track with the endeavors we have been pursuing since 2018 to satisfy the CAO. Farr West recommends that the City approve the Layfield proposal 20E250 V1 for Items 1 and 3 as shown in Table 1. Item 1 will permit Layfield to complete the leak detection testing and liner repairs on the south pond within the existing Task Order #5 contract at no additional cost to the City. Item 3 (Plan B) will permit Layfield to complete the leak detection testing and repairs on the north pond in two mobilizations at a cost of \$61,670². Farr West recommends the City approve the work for two mobilizations in order to be proactive with the contract in case it is not feasible to get both the north and south ponds empty by September 2020. By approving two mobilizations now, the City will avoid the difficulties of completing a contract amendment while Layfield is on site completing the work. If the weather cooperates and operating staff can get both ponds empty by September 2020, then Layfield will not need to mobilize to the site twice, saving the City \$7,560 in mobilization costs.

Since there is no guarantee that the whaling issues will be mitigated through pursual of Item 3 (Plan B), Farr West will conduct a volume analysis to determine the maximum allowable whale diameter that can be present in the pond without compromising the 120 AF storage requirement. Farr West recommends that the City continue to complete and submit weekly whale monitoring logs to Farr West to monitor the whales present in the ponds. Using the whale monitoring logs, Farr West and operating staff will monitor the whale volumes to ensure that the storage capacity of the ponds is not compromised. If whale volumes compromise the storage capacity of the ponds, alternative solutions will be pursued to lessen the impact of the whales.

² Cost does not include the Farr West standard markup of 15%. Total cost including markup will be \$70,921.

APPENDIX A: SUPPORTING DOCUMENTS

TECHNICAL MEMORANDUM
CITY OF LOYALTON
CAO REPORTING – POND LINER UPDATE

Prepared For: California State Water Quality Control Board
Prepared By: Alexa Kinsinger, E.I.
Reviewed By: Lucas Tipton, P.E.
Date: June 12, 2019
Subject: Pond Liner Alternatives

1.0 BACKGROUND

As part of the Cleanup and Abatement Order (CAO) R5-2013-0700 issued to the City of Loyalton (City) in February 2013, the City is responsible to submit certification and as-builts for the two effluent storage ponds located at the City wastewater treatment facility (WWTF). Under this CAO requirement, the City contracted Farr West Engineering (Farr West) and HydroGEOPHYSICS (HGI) in April 2019 to complete a leak detection testing on the storage ponds to determine if the ponds were capable of storing up to 120 acre-feet of effluent on an annual basis. The leak detection method used by HGI meets the American Society of Testing and Materials (ASTM) Method D 7007, Standard Practices for Locating Leaks in Geomembrane Covered with Water or Earth Materials and was approved by Brendan Kenny at the California State Water Quality Control Board (State) in March 2019. HGI's leak detection method places a series of electrodes in the soil outside of the pond that transmit electrical current. Cables placed in the pond water receive this electrical current if there are leaks present in the pond. In the presence of leaks, the current moves more readily to the potential leak location thus resulting in a larger magnitude response near the leak location.

2.0 POND LEAK DETECTION TESTING ISSUES

In preparation for the leak detection testing, it was communicated to Farr West that the pipe penetrations present in the ponds need to be isolated as best as feasibly possible. There are three pipe penetrations in each pond; an inlet pipe, an outlet pipe, and an overflow pipe connecting the two ponds. HGI suggested that pipe isolation could be achieved by physically covering all exposed pipe outlets so water cannot flow through them or by creating an air gap within the pipe to create an electrical break between water in the pond and water outside of the ponds. During the few weeks prior to HGI's arrival to Loyalton, Farr West worked closely with the WWTP operators to investigate potential options for pipe isolation. The operators were able to isolate the overflow pipes by lowering the pond water level below the overflow pipes (Figure 1, left). Next, the operators determined that an air gap could be achieved for the outlet pipes by closing the gate valve present on the pipe and draining the discharge side of the pipe through gravity flow into the irrigation pump station wet well. On May 17th, 2019, Farr West staff Alexa Kinsinger and Logan Garling went to the WWTP to assist the operators with the inlet pipe isolation. The north pond inlet pipe was only partially submerged, and Logan was able to secure three layers of plastic bags over the pipe without excessive contact with the effluent water (Figure 1, right).



Figure 1: Pipe isolation of outlet pipes (left) and north pond inlet pipe (right)

The south pond inlet pipe was submerged in approximately 3 feet of water and would have required Farr West staff to fully submerge themselves in the pond to attempt to fasten plastic bags over the pipe. Hesitant to expose staff to skin and face contact with the effluent water, Alexa called HGI to confirm that inlet pipe isolation through the plastic bag method was absolutely necessary for the success of the leak detection testing. HGI told Alexa that the plastic bag method does not guarantee pipe isolation and would likely still cause an “occurrence that would appear as a leak” in their leak detection software because there would likely still be water flowing through the plastic bag. From this conversation, Alexa concluded the apparent lack of integrity in the plastic bag isolation method was not worth the risk of exposing Logan to the effluent water.

HGI mobilized to the City WWTP on May 20, 2019 to perform the leak detection testing over a week time frame. By the second day on site, HGI reported that their data collection system was sensing an overwhelmingly large occurrence that was pulling all current towards both outlet pipes. Farr West staff mobilized to the site early Wednesday May 22 to investigate possible air gap failures that could be causing the current to flow towards the outlet pipes. Once the air gaps were successfully established again, HGI reran a current test and concluded the occurrence at the outlet pipe was still overwhelmingly large. This result suggested that the current was travelling through the outlet pipe and grounding in the surrounding soil. This occurred because the outlet pipes are metal and therefore were conducting electricity at a much higher rate than a PVC or HDPE pipe. Once the HGI crew realized that the pipes were metal, they communicated that the leak detection testing would not produce viable results because the current will always take the path of least resistance (through the metal outlet pipes) to ground and therefore not flow through any potential leaks present in the liner. Upon news that the outlet pipe air gap isolation method had failed, Farr West decided to cease the leak detection service and demobilize HGI.

After debriefing with HGI, the following conclusions were made:

- Since the pipe penetrations in both ponds are metal, intensive pipe isolation prep work must take place before leak detection through electric current methods can take place.
- The plastic covering on the inlet pipe of the north pond appeared to be an adequate pipe isolation solution, however, it is vital that all exposed metal be covered and that no water can flow through the plastic covering and come in contact with the metal.
- With the outlet pipes being 10-13' below the water surface, the ponds would either need to be drained prior to the pipes being isolated or would require an underwater diver to affix the proper isolation device.

3.0 CURRENT STATUS OF PONDS

Currently, it is unknown if there are leaks present in the storage ponds, but the south pond has at least one whale present that protrudes out of the water surface (Figure 2). According to the plant operators, both the north and south ponds have had multiple whales appear over the last year. These whales fluctuate in size and location depending on the pond water level. Whaling occurs when air or water present under the pond liner bubbles up and deforms the liner. This deformation reduces the pond storage capacity and can cause damage to the liner that could potentially lead to leakage.

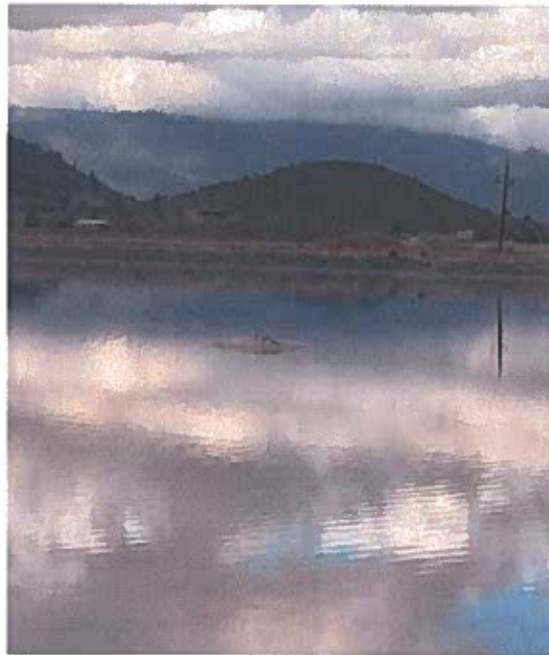


Figure 2: Whale Present in the South Pond. Photo taken May 28, 2019.

Per an April 3, 2012 letter written to the City by Applied Soil Water Technologies, LLC (ASW), air vents were installed at the top of slope around the perimeters of both ponds. At some point after the ASW letter, ballasts were placed in both ponds to alleviate whaling. In a photo from the October 4, 2018 site visit (Figure 3), the ballasts can be seen at the base of the slopes of the ponds parallel to the perimeter. This installation does not meet recommended installation guidelines and may actually be exacerbating the whaling problem by blocking air flow under the liner from traveling up the slope and out the air vents. It was recommended to the City that the ballasts be placed in the center of the pond sitting one on top of another perpendicularly to form a “+”. Some recent discussion about relocating the ballasts to this position and shape has been made by City staff. However, it is unclear whether this activity would result in further damage to the liner, so no further action has been recommended at this time.



Figure 3: Ballasts lying along the edge of the south pond perimeter on October 4, 2018.

4.0 NEXT STEPS TO SATISFY CAO REQUIREMENTS

To satisfy the pond liner requirements of the CAO, Farr West proposes the following alternatives:

Alternative 1: Replace both pond liners and ventilation systems in their entirety and submit as-builts to State. This alternative does not include re-design of pond berms and assumes that existing berms and piping are adequate.

Alternative 2: After the irrigation season, when the pond level is below the outlet pipes (approximately one foot of water), remobilize HGI to the WWTP site to perform leak detection testing on the bottom of the ponds. Side slopes of the ponds would be visually inspected for leaks. Pending results of leak testing, the ponds will be cleaned, liner spot repairs will be performed, and adjustments to ballast system will be made. After ponds are repaired, the liner subconsultant will run pressure tests on each leak area to ensure adequate repair then pond certification and as-builts will be submitted to the State.

Alternative 3: After the irrigation season, when the outlet pipes are exposed, cover the outlet pipes with thick plastic covering to isolate the pipes. Fill ponds over the winter up to bottom of inlet pipes then remobilize HGI to WWTP to perform leak detection testing on full ponds. Once testing is complete, hire scuba diver to remove plastic covering from outlet pipes¹. Pending results of leak testing, the ponds will be cleaned, liner spot repairs will be performed, and adjustments to ballast system will be made in Fall of 2020. After ponds are repaired, the liner subconsultant will run pressure tests on each leak area to ensure adequate repair then pond certification and as-builts will be submitted to the State.

¹ Other methods for outlet pipe cover removal may exist that would allow for removal from the above the water surface.

5.0 COMPARISON OF ALTERNATIVES

Table 1: Pros, Cons, and Unknown Variables of Each Alternative

Alternative	Pros	Cons	Unknown Variables
1	<ul style="list-style-type: none"> -No further leak testing required. - Potential to eliminate whaling issues. - Resolves the outstanding CAO requirements within 12 months. - Gives the City a brand-new pond liner without wasting resources to determine the integrity of the existing liner. 	<ul style="list-style-type: none"> - Most expensive alternative. - Construction may be complicated if high ground water conditions exist. - Subsurface conditions which are causing the whaling would still exist, however would be mitigated by re-design components. - Temporary storage facilities or measures may be required. - Extensive investigation and design phase. 	<ul style="list-style-type: none"> - Presence and extent of existing pond liner leakage. - Suitability of existing pond liner berms.
2	<ul style="list-style-type: none"> - Expected to be the least expensive alternative if full liner replacement is not required. - Testing results received in the Fall of 2019. 	<ul style="list-style-type: none"> - Visual inspection for leaks can be inaccurate. - Requires a remobilization of HGI leak detection testing. - Pond cleaning process can be difficult and lead to additional leaks. - Will not reduce whaling issues in the pond. - Does not guarantee the pond liner life will be significantly extended. - Ponds would not be repaired until end of 2019 at the earliest. - Temporary storage facilities or pumping services may be required. - Future leaks would not be mitigated. 	<ul style="list-style-type: none"> - Presence and extent of existing pond liner leakage; if extensive leaks are discovered, the liner may need to be replaced. - May not receive State approval due to inaccuracy of visual leak inspection.
3	<ul style="list-style-type: none"> - HGI leak detection services are more cost effective on full ponds. - Pond cleaning would only be necessary where leaks are present. 	<ul style="list-style-type: none"> - Requires HGI leak detection testing. - Outlet pipe isolation will be tedious and leak occurrences could still occur if pipes are not completely isolated. - Requires the pond to be cleaned. - Does not guarantee the resolution of whaling issues in the pond. - Does not guarantee the pond liner life will be significantly extended. - Resolves the outstanding CAO requirements the slowest of all alternatives (Fall of 2020). - Future leaks would not be mitigated. 	<ul style="list-style-type: none"> - Presence and extent of existing pond liner leakage; if extensive leaks are discovered, the liner may need to be replaced.

5.1.1 Scheduling of Alternatives

Alternative 1 is estimated to take eight months from the notice to proceed with design. The anticipated items to be completed within this timeframe include:

- 1) Site and Facility investigations (2 months)
- 2) Liner and ventilation system design (3 months)
- 3) Contractor bidding process (1 month)
- 4) Construction Process (2 months, weather permitting):
 - a) Demolition of the existing pond liners
 - b) Re-grading of the pond bottoms to an adequate slope for ventilation
 - c) Installation of a new ventilation system and new pond liners

Alternative 2 is estimated to take six months to a year depending on the results of the leak detection testing. The anticipated items to be completed within this timeframe include:

- 1) Mobilization of HGI to site when the ponds are at their lowest water level (September or October 2019)
- 2) HGI performs leaks detection testing on bottom of pond. Visual inspection of side slopes will take place concurrently with HGI's services. (3 to 4 days)
- 3) Pending results of the leak detection testing:
 - a) Ponds will be cleaned (1 week)
 - b) Contractor will be scheduled to perform spot repairs on the leaking portions of liner (2 months)

If results of the leak detection testing conclude that the liners should be completely replaced, the schedule of this alternative will be delayed by six months to a year to allow for the some of the items in alternative 1 to be completed.

Alternative 3 is similar to alternative 2 because its schedule also depends on the results of the leak detection testing, however, alternative 3 would require another 6 months to fill the ponds prior to testing. The anticipated items to be completed within this timeframe include:

- 1) Isolate outlet pipes when the pond water level falls below the outlet pipe (September or October 2019)
- 2) Fill ponds to rim of inlet pipes (April or May 2020)
- 3) Mobilization of HGI to site to perform leaks detection testing on full ponds (3 to 4 days)
- 4) Pending results of the leak detection testing:
 - a) Ponds will be cleaned (1 week in Fall of 2020)
 - b) Contractor will be scheduled to perform spot repairs on the leaking portions of liner (2 months)

Similar to alternative 2, if the results of the leak detection testing conclude that the liners be completely replaced, the alternative 3 schedule will be extended another six months to a year to allow for some of the items in alternative 1 to be completed.

5.1.2 Opinions of Probable Cost for each Alternative

Opinions of probable costs for each alternative are presented in Table 2 below. It should be noted that these costs are level 5 (i.e. planning level) cost estimates that incorporate numerous assumptions and should be considered within an accuracy range of -40% to +50%. These costs are adequate for general budgeting and cost comparisons between alternatives but should not be considered estimates of bid results or final construction costs. For further detail on these costs and the assumptions included, please refer to Appendix A. For costing purposes, alternatives 2 and 3 have been split into two separate costs (alternatives 2a, 2b, 3a, and 3b). Costs for alternatives 2a and 3a assume that only a few leaks exist in each pond that require minor pond repair work. While costs for alternatives 2b and 3b assume that the existing liners is in poor condition with many leaks present, thus requiring majority of the liner to be repaired.

Table 2: Planning Level Cost Estimates of Alternatives

Alternative	Estimated Cost
1	\$1,423,700
2a	\$272,000
2b	\$600,000
3a	\$276,000
3b	\$608,000

6.0 NEXT STEPS

Farr West met with City representatives on June 5, 2019 to present these alternatives. The City would prefer to pursue alternative 2 because it is the least expensive option and will require less time than alternative 3. Additionally, the City has no reason to believe that there are currently leaks present in the liner and therefore alternative 1 seems too extensive to pursue at this time.

