7. HMP IMPLEMENTATION GUIDANCE

7.1 INTRODUCTION

This chapter provides guidelines to Co-permittees and the development community for implementing the SCVURPPP Hydromodification Management Plan. The concept of controlling the increased runoff flow resulting from development projects is not new – agencies have been requiring mitigation for increased flood flows in the form of flood control detention basins and storm drain improvements for years, and many stream channels in the Santa Clara Valley have been modified to accommodate increased flows. Hydromodification management differs from historical approaches in that it focuses on controlling changes in the smaller, more frequent runoff flows that over time can have more impact on stream health than infrequent flood events. Fortunately, most of the hydromodification management measures discussed in this report are consistent with and compatible with the site design and stormwater treatment measures required for development projects by Permit Provision C.3.

7.2 IMPLEMENTATION OPTIONS

The approach to implementation of the hydromodification control standard, management objective and the associated performance criteria is based on the following considerations:

- Due to the cost of land, limited available space on project sites, and the limited infiltration capacity of soils in Santa Clara Valley, a combination of on-site, off-site, and/or in-stream measures may need to be considered to meet HMP requirements.
- Implementation guidance needs to allow for regional planning efforts between the Cities/County and the District, and coordination with planned District in-stream maintenance, erosion repair, and flood control projects.
- The District is the appropriate agency to plan, construct, and maintain in-stream measures for erosion protection.

Three basic options for implementing the hydromodification control standard are proposed, as described in this section. This approach is intended to allow the selection of the most cost effective strategy, considering on-site, off-site, and/or in-stream measures, and combining HMP control with site design and stormwater treatment controls.

Option 1 – On-Site Controls Only

Option 1a – Minimize Hydromodification Effects. Under this option, effects of the project on hydromodification are avoided or greatly reduced through the application of land use planning and hydrologic source controls as part of site design practices to limit changes in stormwater quantity.

Option 1b – Provide On-site Flow Control. Under this option, hydromodification controls are provided on-site. The project can achieve some of the flow control requirements using site design and stormwater treatment measures that reduce runoff volume and flow. Additional flow control BMP(s) may also be needed to fully meet the performance criteria. If retention or detention basins are selected, they are sized to meet the flow-duration control performance criterion. It may be cost effective for the developer to provide flow duration control and stormwater treatment within the same BMP.

Option 2 – On-Site, Off-Site, and/or Instream Controls

Under this option, hydromodification impacts of development are addressed with a combination of on-site, off-site and/or in-stream controls. On-site controls such as those described in Option 1 can be combined with off-site or in-stream controls to achieve the in-stream erosion potential criterion. Off-site controls can include flow control measures in the same subwatershed that mitigate hydromodification impacts of one or more projects but do not involve modifications to the stream channel. If instream controls are proposed, implementation of this option requires coordination with the Water District. The net effect of the combination of controls needs to be protective of the stream according to the management objective (i.e., $Ep \leq 1.0$).

Option 3 – Master Planning

Option 3 is the development of a master plan to address the impacts of development in large, relatively undeveloped watersheds such as Coyote Valley. The master plan can include a combination of on-site, off-site, regional, and/or in-stream control measures for hydromodification control. The combination of controls would be designed to maintain the existing erosion potential downstream of the planning area. The master plan would also consider requirements for water quality and flood control (see discussion in Section 7.6).

Implementing Off-Site Controls

The most likely scenario for off-site controls would be the use of a regional flow control facility that would serve the needs of multiple developments. If several developments are being constructed at about the same time in the same watershed, developers may wish to explore the concept of a regional facility that may be more cost-effective to build and maintain than individual on-site facilities. Municipal agencies and regulators agree that regional facilities can be practical and economical solutions, especially for development projects on small sites.

However, such a project would require the coordination of multiple projects in close proximity and, at the present time, there are no plans for such facilities to be constructed by public agencies.

Implementing In-stream Controls

The likely scenario for in-stream controls is development projects contributing to the funding of an in-stream project implemented by the Water District. In order to implement in-stream controls, a District project needs to be identified which can addresses the impacts of the proposed development, given information about the increase in impervious surface and the discharge point of the project. In addition, several funding components must be in place:

- An adequate funding mechanism must be available to ensure the project's completion;
- An appropriate mechanism must be developed for collecting funds from a development project proponent; and
- A technically-based methodology must be developed for determining a development project's contribution to an in-stream project based on its contribution to stream impacts. The value of such a contribution must be compatible with the concept of impact nexus and rough proportionality.

While all the funding components are not currently in place, the Co-permittees acknowledge the value of having such an option available to development projects and will work toward creating these tools in the near future. The District has developed a methodology that determines the project's contribution and proportionate funding. The method is based on the ratio of impervious area added by the project to the total impervious area in the watershed in the year 2002, computed for each reach of stream downstream of the project's point of discharge. The proportionate funding is based on this ratio, computed for each reach. (Details of this method have been presented to the San Jose work group working on the Evergreen Visioning Project.) The Program Management Committee will review this methodology with the District to understand its potential application to future projects.

The Santa Clara Valley Water District's Stream Maintenance Program (SMP) may be a viable mechanism to facilitate in-stream controls. Through this program, in-stream projects for erosion control are permitted and approved. Permitted projects are currently funded by the District. The designs completed as part of the SMP accommodate permitted discharges to each reach. SMP designs can typically be completed within a 2 to 3 year period after issuance of the permit for additional in-stream discharges. The District also funds capital projects for improvements to streams for erosion and flood control; these are typically larger in physical scope and budget, and take a longer period of time to design and construct.

If future development is permitted to increase the discharge to certain reach(es), in-stream projects under the SMP can be designed to accommodate the additional flow. A proposed approach is that developers would be able to contribute to the SMP project cost in proportion to each development's flow and erosive work done on a reach. The District plans to develop a GIS map showing creek reaches where SMP projects are planned and/or feasible to construct. City/County staff and developers will be able to use this map to make a preliminary determination of the availability of SMP projects, based on the locations of discharge points of

planned developments. Once a developer determines the discharge point and amount of impervious surface of the planned project, the SMP project can be designed and the cost allocation calculated using the agreed upon methodology.

