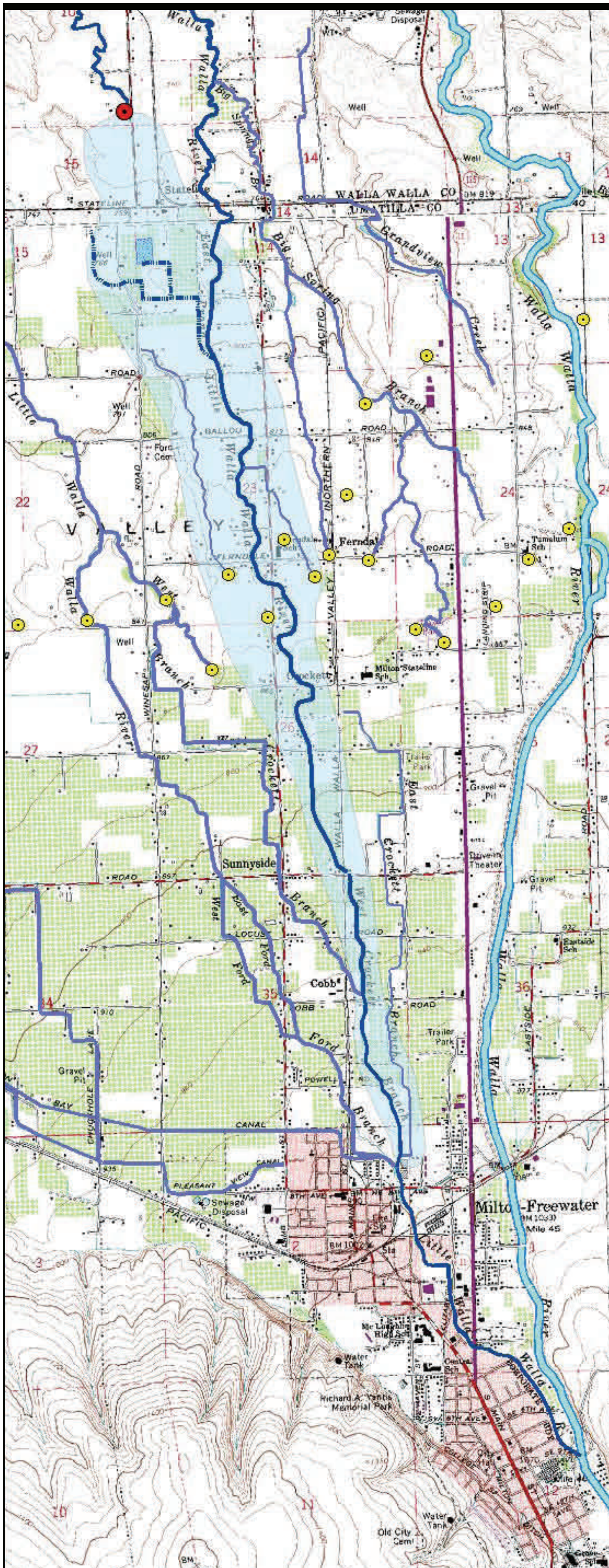

STRATEGIC PLAN

HALL-WENTLAND RECHARGE PROJECT

LONG-TERM IMPLEMENTATION STRATEGY

WALLA WALLA COUNTY
WATERSHED PLANNING DEPT.
GRANT NO. G0600312

compiled by
JOHN WARINNER, PE
FOUNTAINHEAD

in cooperation with
Native Creek Society
Groundwater Solutions
Washington Department of Ecology
Walla Walla River Irrigation District
Oregon Water Resources Department
Walla Walla Basin Watershed Council
Oregon Department of Fish and Wildlife
Walla Walla County Watershed Planning
Walla Walla County Conservation District

JUNE 2007

TABLE OF CONTENTS

FIGURES

TABLES

1.0 Executive Summary

1.1 Background and Purpose

Over the past 50 to 60 years, substantial increases in groundwater and surface water use – and various other factors – have resulted in declining shallow groundwater levels, diminished spring creek flows, reduced base streamflow, and increased water temperature in surface streams.

In 2003, Tom Page – a Walla Walla County landowner – initiated the Hall-Wentland Shallow Aquifer Recharge Project as an experiment to determine the degree to which intentional inundation of upgradient fields would increase the discharge of water from McEvoy Spring.

Over the past several years, Mr. Page and others have monitored and operated this project to improve our technical understanding of the hydrogeological response of the shallow gravel groundwater aquifer – and associated springs – to this intentional recharge activity, and to replenish upgradient groundwater to increase the base discharge from McEvoy Spring.

This monitoring and operational testing has been performed under Grant No. G0600312, funded by the Washington Department of Ecology (WDOE) and administered by the Walla Walla County Watershed Planning Department (WWCWPD).

The purpose of this Strategic Plan is to organize an ongoing strategic effort to:

1. Sustain short-term implementation of the Hall-Wentland Recharge Project through the duration of the Limited License authorized by the Oregon Water Resources Department.

2. Catalyze long-term, seasonal replenishment of McEvoy Spring which feeds McEvoy Spring Branch, a small tributary of the Walla Walla River.

1.2 Short-Term Implementation Strategy

The primary goal of the short-term implementation strategy is to sustain monitoring and operation of the Hall-Wentland Recharge Project through the duration of the Limited License authorized by the Oregon Water Resources Department (16 NOV 2005 through 1 NOV 2010, with a use season from November 1 through April 15 each year).

A secondary goal of the short-term implementation strategy is to supplement the flow of water in the East Prong Little Walla Walla River with water diverted from the Walla Walla River, so that the operators of the Hall-Wentland Recharge Project can test the capacity of the system to infiltrate water, and to evaluate the response of the system to an increased recharge rate.

Accomplishing the primary goal requires operation of the Wells Ditch system and the Hall-Wentland recharge site. Accomplishing the secondary goal requires the additional operation and management of systems that divert streamflow from the Walla Walla River and convey it to the East Prong Little Walla Walla River (both within and beyond the Walla Walla River Irrigation District).

