CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

ORDER NO. R2-2007-0026
PERMIT NO. CAS612005

AMENDMENT REVISING ORDER NO. R2-2003-0034 FOR:

FOR THE FAIRFIELD-SUISUN SEWER DISTRICT AND THE CITIES OF FAIRFIELD AND SUISUN CITY WHICH HAVE JOINED TOGETHER TO FORM THE FAIRFIELD-SUISUN URBAN RUNOFF MANAGEMENT PROGRAM.

The California Regional Water Quality Control Board, San Francisco Bay Region, hereinafter referred to as the Board, finds that:

Findings

1. Incorporation of related documents: The Fact Sheet for this Order includes cited references and additional explanatory information in support of the requirements of this amendment. This information, including any supplements thereto, and any future response to comments on the Order, is incorporated herein by this reference.

   Existing Orders

2. The Cities of Fairfield and Suisun and the Fairfield-Suisun Sewer District (hereinafter collectively referred to as the Permittees and individually as the Permittee) have joined together to form the Fairfield-Suisun Urban Runoff Management Program (hereinafter referred to as the Program).

3. On April 16, 2003, the Board re-issued waste discharge requirements (NPDES Permit No. CAS612005, Order No. R2-2003-0034, hereinafter Permit) under the National Pollutant Discharge Elimination System (NPDES) to the Program to discharge stormwater runoff from storm drains and watercourses within the Permittees' jurisdictions by complying with the Permit and implementing the Permit's associated Stormwater Management Plan.

   Hydromodification Management Plan (HMP) Report

4. On December 15, 2005, the Program submitted its Draft Hydromodification Management Plan (HMP) as required under this Permit. An updated HMP[1] was submitted on April 13, 2006. The intent of the HMP is to reduce the hydromodification impacts from stormwater discharges from certain development projects within the Permittees' jurisdictions. This Order amends the Permit to approve key provisions of the HMP, which are incorporated into this Order.

5. The Program has developed design procedures, criteria, and sizing factors for infiltration basins and bioretention units. The Program's current design procedures, criteria, and sizing factors are

[1] *Hydromodification Management Plan for the Fairfield-Suisun Urban Runoff Management Program*, prepared by Balance Hydrologics, Inc. and GeoSyntec Consultants, April 2006. Available at www.fssd.com .

available for public review.[2] They have undergone technical review by Board staff, which determined the procedures, criteria, and sizing factors are acceptable in all ways except one: they are based on an allowable low flow rate that exceeds the criteria established in this Order. The Program may chose to change its design criteria and sizing factors to the allowable criterion of 20% of the two year peak flow, and seek Executive Officer approval of the modified sizing factors. This criterion, which is greater than the criterion allowed for other Bay Area Stormwater Programs, is based on data collected from Laurel and Ledgewood Creeks and technical analyses of these site-specific data. Following approval by the Executive Officer and notification of the public through such mechanism as an email list-serve, project proponents may meet the HM Standard by using the FSURMP design procedures, criteria, and sizing factors for infiltration basins and/or bioretention units.

6. In the San Francisco Bay Area, the Western Washington Hydrology Model[3] is being adapted to local conditions, and the adapted model is called the Bay Area Hydrology Model (BAHM)[4]. Although the Program has not contributed towards adaptation of the BAHM to date, Permittees may use the BAHM if its inputs reflect actual conditions at the project site and surrounding area. As Permittees gain experience in designing and operating HM controls, the BAHM may be adjusted to improve its function in controlling excess runoff and managing hydromodification impacts. Notification of all such changes shall be given to the Board and the public through such mechanism as an email list-serve.