If a development project will need to consider or provide in-stream control measures to comply with HMP requirements, the developer or permitting agency should notify the District early in the planning process so that an appropriate Stream Maintenance Project (SMP) or erosion repair project can be identified and the proportionate funding can be computed for all affected stream reaches downstream of the project.

7.3 PROCESS FOR EVALUATING HYDROMODIFICATION IMPACTS AND REQUIREMENTS FOR DEVELOPMENT PROJECTS

The potential hydromodification impact of a proposed project should ideally be identified early in the development plan review process, through the use of applicability checklists and environmental review checklists. As a general rule, increases in directly connected impervious surface area on a project site are going to result in increased runoff peaks, volumes and durations. If the impervious surfaces are disconnected or "broken up" by strategic placement of sufficient pervious surfaces to absorb the additional runoff, the potential hydromodification impact is reduced. In some cases, good site design techniques such as clustering buildings and draining runoff to designated open space areas can completely mitigate the increases in flow; however, due to development constraints and land costs, developers in Santa Clara Valley do not often have the luxury of that option.

Evaluation Process

The following is a guideline for evaluating the impacts and requirements of a development project.

1. Determine the potential applicability of the HMP requirements to the proposed project, using the flow chart in Attachment 7-1 as a guide.
    a. Determine if the project is a "Group 1" project subject to the C.3 requirements based on the size criteria and other factors in Provision C.3.c (refer to the SCVURPPP C.3 Stormwater Handbook for guidance). In general, if the project creates or replaces less than one acre of impervious surface, the HMP requirements do not apply.
    b. Determine the ultimate discharge point of the project site or the storm drain system to which it discharges (i.e., the location of the storm drain outfall for the catchment in which the project is located). Refer to Figure 5-1 (or a local agency version of this map) to determine whether the project discharges to a tidal area, hardened channel, or directly to the Bay, and is therefore exempt from HMP controls.
    c. Estimate the increase in impervious surface resulting from the project, compared to the pre-project condition. If there is no net increase in directly connected impervious surface, the project is unlikely to have hydromodification impacts and is exempt from HMP controls. (If the project will have an increase in impervious

area that is not directly connected to other impervious surfaces, such as a paved or roof area that discharges runoff to a pervious area, the project proponent will need to demonstrate that the pervious area can absorb the increased volume created by the added impervious area.) However, the local agency should recommend that the project include site design and treatment BMPs that help accomplish flow control to the extent practicable.

d. Determine if the project is an infill project in a highly developed watershed, per the subsection "Exemption for Infill Projects in Highly Developed Watersheds" in Chapter 5, Section 5.3. If the project meets the criteria in this guideline, it is exempt from full flow control BMPs, but the local agency should recommend that the project include site design and treatment BMPs that help accomplish flow control to the extent practicable.

2. If the project is not exempt from HMP requirements, it has the potential to cause hydromodification impacts on the receiving stream and must use the performance criteria to determine how it will meet the management objective. The next step is to identify the performance criteria applicable to the project.

   a. Consider whether the project is a "Small Site Project" (less than or equal to 20 acres in size). If so, then this project must meet Performance Criteria 4 and 5, and Criterion 3 may also apply (see Chapter 5). The project will comply with the HMP through the use of site design and treatment control measures with flow control "benefits", i.e. measures that accomplish some reduction in runoff volume. The project owner/developer will also be required to contribute funding to an off-site or in-stream project to mitigate any additional flows that are not controlled with the on-site measures, <u>if such off-site or in-stream projects are available and a funding mechanism and methodology for determining developer contributions are in place</u>. If this option is not available, a Small Site Project may implement site design, source control, and treatment control BMPs with flow control benefits to the maximum extent practicable (MEP). The cost of these BMPs may be taken into account when determining what is the MEP (see discussion under #3 below).

      Guidance on selection and design of site design, source control, and treatment BMPs is provided in the SCVURPPP C.3 Stormwater Handbook and the CASQA BMP Handbooks. Appropriate BMPs for flow control on Small Site Projects include small scale, distributed stormwater management techniques such as bioretention facilities, infiltration trenches, filter strips, vegetated swales, and multi-functional landscape areas (a subset of the "site design measures" described in the SCVURPPP permit). When selecting and sizing site design measures and treatment BMPs to comply with the HMP, the objectives are to: 1) reduce runoff volume through the reduction of impervious surface and providing opportunities for infiltration; and 2) increase the time of concentration[1] of runoff to approximate

[1] Time of concentration is defined as the length of time required for runoff to travel from the most remote point in the drainage area to the point of interest, say a storm drain inlet or receiving water.

that of the pre-project condition. Time of concentration can be increased by lengthening flow paths and allowing impervious areas to flow onto pervious areas. The goal is to match pre- and post-project runoff volume and time of concentration of runoff on the site to the MEP.

Runoff reduction and time of concentrations for small scale BMPs can be computed using a discrete storm event approach (based on a 10-year design storm) only until continuous modeling tools are available for simulating the effectiveness of BMPs (see section on Hydrologic Models below).[2]

b. Other non-exempt projects will be required to meet Performance Criteria 1, 2, 3, and 5. These projects are required to perform a more detailed analysis to compare pre-project and post-project runoff patterns for the project site. As described in Chapter 6, flow duration curves illustrating the distribution of flows resulting from a continuous rainfall record will need to be generated for the pre- and post-project condition. This will be accomplished using a continuous simulation hydrology model or a sizing tool based on a continuous simulation model. These or similar tools will then be used to design flow control BMPs, such as a flow duration basin, that produce a discharge pattern that matches the pre-development flow duration curve. A detailed description of the process for sizing a flow duration basin is provided in Appendix F.

3. After a project has gone through the analyses described in Step 2 above, the next step for the developer is to incorporate the flow control BMPs into the project design.

   Meeting the flow duration control criteria generally requires some type of detention and/or infiltration facilities that reduce the volume and control the rate of post-project discharge. These types of facilities may not be suitable for the project site due to space limitations, soil conditions, depth to groundwater, and other factors, and in some cases, these limitations cannot be overcome at a reasonable cost.