After this technical memo is issued to the State, the City will send a formal request for a site walk through with the State and Farr West staff to discuss the liner issues and their available alternatives to satisfy the CAO. Implementation of the selected alternative will likely require time for Farr West to conduct a research investigation to familiarize ourselves with the specific issues in the pond liners. This research will include reading through lawsuit documents, pond liner design documents, ground water level piezometric data, and any other investigative documents that pertain to the pond liner design and issues.

APPENDIX A

Cost Estimates - Pond Liner Alternatives

Alternative 1 - Replace Liner and Ventilation System, Regrade Pond Bottoms

Item	Description	Classification	Quantity	Unit	Unit Price	Total
1	Construction Mobilization/Demob	Construction Cost	1	LS	\$ 43,000	\$ 43,000.00
2	Demolish Existing Liner and Disposal	Construction Cost	500,500	SF	\$ 0.55	\$ 275,275.00
3	Basin Earthwork and Subgrade Prep	Construction Cost	10,000	CY	\$ 12.00	\$ 120,000.00
4	60 mil HDPE liner w/ vents	Construction Cost	500,500	SF	\$ 1.40	\$ 700,700.00
5	Ventilation geocomposite strips	Construction Cost	50	Strips	\$ 0.15	\$ 8.00
6	Farr West Design Cost	Design Cost	1	LS	\$ 284,744	\$ 284,743.75
Total Cost:						\$ 1,423,726.75

Alternative 2 - Leak Detection on Partially Full Ponds and Liner Spot Repairs; Item 4a and Cost 2a Assume Existing Liner is in Good Condition; Item 4b and Cost 2b Assume Existing Liner is in Bad Condition and Requires Extensive Repairs or Majority Overlay.

Item	Description	Classification	Quantity	Unit	Unit Price	Total
1	HGI Leak Detection Testing	Subconsultant Cost	1	LS	\$ 22,466	\$ 22,500.00
2	Visual Leak Detection Testing	Subconsultant Cost	1	LS	\$ 5,000	\$ 5,000.00
3	Clean out ponds	Pond Cleaning Cost	1,102,700	gal	\$ 0.16	\$ 176,400.00
4a	Pond Liner Repairs	Subconsultant Cost	5	day	\$ 2,000.00	\$ 10,000.00
4b	Pond Liner Replacement	Subconsultant Cost	375,375	SF	\$ 0.90	\$ 337,800.00
5	Ballast System	Subconsultant Cost	1	LS	\$ 50,000.00	\$ 50,000.00
6	By pass pumping	Pumping Cost	1	month	\$ 8,055	\$ 8,055.00
Total Cost 2a:						\$ 271,955.00
Total Cost 2b:						\$ 599,755.00

Alternative 3 - Leak Detection on Full Ponds and Liner Spot Repairs; Item 5a and Cost 3 Assumes Existing Liner is in Good Condition; Item 5b and Cost 3b Assume Existing Liner is in Bad Condition and Requires Extensive Repairs or Majority Overlay.

Item	Description	Classification	Quantity	Unit	Unit Price	Total
1	Isolate outlet pipes	Subconsultant Cost	1	LS	\$ 5,000	\$ 5,000.00
2	HGI Leak Detection Testing	Subconsultant Cost	1	LS	\$ 22,466	\$ 22,500.00
3	Scuba to unisolate outlet pipes	Subconsultant Cost	1	day	\$ 8,000	\$ 8,000.00
4	Clean out ponds	Pond Cleaning Cost	1,102,700	gal	\$ 0.16	\$ 176,432.00
5a	Pond Liner Repairs	Subconsultant Cost	5	day	\$ 1,200	\$ 6,000.00
5b	Pond Liner Replacement	Subconsultant Cost	375,375	SF	\$ 0.90	\$ 337,800.00
6	Ballast System	Subconsultant Cost	1	LS	\$ 50,000.00	\$ 50,000.00
7	By pass pumping	Pumping Cost	1	month	\$ 8,055	\$ 8,055.00
Total Cost 3a:						\$ 275,987.00
Total Cost 3b:						\$ 607,787.00

Assumptions:

- Basin Earthwork was assumed at 10,000 CY cut and 10,000 CY fill, pay on fill at 2% sloping of pond bottoms;
- Construction mobilization and demobilization assumed to be 5% of construction cost.
- Ventilation system is assumed to include 3" layer of gravel rock on bottom of ponds priced at \$25/cubic yard of rock and a geocomposite drainage fabric on bottom and side slopes of ponds priced at \$0.20/SF.
- Farr West Design cost assumed at 16% of total construction cost to cover both design and construction management
- Visual leak detection testing assumed to be performed by Farr West inspector for over multiple days including travel time.
- HGI service includes mobilization and 4 days of leak detection testing. Reporting costs to be covered through existing HGI contract
- Outlet pipe isolation assumed to be performed by Farr West inspector and to require a small design effort.
- Bypass pumping cost based off Pac Machine quote for a Godwin HL130 diesel trash pump
- Pond cleaning cost assumes 4" of sediment on pond bottoms at \$0.16/gal of effluent water removal and disposal
- Costs 2a and 3a assume that the leak detection results finds the existing liner in good condition with a small number of spot repairs needed to solve leaking issues.
- Costs 2b and 3b assume that the leak detection results find the existing liner in bad condition that will require 75% of liner to be replaced at \$0.90/SF. Due to economies of scale, the cost of liner will fluctuate depending on the amount of liner that needs to be replaced. No regrading of the pond bottoms is included in the costs.
- All costs have been rounded to the nearest dollar. These costs are level 5 planning costs and should be considered within an accuracy range of -40% to +50%

CITY OF LOYALTON

COUNTY OF SIERRA
605 SCHOOL STREET
PO BOX 128
LOYALTON, CALIFORNIA 96118
(530) 993-6750
cityofloyalton@digitalpath.net



OFFICE OF THE MAYOR

Re: Clean Up and Abatement Order R5-2013-0700

To Whom it May Concern,

The City of Loyalton supports the Interim Corrective Action Measures submitted on our behalf by Farr West Engineering following the September 17, 2019 site visit.

Regards,

Sarah M Jackson

Mayor, City of Loyalton

September 20, 2019

Sarah Jackson
Mayor
City of Loyalton
605 School St.
PO Box 128
Loyalton, CA 96118

RE: Cleanup and Abatement Order R5-2013-0700 – Interim Corrective Action Measures

Dear Sarah:

On September 17, 2019, regulators Brendan Kenny and Howard Hold of the Central Valley Regional Water Quality Control Board (RWQCB) came to the Loyalton wastewater treatment plant (WWTP) for a site visit and meeting to discuss the pathway to compliance for the outstanding Cleanup and Abatement Order R5-2013-0700 (CAO). Also present at the meeting were Loyalton City Council representatives, Nancy Rogers and Darlene Reide; WWTP Operators, John Cussins and Keith Jordan; and Farr West staff, Alexa Kinsinger and Lucas Tipton. This letter presents a summary of the items discussed during the meeting, and a plan for interim corrective action measures to achieve compliance with the CAO.

The primary outstanding items in the CAO are:

1. Item 7 (pg. 6 of the CAO): Submission of a corrective action plan for repair of the storage pond liners.
2. Item 8 (pg. 7 of the CAO): Submission of as-built drawings and certification that the storage ponds have been reconstructed and have a storage capacity of 120-acre feet while maintaining 2-feet of freeboard.

A copy of the CAO is attached for reference.

During the September 17th meeting, the attendees discussed possible pathways to comply with the CAO. This discussion resulted in the following conclusions:

- Leak detection testing through vacuum or electric arc testing will take place on the south pond this year (tentatively at the end of October) and on the north pond next year.
- WWTP operators must immediately implement the following operational changes and monitoring program to prepare the south storage pond for leak detection testing:
 - Direct all influent flow to the north pond,
 - Direct all effluent irrigation flow from the south pond until south pond is completely empty, and
 - Start weekly monitoring for whales and abnormalities in both ponds.

- Monthly and quarterly reporting required under the CAO must continue to be submitted to the RWQCB.

The RWQCB requested that a plan describing interim corrective action measures be submitted for their review. Farr West has prepared an initial plan which includes itemized tasks, responsible parties, and an anticipated schedule. The initial plan is attached as Table 1. RWQCB staff are copied on this letter for submission of the plan for their review and records.

We expect RWQCB acceptance of this plan and anticipate a response in the form of a “comfort letter” in which the tasks and tentative dates of completion will be memorialized. We will continue to work closely with the City and the RWQCB to ensure that the tasks outlined in the plan are carried out to completion. Through close collaboration and organized execution of the plan, we will satisfy the outstanding items in the CAO.

Please review the plan (Table 1) and provide comments to me by September 27, 2019. If you have any questions or concerns, please do not hesitate to contact me at (775) 997-7491 or by email at akinsinger@farrwestengineering.com.

Sincerely,



Alexa Kinsinger, E.I.

Attached: Cleanup and Abatement Order R5-2013-0700; Table 1: Plan for Interim Corrective Action Measures to Satisfy CAO R5-2013-0700

Cc: Brendan Kenny and Howard Hold, Central Valley RWQCB; Lucas Tipton, P.E., Farr West Engineering; Kathy LeBlanc, City of Loyalton

Table 1: Plan of Interim Corrective Action Measures to Satisfy CAO R5-2013-0700

Task No.	Task	Responsible Party	Start Date:	Completion Date:	Cost Impact
1	Submit plan of interim corrective action measures to City and RWQCB	Farr West	9/20/19	9/20/19	None
2	Implement storage pond liner weekly monitoring program	City	9/23/19	Ongoing ¹	None
3	Implement operational changes to facilitate lowering south pond water level: - Direct all influent flow into north pond - Direct all irrigation flow from south pond	City	9/18/19	Ongoing until south pond is empty (tentative 10/14/19) ²	None
4	Coordinate the following with Grandi Ranch: - Removal of cattle from irrigation fields to allow for south pond irrigation - Discuss extending the irrigation discharge period past Nov. 1	City	9/23/19	Until south pond is empty (tentative 10/14/19) ²	None
5	Gather proposals for leak detection services	Farr West	9/19/19	9/27/19	None
6	Draft new Task Order (TO) to close existing CAO TO #2 and open a new TO to include: - Preparation of CAO quarterly progress reports and WDR annual report - Preparation of corrective action plan required under the CAO - Coordination and oversight of leak detection services - Coordination with the RWQCB to keep City on track towards CAO compliance	Farr West	9/30/19	Submit Task Order Draft to City Council Agenda on 10/9/19	TO #2 has ~\$27,000 remaining that will transfer to new TO. Total cost will be determined in upcoming weeks. ³
7	Submit WDR monthly monitoring report to RWQCB	City	10/1/19	Ongoing and submitted monthly	None
8	Submit leak detection services proposal to City Council for approval	Farr West	10/8/19	10/9/19	None

Task No.	Task	Responsible Party	Start Date:	Completion Date:	Cost Impact
9	City Council to vote on new TO and leak detection services	City	10/15/19	10/15/19	None
10	South pond to be completely empty	City	9/23/19	10/14/19 ²	None
11	Leak detection services with liner spot repairs on south pond	Selected Subconsultant, Farr West & City	10/21/19 (tentative)	11/1/19 (tentative)	~\$40,000 +/- \$10,000
12	WWTP Operators place ballasts in correct formation in south pond	City	When leak detection is completed (tentative 11/1/19)	11/1/19 (tentative)	None
13	Submit CAO Quarterly Progress Reports to RWQCB	Farr West	Ongoing until settlement of CAO	Submit on: Q3-19: 11/1/19 Q4-19: 2/1/20 Q1-20: 5/1/20 Q2-20: 8/1/20 Ongoing	None
14	Submit WDR Quarterly Monitoring Reports to RWQCB	City	Ongoing	Submit on: Q3-19: 11/1/19 Q4-19: 2/1/20 Q1-20: 5/1/20 Q2-20: 8/1/20 Ongoing	None
15 ⁴	Submit certification of south pond to RWQCB (Contingency item pending results Task No. 11)	Selected Subconsultant & Farr West	11/1/19 (contingent date)	11/29/19 (contingent date)	None
16 ⁴	Submit Corrective Action Plan for south pond (Contingency item pending results of Task No. 11)	Selected Subconsultant & Farr West	11/1/19 (contingent date)	11/29/19 (contingent date)	None
17	Submit WDR Annual Report to RWQCB	Farr West	2/1/20	2/1/20	None
18	Coordinate north pond leak detection services	Farr West	July 2020	July 2020	None
19	Implement operational changes listed in Task No. 3 to lower water level of north pond	City	9/1/20 (tentative date)	Ongoing until north pond is empty (tentative mid Oct 2020) ²	None

Task No.	Task	Responsible Party	Start Date:	Completion Date:	Cost Impact
20	North pond to be completely empty	City	9/1/20	Week before leak detection testing (tentative mid Oct 2020) ²	None
21	Leak detection services with liner spot repairs on north pond	Selected Subconsultant Farr West & City	End of October 2020 (tentative)	11/1/2020 (tentative)	~\$40,000 +/- \$10,000
22	WWTP Operators place ballasts in correct formation in north pond utilizing lessons learned from south pond ballast formation	City & Farr West	When leak detection is completed (tentative 11/1/20)	11/1/20 (tentative)	None
23 ⁴	Submit certification of north pond to RWQCB (Contingency item pending results Task No. 21)	Selected Subconsultant & Farr West	11/1/20 (contingent date)	11/29/20 (contingent date)	None
24 ⁴	Submit Corrective Action Plan for north pond (Contingency item pending results of Task No. 21)	Selected Subconsultant & Farr West	11/1/20 (contingent date)	11/29/20 (contingent date)	None

Notes:

1 – Pond liner monitoring must take place until the outstanding CAO is settled.

2 – WWTP staff will do all in their power to ensure that the ponds are empty and prepared in time for leak detection testing to take place. If it appears that the pond will not be empty before the leak detection subconsultant begins work, the WWTP operators must implement bypass pumping of all remaining water from one pond into the other. Additionally, under Task No. 4, City staff will engage with Grandi Ranch to propose the extension of irrigation past the November 1st cutoff date. Farr West, City staff, and the RWQCB will work closely to negotiate this irrigation cutoff date extension, if it is needed. Lastly, per Order No. R5-2009-0108, discharge to the irrigation fields cannot take place “within 24 hours of a forecasted storm, during a storm, or within 24 hours after any precipitation event, nor when the ground is saturated.” If storms delay the pond emptying schedule, Farr West and City Staff will notify RWQCB staff as soon as possible to arrange modifications to this proposed schedule.

3 – All Farr West work will be invoiced under the existing TO #2 and the future TO that will be drafted in Task No. 6 for City Council approval under Task No. 9.

4 – Task Nos. 15, 16, 23, and 24 are contingent on the results of the leak detection testing. If the south or north ponds have small leaks, the subconsultant will conduct spot repairs immediately after the leak detection testing and certification of the south and north ponds will be submitted under Task Nos. 15 and 23, respectively. If the ponds have large leaks, Farr West will work with the leak detection subconsultant to develop Corrective Action Plans for resolving the south and/or north pond liner issues for submittal to the RWQCB under Task Nos. 16 and 24, respectively.

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

CLEANUP AND ABATEMENT ORDER R5-2013-0700
FOR

CITY OF LOYALTON
WASTEWATER TREATMENT FACILITY
SIERRA COUNTY

This Order is issued to the City of Loyalton (Discharger) based on provisions of California Water Code section 13304, which authorizes the California Regional Water Quality Control Board, Central Valley Region, (hereafter Central Valley Water Board or Board) to issue a Cleanup and Abatement Order (CAO), and Water Code section 13267, which authorizes the Board to require the submittal of technical reports.