7. The Board recognizes that the collective knowledge of management of erosive flows and durations from new and redevelopment is evolving, and that the topics listed below are appropriate topics for further study. Such study may be initiated by Board staff, or the Executive Officer may request that all Bay Region municipal stormwater permittees jointly conduct investigations as appropriate. Any future proposed changes to the Permittees' HM provisions may reflect improved understanding of these issues:

   - potential incremental costs, and benefits to waterways, from controlling a range of flows up to the 35 or 50-year peak flow, versus controlling up to the 10-year peak flow, as required by this Order;
   - the allowable low-flow (also called Qcp[5] and currently specified as 20% of the pre-project 2-year runoff from the site) from hydromodification control units;
   - the effectiveness of "self-retaining areas" for management of post-project flows and durations; and/or

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[2] Current sizing factors and design criteria are shown in Appendix D of the FSURMP HMP: *Hydromodification Management Plan for the Fairfield-Suisun Urban Runoff Management Program*, prepared by Balance Hydrologics, Inc. and GeoSyntec Consultants, April 2006.

[3] The Western Washington Hydrology Model models runoff from development project sites, and is used for sizing flow duration control structures and determining overall compliance of such structures and other hydromodification control structures (HM controls) in controlling runoff from the project sites to manage hydromodification impacts. See http://www.ecy.wa.gov/programs/wq/stormwater/wwhm_training/wwhm/wwhm_v2/instructions_v2.html .

[4] See *The Bay Area Hydrology Model – A Tool for Analyzing Hydromodification Effects of Development Projects and Sizing Solutions,* Bicknell, J., D. Beyerlein, A. Feng, September 26, 2006. Available at http://www.scvurppp-w2k.com/permit_c3_docs/Bicknell-Beyerlein-Feng_CASQA_Paper_9-26-06.pdf

[5] Qcp is the allowable low flow discharge from a flow control structure on a project site. It is a means of apportioning the critical flow in a stream to individual projects that discharge to that stream, such that cumulative discharges do not exceed the critical flow in the stream.

- the appropriate basis for determining cost-based impracticability of treating stormwater runoff and controlling excess runoff flows and durations.

8. On July 12, 2006, the Board issued Order No. R2-2006-0050, amending the Contra Costa Clean Water Program's (CCCWP) NPDES Permit No. CAS0029912 to include requirements to control excess stormwater runoff flows and durations from new and redevelopment. The Order allowed the use of sizing charts to design flow duration control devices, and required CCCWP to conduct a specific monitoring program to verify the performance of these devices. Following the satisfactory conclusion of this monitoring program, or conclusion of other study(s) that demonstrate devices built according to the CCCWP specifications satisfactorily protect streams from excess erosive flows, the Board intends to allow the use of the CCCWP sizing charts, when tailored to local conditions, by other stormwater Programs and Permittees. Similarly, any other control strategies or criteria approved by the Board would be made available across the Region. This would be accomplished through Permit amendment or in another appropriate manner following appropriate public notification.

9. This Order allows for alternative compliance when on-site and regional HM controls and in-stream measures are not practicable. Alternative compliance includes contributing to or providing mitigation at other new or existing development projects that are not otherwise required to have HM controls. The Order provides flexibility in the type, location, and timing of the mitigation measure in Provision C.3.f.ix.d. The Board recognizes that handling mitigation funds may be difficult for some municipalities due to administrative and legal constraints. The Board intends to allow flexibility for project proponents and/or Permittees to develop new or retrofit stormwater treatment or HM control projects within a broad area and reasonable timeframe. Toward the end of the Permit term, the Board will review alternative projects and determine whether the impracticability criteria and options should be broadened or made narrower.

10. The Board strongly encourages land use planning agencies and developers to carefully consider, early in the development planning process, the potential impacts on water quality and beneficial uses of new development projects. The Board strongly discourages modifying watercourses to adapt to increased flows and durations of runoff, except in limited circumstances where avoidance or other natural alternatives are not feasible and where the watercourse is in a degraded condition. In these limited circumstances, project proponents should first demonstrate that hydromodification has been minimized to the extent practicable by minimizing increases in flows and durations of runoff from the site. Second, the project proponents should demonstrate that mitigation measures have been employed to the maximum extent practicable to mitigate hydromodification impacts. Following the hierarchy of avoidance, minimization, and mitigation of hydromodification impacts, project proponents should document that there will be no adverse effects to water quality or beneficial uses.