   In this case, it is recommended that the developer be required to submit an application for impracticability with the plan for stormwater controls on the project site. The application should provide the reasons for impracticability, the relevant site data, and reasonable cost estimates. The District and appropriate Co-permittee will then determine whether an in-stream project and appropriate funding mechanism as well as the funding are available to mitigate the additional flows. If an in-stream project, funding mechanism, and funding are available, the developer is required to contribute funding to these additional measures to fully meet the management objective. If not, a project for which flow duration control is impracticable must use site design, source control, and/or treatment BMPs to achieve performance criteria to the maximum extent practicable.

   As stated in Chapter 5, full implementation of the HMP will be considered impracticable if the combined construction cost of both required stormwater treatment and flow control measures exceeds 2% of the project construction cost (excluding land costs). If a

[2] If a retention-detention basin or a structure that detains and releases flow is included as part of IMPs to meet the volume and time of concentration requirements, it should use a flow duration matching approach for design.

developer demonstrates that the cost to fully comply with the HMP and other C.3 treatment requirements will exceed this cost threshold, a determination may be made by the reviewing agency that the project may implement HMP controls on-site to the MEP and contribute to an in-stream project if available.

The Program will work with Co-permittee staff to develop guidance on estimating treatment and HMP control measure costs for application of the 2% "cost cap" criterion. The guidance will recommend specific references for unit cost data and will clearly delineate what costs are to be included and excluded. For example, the costs of treatment and HMP controls should not include the cost of site enhancements that would have been installed regardless of the C.3 provisions, such as ornamental landscaping.

Hydrologic Models

There are several hydrologic models available as public domain software that can be used for simulating runoff for a continuous rainfall record and sizing flow control facilities. Examples are: 1) the Army Corps of Engineers' Hydrologic Engineering Center Hydrologic Modeling System (HEC-HMS) which was used for the analyses in this report; 2) the Environmental Protection Agency's (EPA's) Hydrologic Simulation Program – Fortran (HSPF) which is specified in the Stormwater Management Manual for Western Washington (WDOE, 2001); and 3) the EPA's Stormwater Management Model (SWMM). Data for running the models for the three test subwatersheds will be available from the Program's website, and a number of engineering firms have experience with the use of these models. The Program will be sponsoring workshops on HMP implementation that will include training on the various models.

The Program has investigated an automated modeling and flow control facility sizing tool called the Western Washington Hydrology Model (WWHM) and is planning to fund the adaptation of this tool for use in Santa Clara Valley and other parts of the Bay Area, in cooperation with the Alameda Countywide Clean Water Program. The Program is also discussing the potential for collaboration with other Bay Area programs to offset the costs.

The WWHM was developed for the Washington Department of Ecology to assist project proponents with compliance with the western Washington hydromodification control requirements. It is a tool that runs the HSPF model to generate flow duration curves for the pre- and post-project condition and then sizes a flow duration control basin or vault and outlet structure to match the pre-project curve. The tool will be enhanced to be able to size other types of control measures as well.

Hydrologic modeling of site design or low impact development (LID) techniques on a micro-scale or lot level is a current area of research (Huber, et al, 2004). There are few models available in the public domain that can simulate the effectiveness of these measures in reducing hydromodification impacts using a continuous simulation approach. The WWHM is currently able to simulate simplified representations of several LID techniques (dispersion of roof runoff on lawns, infiltration of roof runoff, and porous paving) An updated version of the tool (WWHM3) is being developed for the Washington Department of Ecology that can model lateral flow between pervious and impervious surfaces on a site. This will facilitate the future addition of more accurate representations of LID BMPs. A Bay Area adaptation of the WWHM will be able to take advantage of these improvements, and provide a comprehensive tool to developers to

evaluate a variety of on-site options for flow control. In addition, the Contra Costa Clean Water Program is funding development of design factors for a number of BMPs using continuous simulation with the HSPF model. SCVURPPP is following the progress of this study and will evaluate whether the results can be incorporated into this HMP.

7.4 INCORPORATING HMP REQUIREMENTS INTO LOCAL APPROVAL PROCESSES

Roles and Responsibilities of Co-permittee Agencies

The contemplated roles and responsibilities of the Co-permittee agencies and the development project proponents are similar to those identified for implementing other C.3 provisions, as described in the SCVURPPP C.3 Stormwater Handbook. The Co-permittees' prospective responsibilities are summarized below, with a reference to the section or document that can provide guidance:

1. Provide outreach and education to developers and training to agency staff, with help from SCVURPPP (HMP workshops, future revisions to SCVURPPP C.3 Stormwater Handbook for HMP)
2. Review a development application to determine whether the project is subject to C.3 requirements, and specifically HMP requirements (Flow charts in Chapter II of C.3 Stormwater Handbook, Attachment 7-2 of this report).
3. Ensure that hydromodification impacts are addressed in environmental (CEQA) reviews, including initial study checklists and environmental impact reports (guidance in SCVURPPP C.3 Stormwater Handbook, Section II.5 and Attachment II-7).
4. Review site stormwater management plans and sizing and design of proposed facilities to ensure they address hydromodification impacts according to the standards and criteria in Chapter 5 (see design guidance in Chapter 6).
5. Require a maintenance agreement and maintenance access agreement or other legal control mechanism from the property owner and provide education about maintenance, or accept responsibility for maintenance. (C.3 Stormwater Handbook, Chapter VI)
6. Log information about the project and flow control BMPs, for future annual reporting and for use in the BMP Operation & Verification Program. (C.3 Stormwater Handbook, Chapter VII)
7. Inspect the construction of the flow control BMPs to ensure specifications are met.
8. Include the flow control BMPs on a list of prioritized BMPs for future post-construction inspections. (C.3 Stormwater Handbook, Chapter VI)

If project proponents are not able to meet the HMP standards or performance criteria with on-site controls, they may need to look at a combination of on-site, off-site and/or instream controls. In this case, Co-permittee staffs may need to coordinate on the planning and design of proposed flow controls with multiple property owners and project applicants, other Co-permittees' staff (if drainage areas for off-site controls cross jurisdictional boundaries), Santa Clara Valley Water District staff, and/or Regional Board staff. It is recommended that the Water District be notified

if a project will not meet the HMP requirements on-site and the project proponent will need to consider the availability of off-site and/or in-stream control options. The Water District may provide a list of available off-site and in-stream options as a resource to project proponents.