Operation of the Hall-Wentland Recharge Project to accomplish the primary goal involves the following core activities:

1. Catalyze Project
2. Sponsor and Administer Project
3. Fund Project
4. Authorize Control and Use of Water and Potential Environmental Effects
5. Hold Limited License with OWRD (and other permits)
6. Provide Access to Land Used as Recharge Site
7. Hold Lease with Landowner
8. Monitor Hydrological Conditions
9. Evaluate Hydrological Conditions
10. Manage and Control Water
11. Underwrite Risks of Accidental Harm

Expansion of the Hall-Wentland Recharge Project to accomplish the secondary goal involves the following additional activities:

12. Confirm and/or Increase Hydraulic Capacity of Wells Ditch
13. Divert Streamflow from Walla Walla River
14. Convey Water to WWRID Boundary
15. Convey Water from WWRID Boundary to Wells Ditch
16. Underwrite Additional Risks of Accidental Harm

To sustain monitoring and operation of the Hall-Wentland Recharge Project through the duration of the Limited License authorized by the Oregon Water Resources Department, Fountainhead recommends an adaptive process featuring three main steps:

- Step One. Organize the People
- Step Two. Organize the Money
- Step Three. Implement the Current Possibilities

The first step is for the project Champion/Catalyst (Tom Page) to identify an appropriate Local Sponsor/Administrator to replace Walla Walla County Watershed Planning Department, who have communicated their intention to cease serving in this capacity. Fountainhead recommends the Walla Walla Basin Watershed Council as the most appropriate and capable replacement for the Sponsor/Administrator role.

The new Sponsor/Administrator and Mr. Page should then work together to identify and secure commitments from the remaining required parties. Fountainhead provides a table summarizing recommended parties for each required role, in the order they should be approached.

Once the Sponsor/Administrator and Champion/Catalyst have assembled the complete project team, they should request that each team member prepare an operational budget for each proposed activity under two scenarios: full operation of the system; and limited operation of the system (no supplementation of streamflow in the East Prong Little Walla Walla River).

The Sponsor/Administrator should then compile a complete budget for each of the two scenarios, then contact prospective funders to determine the level of funding available for the project.

Finally, the Sponsor/Administrator should secure an associated grant contract, execute associated subcontracts with each subcontractor, and implement the project.

1.3 Long-Term Implementation Strategy

The primary goal of the long-term implementation strategy is to catalyze and sustain long-term, seasonal replenishment of McEvoy Spring.

This goal can potentially be accomplished in a variety of ways – and it is likely to in the context of a comprehensive regional groundwater management program, rather than an independent effort targeted specifically at McEvoy Spring.

Since the specific recharge areas and water flow paths through which water flows to McEvoy Spring – and other springs similar to McEvoy Spring – are currently unknown, this is likely to remain an experimental effort into the foreseeable future.

To accomplish the stated goal of long-term, seasonal replenishment of McEvoy Spring, Fountainhead recommends an iterative, adaptive process featuring four main steps:

- Step One. Measure the location and timing of current water flow paths
- Step Two. Communicate monitoring results and cultivate the engagement of water users
- Step Three. Establish increasingly clear goals regarding desirable water flow paths
- Step Four. Experiment with systems that can potentially improve water flow paths

Over the past five-to-six years, the Walla Walla Basin Watershed Council has developed an extensive monitoring system to measure streamflows, groundwater table levels, and spring discharges throughout the alluvial fan associated with the Walla Walla River and Little Walla Walla River system. This basic hydrological information provides an excellent foundation upon which to develop a long-term program for adaptive management of water flowing through the Walla Walla River and Little Walla Walla River system – and it should be continued into the future to inform future water management decisions and to evaluate the effects of water management activities.

As more water flow information is collected, it will become increasingly important to convert these raw data into useful information that can guide on-the-ground water management activities. It will become equally important to publicize the results in a manner that increases public awareness and facilitates public engagement in decisionmaking and improved water management actions.

Ultimately, the members of the Walla Walla watershed community should develop clearly identified management points (specific groundwater wells and springs that will be used to indicate hydrological performance) and clearly stated goals regarding the desirable hydrological performance at each of these management points. Specific working performance goals should be identified for all the springs of social, ecological and/or economic importance in the Walla Walla River system – and adaptively refined over time. These performance goals will likely be based on known or estimated historical performance, balanced with other current demands on the hydrologic system.

As citizens become more aware of how water is flowing – and how we desire for water to flow – the remaining step will be to learn the most effective ways to control the flow of water to generate the desired results. This should include experimentation with a variety of water management techniques, including the following systems:

- Operate Hall-Wentland Recharge Project through Limited License period
- Increase flows to the Hall-Wentland recharge site by diverting water from the Walla Walla River to supplement streamflows in the East Prong Little Walla Walla River
- Evaluate and consider the potential value of reconfiguring the lower Wells Ditch system
- Evaluate effects of sustaining year-round flow in streams/ditches within WWRID
- Investigate potential ways to retrofit bulges within WWRID to recharge groundwater
- Investigate potential ways to decrease groundwater pumping in M-F vicinity

1.4 Feedback

Please provide feedback and constructive comments and recommendations to:

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2.0 Purpose & Scope

2.1 Purpose

The purpose of this Strategic Plan is to organize a strategic effort to:

1. Sustain short-term implementation of the Hall-Wentland Recharge Project through the duration of the Limited License authorized by the Oregon Water Resources Department.

2. Catalyze long-term, seasonal replenishment of McEvoy Spring which feeds McEvoy Spring Branch, a small tributary of the Walla Walla River.

2.2 Rationale

The rationale for this project has been described extensively in various previous documents (see bibliography in Chapter 5). In summary, a high degree of hydraulic connection occurs between surface water and shallow groundwater flowing through the Walla Walla Basin. Over the past 50 to 60 years, substantial increases in groundwater and surface water use – and various other factors – have resulted in declining shallow groundwater levels, diminished spring creek flows, reduced base streamflow, and increased water temperature in surface streams. Sustaining sufficient water supplies and restoring the ecological health of the Walla Walla River and its tributaries will require effective, integrated management of surface and ground waters, including effective, seasonal recharge and replenishment of groundwater aquifers.