11. Certain control measures implemented or required by Permittees for urban runoff management may create a habitat for vectors (e.g., mosquitoes) if not properly designed or maintained. Close collaboration and cooperative effort among Permittees, local vector control agencies, Board staff, and the State Department of Health Services is necessary to minimize potential nuisances and public health impacts resulting from vector breeding.

12. The Board recognized in its "Policy on the Use of Constructed Wetlands for Urban Runoff Pollution Control" (Resolution No. 94-102) that urban runoff treatment wetlands that are

constructed and operated pursuant to that Resolution and are constructed outside of a creek or other receiving water, are stormwater treatment systems and, as such, are not waters of the State and United States subject to regulation pursuant to Sections 401 or 404 of the federal Clean Water Act. Board staff is working with the California Department of Fish and Game (CDFG) and U.S. Fish and Wildlife Service (USFWS) to identify how maintenance for stormwater controls required under orders such as this Order can be appropriately streamlined, given CDFG and USFWS requirements, and particularly those that address special status species. The Permittees are expected to work diligently and in good faith with the appropriate agencies to obtain any approvals necessary to complete maintenance activities for treatment controls. If the Permittees have done so, when necessary and where maintenance approvals are not granted by the agencies, the Permittees shall be considered by the Board to be in compliance with Provision C.3.e of the Permit.

Applicable Federal, State, and Regional Regulations

13. Pursuant to 40 CFR Sections 124.5(c)(2) and 122.62, only those conditions to be modified by this amendment shall be reopened with this amendment. All other aspects of the existing Permit shall remain in effect and are not subject to modification by this amendment.

14. Provisions C.11 and C.12 of the Permit anticipate that the Permit may need to be modified from time to time to respond to new information, changed conditions, and to incorporate more effective approaches to pollutant control. Amending the Permit to require additional, more effective and stringent requirements is consistent with State and federal law for permit modifications.

15. Under Section 13389 of the California Water Code, this action to modify an NPDES permit is exempt from the provisions of Chapter 3 of CEQA.

Notification to Permittees and Interested Parties

16. The Permittees and interested agencies and persons have been notified of the Board's intent to modify waste discharge requirements for the existing discharge and have been provided opportunities for public meetings and to submit their written views and recommendations.

IT IS HEREBY ORDERED that the Permittees, in order to meet the provisions contained in Division 7 of the California Water Code and regulations adopted hereunder and the provisions of the Clean Water Act as amended and regulations and guidelines adopted hereunder, shall comply with the following revisions:

Provision C.3.f. of Order No. 2003-0034 is hereby modified and amended as follows:

C.3.f. Limitation on Increase of Peak Stormwater Runoff Discharge Rates

i. No later than 90 days after adoption of this Order, the Permittees shall comply with the requirements set forth in this permit amendment.

ii. Hydromodification Management (HM) Standard

Stormwater discharges from applicable new development and redevelopment[6] projects shall not cause an increase in the erosion potential of the receiving stream over the pre-project (existing) condition. Increase in runoff flow and volume shall be managed so that post-project runoff shall not exceed estimated pre-project rates and durations, where such increased flow and/or volume is likely to cause increased potential for erosion of creek beds and banks, silt pollutant generation, or other adverse impacts to beneficial uses due to increased erosive force. Such management shall be through implementation of the hydromodification requirements of this Provision and in Attachment A below.

iii. HM Control Areas

Applicable projects (see Provision C.3.f.iv. below) shall be required to meet the HM Standard when such projects discharge into the upstream reaches of Laurel or Ledgewood Creeks, as delineated in Attachment A. Plans to restore a creek reach may re-introduce the applicability of HM requirements; in these instances, Permittees may add, but shall not delete, areas of applicability accordingly.