Steps in the Review Process

Chapter II of the SCVURPPP *C.3 Stormwater Handbook* describes the changes to Co-permittees' development project review processes that are necessary to address the requirements of Provision C.3. A table and flow chart of typical development review process steps and the stormwater quality requirements that need to be considered in each step are provided in Attachments II-1 and II-2, respectively. In general, hydromodification controls should be considered at the same times in the process that site design and treatment measures are considered. Not only does this ensure that the requirements are met during the review process, but it provides the opportunity to consider the combined flow control benefit of all of the BMPs selected.

Attachments 7-1 and 7-2 in this HMP Report provide two tools to assist with incorporation of HMP requirements into local approval processes: the HMP Applicability and Requirements Flow Chart (from Figure 5-2) and a Development Review Process Flow Chart Incorporating HMP Requirements (an update of *C.3 Handbook*, Attachment II-2).

As with site design and stormwater treatment BMPs, it is desirable to consider hydromodification controls as early in the project planning stages as possible. One of the first steps is to determine whether the project falls under the C.3 requirements at all (i.e., whether the completed project's impervious area exceeds the thresholds for Group 1 projects) and then whether the HMP requirements apply to the project. The flow chart in Attachment II-3 of the *C.3 Handbook* can be used to determine C.3 applicability, and the flow chart in Attachment 7-2 of this HMP Report can be used to determine potential HMP applicability. Even if the project is determined to be exempt from HMP requirements, Co-permittees should recommend that the project applicant select site design and treatment BMPs that accomplish flow control if possible.

Another important reason to start considering HMP requirements early in the project planning process is that extra lead time may be needed to coordinate implementation of hydromodification mitigations that are a combination of on-site, off-site and/or in-stream controls. As discussed in the previous section, Co-permittee staff and project proponents may need to meet with multiple agencies, property owners, and other parties to coordinate the planning, design, approval and construction of proposed flow controls. Notification of the Water District regarding availability of off-site and/or in-stream control options should take place as early in the planning process as possible. The Co-permittee agencies will need to evaluate how District notification is incorporated into their development review processes and schedules.

7.5 LAND USE PLANNING MEASURES

Permit Provision C.3.f.vi.5 states that the HMPs management measures may include implementation of land use planning measures to "allow expected changes in stream channel cross sections, stream vegetation, and discharge rates, volumes and durations without adverse impacts to stream beneficial uses." The examples provided in the provision include stream

buffers and stream restoration activities, such as "restoration-in-advance" of flood plains, revegetation, and use of less impacting facilities at the point(s) of discharge.

A key element of hydromodification management strategies described in the literature is land use planning. The approach is to optimize development project site design to preserve the natural hydrologic conditions and protect sensitive hydrologic features, sediment source characteristics and sensitive habitats. This helps avoid the need to mitigate for hydromodification

A number of the site design techniques described in Chapter 6, such as clustering buildings to provide more open space, can be considered effective land use planning measures to reduce the increases in stormwater runoff from the project. However, there are additional planning measures that may be implemented for land use near streams that can further help the stream tolerate or adjust to increases in flow and associated erosion potential.

Some Co-permittees have established policy for allowable development and uses near riparian corridors, such as minimum buffer widths in which no development or very little development is allowed[3]. For example, the City of San Jose's Riparian Corridor Policy Study (1999) contains a guideline that all structures, impervious surfaces and ornamental landscaping be separated from the edge of the riparian corridor by a minimum of 100 feet. In addition to protection of riparian habitat, large setbacks from streams, where feasible, allow room for the stream channel to widen in response to increased flows and restabilize with a larger cross section.

Riparian corridors provide natural vegetative filters for slowing and infiltrating runoff and removing pollutants from runoff. For developments that are located near riparian corridors, the conveyance of runoff in sheet flow across these buffer areas instead of piped to an outfall to the creek can be considered. In addition, wide riparian corridors can also provide opportunities for siting shallow infiltration facilities that are intentionally constructed to provide flow control. These facilities can be designed to blend in with the surrounding terrain and planted with native vegetation.

The Santa Clara Valley Water District is the agency that conducts flood protection and most of the environmental restoration projects in Santa Clara Basin streams. Flood protection projects are now typically multi-objective projects that provide valuable habitat, protect endangered species, and allow for open space recreation. In the design of future flood protection projects, District staff will also consider providing bank stabilization, grade controls, and other in-stream measures to protect the stream from impacts of hydromodification from future development.

[3] SCVURPPP Development Policies Comparison Report, 2003.

7.6 OPPORTUNITIES FOR WATERSHED MASTER PLANNING FOR HYDROMODIFICATION, WATER QUALITY, AND FLOOD MANAGEMENT

The C.3.f. requirements include: *…An equivalent limitation protocol, as defined in the HMP, may be used to address impacts from changes in the volumes, rates, and/or durations of peak flows through measures other than control of those volumes and/or durations. The protocol may allow increases in peak flow and/or durations, subject to the implementation of specified BMPs and land use planning practices that take into account expected stream change resulting from changes in discharge rates and/or durations, while maintaining or improving beneficial uses of waters.* (Paraphrased from C.3.f.vii) This protocol provides for managing hydromodification through a combination of efforts that are not restricted to the project site.

In the Santa Clara Valley Basin, where many of the watersheds have been developed and where projects will be more of an infill variety, controls may not be required or are likely to be addressed on-site. However where portions of watersheds are currently not developed but planned for development, there may be an opportunity to conduct Watershed Master Planning that not only incorporates water quality and hydromodification, but also flood control. The incentive for such an effort derives from the fact that multi-purpose facilities designed for flood control are usually sufficient in size to address water quality and hydromodification, and that such facilities would be more economical to build and maintain than if separate facilities were designed for water quality, hydromodification, and flood control. A significant advantage of Master Planning is that cumulative effects of multiple developments and stream reach sensitivity to hydromodification are taken into account in the development of the plan.

Watershed Master Planning has its own set of institutional, regulatory, scheduling and financial challenges. Cooperative arrangements may be required to resolving institutional issues such as roles and responsibilities, and operation and maintenance. Regulatory approval will be needed to ensure that the master planning effort meets the C.3 requirements, and the master plan may require CEQA approval and perhaps other permits. Funding sources and cost sharing also come into play, with the added requirement that an approved plan and funding mechanism need to be in place to ensure that in-stream controls will be constructed within a reasonable time following completion of the development project. Resolution of some of these issues is sometimes achieved by distinguishing a water quality treatment pool (sometimes referred to as "dead storage") from the flood control volume. This distinction ensures that flood control reliability will not be compromised by multipurpose use and also may assist in defining O&M requirements and responsibilities.