The Executive Officer of the Central Valley Water Board finds, with respect to the Discharger's acts, or failure to act, the following:

1. The Discharger owns and operates a municipal wastewater treatment facility located at 403 Poole Lane, Loyalton in Sierra County.
2. For the purposes of this Order, the term "Wastewater Treatment Facility" (WWTF) shall mean the wastewater collection system, the wastewater treatment ponds, constructed wetlands, wastewater storage ponds, recycled water distribution piping, and the land application area. Grandi Ranch owns the land application area (LAA). The LAA is located in Section 11, T2N, R15E, MDB&M.
3. Several Orders have been adopted regarding the wastewater treatment facility. They consist of:
 - a. Waste Discharge Requirements (WDRs) Order 5-01-069 and Water Recycling Requirements (WRRs) Order 5-01-051 were adopted by the Central Valley Water Board on 16 March 2001. The Orders regulated the treatment, storage, onsite disposal of wastewater, and also allowed recycled water to be applied on the Bar One Ranch.
 - b. Cease and Desist Order (CDO) R5-2005-0089 was adopted by the Central Valley Water Board on 24 June 2005. Because of excessive inflow and infiltration into the community collection system, limited disposal area, and restrictions on land application due to weather conditions, the Order required design and construction of a system that complies with the storage capacity requirements of WDRs Order 5-01-069.
 - c. WDRs Order R5-2009-0108 was adopted by the Central Valley Water Board on 8 October 2009. The Order rescinded WDRs Order 5-01-069 and WDRs Order 5-01-051, and allows the discharge of wastewater to recently constructed wetlands, lined wastewater storage ponds and 65 acres of land application area located on the Grandi Ranch. Order R5-2009-0108 requires 120 acre feet of storage at the wastewater treatment facility and 65 acres of land application area.

DISCHARGE VIOLATIONS

4. Finding 11 of WDRs Order R5-2009-0108 states, in part, "*The Discharger plans the following improvements: C. Convert seven of the nine existing rapid infiltration ponds into two 60-mill thick HDPE liner equipped effluent storage ponds that provide 120 ac.ft of treated wastewater storage.*"
5. Finding 48 of WDRs Order R5-2009-0108 states, in part, "*The Discharger will provide treatment and control of the discharge that incorporates: E. Synthetically lined wastewater storage ponds.*"
6. On 24 August 2010, the WWTF operator observed a large bubble in lined wastewater storage pond #1 (also known as the south storage pond). The liner lifted to a height of approximately nine feet before bursting later that day. Wastewater was transferred to the north storage pond and the liner in the south pond was subsequently repaired by the Discharger.
7. In January 2011, bubbles reappeared in the south pond.
8. In April 2011, bubbles appeared in the north pond. The Discharger subsequently (a) installed air vents in the perimeter of both storage ponds to allow trapped air beneath the liners to escape and (b) placed ballast on the bottom of the storage ponds in an attempt to hold the liners down.
9. Discharge Specification A.2 of WDRs Order R5-2009-0108 which states, "*Bypass or overflow of untreated or partially treated waste is prohibited.*"
10. General Provision A.7 of the Standard Provisions and Monitoring Requirements for Waste Discharge Requirements, states, "*The Discharger shall maintain in good working Order and operate as efficiently as possible any facility, control system, or monitoring device installed to achieve compliance with the waste discharge requirements.*"
11. On 9 June 2011, Central Valley Water Board staff inspected the WWTF. During the inspection staff observed inoperable aerators, a leaking chlorine generator, moderate erosion of outer pond berms, signs of wastewater seepage around a valve box, bubbles in both storage ponds and ponded water adjacent to, and outside of, the land application area tailwater diversion box. The storage pond seeps are a violation of Discharge Specification A.2. The inoperable aerators and leaking chlorine generator are a violation of General Provision A.7 of the Standard Provisions.
12. Staff issued a Notice of Violation (NOV) on 23 June 2011 for violations observed during the inspection. The NOV required the Discharger to submit a corrective action plan by 25 July 2011 for repairs associated with the storage pond liners in the north and south ponds, erosion areas and rodent holes on the outer pond slopes, pond aerators and chlorine generator. Additionally, the Discharger was required to investigate the integrity

of tailwater diversion box and surrounding grade to ensure that wastewater applied to the land application area remains contained on-site. The corrective action plan was also to contain a description of how wastewater would be managed to maintain compliance with Order R5-2009-0108 while the liner inspection and repairs were performed on the storage ponds. The repairs were to be completed by 15 September 2011.

13. On 12 September 2011, the Discharger submitted a status report and request for a time extension to resolve issues identified during staff's inspection. The report stated that erosion of the north pond berm was being addressed, rodent holes in the pond berms were being repaired, vegetation around the ponds was being minimized, the pond aerators were operational, and the chlorine generator was not leaking. Additionally, the report requested additional time to investigate and complete repairs to the wastewater storage pond liners and tailwater diversion box.
14. On 10 January 2012, the Executive Officer issued a *Water Code Section 13267 Order for Technical and Monitoring Reports*. The Order was issued because the Discharger did not submit the Corrective Action Plan required by the 23 June 2011 NOV. The Order required the Discharger to submit a technical report/corrective action plan by 28 February 2012 that addresses necessary repairs for the storage pond liners and eliminate the seeps in the wastewater storage ponds. Additionally, the Order required the Discharger to submit past due monthly and quarterly monitoring reports for the period of August 2011 through November 2011 (inclusive).
15. On 7 March 2012, the Discharger requested a 60 day extension to submit the corrective action plan required by the 10 January 2012 Water Code Section 13267 Order. The extension request was approved.
16. On 27 April 2012, the Discharger submitted the previously requested corrective action plan. The corrective action plan cited shallow groundwater conditions and inadequate site grading as the most likely cause of air entrapment and subsequent bubble formation in the storage ponds. Additionally, the corrective action plan provided three potential solutions to stop the occurrence of bubbles in the storage ponds. However, the report concluded that additional groundwater characterization in the vicinity of the storage basins was necessary before identifying the appropriate corrective action. The corrective action plan also stated that stability issues with the interior basin berm may exist and further evaluation of the interior berm, which separates the north and south storage ponds would be required.
17. On 13 June 2012, the Discharger submitted a status report stating that the City has received grant funding in the amount of \$1.4 million to investigate and repair the storage pond liners. Proposed options for repairing the liners and eliminating future bubbles from forming in the storage ponds include adding more ballast to the pond liners, intercepting upgradient groundwater which may be pooling beneath the pond liner, or removing the liners, re-grading the site and reinstalling the liners with increased bottom

slopes and air vents. The report also stated that no seeps were observed from the storage pond berms and adequate capacity was still available in the storage ponds.

18. On or before 13 June 2012, the Discharger installed eight piezometers in the vicinity of the storage ponds to characterize fluctuations in shallow groundwater elevations. The Discharger anticipates that 12 months of groundwater data must be collected and analyzed from the piezometers before the specific correction action can be decided upon and implemented. Therefore, the Discharger expects repairs of the storage pond liners to be completed by December 2014.

MONITORING AND OPERATING VIOLATIONS

19. Monitoring and Reporting Program R5-2009-0108 describes requirements for monitoring influent wastewater, treated effluent, wastewater ponds, land application areas, groundwater, sludge, and water supply.
20. Provision G. 4 of WDRs Order R5-2009-0108 states: "*The Discharger shall comply with Monitoring and Reporting Program R5-2009-0108, which is part of this Order, and any revisions thereto as Ordered by the Executive Officer.*" As described in Finding 14, above, the Discharger did not submit the August 2011 through November 2011 monitoring reports until required by the Water Code Section 13267 Order. The Reports were submitted on 19 January 2012.
21. Monthly monitoring reports have not contained the required land application area loading rates for nitrogen and fixed dissolved solids.
22. Provision G.1e of WDRs Order R5-2009-0108 states in part,: "***By 3 August 2012, the Discharger shall submit a Background Groundwater Quality Study Report.*** The Discharger has not submitted the *Background Groundwater Quality Study Report* required by Order R5-2009-0108.
23. Provision G.7 of Order R5-2009-0108 states, "*The Discharger shall provide certified wastewater treatment facility operators in accordance with Title 23 CCR, Division 3, Chapter 26.*" The Discharger does not currently have a certified operator on staff to oversee operation of the wastewater treatment facility.

REGULATORY CONSIDERATIONS

24. The *Water Quality Control Plan for the Sacramento River and Sierra River Basins, Fourth Edition* (hereafter Basin Plan) designates beneficial uses, establishes water quality objectives, contains implementation plans and policies for protecting waters of the basin, and incorporates by reference plans and policies adopted by the State Board. These requirements implement the Basin Plan.
25. Surface water drainage from the WWTF is to Smithneck Creek and then the Middle Fork Feather River. The beneficial uses of the Middle Fork Feather River from the

source to Little Last Chance Creek as stated in the Basin Plan, are agricultural supply; water contact recreation; non-contact water recreation; warm freshwater habitat; cold freshwater habitat; spawning, reproduction, and/or early development; and wildlife habitat.

26. The beneficial uses of the underlying groundwater are municipal and domestic supply, agricultural supply, industrial service supply, and industrial process supply.

27. Water Code section 13304(a) states, in relevant part:

Any person who has discharged or discharges waste into the waters of this state in violation of any waste discharge requirement or other order or prohibition issued by a regional board or the state board, or who has caused or permitted, causes or permits, or threatens to cause or permit any waste to be discharged or deposited where it is, or probably will be, discharged into the waters of the state and creates, or threatens to create, a condition of pollution or nuisance, shall upon order of the regional board, clean up the waste or abate the effects of the waste, or, in the case of threatened pollution or nuisance, take other necessary remedial action, including, but not limited to, overseeing cleanup and abatement efforts.

28. Water Code section 13267(b) states, in relevant part:

In conducting an investigation specified in subdivision (a), the regional board may require that any person who has discharged, discharges, or is suspected of having discharged or discharging, or who proposes to discharge waste within its region ... shall furnish, under penalty of perjury, technical or monitoring program reports which the regional board requires. The burden, including costs, of these reports shall bear a reasonable relationship to the need for the report and the benefits to be obtained from the reports. In requiring those reports, the regional board shall provide the person with a written explanation with regard to the need for the reports, and shall identify the evidence that supports requiring that person to provide the reports.

29. The technical reports required by this CAO are necessary to ensure compliance with this CAO and WDRs Order R5-2009-0108, and to ensure the protection of water quality. The Discharger owns and operates the facility that discharges waste subject to this CAO and WDRs Order R5-2009-0108.

30. The issuance of this Order is an enforcement action taken by a regulatory agency and is exempt from the provisions of the California Environmental Quality Act (Pub. Resources Code, § 21000 et seq.) pursuant to California Code of Regulations, title 14, section 15321(a)(2).

IT IS HEREBY ORDERED that, pursuant to Water Code sections 13304 and 13267, the City of Loyalton shall cleanup and abate the WWTF in accordance with the scope and schedule set forth below, in order to comply with WDRs Order R5-2009-0108.

1. **Beginning 1 May 2013**, and continuing quarterly until this Order is rescinded, the Discharger shall submit quarterly progress reports describing the work completed to date to comply with each of the requirements described below. The Quarterly Progress

Reports shall be submitted by the 1st day of the second month following the end of the quarter (e.g. 1 May, 1 August, 1 November, and 1 February).

2. **Effective immediately**, the Discharger shall submit complete monitoring reports that comply with monitoring and reporting program R5-2009-0108.
3. **Effective immediately**, any seepage of wastewater from pond berms shall be contained and immediately returned to the wastewater storage ponds.
4. **By 15 April 2013**, the Discharger shall submit a report certifying that the tailwater diversion box is functioning adequately to prevent bypass or overflow from the land application area to surface water drainage courses and that the soil around the box is graded to prevent bypass of water around the diversion box.
5. **By 15 April 2013**, the Discharger shall submit the past due *Background Groundwater Quality Study Report* required by Order R5-2009-0108.
6. **By 15 August 2013**, the Discharger shall submit a report certifying that a Certified Wastewater Treatment Plant Operator has been retained to oversee operation of the wastewater treatment facility. The report shall contain a copy of the operator's current registration certificate.
7. **By 15 October 2013**, the Discharger shall submit a *Corrective Action Report* that describes the corrective action that will be implemented to repair the storage pond liners and berms (if necessary). The Report shall contain a copy of the preliminary design drawings and volume calculations showing that the storage pond capacity will be equal to or greater than the 120 acre feet storage requirement required by WDR Order R5-2009-0108. The report shall also include a *Wastewater Management Plan* that describes how wastewater will be managed in compliance with Order R5-2009-0108 while the storage ponds are being repaired or re-constructed. Based on the chosen corrective action the following permits are required based on the construction activities:
 - If the project will involve the disturbance or discharge of dredged or fill material into surface waters or wetlands, a permit pursuant to Section 404 of the Clean Water Act may be required from the U.S. Army Corps of Engineers. If a Section 404 permit is required by the Corps, a Water Quality Certification must be obtained from the Regional Board as required under Section 401 of the Clean Water Act. A Water Quality Certification must be obtained prior to initiation of project activities. The applicant is also advised to contact the Department of Fish and Game for information on Streambed Alteration Permit requirements
 - If dewatering of groundwater is required, and the groundwater will be discharged to land, the Discharger may apply for coverage under Resolution No. R5-2008-0182, *Waiver of Reports of Waste Discharge and Waste Discharge Requirements for Specific Types of Discharge*.
 - If discharging groundwater to surface water, the Discharger may be required to file a dewatering permit covered under WDRs Order No. R5-2008-0081 (NPDES CAG995001) *General Order for Dewatering and Other Low Threat Discharges to Surface Waters*.

The *Corrective Action Report* shall describe whether any of the above permits are required and shall document that the Discharger has applied for them.

8. By **15 February 2015**, the Discharger shall submit the as-built drawings and certification that the storage ponds have been re-constructed and have a storage capacity of 120 acre feet while maintaining two feet of freeboard.
9. In addition to the above, the Discharger shall comply with WDRs Order R5-2009-0108 and all applicable provisions of the Water Code that are not specifically referred to in this Order.

As required by the California Business and Professions Code sections 6735, 7835, and 7835.1, all reports shall be prepared by, or under the supervision of, a California Registered Engineer or Professional Geologist and signed by the registered professional.

Any person signing a document submitted under this Order shall make the following certification:

"I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my knowledge and on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment."

If the Discharger is unable to perform any activity or submit any document in compliance with the schedule set forth herein, or in compliance with any work schedule submitted pursuant to this Order and approved by the Executive Officer, the Discharger may request, in writing, an extension of the time specified. The extension request shall include justification for the delay. Any extension request shall be submitted as soon as a delay is recognized and prior to the compliance date. An extension may be granted by revision of this Order or by a letter from the Executive Officer.

If the Discharger fails to comply with the provisions of this Order, the Executive Officer may refer this matter to the Attorney General for judicial enforcement or may issue a complaint for administrative civil liability. Failure to comply with this Order may result in the assessment of administrative civil liability up to \$10,000 per violation per day, pursuant to the Water Code sections 13268, 13350, and/or 13385. The Central Valley Water Board reserves its right to take any enforcement actions authorized by law.

Any person aggrieved by this action of the Central Valley Water Board may petition the State Water Board to review the action in accordance with Water Code section 13320 and California Code of Regulations, title 23, sections 2050 and following. The State Water Board must receive the petition by 5:00 p.m., 30 days after the date of this Order, except that if the thirtieth day following the date of this Order falls on a Saturday, Sunday, or state holiday, the petition

must be received by the State Water Board by 5:00 p.m. on the next business day. Copies of the law and regulations applicable to filing petitions may be found on the Internet at:

http://www.waterboards.ca.gov/public_notices/petitions/water_quality
or will be provided upon request.

This Order is effective upon the date of signature.

-Original Signed By-

PAMELA C. CREEDON, Executive Officer

28 February 2013

(Date)

Electronic Report Transmittal Form

Attention: Brendan Kenny (916) 464-4635

Discharger: City of Loyalton
Name of Facility: Loyalton WWTF
WDRs Order Number: R5-2009-0108
CIWQS Place ID: 214650
County: Sierra

I am hereby submitting to the Central Valley Water Board the following information:

Check all that apply:

Technical Report Title and Date Q4 2019 Progress Report - January 30, 2020

Monthly Monitoring Report for the month of _____

1st / 2nd / 3rd / **4th** (circle one) Quarterly Monitoring Report for the year of 2019

1st / 2nd (circle one) Semi-annual Monitoring Report for the year _____

Annual Monitoring Report for the year _____

Violation Notification:

During the monitoring period, there were / were not (circle one) any violations of the WDRs.