iv. Applicable Projects

A new development or redevelopment project in which the combined amounts of impervious surface created and replaced totals one acre or more shall be required to meet the HM Standard unless it falls into one of the exempt categories stated in Provision C.3.c. Permittees shall require project proponents of exempt categories a. – d. (below) to incorporate site design/landscape characteristics which maximize infiltration (where appropriate), provide retention or detention, slow runoff, and minimize impervious land coverage (i.e., use hydrologic source controls[7]) to the maximum extent practicable. For each of these categories, the definition, description, and/or limitations stated in Provision C.3.c., including any changes in future amendments/reissuances, shall apply.

a. Projects consisting of one single-family home that are not part of the larger common plan of development;
b. Sidewalks, bicycle lanes, trails, bridge accessories, guardrails, and landscape features associated with streets, roads, highways, or freeways under the Permittees' jurisdictions;
c. Transit village type of development;
d. A project within a "Redevelopment Project Area" that redevelops an existing brownfield site, or the portion of a project that creates housing units affordable to persons of low or moderate income.

v. Requirements for Applicable Redevelopment Projects

Redevelopment projects in HM Control Areas in which the combined amounts of impervious surface created and replaced totals one acre or more, and which are not exempt under Provision C.3.f.iv. above, shall be required to meet the following requirements:

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[6] Redevelopment is defined in Finding 37 of Order No. R2-2003-0034.

[7] Hydrologic source controls are design techniques that minimize and/or slow the rate of stormwater runoff from the site.

a. No Increase in Impervious Surface

A redevelopment project may be exempted from the HM standard if a comparison of the project design to the pre-project condition shows the project will not increase impervious area and also will not increase the efficiency of drainage collection and conveyance compared with the pre-project condition. The pre- and post-project comparison shall include all of the following:

1. Assessment of site opportunities and constraints to reduce imperviousness and retain or detain site drainage;
2. Description of proposed design features and surface treatments used to minimize imperviousness;
3. Inventory and accounting of existing and proposed impervious areas; and
4. A qualitative comparison of pre-project to post-project efficiency of drainage collection and conveyance that demonstrates that hydrologic source controls will be incorporated into the project to the maximum extent practicable. [8]

b. Increase in Impervious Surface

Where a redevelopment project results in an increase of impervious surface, the HM Standard shall apply to the entire redevelopment project.

vi. Types of HM Controls

Projects shall meet the HM Standard by use of on-site control measures, regional control measures, in-stream measures, or a combination thereof.

vii. On-site and Regional Control Design Criteria

a. *On-site HM controls* are flow duration control structures and hydrologic source control measures[9] that collectively result in the HM Standard being met at the point(s) where stormwater runoff discharges from the project site.
b. *Regional HM controls* are flow duration control structures that collect stormwater runoff discharge from multiple projects (each of which should incorporate hydrologic source control measures as well) and are designed such that the HM Standard is met for all the projects at the point where the regional HM control discharges.
c. *Range of flows to control*: Flow duration controls shall be designed such that post-project stormwater discharge rates and durations match pre-project discharge rates and durations from 20% of the pre-project 2-year peak flow[10] up to the pre-project 10-year peak flow.
d. *Goodness of fit criteria*: The post-project flow duration curve shall not deviate above the pre-project flow duration curve by more than 10% over more than 10% of the length of the curve corresponding to the range of flows to control.

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[8] In addition to reviewing the site plan to determine that opportunities for incorporating hydrologic source control measures are maximized, an appropriate way to make this demonstration is by demonstrating that the time of concentration is not decreased.

[9] Hydrologic source control measures are design techniques that minimize and/or slow the rate of stormwater runoff from the site.