2.3 Background

Tom Page – a Walla Walla County landowner – initiated the Hall-Wentland Shallow Aquifer Recharge Project in 2003, as an experiment to determine the degree to which intentional inundation of upgradient fields would increase the discharge of water from McEvoy Spring, located apparently downgradient from these fields.

Over the past several years, Mr. Page has encouraged other parties to add value to the project that he initiated. At Mr. Page's prompting, Walla Walla County Watershed Planning Department secured and administered funding from the Washington Department of Ecology to formalize and enhance the Hall-Wentland Shallow Aquifer Recharge Project. Under the technical guidance of Dr. Kevin Lindsey (a hydrogeologist formerly with Kennedy/Jenks Consultants and now with Groundwater Solutions), this groundwater recharge project has been monitored and operated to:

- improve our technical understanding of the hydrogeological response of the shallow gravel groundwater aquifer – and associated springs – to this intentional recharge activity (primary goal); and

- replenish upgradient groundwater to increase the base discharge from McEvoy Spring.

This monitoring and operational testing has been performed under Grant No. G0600312, funded by the Washington Department of Ecology (WDOE) and administered by the Walla Walla County Watershed Planning Department (WWCWPD).

The Hall-Wentland Recharge Project involves intentional diversion of streamflow from the East Prong Little Walla Walla River, conveyance of this water to the recharge site via Wells Ditch, and application of the water to agricultural fields (adjacent properties owned by Gordon Hall and Loren Wentland) using a practice similar to flood irrigation. The project also involves an array of monitoring wells and streamflow measurement stations used to record and evaluate the hydraulic response of the groundwater aquifer to the recharge water.

Oregon water law states that under the legal practice of irrigation, water must be put to the beneficial use of growing a crop. While recharge of groundwater aquifers is socially beneficial in many cases, groundwater recharge is currently not included among the beneficial uses associated with the authorized practice of irrigation. Therefore, intentional practice of groundwater recharge requires specific authorization from the Oregon Water Resources Department (OWRD).

In the case of the Hall-Wentland Recharge Project, OWRD has provided this authorization in the form of a Limited License – a temporary permit for the purpose of testing the feasibility of this form of water use. Long-term operation of the Hall-Wentland Recharge Project, beyond the five-year duration of the Limited License (16 NOV 2005 through 1 NOV 2010, with a use season from November 1 through April 15 each year), will require a permanent water right specifically for the purpose of groundwater recharge.

2.4 Scope

Due to the “ad-hoc” nature of this experimental project, Walla Walla County Watershed Planning hired the author of this Strategic Plan (Fountainhead) to develop a strategy for long-term operation of the Hall-Wentland Recharge Project. However, during the course of this effort, it became evident that the primary value of the Hall-Wentland Recharge Project is to gain practical information about one particular technique for recharging the shallow gravel aquifer. In time, it may become evident that there are more effective and/or more sustainable ways to seasonally replenish the flow of water through the shallow gravel aquifer to McEvoy Spring. Hence, operation of the Hall-Wentland Recharge Project (in its current form) may turn out to be a relatively short-term practice.

When these realizations came to light, Walla Walla County Watershed Planning Department requested a two-part strategy, including a short-term strategy for sustaining operation of the Hall-Wentland Recharge Project, and a long-term strategy for sustaining the flow of water from McEvoy Spring.

The geographic scope for both of these inquiries involves, to varying degrees, the complete hydrologic system upgradient of McEvoy Spring illustrated in Figure 2-1, including (from south to north):

- Walla Walla River, the stream reach conveying water from the Blue Mountains to the Little Walla Walla River diversion

- Little Walla Walla River diversion, the impoundment, headgate and screen system controlling the flow of water from the Walla Walla River into the Little Walla Walla River

- Little Walla Walla River, the stream reach conveying water from the Walla Walla River to the “Frog” (the point at which water is diverted into an array of various streams and ditches)

- East Prong Little Walla Walla River, the stream reach conveying water from the “Frog” to Wells Ditch

- Wells Ditch, the ditch system conveying water from the East Prong Little Walla Walla River to the Hall-Wentland Recharge Site

- Hall-Wentland Recharge Site, the agricultural lands owned by Gordon Hall and Loren Wentland (immediately south of Stateline Road and east of Winesap Road near Milton-Freewater, Oregon), and associated water control structures, used to spread water diverted from Wells Ditch and to allow it to infiltrate into the soil and percolate through the soil profile into the shallow gravel aquifer

- Shallow Gravel Aquifer, the geological deposits of coarse gravel, sand, silt and clay underlying the previously-listed elements that conveys water to McEvoy Spring (and other associated springs)