1. The violations were:

n/a

2. Have the violations been corrected? Yes / No. If no, what will be done to correct the violations:

n/a

Certification Statement:

"I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment."

Signature:  Phone: 775-997-7491

Printed Name: Alexa Kinsinger Date: 1/31/20

Electronic Report Submittal:

To submit the electronic reports please do the following:

1. First, make a PDF copy of your report and include this *form as the first page of the report.*
2. Attach the PDF file to the email.
3. Send the email and PDF attachment to **centralvalleysacramento@waterboards.ca.gov** (Please note that in order to ensure your reports are cataloged correctly and routed to the appropriate Regional Board staff, only one report/attachment shall be included with each e-mail.)

QUARTERLY PROGRESS REPORT

CITY OF LOYALTON

Prepared For: Central Valley Regional Water Quality Control Board
Brendan Kenny, Engineering Geologist

Prepared By: Alexa Kinsinger, E.I., Project Designer

Reviewed By: Lucas Tipton, P.E., Principal Engineer

Prepared Date: January 30, 2020

Subject: CAO Reporting - Quarter 4 2019

INTRODUCTION

The discharge of domestic wastewater from the City of Loyalton (City) Wastewater Treatment Plant (WWTP) in Sierra County is regulated by Waste Discharge Requirements (WDRs) Order R5-2009-0108 and Cleanup and Abatement Order (CAO) R5-2013-0700. The collection system is regulated under the State Water Resources Control Board's (Board) Sanitary Sewer System General Order 2006-0003-DWQ. Pursuant to Water Code sections 13304 and 13267, the CAO issued in 2013 ordered that quarterly progress reports be submitted describing the work completed to date for compliance of the requirements set forth not only in the CAO but also in the WDRs.

In August of 2018, the City contracted Farr West Engineering (Farr West) to assist in handling the outstanding requirements defined in the WDRs and CAO shown in Table 1.

Table 1: State ordered studies and reports including the originating orders and due dates.

Reports Required	Originating Order	Due Date
CAO Quarterly Progress Reports	CAO	5/1/2013
Monitoring and Reporting Program	WDR	continuous
Groundwater Monitoring Workplan and Well Construction Evaluation	WDR	5/1/2010
Monitoring Well Installation Report	WDR	8/2/2010
Operation and Maintenance Plan	WDR	5/1/2010
Background Groundwater Quality Report	WDR & CAO	8/3/2010 4/15/2013
Tailwater Diversion Box Report	CAO	4/15/2013
Certified Operator Report	CAO	8/15/2013
Corrective Action Report w/ Waste Management Plan	CAO	10/15/2013
As-Built and Certification for Ponds	CAO	2/15/2015

This report will summarize the work performed during the 4th Quarter (Q4) of 2019.

1.0 INTERIM CORRECTIVE ACTION MEASURES PLAN – Q4 2019 UPDATE

Sections 1.1-1.3 of the Q3 2019 Quarterly Progress Report detail the Interim Corrective Action Measures Plan to settle the two outstanding CAO items¹ by the end of 2020.

As reported in the Q3 2019 report, Layfield Group was contracted under Task Order #5 to conduct a leak location survey and liner repairs on the south effluent pond in November 2019. During their time onsite, the Layfield field crew was not able to complete a full leak location survey due to weather complications and freezing within the pond. They completed one liner repair on a three-foot gash that was discovered at the toe of the slope below the inlet pipe. A second six-inch hole in the liner was discovered at the toe of the slope in the northwest corner of the south pond, but the field crew was unable to clear the area of water and ice to repair the hole. After eight days on site, Farr West and the City decided it would be best to demobilize the Layfield crew because unanticipated winter conditions were preventing the crew from completing their services. Farr West communicated the south pond leak detection testing and repair issues to Brendan Kenny of the RWQCB through emails. Layfield Group also provided a report detailing the work completed and issues faced while they were onsite. This report and emails to the RWQCB are included in Appendix A.

In December 2019, Farr West held two conference calls with Layfield to formulate a plan for the south and north pond leak detection and repairs. It was concluded that all work can be completed within the schedule set forth in the Interim Corrective Action Measures Plan. On January 8, 2020, Layfield Group submitted a proposal for completing the following work in September 2020:

1. Completion of leak detection testing and liner repairs on the south pond within the existing Task Order #5 contract price
2. Proposal Plan A: Completion of leak detection testing and repairs on the south pond within the same mobilization as the north pond work
3. Proposal Plan B: Completion of leak detection testing and repairs on the south pond during a second mobilization to the site (2-3 weeks after completing work on the north pond)
4. Sand tube ballast installation in the south pond

The proposal plans A and B were included to allow operational flexibility while emptying both ponds. To minimize mobilization costs, the City is hoping that it will be feasible to pursue proposal plan A by emptying both ponds before Layfield commences work. To empty both ponds by the time Layfield arrives on site, the following operational changes will take place:

1. Begin land application irrigation as early as the WDR R5-2009-0108 permits to lower pond water levels
2. Divert settling basin effluent to the emergency storage pond as needed to lower effluent pond levels
3. Pump north to south pond as needed to empty north pond first
4. Pump south pond to grasslands as needed to empty south pond

Diversion of the settling basin effluent is contingent on approval from the RWQCB and is being considered a last resort operational change in which permission will be requested in advance if flow diversion is needed. Specifics on if and when diversion to the emergency storage pond will be needed will depend on the water year that takes place throughout winter, spring, and summer 2020. Pond water levels will be monitored to make an informed decision on operational changes needed as September 2020 approaches.

¹ CAO Item 7 (Section 2.9, this report): Submission of the corrective action plan for repair of the storage pond liners.
CAO Item 8 (Section 2.10, this report): Submission of as-builts and certification that the storage ponds have been reconstructed and have a storage capacity of 120-acre feet while maintaining 2-feet of freeboard.

If the water year results in large inflows that make it unfeasible to get both ponds empty, proposal plan B will be pursued. In proposal plan B, once testing and repairs are completed on the north pond, Layfield will demobilize for 2-3 weeks and all water from the south pond will be pumped to the north pond. Once the south pond is empty, Layfield will remobilize to the site to complete the south pond work.

The City Council will vote on the Layfield proposal to complete the work on the north and south ponds during Q1 2020.

2.0 CAO WORK COMPLETED IN Q4 2019

The following sections summarize the work completed in Q4 2019 for each CAO item presented in Table 1.

2.1 CAO QUARTERLY PROGRESS REPORTS

The Q3 2019 progress report was submitted to the Board on October 28, 2019. Under the current contract, Task Order #5, Farr West has committed to complete and submit the following reports on behalf of the City:

- CAO Quarterly Progress Reports Q3-4 2019 and Q1-4 2020
- WDR Annual Monitoring Report 2019 and 2020

Under Task Order #5, the City will be responsible for completing and submitting the WDR monthly monitoring reports and the WDR quarterly monitoring reports.

2.2 MONITORING AND REPORTING PROGRAM

Per City staff, all monthly monitoring reports were submitted for Q4 2019 utilizing the City monitoring and reporting template. The weekly effluent pond monitoring log for the week of October 31, 2019, January 15, 2020 are included in Appendix B. Operating staff did not record pond monitoring logs throughout Q4 for the following reasons:

- The south pond (the only pond experiencing whaling issues at this time) was empty from November through mid-December for the cleaning and repairs performed by Layfield Group in November. Since the pond was empty, operating staff had no whaling issues to report.
- During the week of January 13, 2020, Farr West contacted operating staff and instructed them to recommence the weekly monitoring.

2.3 GROUNDWATER MONITORING WORKPLAN AND WELL CONSTRUCTION EVALUATION

There is nothing new to report on this issue since the Q3 2018 report.

2.4 MONITORING WELL INSTALLATION REPORT

There is nothing new to report on this issue since the Q3 2018 report.

2.5 OPERATION AND MAINTENANCE PLAN

There is nothing new to report on this issue since the Q3 2018 report.

2.6 BACKGROUND GROUNDWATER QUALITY REPORT

There is nothing new to report on this issue since the Q3 2018 report.

2.7 TAILWATER DIVERSION BOX REPORT

Routine maintenance of the tail water diversion box is taking place to ensure that bypass of water from the land application area to surface waters is being prevented. There is nothing new to report on this issue since the Q4 2018 report.

2.8 CERTIFIED OPERATOR REPORT

This issue was resolved as of September 30, 2018 with the submission of the licenses of the current OITs, Kenn Bennett and Keith Jordan, in the Q3 2018 quarterly progress report. As reported in the Q3 2019, Kirk Peterson of SPB utilities assumed the position of certified operator on November 1, 2019. Peterson served as the certified operator through January and is in the process of stepping down currently. John Cussins will resume the position of certified operator starting February 1, 2020. His certification is included in Appendix C.

2.9 CORRECTIVE ACTION REPORT WITH WASTE MANAGEMENT PLAN

The CAO still requires that a Corrective Action Plan be submitted to the Board that details the plan for repair of the storage ponds. The extent of required repairs will not be known until Layfield Group completes the leak detection testing. Therefore, the Corrective Action Plan will be submitted after the leak detection testing is complete. Refer to Section 2.9 of the Q3 2019 progress report for the tentative plan of action that may take place if the liner repairs do not restore the integrity of the pond liner.

2.10 AS-BUILTS AND CERTIFICATION FOR PONDS

As detailed in Section 1.0 Layfield Group has been contracted through task order #5 to complete water lance leak detection testing and liner repairs on the north and south ponds in September 2020.

If small leaks are found during the leak detection testing, Layfield Group will complete spot repairs and write a report that certifies the integrity of the pond liner. If large leaks are found and Layfield Group is unable to perform spot repairs, they will submit a report detailing the results of the leak detection testing and the extent of repairs needed. Once the extent of repairs needed is known, Farr West will detail efforts required to restore the integrity of the pond liner in the Corrective Action Plan.

**APPENDIX A: LAYFIELD REPORT AND COORESPONDENCE
WITH THE RWQCB**



UNITED STATES

LAYFIELD USA CORPORATION
2500 Sweetwater Springs Blvd., #110, Spring Valley, CA 91978 USA
Contractor's License # 837614 CA

■ Phone: (619) 562-1200
■ Fax: (619) 562-1150
■ Toll Free: 1 800 377-8404

■ Web: www.layfieldgroup.com
■ E-Mail: san@layfieldgroup.com

December 5th, 2019

Alexa Kinsinger
Project designer
Far West Engineering
5510 Longley Lane
Reno, NV 89511
775-851-4788

Ref: City of Loyalton ELL Survey and Repairs
Subj: South Pond Summary of Work

LUSAC # 20-562P – L# 01

Ms. Kinsinger,

On November 1st, 2019 Layfield was contracted by Farr West Engineering to perform services to a WWTP pond liner for the city of Loyalton. The services included in Layfield's work were dewatering/sludge removal, an electronic leak detection survey and repairs to an existing 80 mil HDPE liner system. This report will assist Farr West and the city of Loyalton to understand what was performed by Layfield.

Layfield mobilized to site the day of on November 18th, 2019 with a four-man work crew. Work started on the 19th with Layfields crew deploying liner materials, Geotubes, hoses, pumps and polymer injection equipment.

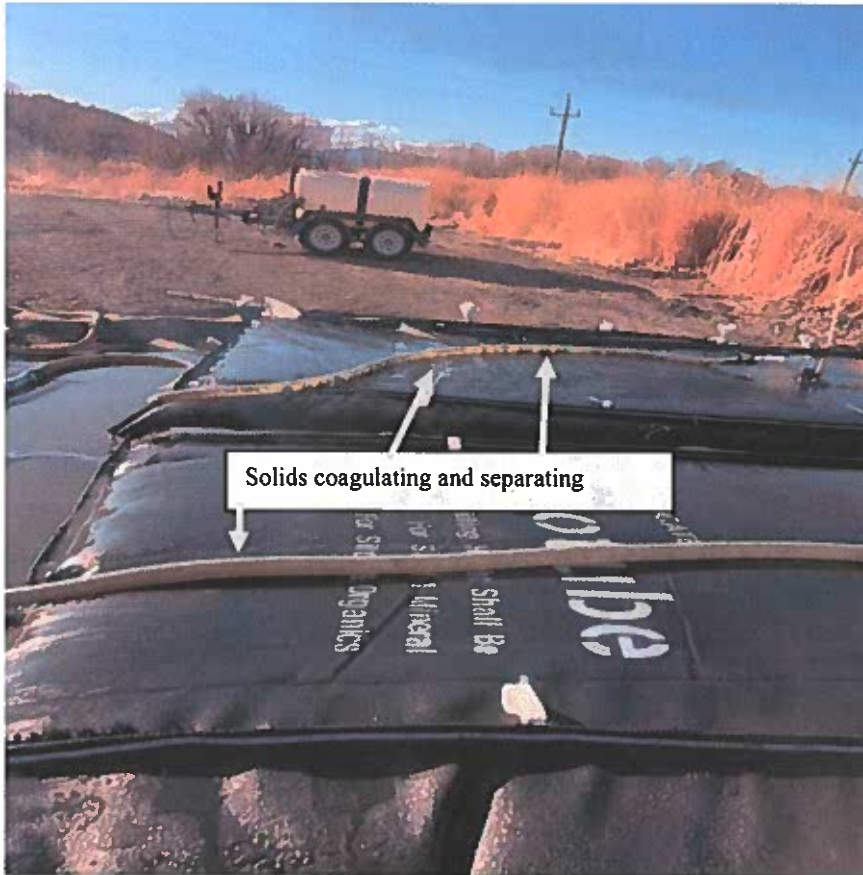


STRATEGIC LOCATIONS ACROSS NORTH AMERICA



On the 20th, the polymer injection pump was set-up along with the installation of the trash pumps. Layfields crew then started to push waste solids to the south east corner of the pond, where the pumps were placed to dewater the pond. Pumping and migration of the solids to the southeast corner continued. Layfield's crew continued and received a good floc while pumping into the Geotubes. This continued for a few days until the weather temperatures began to drop.





On November 22nd Layfield's crew started having issues with cold temperatures. With temperatures below freezing, the water left inside the hoses had frozen solid. This delayed pumping of the solids into the Geotubes. A few of the pipe fittings had broken due to the cold weather. Pumping continued in the later morning after the hose were de-iced and the fitting were repaired.

The temperatures continued to be a hinderance. Breaking of the ice in the pond needed to take place before pumping could occur. Heating of the pumps due to the cold weather and de-icing of the hydrant for fresh water were issues that arose as the project continued.

During the migration of water, de-icing and sludge removal Layfield's crew was able to make one repair on the liner system. The repair that was made was a 36" x 36' area just beneath the inlet pipe. The repair was made utilizing the extrusion technique. This is done but using HDPE rod that comes in a spool of material. This rod is then fed through a plasticiser/extrusion gun. The extrusion gun heats the extrusion rod through its barrel and creates a molten bead extruded through the front end of the extrusion welder. The bead is then smeared over the patch material that was placed over the torn material. As the bead cools it thermal welds the two materials creating a weld. This is then tested via vacuum box once the material extrude has cooled. The vacuum box places a negative 2 psi vacuum over the patch for ten seconds. Soapy water is applied over the patch before the vacuum is placed. When the vacuum is applied and bubbles form on the beaded area, it tells the technician that there is a leak present. This will be marked and repaired again. If no bubbles form the technician knows no leak is present and can proceed to the next repair.



Weather became a major factor in the delays of the project. It was concluded that Layfield could no longer proceed with work as the weather would no longer cooperate in the winter season. Layfield, Farr West and the city of Loyalton agreed that the project would be postponed until September 2020. This time of the year would be ideal weather in late summer and water consumption would be low. Layfield will continue with the ELL survey, manually remove sediments and complete the liner repairs. The city of Loyalton will get the south pond at its lowest as they did before Layfield mobilized in early November.

Thank you for your time and please feel free to contact me if you have any questions.

Best Regards,

LAYFIELD USA CORPORATION

A handwritten signature in black ink, appearing to read "Armando Contreras". The signature is fluid and cursive, with a long horizontal stroke at the beginning.