[10] Where referred to in this Order, the 2-year peak flow is determined using a flood frequency analysis based on USGS Bulletin 17 B to obtain the flow peak statistically expected to occur at 2 year intervals. In this analysis, the entire record of hourly rainfall data (e.g., 35-50 years of data) is run through a continuous simulation model (footnote 11), the annual peak flows are identified, rank ordered, and the 2 year flow is generated.

e. *Allowable low flow rate*: Flow control structures may be designed to discharge stormwater at a very low rate that does not threaten to erode the receiving water body. This flow rate (also called "Qcp") shall be no greater than 20% of the pre-project 2-year peak flow.

f. *Standard HM modeling*: On-site and regional control measures designed using the Bay Area Hydrology Model (BAHM) and site-specific input data shall be considered to meet the HM Standard. Such use must be consistent with directions and options set forth in the most current BAHM User's Manual[11]. Permittees shall demonstrate to the satisfaction of the Executive Officer that any modifications of the BAHM made (per Finding 6) are consistent with the requirements of this Provision.

g. *Alternate HM modeling and design*: The project proponent may use a continuous simulation hydrologic computer model[12] to simulate pre-project and post-project runoff and to design HM controls. To use this method, the project proponent shall compare the pre-project and post-project model output for a rainfall record of at least 30 years, and shall show that all applicable performance criteria in C.3.f.vii. (a-e above) are met.

h. *Sizing Charts*: The Program developed design procedures, criteria, and sizing factors for infiltration basins and bioretention units, based on a low flow rate that exceeds the *allowable low flow rate*. After the Program has modified its sizing factors[13] to the allowable criteria, received approval of the modified sizing factors from the Executive Officer,[14] and informed the public through such mechanism as an email list-serve, project proponents may meet the HM Standard by using the Program's design procedures, criteria, and sizing factors for infiltration basins and/or bioretention units.

viii. In-Stream Measures Design Criteria

In-stream measures shall be an option only where a stream is already impacted by erosive flows and shows evidence of excessive sediment, erosion, deposition, or is a hardened channel.

In-stream measures involve modifying the receiving stream channel slope and geometry so that the stream can convey the new flow regime without increasing the potential for erosion and aggradation. In-stream measures are intended to improve channel stability and prevent erosion by reducing the erosive forces imposed on the channel boundary.

In-stream measures, or a combination of in-stream and on-site controls, shall be designed to achieve the HM Standard from the point where the project(s) discharge(s) to the stream to the mouth of the stream. Designing in-stream controls requires a hydrologic and geomorphic evaluation (including longitudinal profile) of the stream system downstream and upstream of the project. This entails computing creek flows at several locations

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[11] *The Bay Area Hydrology Model – A Tool for Analyzing Hydromodification Effects of Development Projects and Sizing Solutions,* Bicknell, J., D. Beyerlein, A. Feng, September 26, 2006.

[12] Such models include USEPA's Hydrograph Simulation Program—Fortran (HSPF), US Army Corps of Engineers hydrologic Engineering Center-Hydrologic Modeling System (HEC-HMS), and USEPA's Surface Water M- Model (SWMM).

[13] Current sizing factors and design criteria are shown in Appendix D of the FSURMP HMP.

[14] The modified sizing factors will not introduce a new concept, but rather make an existing compliance mechanism more stringent; therefore, Executive Officer approval is appropriate. See also Finding 5.

within a stream system and the work done on the stream channels before and after the project is built. A continuous hydrologic model is required as well as geometric and geomorphic data at each location. As with all in-stream activities, other regulatory permits/certifications are required and must be obtained by the project proponent.[15]

ix. Impracticability Provision

Where conditions (e.g., extreme space limitations) prevent a project from meeting the HM Standard for a reasonable cost, and where the project's runoff cannot be directed to a regional HM control within a reasonable timeframe, and where an in-stream measure is not practicable, the project shall use (1) site design for hydrologic source control, and (2) stormwater treatment measures that collectively minimize, slow, and detain[16] runoff to the maximum extent practicable. In addition, the project proponent shall provide for or contribute financially to an alternative HM project as set forth below:

a. *Reasonable cost*: To show that the HM Standard cannot be met at a reasonable cost, the project proponent must demonstrate that the total cost to comply with both the HM standard and the C.3.d. treatment requirement exceeds 2% of the project construction cost, excluding land costs. Costs of HM and treatment control measures shall not include land costs, soil disposal fees, hauling, contaminated soil testing, mitigation, disposal, or other normal site enhancement costs such as landscaping or grading that are required for other development purposes.
b. *Regional HM controls*: A regional HM control shall be considered available if there is a planned location for the regional HM control and if an appropriate funding mechanism for a regional HM control is in place by the time of project construction.
c. *In-stream measures practicability*: In-stream measures shall be considered practicable when an in-stream measure for the project's watershed is planned and an appropriate funding mechanism for an in-stream measure is in place by the time of project construction.
d. *Financial contribution to an alternative HM project*: The difference between 2% of the project construction costs and the cost of the treatment measures at the site (both costs as described in Provision C.3.f.ix.a.) shall be contributed to an alternative HM project, such as a stormwater treatment retrofit, HM retrofit, regional control measure, or in-stream measure. Preference shall be given to projects discharging, in this order, to the same tributary, main stem, watershed, then in the same municipality or county.

x. Record Keeping

Permittees shall collect and retain the following information for all projects subject to HM requirements:

a. Site plans identifying impervious areas, surface flow directions for the entire site, and location(s) of HM measures;
b. For projects using standard sizing charts, a summary of sizing calculations used;

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[15] In-stream control projects require a Stream Alteration Agreement from the State Department of Fish & Game, a Clean Water Act Section 404 permit from the US Army Corps of Engineers, and a Section 401 certification from the Water Board. Early discussion on the acceptability of an in-stream modification is necessary to avoid project delays or redesign.

[16] Stormwater treatment measures that detain runoff are generally those that filter runoff through soil or other media, and include bioretention units, bioswales, basins, planter boxes, tree wells, media, filters, and green roofs.

c. For projects using the BAHM, a listing of model inputs;
d. For projects using custom modeling, a summary of the modeling calculations with corresponding graph showing curve matching (existing, post-project, and post-project with HM controls curves);
e. For projects using the Impracticability Provision, a listing of all applicable costs and a brief description of the alternative HM project (name, location, date of start up, entity responsible for maintenance);
f. A listing, summary, and date of modifications made to the BAHM, including technical rationale.