Master planning in the Santa Clara Valley Basin also may be appropriate for those situations where stakeholders agree that in-stream controls in stream reaches already impacted by existing development is feasible and desirable. This makes particular sense where proposed large developments would discharge to already impacted streams, in which case the implementation of on-site controls alone would not provide any in-stream benefits. In such situations, developers could participate with the Santa Clara Valley Water District and perhaps other entities to jointly fund in-stream restoration efforts. If a plan and funding mechanism for an in-stream project is in place, contributing developers would receive credit for funding the value of mitigation for their developments' impacts.

7.7 INSPECTION AND MAINTENANCE REQUIREMENTS

This section addresses the prospective inspection and maintenance requirements for hydromodification control facilities, including flow duration basins and site design and treatment measures that could be used to reduce runoff volumes as part of a hydromodification control strategy.

Chapter VI of the *C.3 Stormwater Handbook* provides a discussion of inspection and maintenance requirements for all stormwater BMPs, including: elements of a BMP operation and maintenance (O&M) verification program; landowner and municipality responsibilities; BMP maintenance fact sheets; maintenance cost estimates; options for disposal of residuals; and vector control issues. Both the Co-permittee agency issuing the building permit and the property owner(s) have inspection and maintenance responsibilities for on-site flow and drainage area control measures. These may include:

Co-permittee:

- Require a maintenance agreement and maintenance access agreement or other legal control mechanism from the property owner and provide education about maintenance, or accept responsibility for maintenance.
- Inspect the construction of the flow control BMPs to ensure specifications are met.
- Include inspection of the BMP in the Co-permittee's BMP O&M Verification Program, according to the inspection priorities and frequencies established in the program.

Property Owner(s):

- Enter into a maintenance agreement and maintenance access agreement or other legal agreement with the permitting agency.
- Conduct regular inspection and maintenance of the facilities, according to the recommendations in the *C.3 Handbook* and *California BMP Handbooks*.
- Keep a log of inspections and records of maintenance performed, and make them available to the permitting agency upon request.

In addition, the Water District may have responsibility for inspecting and maintaining any in-stream hydromodification controls.

Flow duration basins are very similar to detention and infiltration basins in their design and therefore in their maintenance requirements. The main difference is in the design of the outlet structure, but the components of the outlet that need to be maintained are similar (e.g., orifices, weirs, screen and/or rock protection, etc.). Key maintenance issues include sediment and debris removal, vegetation management, and ensuring that the basin dewaters completely within 5 days to minimize vector production. A pretreatment mechanism for sediment removal, such as a sediment forebay, facilitates maintenance and helps keep the facility from clogging.

Attachment VI-3 of the *C.3.Stormwater Handbook* contains 22 BMP Maintenance Fact Sheets[4] developed for use by Co-permittees and property owners. The fact sheets describe inspection and maintenance activities for a number of BMPs that could be used for flow control and to reduce runoff volumes. These include:

- Bioretention
- Exfiltration trench
- Extended detention basin
- Infiltration basin
- Infiltration trench
- Planter boxes (flow-through type)
- Porous pavement
- Retention/irrigation
- Roof gardens
- Vegetated buffer strip
- Vegetated swale
- Wet pond
- Wetland

The fact sheets help property owners understand the maintenance and inspection requirements and recommended frequencies associated with the facilities on their property. They can be attached to building permits and/or maintenance agreements. The fact sheets are available on-line at www.scvurppp.org .

7.8 MONITORING AND REPORTING REQUIREMENTS

The Program's monitoring strategy is based on a two-pronged approach: Programmatic Monitoring and Environmental Monitoring/Assessment Measures. Programmatic monitoring is used to gauge how well performance standards are being met and control measures implemented. For the HMP, programmatic monitoring efforts by the Co-permittees will include:

1. Tracking the projects that have HMP requirements and how the requirements were met, including the types of flow control measures that are installed, via the Provision C.3 reporting requirements (Chapter VII of the *C.3 Handbook*);
2. Documenting the design of flow control measures according to the HMP guidelines;
3. Documenting inspections conducted as part of the BMP O&M Verification Program;
4. Self-evaluation of the New Development element of local urban runoff management programs, including the implementation of the HMP requirements, in annual reports.

The Program, if authorized, will assist Co-permittees with these efforts annually and provide a Program-level evaluation of effectiveness of HMP implementation in the Program's Annual Report every two to three years.

The Program is conducting environmental monitoring and assessment according to its Multi-Year Receiving Waters Monitoring Plan (2002). The Multi-Year Plan incorporates specific data needs that have been identified in Program activities relevant to watershed assessment and monitoring requirements. The need for monitoring activities related to the HMP will be discussed with the Water District and other Co-permittees and coordinated with other activities in the Multi-Year Plan.

[4] Sixteen (16) of the 22 BMP Maintenance Fact Sheets were taken from the California Stormwater BMP Handbooks (CASQA, 2003) and six (6) were developed by Program staff for the C.3 Handbook.

7.9 PROGRAM EVALUATION AND CONTINUOUS IMPROVEMENT

On January 15, 2004, the Program submitted to the Regional Board a letter documenting the substantial completion of the HMP Work Plan tasks and a list of next steps to be conducted to complete the final HMP. The letter and next steps were approved by the SCVURPPP Management Committee. Since that time, the following tasks have been completed:

- Ross Creek and San Tomas Aquino Creek assessments;
- Various technical studies and implementation guidance;
- Public Review Draft HMP Report, June 2004
- Public review process, receipt of comments, and incorporation of comments into report
- Revised Public Review Draft HMP Report, November 2004
- Final HMP Report, April 2005 (this document.