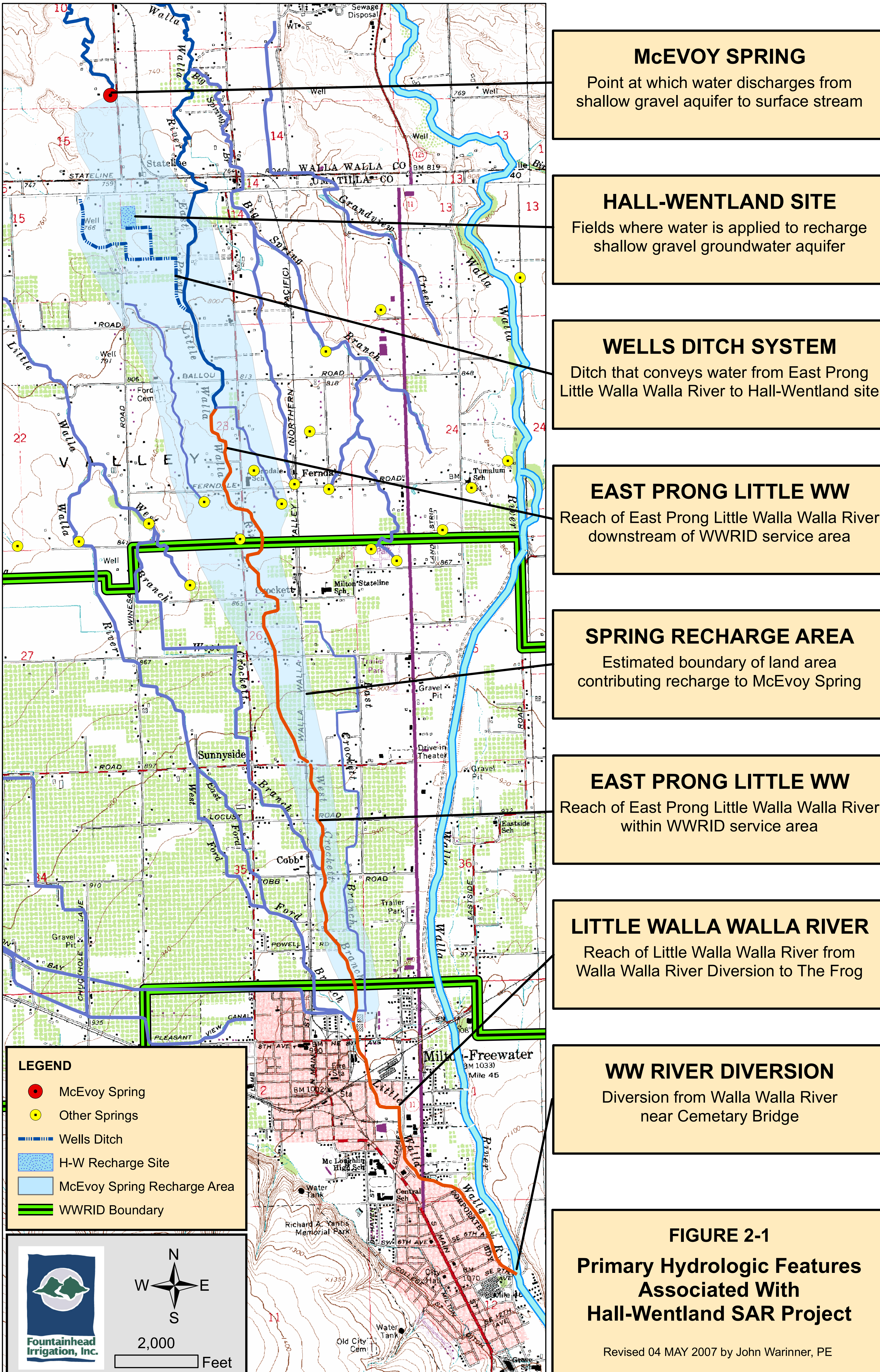


FIGURE 2-1

Primary Hydrologic Features Associated With Hall-Wentland SAR Project

Revised 04 MAY 2007 by John Warinner, PE

3.0 Short-Term Implementation Strategy

3.1 Desired Outcome

The primary goal of the short-term implementation strategy is to sustain monitoring and operation of the Hall-Wentland Recharge Project through the duration of the Limited License authorized by the Oregon Water Resources Department (16 NOV 2005 through 1 NOV 2010, with a use season from November 1 through April 15 each year).

A secondary goal of the short-term implementation strategy is to supplement the flow of water in the East Prong Little Walla Walla River with water diverted from the Walla Walla River, so that the operators of the Hall-Wentland Recharge Project can test the capacity of the system to infiltrate water, and to evaluate the response of the system to an increased recharge rate.

3.2 System Description

The primary elements of the hydrologic system associated with the Hall-Wentland Recharge Project was described and illustrated in Section 2.4.

Accomplishing the primary goal requires operation of the Wells Ditch system and the Hall-Wentland recharge site.

Accomplishing the secondary goal requires operation and management of the following elements of the hydrologic system:

- Little Walla Walla River diversion, the impoundment, headgate and screen system controlling the flow of water from the Walla Walla River into the Little Walla Walla River (normally operated and managed by Walla Walla River Irrigation District (WWRID))

- Little Walla Walla River, the stream reach conveying water from the Walla Walla River to the “Frog” (normally operated and managed by WWRID)

- East Prong Little Walla Walla River, the stream reach conveying water from the “Frog” to the northern boundary of the WWRID service area (normally operated and managed by WWRID)

- East Prong Little Walla Walla River, the stream reach conveying water from the northern boundary of the WWRID service area to Wells Ditch (normally operated and managed by individual, independent landowners)

- Wells Ditch, the ditch system conveying water from the East Prong Little Walla Walla River to the Hall-Wentland Recharge Site (normally operated by AJ Wentland and other landowners served by Wells Ditch)

- Hall-Wentland Recharge Site, the agricultural lands owned by Gordon Hall and Loren Wentland (immediately south of Stateline Road and east of Winesap Road near Milton-Freewater, Oregon), and associated water control structures, used to spread water diverted from Wells Ditch and to allow it to infiltrate into the soil and percolate through the soil profile into the shallow gravel aquifer (recently operated by Tom Page as a subcontractor to Groundwater Solutions)

- Hall-Wentland Recharge Project groundwater monitoring system (recently operated by Groundwater Solutions and Tom Page)

3.3 Core Activities

Operation of the Hall-Wentland Recharge Project, in its current form, involves the following core activities.

3.3.1 Catalyze Project

The Champion(s) or Catalyst(s) provide(s) the fundamental driving force behind the project. Project Champion/Catalysts are typically private landowners and/or local service providers with a personal understanding of the need for the project and the standing and will to vocalize and represent the value of the project. With the substantial need that exists for improved water management and ecological restoration throughout the Walla Walla Basin, potential projects are unlikely to occur in the absence of substantial representation by a Champion/Catalyst.

To date, Tom Page has served as the Champion/Catalyst. He remains committed to continue serving in this capacity, provided that public funding and administrative support remain available for the project.

3.3.2 Sponsor and Administer Project

The Sponsor/Administrator organizes, assembles, and stewards the tasks, people, money and other resources required to perform the project. This task is especially necessary for projects that are unlikely to occur without substantial public funding. The Sponsor/Administrator must be an entity with authority/standing with the public funding agency(ies). In some cases, the Champion and the Sponsor/Administrator roles are performed by the same individual, or individuals within the same organization. However, in many cases, the Champion lacks the standing and/or capacity to play the Sponsor/Administrator role, so a third party performs this role.