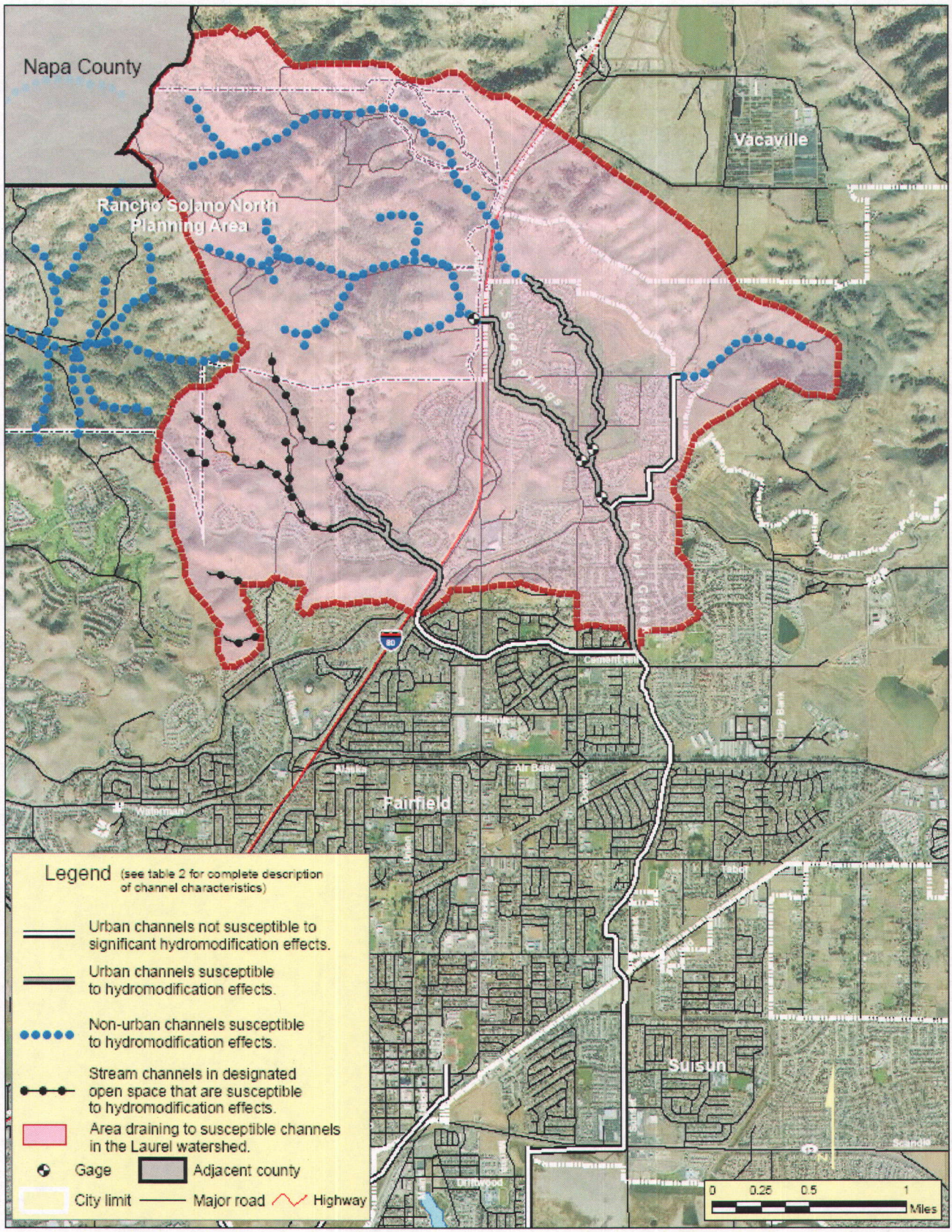
I, Bruce H. Wolfe, Executive Officer, do hereby certify that the foregoing is a full, true, and correct copy of an order adopted by the California Regional Water Quality Control Board, San Francisco Bay Region, on March 14, 2007.

Bruce H. Wolfe
Executive Officer

Attachment A: Hydrograph Modification Management Standard – HM Control Areas

Attachment A:

Hydrograph Modification Management Standard – HM Control Areas



Source: Basemap data provided by Fairfield-Suisun Sewer District. Note that the roads layer does not include the most recently urbanized areas (north of Cement Hill Road, for example).

Balance Hydrologics, Inc.

Figure 2. Map showing HMP channel Classification for the Laurel Creek watershed. The mid- to upper reaches include all channels within the watershed that are susceptible to hydromodification effects (dotted and gray-shaded channels on this map). Hydromodification controls are not required for projects that drain directly to non-susceptible urban channels.