Regards,
Armando Contreras
Senior Service Manager

From: Alexa Kinsinger
Sent: Wednesday, December 4, 2019 4:10 PM
To: Kenny, Brendan@Waterboards
Cc: Lucas Tipton; Matt Schultz
Subject: RE: Update on Loyalton Leak Detection

Hi Brendan,

You are correct in that the 3' gash under the inlet pipe was repaired while a ~6" hole located at the toe of slope in the NW corner of the pond was not repaired due to inaccessibility. I personally do not have photos of the holes or repair, but I requested that Layfield send me photos at their earliest convenience. I will include this information and the photos in the Quarterly Progress Report.

The plan for completion now it to conduct leak detection testing and repairs on both the south and north ponds at the end of irrigation season (tentative mid-September) 2020. John and I believe that we can get both ponds empty by this time if we modify operations as follows:

- Irrigate as early as feasible and as often as possible to lower pond levels
- Divert settling basin effluent to emergency storage pond as needed to lower effluent pond levels
- Pump north to south pond as needed to empty north pond first
- Pump south pond to grasslands as needed to empty south pond

I realize that diversion from the settling basin to the emergency storage pond is contingent on approval from you and others at the board. For that reason, we consider that operational change a last resort in which we will request permission from you if this change is needed. Specifics of if and when we will need to begin diversion to the emergency storage pond will depend on the water year we face throughout winter, spring, and summer of next year. We will monitor the pond levels and keep you informed on the status as we approach September.

If the water year makes it difficult to get both ponds empty, then plan B is to get the north pond empty first, complete leak detection and repairs, demobilize Layfield for 2 weeks and pump all south pond water to the north pond, then remobilize Layfield to complete testing and repairs on the south pond. Layfield is preparing their north pond work proposal now and is including plan B as a proposal alternate in case weather conditions force us to pursue it.

If you would like to discuss these plans more in depth, I would be happy to schedule a conference call. Just let me know some days and times that work best for you.

Thanks and let me know if you need anything else from me right now.

Best,
Alexa

Alexa Kinsinger, E.I.

Farr West Engineering
Direct: (775) 997-7491

From: Kenny, Brendan@Waterboards <Brendan.Kenny@waterboards.ca.gov>
Sent: Tuesday, December 3, 2019 9:31 AM
To: Alexa Kinsinger <akinsinger@farrwestengineering.com>
Cc: Lucas Tipton <lucas@farrwestengineering.com>; Matt Schultz <mschultz@farrwestengineering.com>; Kenny, Brendan@Waterboards <Brendan.Kenny@waterboards.ca.gov>
Subject: RE: Update on Loyalton Leak Detection

Alexa,

Thanks for the call this morning. Per our conversation, please document the efforts in the fourth Quarter Progress Report. I understand that based on a limited visual inspection of the south pond, a gash approximately 3 feet long was identified and repaired near the inlet pipe. Additionally a hole approximately 6 inches in diameter was identified, but not repaired due to excessive water at the north west corner near the toe of the slope. If you have pictures of the cleaning efforts, identified liner punctures, and repairs please e-mail them to me (and include them in the Quarterly Progress Report).

Additionally, after you speak with the Layfield Group and the City to develop a plan and schedule to finish cleanout, electrical testing and vacuum testing of the ponds we should schedule a conference call so that we can provide preliminary comments on the plan and schedule.

Thanks,

Brendan

Brendan Kenny
Engineering Geologist
CVRWQCB R5s
(916)464-4635

From: Alexa Kinsinger <akinsinger@farrwestengineering.com>
Sent: Wednesday, November 27, 2019 11:31 AM
To: Kenny, Brendan@Waterboards <Brendan.Kenny@waterboards.ca.gov>; Hold, Howard@Waterboards <Howard.Hold@waterboards.ca.gov>
Cc: Lucas Tipton <lucas@farrwestengineering.com>; Matt Schultz <mschultz@farrwestengineering.com>
Subject: FW: Update on Loyalton Leak Detection

Hi all,

Just wanted to provide an additional update about what has happened today. The Layfield crew informed me that the second known leak location is submerged under approximately 6-incehs of water and would require at least a full day of pumping to attempt to access the leak location with no guarantee that they would be able to repair it before demobilizing at the end of the day

today. Therefore, I called off the second leak repair and told the crew to demobilize immediately to avoid costs incurred due to pumping time. Please let me know if you have any questions.

Thanks,

Alexa Kinsinger, E.I.

Farr West Engineering
Direct: (775) 997-7491

From: Alexa Kinsinger
Sent: Wednesday, November 27, 2019 9:04 AM
To: Kenny, Brendan@Waterboards <Brendan.Kenny@waterboards.ca.gov>; Hold, Howard@Waterboards <Howard.Hold@waterboards.ca.gov>
Cc: Lucas Tipton <lucas@farrwestengineering.com>; Matt Schultz <mschultz@farrwestengineering.com>
Subject: Update on Loyalton Leak Detection

Good morning Brendan and Howard,

Unfortunately, we have run into some significant weather issues that have forced us to demobilize the leak detection and repairs crew, Layfield Group, from Loyalton today. They started work on Tuesday 11/19 and instructed us to fill the empty south pond with water so they could de-sludge the pond utilizing a trash pump and geotubes. On Friday 11/22 they began having equipment freezing issues that slowed the sludge pumping process. On Monday 11/25, the field crew abandoned the sludge pumping approach because their equipment kept freezing and instead started pumping the remaining water in the south pond to the north pond in an effort to simply remove the water so they could conduct the leak detection testing and repairs as soon as feasible. By Tuesday 11/26, water present in the pond had frozen and had ~1.5" thick layer of ice that covered ~80% of the pond surface. The field crew tried their best to break off as much ice as possible but the weather continued to worsen and cause problems. Upon instruction from the operators and Farr West, they repaired one of the two known gashes in the liner yesterday. We then all gathered for a conference call yesterday at 4 to discuss the issues and concluded that with this much ice present in the pond, any leak detection testing would be non-conclusive because the ice layer conducts electricity differently than water. It was decided that the crew will work on repairing the second known gash in the liner this morning, then demob from the site so the City does not need to cover standby costs associated with weather delays.

We are scheduling a follow up conference call with all parties early next week to formulate a plan for completing the leak detection and repairs on the south pond. Right now we are hoping that Layfield Group will be able to complete these services on both the north and south pond at the same time at the end of irrigation season 2020 (tentatively September). John and I have spoken at length about the feasibility of completing both ponds at once and have concluded it should be feasible if we adjust operations as follows:

- Utilize land application irrigation as much as possible to get both pond levels to 0.5-1.5 feet deep
- Re-direct flows from the settling basin into the emergency storage pond as needed to ensure that the effluent ponds remain at 0.5-1.5 foot depth throughout the leak detection process

- Layfield will pump the ponds dry during the de-sludging process, then complete leak detection testing and repairs on both ponds

If we have an abnormally wet water year, then these operational adjustments may not be feasible. If this is the case then we will have to pump all water from one effluent pond to the other and remob Layfield Group for work on one pond at a time. I will keep you both informed through the spring and summer 2020 as we observe the pond water levels. We also plan to continue pond whale monitoring throughout this period.

We are disappointed that this endeavor did not work out, but we are confident that we can come up with a viable solution and plan for settling these pond liner issues once and for all. We simply have to wait for better weather before we can execute it. Please feel free to contact me if you have any questions, concerns, or need further information. I will send a follow up email about this topic after our conference call next week with Layfield Group and remain in close contact with you both.

I hope you have a wonderful Thanksgiving and safe travels if you are venturing out into snowy areas!

Thanks,
Alexa



Alexa Kinsinger, EI
Project Designer
Farr West Engineering
5510 Longley Lane
Reno, NV 89511

Main: (775) 851-4788
Direct: (775) 997-7491
Fax: (775) 851-0766
www.farrwestengineering.com

APPENDIX B: EFFLUENT POND MONITROING LOGS

Loyalton WWTP Effluent Storage Ponds - Weekly Monitoring Log

Date: OCT 31, 2019

Recorded By: Kevin Bennett

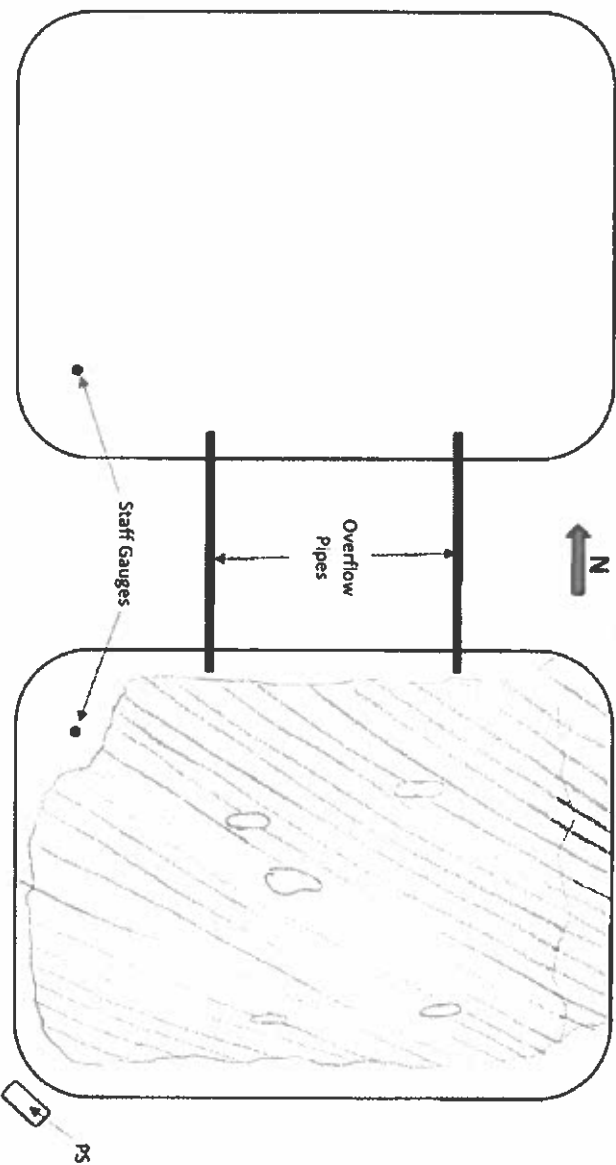
Fill out the below charts and draw approximate locations and sizes of whale protrusion out of water surface. Draw a * next to any whales that are protruding 1+ foot out of the water surface level.

NORTH POND

Pond Depth:	2'
Total # of Visible Whales:	0
Total # of Whales Protruding 1'+ Out of Water:	0

SOUTH POND

Pond Depth:	4'
Total # of Visible Whales:	5
Total # of Whales Protruding 1'+ Out of Water:	0



General Observations and/or Abnormalities:

Loyalton WWTP Effluent Storage Ponds - Weekly Monitoring Log

Date: Jan 15, 2020

Recorded By: KJ

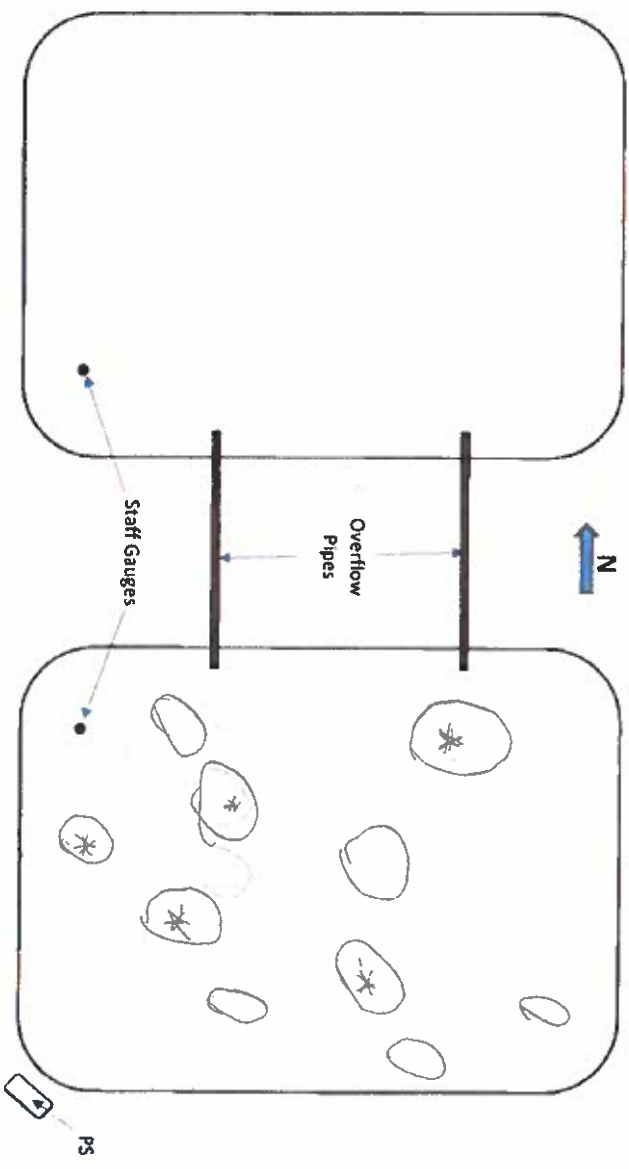
Fill out the below charts and draw approximate locations and sizes of whale protrusion out of water surface. Draw a * next to any whales that are protruding 1+ foot out of the water surface level.

NORTH POND

Pond Depth:	2
Total # of Visible Whales:	2
Total # of Whales Protruding 1'+ Out of Water:	0

SOUTH POND

Pond Depth:	2.5
Total # of Visible Whales:	10
Total # of Whales Protruding 1'+ Out of Water:	5



General Observations and/or Abnormalities:

APPENDIX B: LAYFIELD PROPOSAL



Environmental Solutions with Geosynthetics

10038 Marathon Parkway, Lakeside, CA 92040 • Phone: (425) 503-6979 • Web: www.layfieldgroup.com
 • Toll Free: 1 800 377-8404 • Fax: (619) 562-1150 • E-Mail: Diana.Macha @layfieldgroup.com

Date: January 3, 2019

To: Farr West Engineering

Attn: Alexa Kinsinger

Re: Loyalton WWTP Leak Detection North Pond

Pages (4)

Bid Number: 20E250 V1

Layfield USA Corp. is pleased to provide you with our Price Estimate with respect to the above-mentioned project. Our Project Scope is defined below for your reference:

Item	Description	Estimated Qty	UoM	Unit Price	Total
1	South Pond: Completion of testing and repairs (Original contract)	1	LS	\$36,229.04	\$36,229.04
2	Plan A: Testing and repairs of North w/ single mobilization.				
	Layfield Mobilization/Demobilization/Equipment Freight	1	Ea	\$7,560.00	\$7,560.00
	North Pond: Layfield Crew and Equipment Rate (based upon 10 hrs/day) Personnel: 3 Technicians, 1 Supervisor, Crew Cab 4x4 (x2)	7	Days	\$6,650	\$46,550.00
	Total Item #2				\$54,110.00
3	Plan B: Testing and repairs of North w/ double mobilization.				
	Layfield Mobilization/Demobilization/Equipment Freight	2	Ea	\$7,560.00	\$15,120.00
	North Pond: Layfield Crew and Equipment Rate (based upon 10 hrs/day) Personnel: 3 Technicians, 1 Supervisor, Crew Cab 4x4 (x2)	7	Days	\$6,650	\$46,550.00
	Total Item #3				\$61,670.00
A	Add Alternate A: Desludging North Pond w/ existing Geotubes				
	Materials (FOB Loyalton, CA) - Polymer (Solve 137)	1	Totes	\$3,328.00	\$3,328.00
	Equipment - Chemical Control and Tracking System (Automated Polymer Make-Down) - 6" Geotube Injection Ports, Manifolds and Inspection Ports - 2" Pump (x1) c/w Suction & Discharge Hose - 6" Pumps (x2) c/w Suction & Discharge Hose - 4" Pump (x1) c/w Suction & Discharge Hose - Day Rate - \$2,465. ⁰⁰	1	Week	\$12,325.00	\$12,325.00

	- Week Rate - \$12,325. ⁰⁰				
	Layfield Crew and Equipment Rate (based upon 10 hrs/day) <u>Personnel: 3 Technicians, 1 Supervisor, Crew Cab 4x4 (x2)</u>	5	Days	\$6,650	\$33,250.00
	Total Alternate A				\$48,903.00
B	Furnish and install 6" diameter by 6' long sand tube ballasts made of black 45 mil RPP PW				
	Materials & fabrication	250	Ea	\$49.99	\$12,497.50
	Freight (client to receive and unload onsite)	1	LS	\$1,300.00	\$1,300.00
	Installation: Layfield Crew and Equipment Rate (based upon 10 hrs/day) <u>Personnel: 3 Technicians, 1 Supervisor, Crew Cab 4x4 (x2)</u>	8	Days	\$6,650.00	\$53,200.00
	Total Alternate B				\$66,997.50

Our Price Estimate is subject to the following Project Clarifications and our Standard Terms and Conditions as stipulated in Appendix A.