Implementation Program

To effectuate implementation of the HMP as contemplated by Provision C.3.f.viii.5 and to better evaluate and address issues that could arise from full scale implementation of the HMP following its approval, Program staff, City of San Jose staff, and District staff have been involved in discussions concerning implementation in the Evergreen area on the eastern edge of San Jose, based on the draft HMP. The City of San Jose is currently developing a Smart Growth Strategy for Evergreen, which includes the future development of several non-contiguous properties in the Evergreen area. The development of these properties comprises more than 500 acres and could include approximately 6,000 homes. The Evergreen Smart Growth Strategy provides a unique opportunity to address stormwater and HMP issues early in the planning stages for this community development. San Jose, Water District and Program staffs have met several times with the team of consultants representing the property owners, and are continuing to assist them in evaluating how to meet the HMP requirements for the proposed developments.

Next Steps

This HMP report was initially released as a public review draft to Co-permittees and Regional Board staff at the end of June 2004, as contemplated in the January 15, 2004 letter. It was re-released in November 2004, following a public review and peer review process. The HMP Report will continue to be improved through lessons learned from implementation experiences and through review of approaches proposed in other Bay Area countywide stormwater programs following the release of the final HMP Report. Additional contemplated steps are as follows:

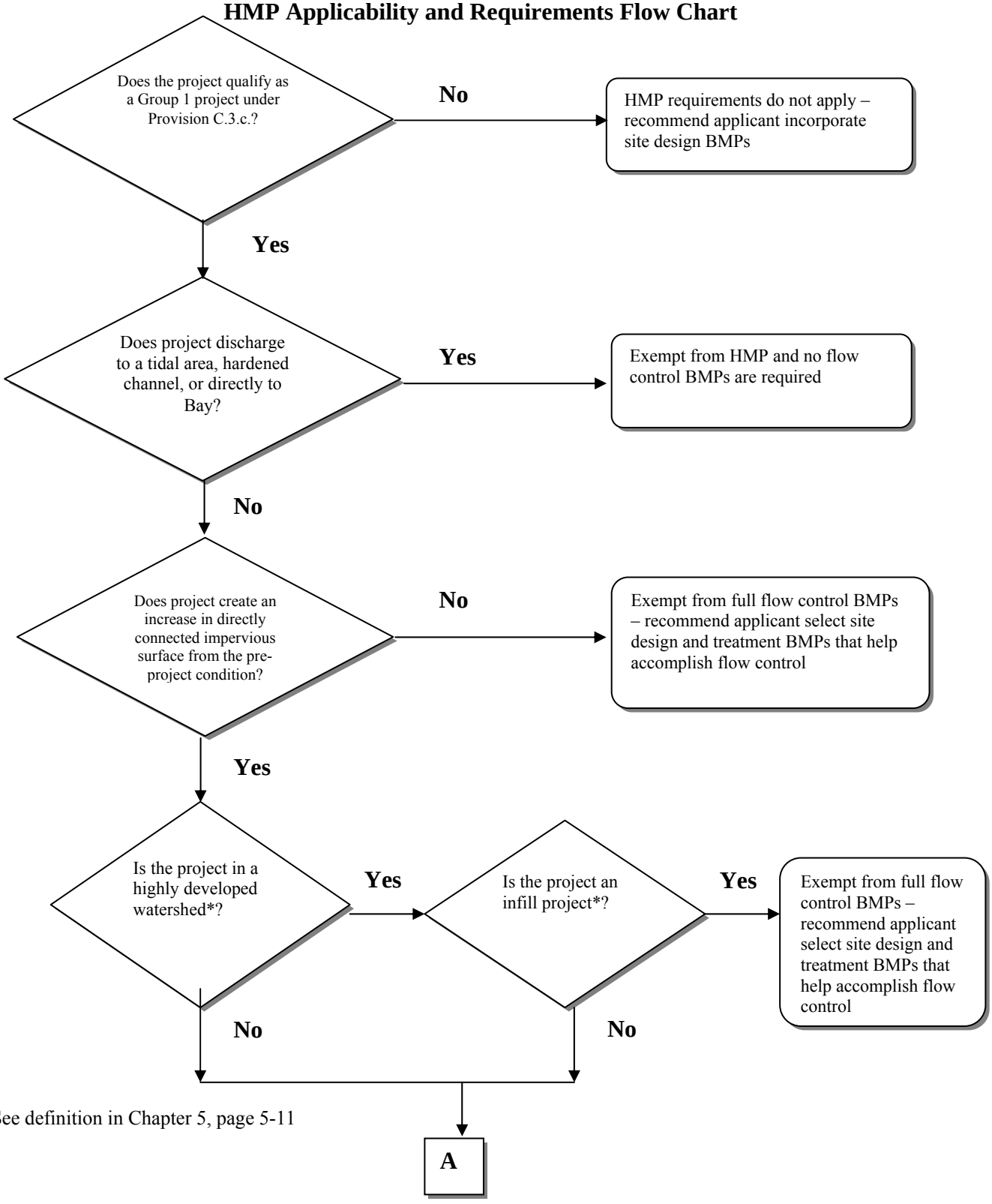
- Address remaining implementation issues as follows:
    - Continue to develop a funding mechanism such that projects can utilize in-stream control options, and a methodology for determining developer contributions based on the stream changes expected to result from changes in project runoff conditions (high priority – work has already begun by District staff).
    - Work with City/County planning and public works departments and the Water District to determine the timing and method of notifying District staff during the

development review process about HMP projects that may need in-stream controls, in a manner that does not unreasonably prolong the review process.

- Facilitate the review of the District's MDL analysis, both by the Co-permittees and the HMP Expert Panel, and work with the Management Committee to determine the need to integrate some or all of the MDL analyses in the implementation of the HMP.
- Conduct additional studies of implementation of site design, integrated management practices, and/or basins at example development sites in Santa Clara Valley
- Collect data on the implementation of the HMP at small sites for a period of two years after the start of implementation, and plan to re-evaluate the small site size threshold and approach at that time.