To date, Walla Walla County Watershed Planning has served as Sponsor/Administrator. Walla Walla County Watershed Planning Department intends to discontinue operating in this role, due to their internal workload, production capacity, and professional qualifications. They desire for another, better-qualified organization to assume the role of Sponsor/Administrator for the project.

Participants in the development of this strategic plan discussed several possible organizations potentially suited to assume this role, including: Walla Walla Basin Watershed Council (WWBWC); Walla Walla County Conservation District (WWCCD); Walla Walla Water Management Initiative (WMI); Native Creek Society; McEvoy Spring Branch Restoration Group (an informal group of landowners currently restoring McEvoy Spring Branch); or an individual, such as Tom Page.

Private professional consulting firms (such as Groundwater Solutions and Fountainhead) are not the most appropriate organizations to serve as the Sponsor/Administrator for publicly-funded restoration projects.

3.3.3 Fund Project

The Funder(s) provide(s) the money required to purchase the labor, equipment and other resources required to implement the project.

To date, Washington Department of Ecology (WDOE) has served as primary Funder. In the context of the Walla Walla Water Management Initiative, WDOE and other local agencies have expressed an ongoing interest in – and commitment to – experimentation with recharge and replenishment of the shallow gravel aquifer.

Governmental funding of the Hall-Wentland Recharge Project is somewhat complicated by the Oregon-Washington state line. With the exception of some surface and ground water monitoring that occurs on the Washington side of the state line, almost all of the project activities occur in Oregon. However, the primary intent of these activities is to path Oregon surface water so that it flows underground through the shallow gravel aquifer to emerge (at least in part) from McEvoy Spring, which is located in Washington.

Due to complications with the expenditure of Washington State funds to pay for activities occurring in Oregon, it would be ideal to develop a project funding package combining funds from Oregon-based and Washington-based agencies. WDOE and Oregon Watershed Enhancement Board (OWEB) appear to be the leading candidates to serve as Funder for the Hall-Wentland project. However, the Walla Walla Basin Watershed Council, Walla Walla County Conservation District, and/or Walla Walla Watershed Alliance may be able and willing to secure funding from other sources.

3.3.4 Authorize Project

Depending on the project scope, project activities fall under the jurisdiction of one or more regulatory agencies.

3.3.4.1 Authorize Control and Use of Water

According to state water laws in Oregon and Washington, water flowing through these states is owned by the respective state. Water flowing through Oregon is administered by the Oregon Water Resources Department. Water flowing through Washington is administered by the Washington Department of Ecology. These agencies must authorize the activities of other parties who desire to manage or otherwise affect the flow of water through these respective states. All the water control activities associated with the Hall-Wentland Recharge Project occur in the State of Oregon, and are therefore under the jurisdiction of Oregon Water Resources Department.

To date, OWRD has authorized the diversion of water from the East Prong Little Walla Walla River into and through Wells Ditch for application to the recharge site for the purpose of intentional groundwater recharge. OWRD has granted this authority in the form of a Limited License – a temporary permit for the purpose of testing the feasibility of this form of water use. The Limited License authorizes the diversion of water for a five-year term, beginning on November 16, 2005 and ending on November 1, 2010, with an annual season of use extending from November 1 through April 15 each year. This Limited License is actually held by WWRID, due to the fact that the license authorizes diversion of water from the Walla Walla River (at Cemetary Bridge), in addition to the East Prong Little Walla Walla River (at Wells Ditch).

This arrangement is somewhat problematic, as the Walla Walla River diversion system is an integral part of the WWRID system – however, the Wells Ditch system is not. Wells Ditch is used to divert and convey water from the East Prong Little Walla Walla River at a location that lies far outside of the WWRID service area boundary. WWRID is concerned that this arrangement associates them with operations and risks that are beyond their jurisdiction and control. In light of the litigious battles they have been through in recent years, they are understandably reluctant to open themselves to liabilities in addition to those already associated with their own internal operations. At this juncture, they have expressed a willingness to consider shouldering this responsibility, but only if sufficient funds are provided to enable them to cover their associated y activities.

3.3.4.2 Authorize Potential Effects on Threatened and Endangered Species

In the event that water control activities affect international treaties and/or threatened or endangered species, these activities are additionally subject to the jurisdiction of the Confederated Tribes of the Umatilla Indian Reservation (CTUIR), and state and federal agencies, including the Oregon and Washington Departments of Fish and Wildlife (ODFW and WDFW), National Marine Fisheries Service (NMFS), and the United States Fish and Wildlife Service (USFWS).

To date, no project participants have been required to grant express permission from these agencies to operate the Hall-Wentland Recharge Project, as the Hall-Wentland Recharge Project has been operated using only streamflows occurring naturally in the East Prong Little Walla Walla River. The primary goal of continuing to operate the recharge system in this manner can be accomplished without these additional activities and associated risks.

However, the secondary goal of supplementing streamflow in the East Prong Little Walla Walla River to increase the rate and volume of flow to the recharge project cannot be accomplished without addressing the fact that diverting streamflow from the Walla Walla River for intentional supplementation of flow in the East Prong Little Walla Walla River, may potentially attract threatened or endangered species of fish into upper reaches of the Little Walla Walla River system – where they are unlikely to survive due to migration barriers, out-of-stream uses of water, predation and other factors.

Prior to initiating operations of this nature, project participants must install structural devices to prevent problematic fish migration and/or obtain a “Safe Harbor Agreement” or similar written permission from the appropriate agency(ies) to protect themselves from legal liability.

These agencies have been involved in the regulatory review of the Limited License issued by OWRD – and have generally voiced their support for the project at this experimental phase.

3.3.5 Hold Limited License with OWRD (and other permits)

The Limited Licensee holds the Limited License whereby OWRD grants permission to divert streamflows from the East Prong Little Walla Walla River and Walla Walla River for intentional recharge of groundwater at the Hall-Wentland Recharge site.