Project Clarifications

A. Our Pricing is based upon:

Plan A:

- Owner to drain both North and South ponds to completely empty and dry. North pond will be completely dry by finished scope of South pond.
- Complete leak detection and repairs in North and South ponds within one mobilization.
- Work to begin mid September 2020.
- Layfield's did not perform a Sludge Survey and is not included. Assumed overall sludge thickness of less than 2". Existing sludge to be stockpiled within pond (not removed from pond). Pond to be dewatered to dry condition by others. If desludging is needed, see Add Alternate A.

Plan B:

- Complete leak detection and repairs in North and South ponds within two mobilizations (one mobilization for each pond). Layfield will demobilize after completing work on the North pond to allow for the City to pump water from the South pond to the North pond. Layfield will remobilize approximately 2-3 weeks later to complete work on the completely empty North pond.
- Work to begin mid September 2020 through October 2020.
- Layfield's did not perform a Sludge Survey and is not included. Assumed overall sludge thickness of less than 2". Existing sludge to be stockpiled within pond (not removed from pond). Pond to be dewatered to dry condition by others. If desludging is needed, see Add Alternate A.

- 1) Equipment charges commence from the time they are picked up from Layfield's facility to the time when returned to the Layfield facility.
- 2) Activities permitted to continue up to ten (10) hours per day, seven (7) days per week, including holidays, weather permitting.



- 3) The use of the existing site with the work area free and clear of all obstructions.
 - 4) Safe, complete and clear access to and around the site at all times during the setup, testing, and teardown activities.
 - 5) Existing Geotubes and base liner to be in good operating and undamaged condition.
- B. Layfield has included the following allowances in our pricing:
- 1. Four (4) person crew augmented by a Site Project Manager.
 - 2. An electronic Leak detection survey utilizing the water lance method and repairs of up to 5 days and sludge relocation within the pond of up to 2 days. Additional days will be charged at the listed rate above.
- C. Layfield has not included the following allowances in our pricing (to be provided by the Owner, at no charge to Layfield):
- 1. All costs associated with survey control or the location of underground utilities.
 - 2. Potable water to be provided by others (via hydrant w/ hose to all work areas, or water buffalo w/ hose.)
 - 3. All processed water in dewatering containment pond after Layfield leaves site is the responsibility of others.
 - 4. On-site disposal bins, sanitary toilets or temporary fencing for the duration of Layfield's work.
 - 5. Special protective devices, special work clothing, or specific safety training or certification required by the Contract Documents or because of hazardous site conditions.
 - 6. Permits that may be required.
 - 7. Forklift equipment for installation of materials is not included and must be provided by others.
 - 8. Receive and offload of materials onsite is not included. Materials to be stored onsite in staging area.
- D. Layfield will require a minimum of six to eight (6-8) weeks' notice in order to procure materials and to schedule the arrival of our Installation Crew at the site.

We trust that our Price Estimate meets with your current needs. Please do not hesitate to contact the undersigned if you have any questions.

Regards,
Layfield USA Corp.

Diana Macha
916-247-4499
Diana.Macha@layfieldgroup.com

Attachments: Appendix "A"

Acceptance of Price Quotation:

I (the undersigned) accept this Price Quotation and authorize Layfield USA Corp. to proceed with the entire scope of work stated herein.

Company Name : _____ Date : _____

Name and Title : _____

Signature : _____ Purchase Order No. : _____

Appendix A
Standard Terms and Conditions

1. Layfield USA Corp. ("Layfield") is a non-union contractor. We have not based our labour rates on a union scale, nor have we included union permitting fees for our Layfield personnel (extra to the contract if applicable).
2. Terms :
 - Prices do not include sales tax
 - Prices are F.O.B. Jobsite, unless otherwise noted
 - Prices are firm for 30 days
 - Prices presented are based on the scope of work stated herein, in its entirety
 - Payment net 30 days O.A.C.
 - Interest charged on overdue accounts at 1.5% per month (18% per annum)
3. Layfield has not included in its price the costs of any Bonds. We will, upon reasonable notice, supply the same as an extra to the Contract, at Layfield's cost plus ten percent (10%).
4. All additional costs incurred by Layfield to accommodate "Winter Conditions" installation, shall be added to the Contract Price. Further information can be provided upon request.
5. Layfield agrees that the Owner or Contractor may maintain a holdback pursuant to Builder's or Mechanic's Lien legislation applicable to the place of the Work until forty-five (45) days following Total Performance of the Work hereunder. Release of any holdback shall be made at that time, notwithstanding that the Contractor may not have received or be entitled to receive holdback release from the Owner.
6. Quality of the Work shall conform to Layfield's Quality Assurance / Quality Control (QA/QC) program and to the standards in the Contract Documents subject to any exceptions or clarifications in Layfield's Proposal.
7. The prices quoted are based on plastic resin prices on the date of the Proposal and are subject to adjustment at Layfield's discretion to account for resin price increases after the date of the Proposal. All prices are F.O.B. the Seller's plant and unless otherwise specified, exclude all local, state, or federal sales taxes. Proposal prices apply only in the quantity and on the shipping schedule, named in the proposal and unless the Seller expressly agrees to the contrary in writing, such proposals are subject to change without notice. Prices are subject to change in the event of increases in customs duty, sales, excise, or other similar taxes, or increases in freight, insurance, of variation in foreign currency exchange rates, or in the costs of manufacture.
8. Layfield's senior on-site representative has sole discretion to temporarily to stop work if, in the representative's opinion, weather conditions inhibit the safe and proper prosecution of the Work. Layfield will not be responsible for any costs, claims or damages, including but not limited to crew downtime, standby, subsistence, mobilization, consultant fees and liquidated damages incurred by Others as a result of weather delays in Layfield's Work.
9. Layfield's warranty obligations shall apply only to the installation of the geosynthetic components. The manufacturer of materials shall provide any warranty of the geosynthetic materials to be installed or supplied hereunder, and Layfield shall have no obligations with respect to the same.
10. Layfield shall not be responsible or held liable for defects, damage and/or deficient materials and installations, either in whole or in part, should these arise or result from the use of poor quality, inappropriate or unsuitable earthworks material, including the use of inappropriate methods employed to construct the earthworks in contact with the completed geosynthetic installation, or from misuse, vandalism or force majeure.
11. Layfield's installation warranty is limited to repair or, at Layfield's discretion, replacement of defects that are demonstrated to Layfield's satisfaction to be the result of substandard workmanship by Layfield. Such warranty work shall be performed only to the same standards and Scope of Work as set out in the Contract Documents. Layfield shall not be liable for any damages, including without limitation, any special, direct, indirect, consequential or incidental damages arising from the use of the geosynthetics installation, howsoever caused.
12. Layfield's Proposal is based on using the *Associated General Contractors Subcontract Form 650* as the Form of Agreement between Layfield and the Contractor. Layfield reserves the right to modify its proposal, to negotiate acceptable terms and conditions with the Contractor, or to refuse to execute the subcontract in its entirety if the Contractor imposes any other form of agreement.

APPENDIX C: LITIGATION REFERENCE DOCUMENTS



**Applied Soil Water
Technologies, LLC**

56 Coney Island Drive
Sparks, NV 89431

776.284.6600 Phone
776.284.6604 Fax

www.appliedsoilwater.com

April 3, 2012

City of Loyalton
P.O. Box 128
Loyalton, CA 96118

Attn: Mr. Craig McHenry
City Councillman
Via Email

RE: **Geomembrane Lined Pond Mitigation**
Waste Water Treatment Plant
City of Loyalton, Sierra County California
ASW Project No. 109-001

Applied Soil Water Technologies, LLC (ASW) was retained to assist the City of Loyalton, California (City) in mitigating air bubbles that have developed beneath the liner in two ponds constructed at the waste water treatment plant. ASW performed a site visit on November 16, 2011 and reviewed documentation that was provided by the City. This letter presents ASW's preliminary recommendations to mitigate the detrimental impacts associate bubbles forming beneath the geomembrane and high groundwater.

Project Description

In the fall of 2009, two lined ponds were constructed in support of upgrades made to the City's waste water treatment plant (WWTP). The ponds were constructed at the location of previous unlined effluent discharge ponds. The south pond is referred to as Pond 1 and the north pond is referred to as Pond 2. The ponds are used to store discharge from the WWTP for use as irrigation by means of a pivot during the irrigation season. Therefore, the depth of water stored in the ponds will vary seasonally.

Pond 1 contained very little water until late summer of 2010. During late August 2010, when the depth of water was approximately nine feet, the geomembrane liner was observed by City personnel to be floating above the water surface in Pond 1. The geomembrane liner in Pond 1 was stretched to an extent which caused a small hole to develop. The damaged section of liner has since been repaired. Water was pumped from Pond 1 into Pond 2. As Pond 2 began to fill water was again placed in Pond 1. During a relatively warm period in January of 2011, bubbles reappeared in Pond 1.

COL000981

Pond 2 was partially filled as Pond 1 was de-watered in late 2010. Pond 2 was initially filled during spring 2011. After several feet of water had been placed in Pond 2, bubbles were noted by City personnel.

It is our understanding that subsequent to the development of bubbles in Pond 1, air vents were installed at the top of the slope around the perimeter of both ponds.

In general, it is reported that as more water is placed in the ponds the bubbles get worse.

Potential Sources of Air Beneath the Geomembrane

Degradation of organic material generates methane gas. If organic material degrades beneath a geomembrane, the methane gas can collect and cause the geomembrane to float. There is documentation that the air in one of the bubbles was sampled and tested. The test results indicated that there was minimal methane gas in the air in this bubble and that the air which collected beneath the geomembrane was essentially ambient air.

*Eco-logic?
not ambient*

Air can be trapped and concentrated beneath a geomembrane when a pond is filled from a dry state. To avoid trapping air beneath the geomembrane a pond bottom is typically sloped to one side or corner causing the water to flow to one side of the pond and work its way across the bottom forcing any trapped air to the upstream slope where it can be vented. The as-built drawings of the City's ponds indicate that the ponds have a minimal slope of 0.2-percent. During our site visit Pond 1 had been drained as much as possible. There was no water above the geomembrane for the majority of the pond bottom, however, there was water concentrated around the perimeter of the pond bottom at the toe of the slope. It is possible that when the pond was filled water first collected around the bottom perimeter of the pond and worked its way toward the middle. This situation could force air to the middle of the pond where it can collect and cause the geomembrane to float. ASW does not know at this time the relationship of when the pond was first filled and when the bubbles first appeared.

The City has reported that one of their consultants has theorized that fluctuations of the shallow groundwater table may be causing the concentration of air beneath the geomembrane. While we do not have any specific experience with shallow fluctuations causing air to concentrate beneath a geomembrane, it may be a contributing factor. Groundwater is discussed in more detail below.

Groundwater Elevation

It appears that there was a change in elevation datum used to calculate the groundwater elevation at the site. This change is evident in the difference in Top-of-Casing (TOC) and ground surface elevations presented in the groundwater elevation tables between the June 23, 2010 measurements and the September 21, 2010 measurements. It was reported that the elevation datum change occurred when monitoring wells MW-1, MW-2 and MW-3 were re-surveyed at the time the monitoring wells at the pivot location were installed and surveyed. The more recent elevations are based on the NAVD 88 datum.

As a part of our evaluation of the existing ponds, the groundwater elevations beneath the ponds were estimated by extrapolation of groundwater elevations determined from monitoring wells MW-1, MW-2 and MW-3. The groundwater elevation at a monitoring well is calculated by subtracting the depth to ground water measured from the TOC from the elevation of the TOC. In order to relate the estimated groundwater elevations to the as-built elevations of the pond bottom, the datum used to establish the TOC elevation needs to be the same as the datum used to establish the as-built elevations for the pond bottom. Based on information provided to ASW, it is our understanding the NAVD 88 datum was used to establish pond bottom elevations. Therefore, if groundwater elevations are estimated based on calculations using the NAVD 88 datum the relationship to the pond bottom elevations should be appropriate.

Groundwater depth data was provided to ASW by the City. Figure 1 presents groundwater elevations for the data provided calculated using the NAVD 88 datum for monitoring wells MW-1, MW-2 and MW-3. It can be seen in the figure that the site experiences seasonal groundwater level fluctuations on the order of two to four feet. The highest groundwater elevations typically occur during the spring and early summer months.

ASW performed a preliminary estimation of groundwater elevations at three pond locations based on linear interpolation of the groundwater elevations in monitoring Wells MW-1 and MW-3 and MW-2 and MW-3. Groundwater elevations were estimated for the Center of the South Side of Pond 1, the Center of the West Side of Pond 1 and the Center of the West side of Pond 2. The results of these calculations, in terms of groundwater elevation and depth below the as-built elevation of the ponds, are presented in the following Tables 1 through 3 and as depth below the pond bottom in Figure 2. It should be noted that these calculations assume the groundwater elevations in the monitoring wells are representative of the groundwater elevations at the ponds. Perched groundwater and confining layers, should they exist, may not be accurately accounted for at this time.

Table 1 – Groundwater Elevations (NAVD 88) Center South Side Pond 1

Date	Center of South Side Pond 1, Elev. 4914.17 ft	
	Groundwater Elevation, ft	Depth Below Ground Surface, ft
7/31/2001	4912.39	1.78
10/30/2001	4911.18	2.99
1/15/2002	4913.62	0.55
4/2/2002	4914.03	0.14
7/16/2002	4912.51	1.66
3/21/2008	4913.30	0.87
6/17/2008	4913.31	0.86
9/16/2008	4911.61	2.56
12/23/2008	4912.50	1.68
6/4/2009	4913.65	0.52
8/18/2009	4911.74	2.43
11/3/2009	4912.01	2.16
3/29/2010	4914.23	-0.06
6/23/2010	4912.96	1.21
9/21/2010	4912.42	1.75
3/29/2011	4914.90	-0.73
6/28/2011	4913.57	0.60
9/27/2011	4911.92	2.25

-0.73 to
 2.99
 2.22 Δ

Table 2 – Groundwater Elevations (NAVD 88) Center West Side Pond 1

Date	Center of West Side Pond 1, Elev. 4919.88 ft	
	Groundwater Elevation, ft	Depth Below Ground Surface, ft
7/31/2001	4909.97	3.83
10/30/2001	4909.30	4.50
1/15/2002	4911.80	2.00
4/2/2002	4912.59	1.21
7/16/2002	4910.32	3.48
3/21/2008	4911.75	2.05
6/17/2008	4911.31	2.49
9/16/2008	4910.06	3.74
12/23/2008	4910.56	3.24
6/4/2009	4911.89	1.91
8/18/2009	4909.30	4.50
11/3/2009	4909.59	4.21
3/29/2010	4912.01	1.79
6/23/2010	4910.84	2.96
9/21/2010	4910.08	3.72
3/29/2011	4913.19	0.61
6/28/2011	4911.72	2.08
9/27/2011	4909.88	3.92

0.61' to
 4.10'
 3.84' Δ

Table 3 – Groundwater Elevations (NAVD 88) Center West Side Pond 2

Date	Center of West Side Pond 2, Elev. 4913.36 ft	
	Groundwater Elevation, ft	Depth Below Ground Surface, ft
7/31/2001	4909.57	3.78
10/30/2001	4907.61	5.74
1/15/2002	4911.12	2.23
4/2/2002	4912.06	1.29
7/16/2002	4909.90	3.45
3/21/2008	4909.82	3.53
6/17/2008	4910.76	2.59
9/16/2008	4908.46	4.89
12/23/2008	4909.30	4.05
6/4/2009	4910.88	2.47
8/18/2009	4908.42	4.93
11/3/2009	4908.58	4.77
3/29/2010	4911.80	1.55
6/23/2010	4910.00	3.35
9/21/2010	4909.28	4.07
3/29/2011	4912.52	0.83
6/28/2011	4910.96	2.39
9/27/2011	4908.54	4.81

083' x
 574'
 491' Δ

Tables 1 through 3 show that the groundwater level may have been above the as-built elevation of the center of the south side of the Pond 1 on at least two occasions, Spring of 2010 and Spring of 2011. In all the cases, groundwater may have been less than one foot below the as-built elevation of the ponds at different points in time.