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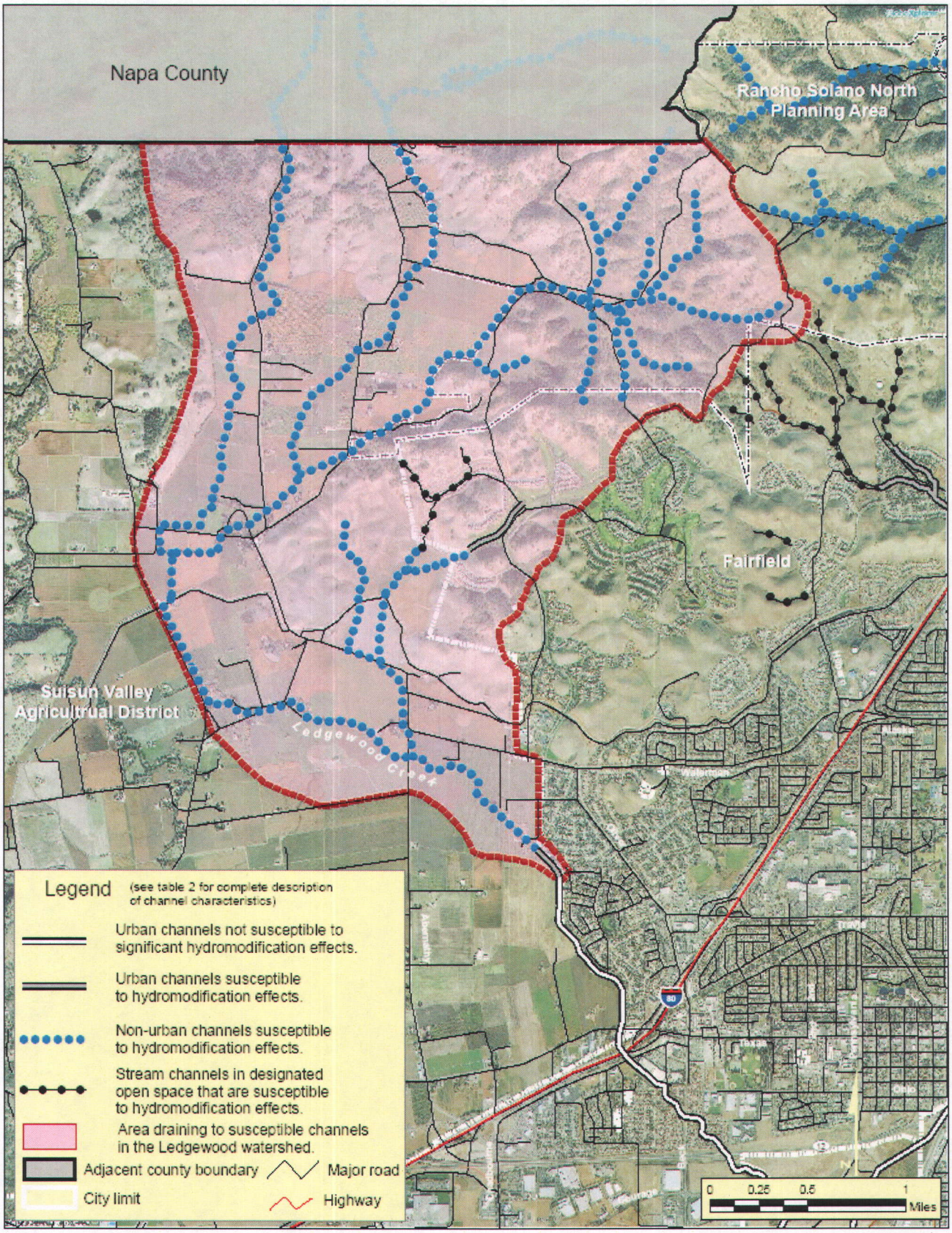

Basemap data provided by Fairfield-Suisun Sewer District. Note that the roads layer does not include the most recently urbanized areas, as shown in the aerial photo.

Balance Hydrologics, Inc.

Figure 3. Map showing HMP channel Classification for the Ledgewood Creek watershed.
The mid- to upper reaches include all channels within the watershed that are susceptible to hydromodification effects (dotted and gray-shaded channels on this map), however areas outside the City of Fairfield are not included in this permit unless annexed by the city. The non-developed areas within the current city limits are designated open space in relatively steep terrain, and are unlikely to be converted to urban areas however the HMP still applies in these areas.

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