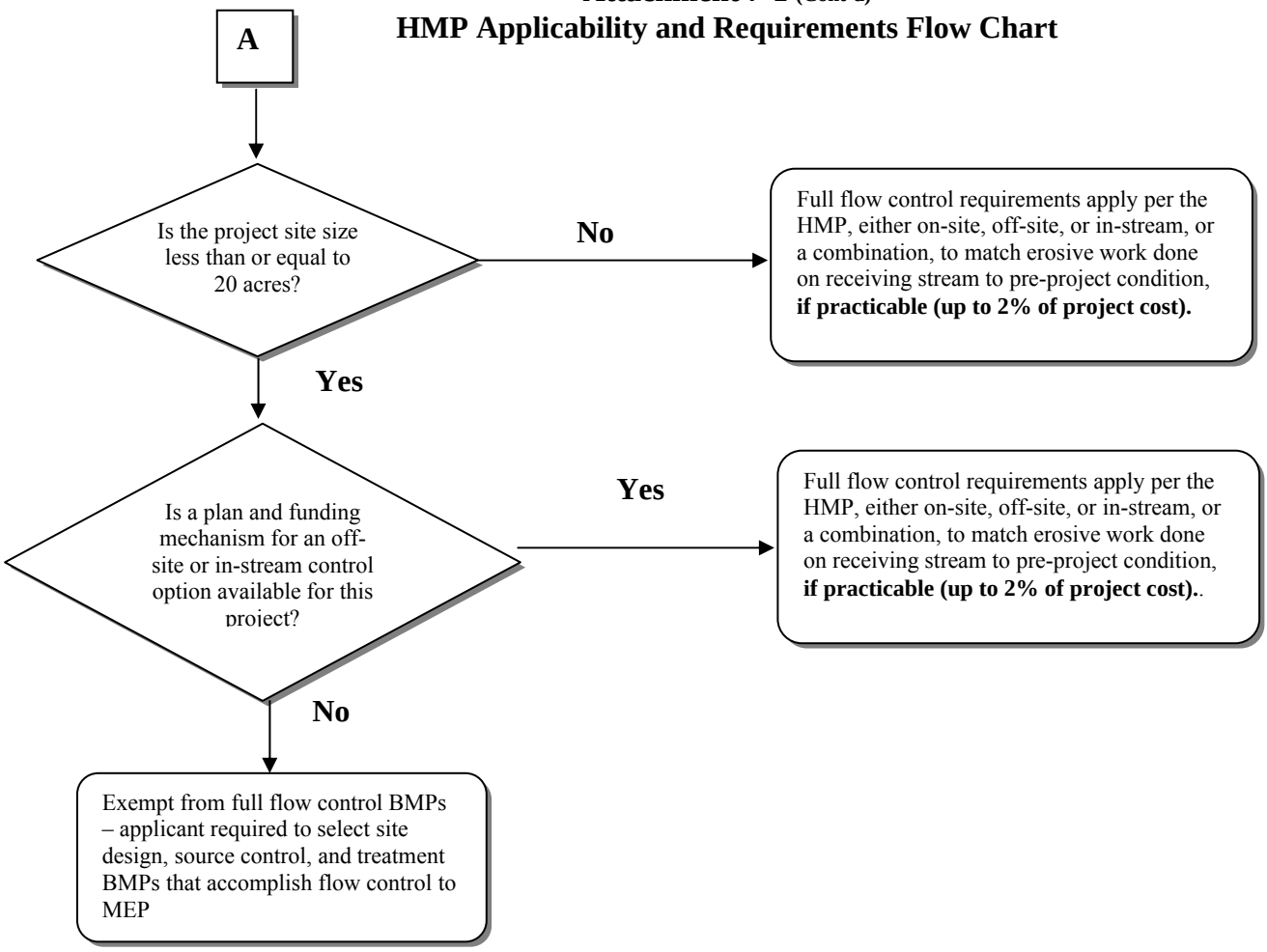
- Coordinate with other Bay Area stormwater programs to work toward a consistent approach for the Bay Area.
- Apply HMP requirements to additional projects and obtain feedback/suggestions for further refinement and implementation guidance
- Make additional refinements per: 1) lessons learned from implementation efforts; 2) the need for consistency with HMPs being developed by other Bay Area stormwater programs; and 3) development community, Co-permittee, and Regional Board feedback.
- Coordinate additional Co-permittee, Bay Area stormwater program, and Regional Board staff review process and progress meetings, including the development of a schedule for Bay Area-wide HMP implementation pursuant to requirements to be adopted by the Regional Board in the upcoming regional municipal urban runoff permit.

Attachment 7-1
HMP Applicability and Requirements Flow Chart



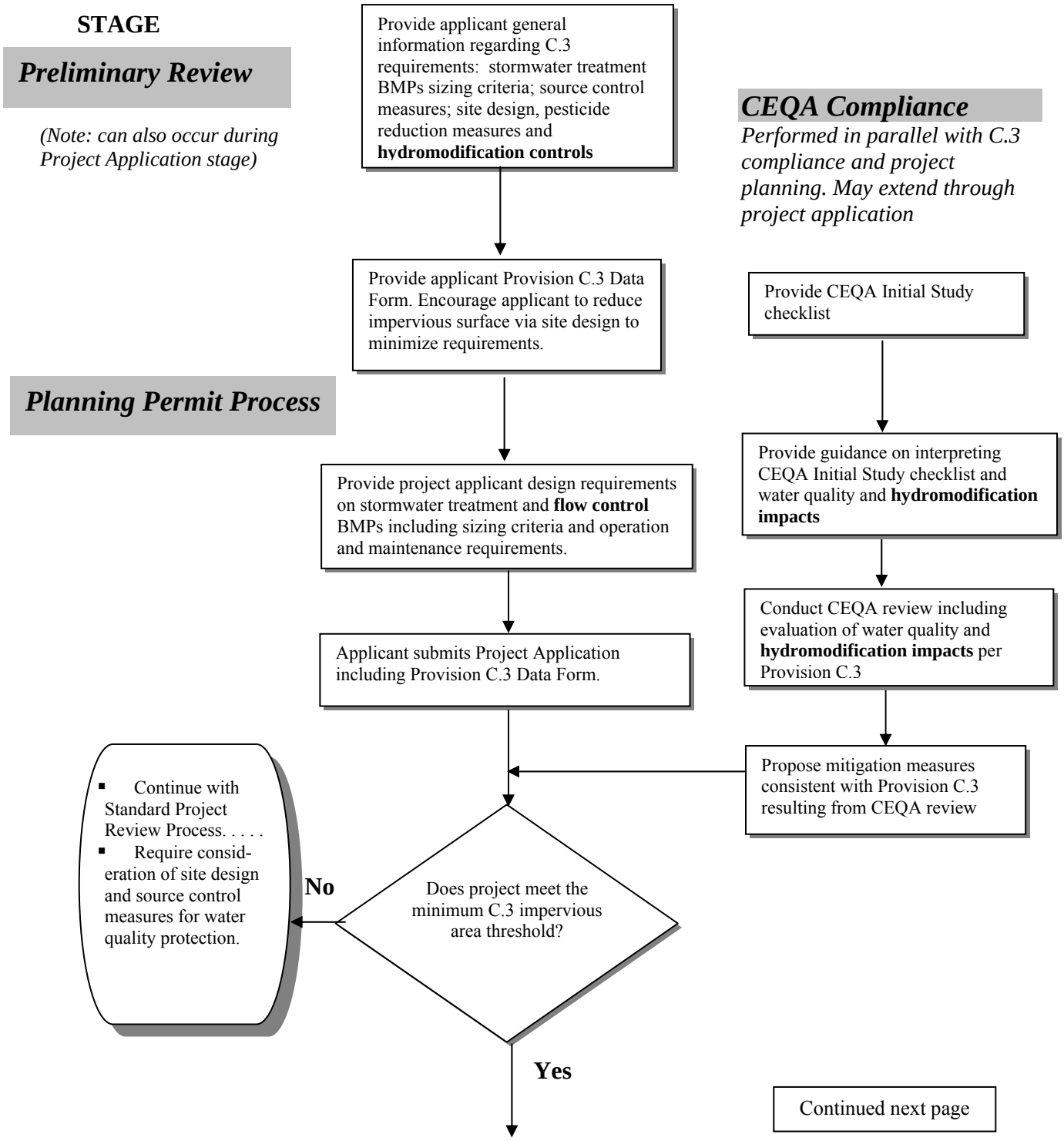
* See definition in Chapter 5, page 5-11