It is our understanding that the earthworks contractor that constructed the ponds reported that groundwater was encountered on the eastern portion of the ponds during excavation in November of 2009. A report was prepared by CGI Technical Services, Inc. (CGI) summarizing a November 3, 2009 site visit on behalf of the pond earthworks contractor. CGI noted groundwater daylighting on along the eastern approximately third of Pond 1 and the southeastern corner of Pond 2. A groundwater interceptor trench had been excavated approximately 2.5-feet to 3-feet deep in a north-south direction along the eastern toe of the east slope of Pond 1. Water, presumably groundwater, was being pumped from the south end of the ditch. The calculations presented in Table 1 indicate that, based on interpolation of monitoring well data, the groundwater elevation at the middle of Pond 1 during November 2009 would have been approximately 2-feet below pond grade. Due to the fact that water was present as stated in the CGI report, this indicates that perhaps something is altering the groundwater gradient from a normal planar surface with a predictable gradient, possibly a confining layer that was penetrated or perched water that was flowing on top of a confining layer. It should also be noted that it is our understanding that during the fall of 2011, while

Pond 1 was essentially dry, water was present beneath the geomembrane at the bottom of the pond.

Options for Mitigation

At the present time ASW cannot say conclusively what caused the air to accumulate beneath the geomembrane. Based on the results of the air test, the cause of the bubbles does not appear to be methane. Observation of Figures 1 and 2 shows that, based on monitoring well groundwater data, the bubbles formed in Pond 1 during a period of time when the groundwater levels appeared to be dropping and in Pond 2 when groundwater levels appeared to be rising. These observations indicate that a raising groundwater table may not be the cause of the bubbles. The bubbles may be more closely associated with filling the ponds.

Another consideration in addition to the formation of air bubbles is groundwater elevations above the bottom of the pond which cause the liner to float and saturates the toe of the slopes. The floating geomembrane can create cyclic stresses detrimental to the geomembrane, particularly at seams. Saturation of the toes of the slopes can cause progressive failure of the slopes.

Based on the previous discussions it is ASW's opinion that there are three options for dealing with the formation of air bubbles beneath the lined surfaces. There is also the option of doing nothing to prevent bubble formation, keeping water in the ponds and repairing liner as it is damaged, which is not recommended.

1. **Ballast the liner.** This would be accomplished by placing appropriate fine grained fill over the entire lined surface area. This option has the potential to damage the geomembrane due to the logistics involved in its placement, the steep side slopes on the embankments and stresses building up in the liner. This option may not eliminate the problem, but rather mask it.
2. **Intercept the water upgradient.** This option would be expensive and may not solve the air bubble problem. Groundwater would be intercepted by installing a deep interceptor trench up-gradient of the pond so that as the groundwater is forced to a deeper elevation and would not flow back up to shallow depths again until it had flowed beyond the lined surface area. This option would require extensive field investigation to design.
3. **Remove the liner and regrade.** Remove the majority of the geomembrane and regrade the pond bottom with a substantial slope (minimum 2-percent) from west to east. Regrading would be accomplished by placing compacted fill. The extent and depth of fill will be determined based on the work recommended below. Strategically placed vent strips and shoulder vents would be installed to vent air that may accumulate beneath the geomembrane to mitigate the formation of air bubbles. This is the option that ASW recommends. It should be noted that this option will reduce the storage capacity of the ponds.

ASW recommends the following work be performed prior to implementing any of the options presented. The results of the work will attempt to identify where the shallow groundwater is sourcing from:

- Install several shallow and possibly some deeper piezometers around the eastern perimeter of the ponds to monitor groundwater adjacent to the ponds.

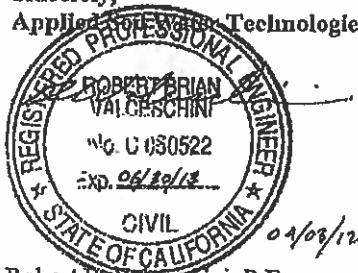
It is anticipated the network of piezometers would assist in clarifying the groundwater elevation surrounding the pond and provide insight into fluctuation in shallow groundwater beneath the lined surface area. This information is needed to implement any of the three options discussed above. The piezometers may also provide information to assist in determining if groundwater fluctuation is the likely cause of the formation of air bubbles beneath the geomembrane. Accurate logs of the subsurface soils prepared during installation of the piezometers will help determine if there is a confining layer that has been breached affecting the groundwater fluctuation and shallow observed elevations.

Additional Considerations

It was reported by the geomembrane installation contractor that repaired the breach in the geomembrane that the interior berm between the two ponds may be failing. The interior berm should be carefully inspected to assess its stability. This may be accomplished by cutting portions of the geomembrane away to directly evaluate the embankment soils. If it is determined that the interior berm is failing, Option 3 may be the only mitigation strategy to effect long term mitigation.

We trust this information suits your current need. Please do not hesitate to contact us with any questions or comments.

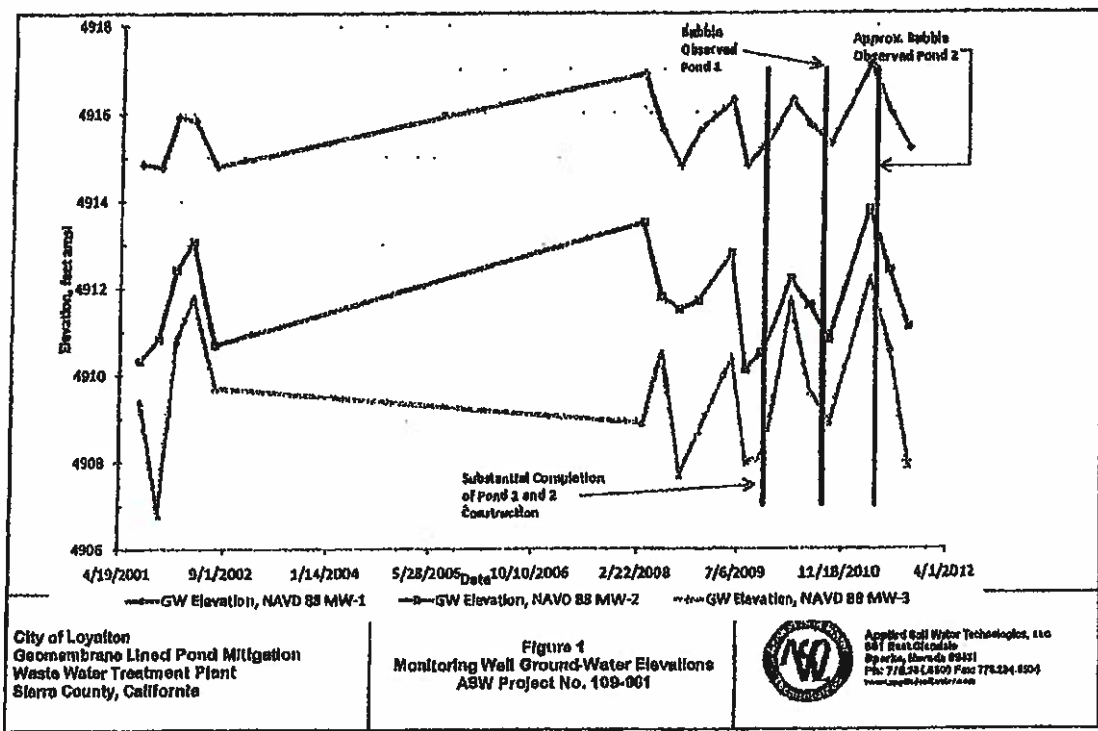
Sincerely,
Applied Water Technologies, LLC



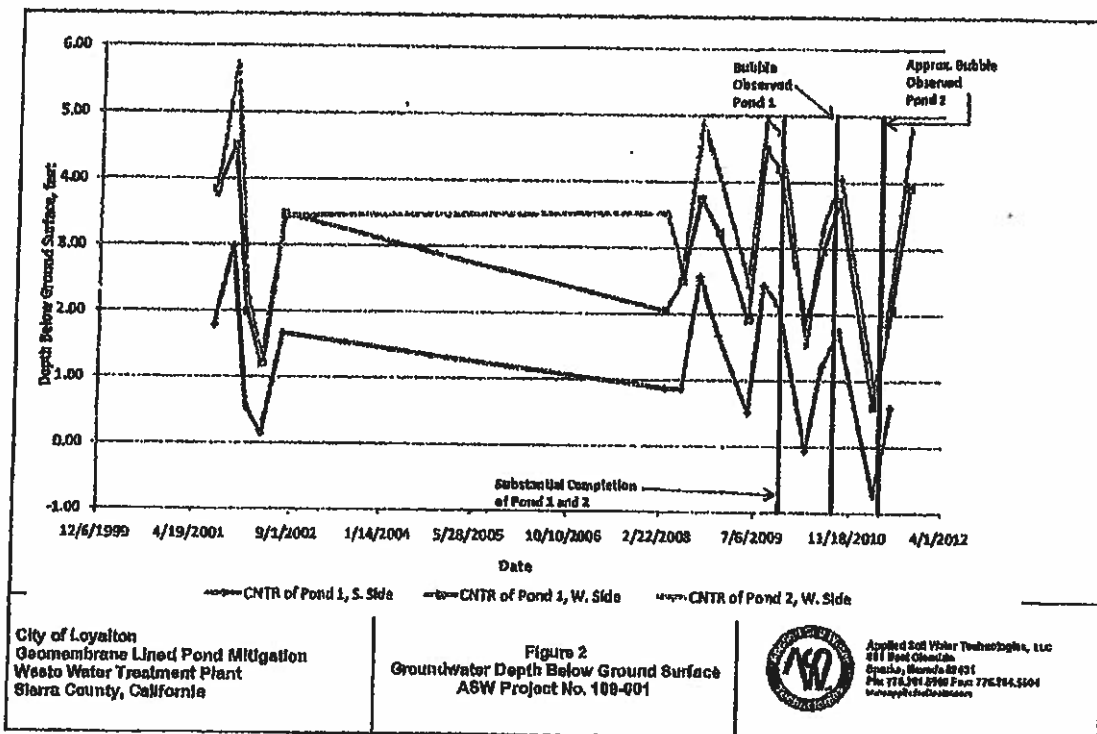
Robert B. Valceschini, P.E.
Principal/Senior Engineer

Michelle L. Morrow, E.I.
Project Professional

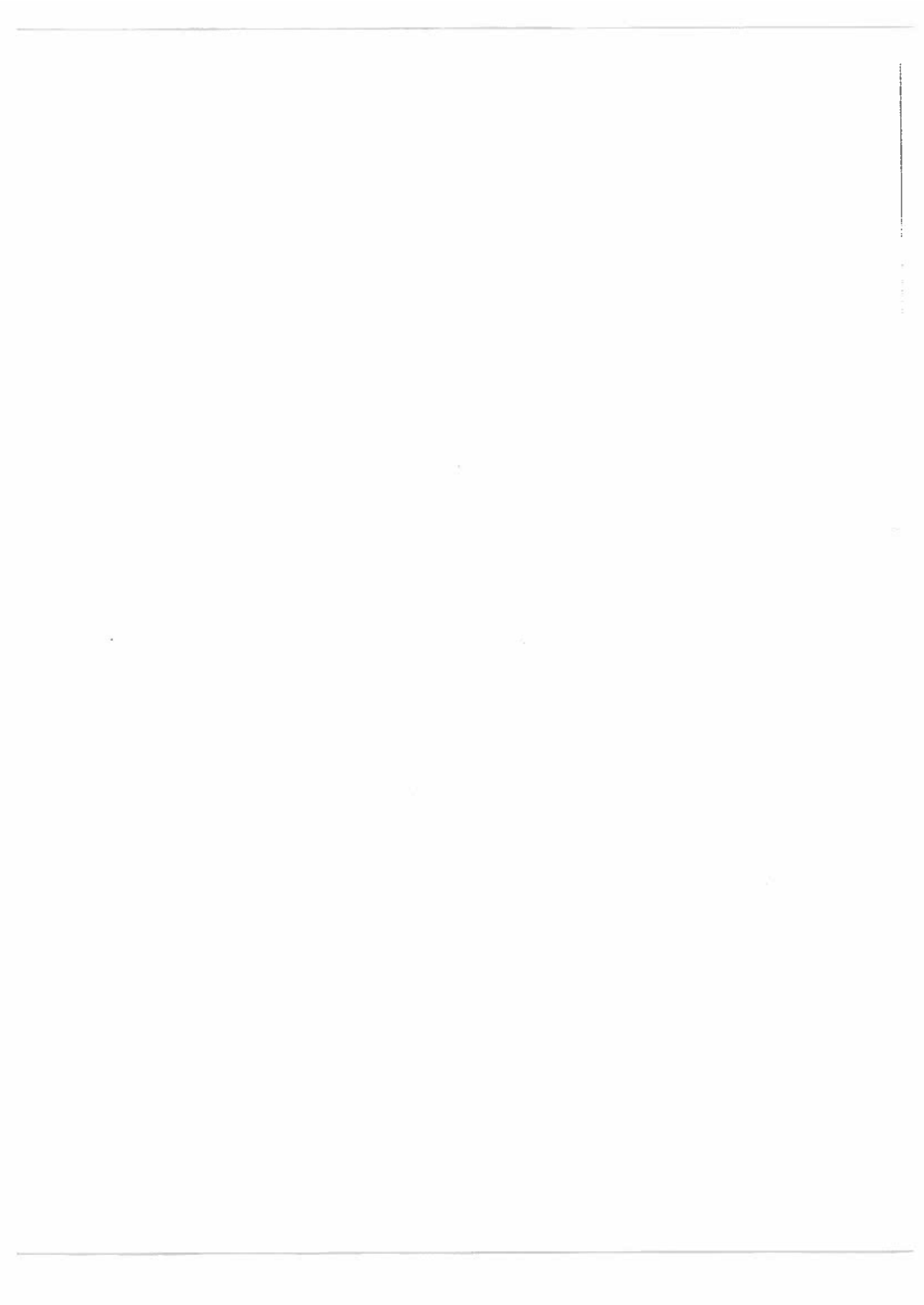
Attachments: Figures 1 and 2



COL000988



COL000989



May 3, 2013

City of Loyalton
P.O. Box 128
Loyalton, CA 96118

Attn: Mr. Brooks Mitchell
Mayor, City of Loyalton
Via Email

RE: Preliminary Findings
Geomembrane Lined Pond Mitigation
Waste Water Treatment Plant
City of Loyalton, Sierra County California
ASW Project No. 109-001

Applied Soil Water Technologies, LLC (ASW) was initially retained to assist the City of Loyalton, California in mitigating problems to two lined evaporation ponds that were constructed in 2009 at the city's waste water treatment plant. Our work was initiated pursuant to a cease-and-desist order presented to the City of Loyalton by the California Regional Water Quality Control Board, Central Valley Region because whale sized air bubbles had developed beneath the liner in the two ponds. Based on the work that we have performed to date we have identified the following preliminary list of defects with the lined evaporation ponds.