As discussed in Section 3.3.4, WWRID has served as the Limited License holder to date. They have expressed a willingness to continue serving in this capacity, provided that funds are made available to enable them to cover the costs associated with this function. Their responsibilities and associated costs are simpler and lower (respectively) if the Hall-Wentland Recharge Project is operated with streamflows flowing in the East Prong Little Walla Walla under normal operating conditions. WWRID is subject to more substantial risks and associated costs if they agree to divert streamflow from the Walla Walla River to intentionally supplement streamflow in the East Prong Little Walla Walla River.

3.3.6 Provide Access to Land Used as Recharge Site

The Landowners provide access to use their land as the surface that is intentionally inundated to path surface water to the shallow gravel groundwater aquifer. Historically, Gordon Hall and Loren Wentland have leased their land to Walla Walla County Watershed Planning Department for this purpose. Both parties have indicated a willingness to continue leasing their land for this purpose, provided they are equitably compensated and appropriately protected from liability for consequences of project activities.

3.3.7 Hold Lease with Landowner

The Lease Holder holds the lease with the landowners whose property is used for the recharge site: Gordon Hall and Loren Wentland. To date, Walla Walla County Watershed Planning Department has served as the Lease Holder. However, Walla Walla County Watershed Planning Department intends to discontinue operating in this role, due to their internal workload, production capacity, and professional qualifications. They desire for another, better-qualified organization to assume the role of Lease Holder for the project.

Several possible organizations are potentially suited to assume this role, including: Walla Walla Basin Watershed Council (WWBWC); Walla Walla County Conservation District (WWCCD); Walla Walla Water Management Initiative (WMI); Native Creek Society; McEvoy Spring Branch Restoration Group (an informal group of landowners currently restoring McEvoy Spring Branch); or an individual, such as Tom Page.

In any event, the project budget should include sufficient funds to cover the cost of adequately insuring the Lease Holder and the Landowners against potential liability associated with the project.

3.3.8 Monitor Hydrological Conditions

The Hydrological Monitor operates and maintains the monitoring system that measures the hydrologic response of surface and ground water features. Now that the monitoring system is installed and functional, this activity is limited to collecting (downloading) recorded data, servicing sensors and data recorders, and compiling recorded data into databases and/or spreadsheets that the project evaluator can use to evaluate the hydrological response of the system to recharge activities.

To date, Groundwater Solutions – in association with Tom Page – has served as the Hydrological Monitor. Groundwater Solutions and Tom Page remain interested in serving in this manner and they have clearly demonstrated their qualifications and capacity to perform these roles. However, since Groundwater Solutions is a private consulting firm, it is probably appropriate to invite them and other qualified organizations to competitively bid to provide these professional services as contracts are renewed to continue the project.

3.3.9 Evaluate Hydrological Conditions

The Hydrological Evaluator analyzes the hydrological data collected by the project monitor to determine whether the recharge system ought to be operated, the rate at which the water manager(s) should deliver water to recharge project, and to characterize the hydrological performance and response of the groundwater recharge system. Functionally, the Hydrological

Evaluator serves as the technical leader of the project, with primary responsibility for directing the activities of the on-the-ground water manager(s) in coordination with the project champion/catalyst.

Historically, Kevin Lindsey of Groundwater Solutions (formerly with Kennedy/Jenks Consultants) has performed the role of Hydrological Evaluator and Technical Leader. Groundwater Solutions remains interested in serving in this manner and they have clearly demonstrated their qualifications and capacity to perform these roles. However, since Groundwater Solutions is a private consulting firm, it is probably appropriate to invite them and other qualified organizations to competitively bid to provide these professional services as contracts are renewed to continue the project.

3.3.10 Manage and Control Water

The Water Manager(s) personally control(s) the headgates, ditches and other physical features that guide and control the flow of water from the original source(s) to the recharge site. Generally, these water control activities are performed under the direction of the Hydrological Evaluator (Technical Leader) who is responsible for evaluating hydrological conditions (see Section 3.2.5). Historically, Tom Page and AJ Wentland have served as Water Managers for the Hall-Wentland Recharge Project.

3.3.11 Underwrite Risks of Accidental Harm

The Risk Underwriter(s) provide(s) insurance policies to cover potential harm that might occur as a result of intentional water control activities (see Section 3.3). Historically, Walla Walla County has opted not to purchase a specific insurance rider for this purpose. Rather, through contractual terms, they have required their subcontractors (such as Groundwater Solutions and Fountainhead) to demonstrate proof of professional liability insurance and to hold Walla Walla County harmless for any damages resulting from negligence of the professional services provider.

Since accomplishing the primary goal involves only operation of the Wells Ditch system and the Hall-Wentland recharge site, the risk exposure is substantially different than for the second goal which involves operation and management of the additional system elements between the Walla Walla River diversion and Wells Ditch diversion.

To accomplish the primary goal, insurance is required for seasonal operation of Wells Ditch and the Hall-Wentland recharge site.

Accomplishing the secondary goal is additionally complicated by other administrative and jurisdictional boundaries associated with the WWRID service area – and the associated presence and absence of formal maintenance of water conveyance channels within and outside of the WWRID service area. To accomplish the secondary goal, insurance is required for operation of the Walla Walla River diversion and the Little Walla Walla River channels from this point of diversion to the Wells Ditch point of diversion. This includes stream/ditch reaches both within and beyond the boundaries and jurisdiction of WWRID – which probably necessitates separate insurance policies held by separate organizations for these respective portions of the water conveyance system.

3.3.12 Divert Streamflow from Walla Walla River

This activity is not necessary to achieve the primary goal. If the secondary goal is to be achieved, the secondary streamflow diverter must divert flow from the Walla Walla River (Diverter WWRID) and manage this water flow to supplement streamflow in the East Prong Little Walla Walla River system (Conveyor WWRID). As discussed previously, OWRD has granted permission for WWRID to perform this function (from a water rights standpoint) via the Limited License. To date, this activity has not occurred for aforementioned reasons.