Attachment 7-1 (Cont'd)
HMP Applicability and Requirements Flow Chart



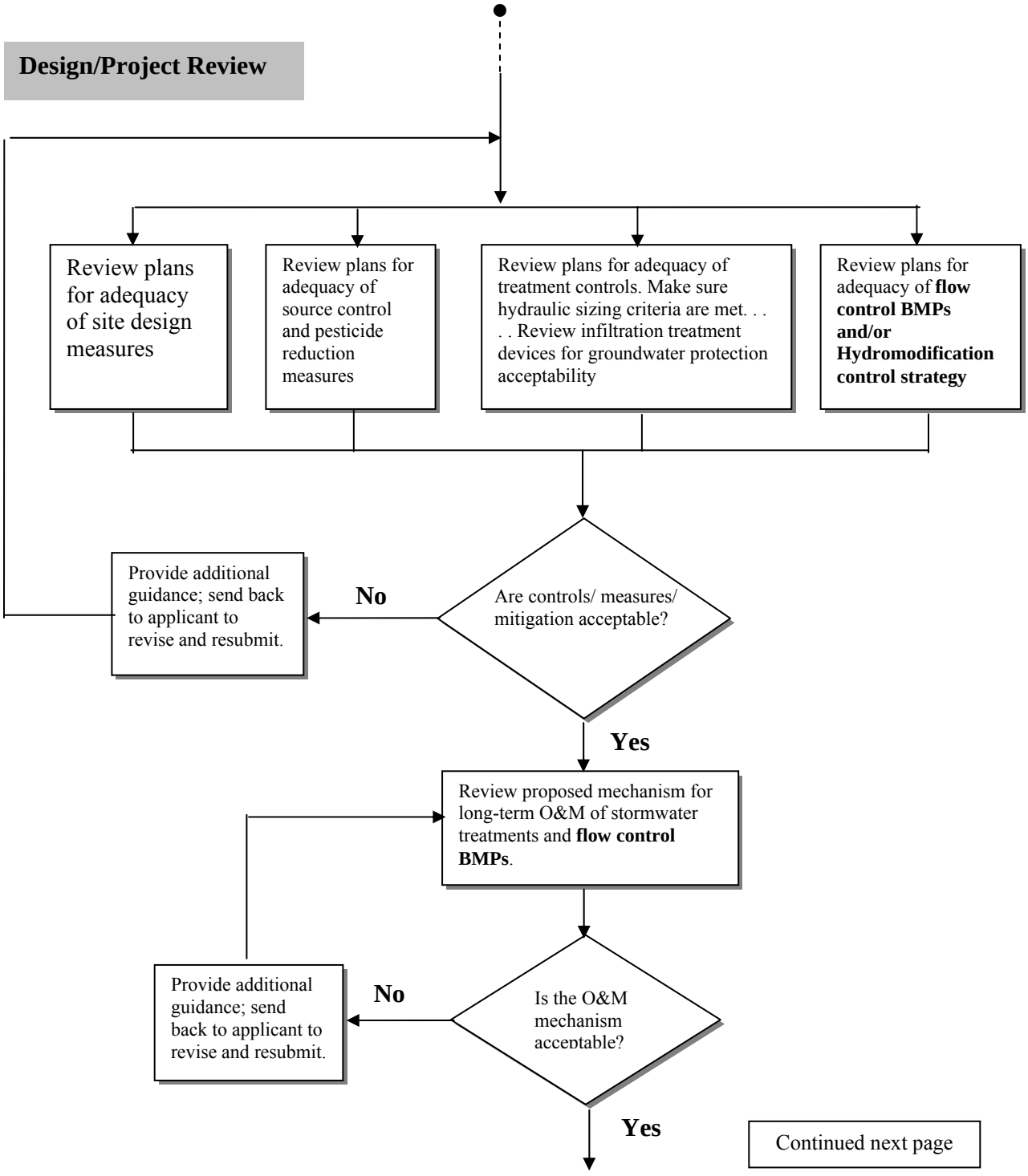
Attachment 7-2

Typical Development Review Process Flow Chart for Provision C.3 Incorporating HMP Requirements



Attachment 7-2 (cont'd)

Typical Development Review Process Flow Chart for Provision C.3 Incorporating HMP Requirements (continued)



Attachment 7-2 (cont'd)

Typical Development Review Process Flow Chart for Provision C.3 Incorporating HMP Requirements (continued)