1. Portions of the bottom of the lined evaporation ponds are below the groundwater table during spring run-off, summer irrigation and major storm events. This is a concern in that:
 - a. High ground water causes the geomembrane to float off of the ground surface. This can cause stress concentrations and fatigue of the liner reducing its service life.
 - b. High ground water will cause deterioration of the subgrade and embankment soils reducing their ability to support the geomembrane and potentially initiating sloughing of embankment soils.
 - c. Cycling of groundwater levels beneath the pond liner may be causing air accumulate beneath the liner.
 - d. Typically, pond liner systems are separated from potential groundwater affects. If the design requires the liner to be impacted by groundwater, elements are incorporated into the design to mitigate those impacts. The design of the Loyalton ponds does not include any of those mitigating design elements.



Applied Soil Water
Technologies, LLC

56 Coney Island Drive
Sparks, NV 89431

775.284.5500 Phone
775.284.5504 Fax

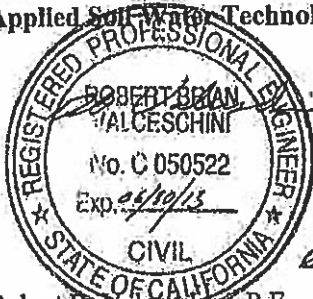
www.appliedsoilwater.com

COL003742

2. The exterior berm slopes, the interior berm slopes and the berm dividing the two ponds are all failing. A contributing factor may be the steepness of the slopes. Our evaluation of the slopes is on-going.
3. Air bubbles, some whale sized, have developed beneath the ponds liners. Air bubbles are a concern as follows:
 - a. If they get too large they can thin the liner reducing its strength and therefore its service life.
 - b. They can get large enough to burst the liner, which has already occurred. The city retained a licensed liner installation contractor to affect a repair.
 - c. Expanding and contracting bubbles can cause stress concentrations and fatigue of the liner reducing its service life.
4. The grade of the bottom of the pond is nearly flat which may be exacerbating the formation of bubbles. Typically lined ponds are sloped to allow air trapped beneath the liner to escape at the high side of the pond.

We trust this information suits your current need. Please do not hesitate to contact us with any questions or comments.

Sincerely,
Applied Soil Water Technologies, LLC



Robert B. Valdeschini, P.E.
Principal/Senior Engineer



Applied Soil Water Technologies, LLC

56 Coney Island Drive
Sparks, NY 89431

775.284.5500 Phone
775.284.5504 Fax

www.appliedsoilwater.com

October 23, 2013

City of Loyalton
403 Poole Lane
Loyalton, California 96118

Attn: Mr. Brooks Mitchell
Mayor

RE: **Slope Mitigation Design**
Portion of the Western Exterior Slope
Wastewater Treatment Ponds
City of Loyalton
Sierra County, California
ASW Job Number 109-001

Explain Failure to maintain adequate drainage

Mr. Mitchell,

Applied Soil Water Technologies, LLC (ASW) is pleased to present our Slope Mitigation Report for a portion of the **western exterior embankment at the City of Loyalton, California's Waste Water Treatment Ponds (Site)**. In December 2012, a **slope failure occurred in the west exterior berm of the wastewater treatment ponds during a heavy rain event**. The slope failure occurred over an **approximate 22-foot wide section of the slope to a maximum depth of 1:35-feet below the existing slope surface**. The **berm measures 12-feet in height in the location of the failure**.

Descriptions of the slope stability analysis and stabilization design for the referenced slope are provided below.

Field Visit

A field visit was made to the site on **March 29, 2013**. Numerous small, **surficial slope failures were noted**. **One significantly larger slope failure** was noted near the center of the exterior slope of the western berm. Observations were taken in the area of the larger slope failure and bulk samples of the failed material were collected. Samples were transported back to ASW's soils laboratory, where testing for **Grain-Size Distribution, Atterberg Limits, and Compaction** was conducted. A sample of the failed material was also sent to Black Eagle Consulting for **Direct Shear testing**. Laboratory test results are presented in Attachment A.

The geometry of the failed slope was surveyed at a later date.

Cause of Failure

Precipitation during December was reported to be wetter than previous years. Our observations indicated that water pooled in a depression in

- Questions -*
1. Methodology - Bulk calc
 2. DS - Remolded? substantially higher strength
 3. New slope - Calculations?
 4. Sectional Stud - Integrate Slope Case?
 5. Why 1:35' depth selected other than prior failure

Note - Depression in perimeter road led to failure

the perimeter road adjacent to where the failure occurred. It is our opinion that the water infiltrating into the slope due to the depression in combination with the steepness of the slopes contributed to the slope failure.

Slope Mitigation Design

The failed slope has been redesigned with a buttress approximately 3.3-feet in height and 10-feet wide at the toe of the existing slope that will serve to continue to provide access around the outside perimeter of the ponds. From the inner edge of the buttress the slope extends up to the top of the berm at a 2:5H:1V slope angle. The top of the berm has been graded at a 2-percent sloping away from the ponds to prevent pooling of water. Drawings are presented in Attachment B.

Slope Stability Analysis

Methodology

Using the geometry of the failed slope and assuming a factor of safety of one, shear strength parameters (cohesion and effective angle of internal friction) of the failed fill material were back-calculated. To account for rainfall infiltration from the depression at the top of the slope, seepage parallel to the slope was assumed when back-calculating the shear strength parameters (Day 1994).

methodology

The back-calculated shear strength parameters were then used to assist in the design the slope mitigation.

Soil Properties

Shear strength parameters back-calculated as described above are presented in Table 1.

Table 1: Slope Mitigation Design Shear Strength Parameters

Material	Saturated Unit Weight (PCF)	Friction Angle (degrees)	Cohesion (PSF)
Berm Fill Material	130	24	50

Results

Table 2 presents the minimum factor safety for the mitigation design for a 1.35 feet deep failure surface which corresponds to the depth of the failure surface experienced during the December rain-induced slide. A cross-section of the analyzed slope mitigation is presented in the drawings in Attachment B. Complete output and results from this analysis showing varying depths are presented in Attachment C.



Table 2: Minimum Factors of Safety

Cross-Section	Depth	Factor of Safety with Seepage
Redesigned Pond Slope	1.35	1.40

Conclusions

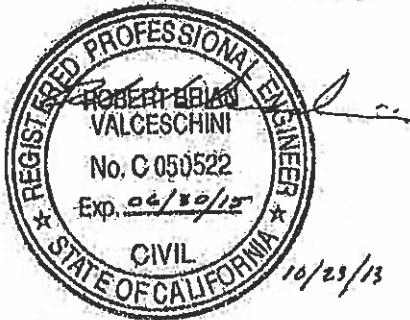
For the west outer berm of the wastewater treatment ponds, a factor of safety greater than 1.0 was calculated for the designed slope mitigation accounting for seepage conditions. This indicates that 2.5:1 slopes and the buttress will be stable from surficial failures. It is critical that the perimeter road be graded to promote run-off and to prevent water from pooling and infiltrating into the embankment soils.

Closure

We trust this information suits your current need. If you have any questions or would like to discuss this letter in more detail, please do not hesitate to contact us at (775) 284-5500.

Sincerely,

Applied Soil Water Technologies, LLC.



Robert B. Valceschini, P.E.
Principal / Senior Engineer

Jack D. Jacquet
Staff Professional

Attachments

- Attachment A: Laboratory Test Results
- Attachment B: Design Drawings
- Attachment C: Slope Stability Analysis
- Attachment D: Technical Specifications

References

Day, R. "Surficial Stability of Compacted Clay: Case Study." ASCE Journal of Geotechnical Engineers. Vol. 120 No. 11, pg. 1980-1990. November 1994.

City of Loyalton
Slope Stabilization Report
October 22, 2013





**Applied Soil Water
Technologies, LLC**

56 Coney Island Drive

Sparks, NV 89431

775.284.5500 Phone

775.284.5504 Fax

www.appliedsoilwater.com

January 7, 2014

City of Loyalton
403 Poole Lane
Loyalton, California 96118

Attn: Mr. Brooks Mitchell, Mayor

RE: **Loyalton v. Stantec; Case No. CU13-079346**
Response to Demand for Distribution of Bag Ballast in Ponds
City of Loyalton
Sierra County, California
ASW Job Number 109-001

Applied Soil Water Technologies has reviewed the letter titled "Demand for Distribution of Bag Ballast in Ponds" dated November 19, 2013. The following presents our comments to the Demand.

ASW analyzed the piezometer data surrounding the ponds in order to estimate the amount of pond ballast needed to compensate for anticipated groundwater levels above the pond bottom. A factor of safety of 2.0 was utilized for the procedure. For the South Pond, a cross-section displaying groundwater levels was constructed from Pz-8 to Pz-4 utilizing a linear interpolation. Piezometer data for Pz-8 had a maximum measured groundwater level of 3.37 feet above the pond bottom. A height of 6.74 feet for Pz-8 was used for the cross-section. Piezometer data for Pz-4 had a maximum measured groundwater level of 0.87 feet below the pond bottom. A height of 0.0 feet for Pz-4 was used for the cross-section. Using the cross-section, a groundwater level of 6.4 feet above the pond bottom was calculated for the east end and 0.6 feet for the west end. Assuming a unit weight of 100 pcf (pounds per cubic foot) and a 6 inch diameter sand-filled tube, ballasting the pond bottom would require tubes stacked 8 high on the east end gradually decreasing to 1 tube high on the west end. Tubes must be stacked continuous and side-by-side with no space between them.

An assessment of the piezometer data was also conducted to determine the required height of pond ballast needed for the North Pond. For the North Pond, a cross-section displaying groundwater levels was constructed from Pz-5 to Pz-4 utilizing a linear interpolation. Piezometer data for Pz-5 had a maximum measured groundwater level

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of 2.28 feet above the pond bottom. A height of 4.56 feet for Pz-5 was used for the cross-section. Piezometer data for Pz-4 had a maximum measured groundwater level of 0.87 feet below the pond bottom. A height of 0.0 feet for Pz-4 was used for the cross-section. ASW calculated a groundwater level of 3.9 feet above the pond bottom on the east end and 0.5 feet on the west end. Using the same assumptions as those for the South Pond, the North Pond would require tubes stacked continuous and side-by-side 5 high on the east end gradually decreasing to 1 tube high on the west end. Figure 1, attached, presents the configuration of pond ballasts for the North and South Ponds.

With the required amount of sand-filled tube weights needed for pond ballasting, the total storage of the pond will be decreased below that which is required in the permit. The pond ballasting in the South Pond will result in a 3.62 million gallon or 11.12 acre-feet decrease in available storage volume of the pond. For the North Pond, the pond ballasting will result in a 2.08 million gallon or 6.38 acre-feet decrease in available storage volume of the pond.

The formation of bubbles has imposed cyclic stress on the liner not typical of the service stress for a project of this type. One area experienced strains of such a magnitude that the liner thinned and failed. These stresses and strains have reduced the service life of the liner. Stantec will need to address the reduced service life.

In addition to the problems with the pond liner, the pond berms are failing in many areas. The interior middle berm is failing on both sides under the liner. The exterior berm is failing on the inside under the liner and outside slopes primarily on the north and west sides of the pond. Stantec will need to establish a solution to fix those failed areas and prevent further failures of the berm slopes.

If Stantec cannot adequately address all of these issues, pond ballast will not provide a solution to the problems with the ponds.

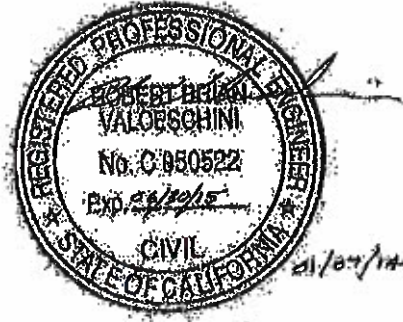


Closure

We trust this information suits your current need. If you have any questions or would like to discuss this letter in more detail, please do not hesitate to contact us at (775) 284-5500.

Sincerely,

Applied Soil Water Technologies, LLC.



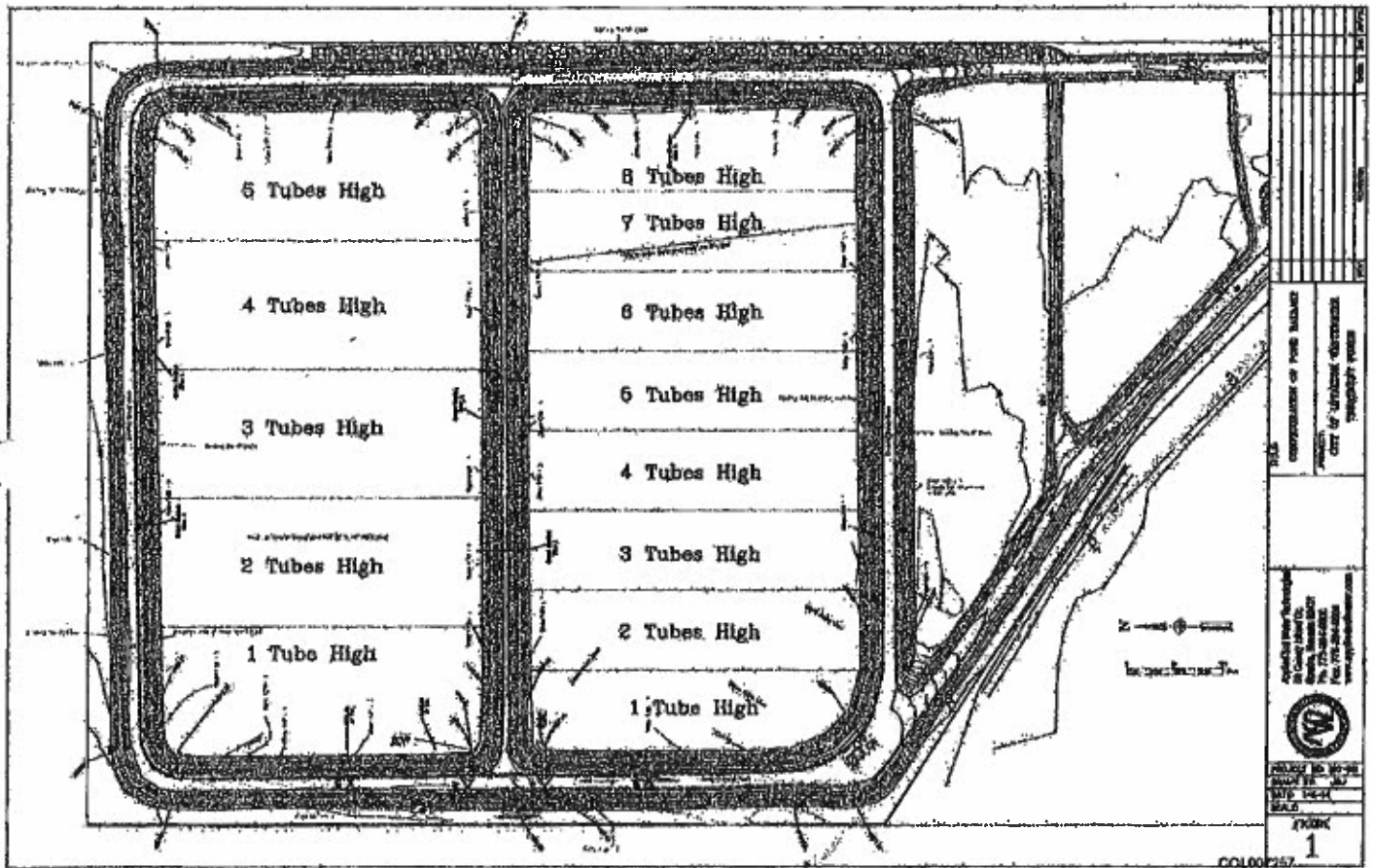
Robert B. Valceschini, P.E.
Principal / Senior Engineer

Jack D. Jacquet
Staff Professional

Attachments: Figure 1, Configuration of Pond Ballast

Loyalton Wastewater Treatment Ponds
Response to Stantec Demand
January 7, 2014





PREPARED BY ENGINEERING DEPARTMENT OF THE CITY OF CHICAGO CHICAGO, ILL.	
DATE 1914	
DRAWN BY J. H. ...	
CHECKED BY ...	
APPROVED BY ...	
TITLE ...	
SHEET NO. ...	
TOTAL SHEETS ...	

ENGINEERING DEPARTMENT
 OF THE CITY OF CHICAGO
 CHICAGO, ILL.

PROJECT NO. 40-10
 SHEET NO. 1
 DATE
 1914

FIGURE
 1

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