If the secondary goal is to be achieved, WWRID will almost certainly need to perform this role, due to their ownership of, and responsibility for, the existing streamflow diversion structure. The primary obstacles to this activity, which have been presented previously, are: (a) legal concerns relating to attraction of threatened and/or endangered species of fish into the upper reaches of the Little Walla Walla River system; (b) financial concerns relating to the need for additional insurance; and (c) jurisdictional concerns relating to operation and management of the stream system downstream of the WWRID boundary. All three of these issues must be addressed in order for WWRID to divert flow from the Walla Walla River and manage this flow to supplement flow in the East Prong Little Walla Walla River.

3.3.13 Convey Water to WWRID Boundary

This activity is not necessary to achieve the primary goal. However, it is necessary to achieve the secondary goal. The discussion of this activity has been integrated into Section 3.3.13 regarding diversion of streamflow from the Walla Walla River into and through the WWRID system (Conveyor WWRID).

3.3.14 Convey Water from WWRID Boundary to Wells Ditch

This activity is not necessary to achieve the primary goal. If the secondary goal is to be achieved, the secondary water conveyer must manage the supplemented streamflow downstream of the WWRID service area boundary to the point of diversion for Wells Ditch. As discussed previously, this stream reach lies outside of the WWRID service area and is therefore outside of their jurisdiction and control. For this reason, a different party (Conveyor Non-WWRID) must manage the flow of water – and associated risks – for this portion of the hydrologic system.

To date, no party has been required to perform this role, since WWRID has not diverted supplemental flows from the Walla Walla River. Possible organizations potentially suited to assume this role, include: Walla Walla Basin Watershed Council (WWBWC); Walla Walla County Conservation District (WWCCD); Walla Walla Water Management Initiative (WMI); Native Creek Society; McEvoy Spring Branch Restoration Group (an informal group of landowners currently restoring McEvoy Spring Branch); or an individual, such as Tom Page. If none of these parties are able and willing to provide this service, the function could potentially be included by a professional services contractor.

In any event, the project budget will need to include sufficient funds to cover the costs associated with this activity.

3.3.15 Confirm and/or Increase Hydraulic Capacity of Wells Ditch

A Hydraulic Designer has determined the hydraulic capacity of Wells Ditch and designed the improvements required to enable Wells Ditch to convey additional streamflow to the Hall-Wentland recharge site. To achieve the secondary goal, a Hydraulic Contractor must improve Wells Ditch to provide additional hydraulic capacity.

Possible organizations potentially suited to assume this role, include: Walla Walla Basin Watershed Council (WWBWC); Walla Walla County Conservation District (WWCCD); Walla Walla Water Management Initiative (WMI); Native Creek Society; McEvoy Spring Branch Restoration Group (an informal group of landowners currently restoring McEvoy Spring Branch); or an individual, such as

Tom Page or AJ Wentland. If none of these parties are able and willing to provide this service, the function could potentially be included by a professional contractor. In any event, the project budget will need to include sufficient funds to cover the costs associated with this activity.

3.3 Assumptions & Risks

An appropriate strategy for accomplishing the stated primary and secondary goals should carefully consider the following key assumptions and critical risks:

1. All water belongs to the state in which it occurs and its use is subject to the laws and policies of that respective state.

2. The portion of the shallow gravel aquifer associated with the Hall-Wentland project falls across the Oregon-Washington state line, presenting unique jurisdictional challenges.

3. The hydrologic system associated with the Hall-Wentland Recharge Project includes elements both beyond and within the Walla Walla River Irrigation District boundary, presenting additional jurisdictional challenges.

4. Oregon and Washington appear to have substantially different financial resources to invest in water conservation and ecological restoration projects – and constraints on the geographic boundaries within which they can invest them.

5. No particular party is clearly responsible to seasonally replenish and sustain the flow of water into and through the shallow gravel aquifer.

6. Intentional control of water into and through surface streams and groundwater aquifers includes risks and hazards that must be anticipated and mitigated, including maintaining the hydraulic capacity of conveyance channels to safely convey flow under varying weather conditions, controlling the location and/or rate of water flow to prevent flooding, and minimizing the risk of drowning.

7. Intentional management of water to replenish groundwater flow is a relatively new and experimental practice for the people living in the Walla Walla Basin, requiring public subsidy and potentially new forms of organization and operation.

8. Leaders of the water conservation and ecological restoration community in the Walla Walla Basin have a finite capacity to initiate, administer and implement projects. Many, if not most, resource management organizations are currently operating at or near this capacity.

9. Walla Walla County Watershed Planning Department intends to discontinue operating in the role of sponsor/administrator for the Hall-Wentland Recharge Project, due to their internal workload, production capacity, and professional qualifications.

3.4 Strategic Path

Assembling the people and money required to accomplish a task is often a bit of a riddle. To attract public funding (money) you need a constituency (people) and a clear plan of action. However, it often seems easier to decide on a clear plan of action if you know how much money you have to work with – and who is going to do the work. So where is one to start?

In this situation, Fountainhead recommends an adaptive process featuring three main steps:

- Step One. Organize the People
- Step Two. Organize the Money
- Step Three. Implement the Current Possibilities

3.4.1 Organize the People

Figures 3-1 and 3-2 illustrate a recommended way to organize the multiple parties required to perform the Core Activities identified in Section 3.3. Figure 3-1 illustrates the recommended flow of AUTHORITY and Figure 3-2 illustrates the recommended flow of MONEY.

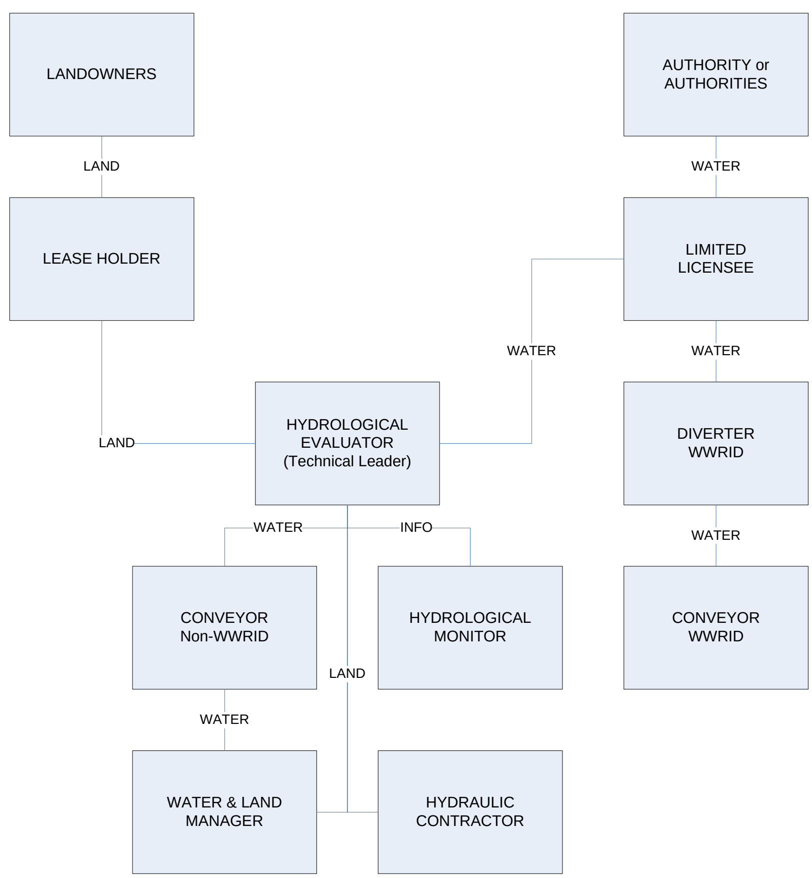


Figure 3-1. Organizational Chart Indicating Flow of AUTHORITY for Short-Term Implementation Strategy

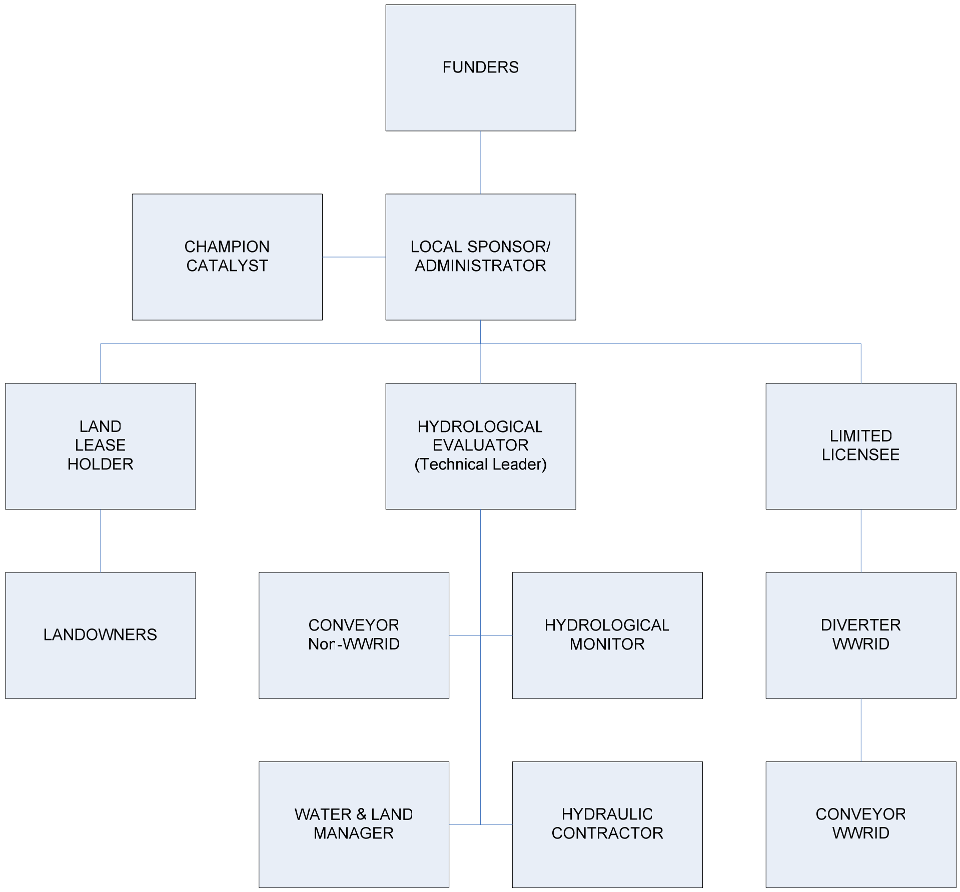


Figure 3-2. Organizational Chart Indicating Flow of MONEY for Short-Term Implementation Strategy

The first step is to fill in this organizational chart as completely as possible with committed project partners. This responsibility falls to the Champion/Catalyst – Tom Page – who initiated this project and remains the key party committed to its progress.

As Champion/Catalyst, Mr. Page's first priority should be to identify an appropriate Local Sponsor Administrator to replace Walla Walla County Watershed Planning Department, which has communicated its intention to cease serving in this capacity.

The new Sponsor/Administrator and Mr. Page should then work together to identify and secure commitments from the remaining required parties. Table 3-1 summarizes the local public service agencies recommended for each of the core activities described in Section 3.3. We recommend that the new Sponsor/Administrator and Mr. Page approach these parties in the order they are presented in this table. In light of current uncertainties regarding the availability of project funding, we recommend that Mr. Page and the new Sponsor/Administrator request commitments from the other parties subject to successful funding of the project.

To the maximum degree possible, local public service agencies should provide the required services. If local public service agencies lack capacity to provide a required service, the most qualified professional contractor(s) should be selected through an open, public solicitation for Statements of Qualifications from qualified parties.

TABLE 3-1
Recommended Project Partners

ROLE	RECOMMENDED PARTNER	ALTERNATE PARTNER
Champion/Catalyst	Tom Page	*None*
Sponsor/Administrator	WW Basin Watershed Council	WW County Conservation Dist.
Landowners	Gordon Hall & Loren Wentland	*None*
Limited Licensee	WW River Irrigation District	WW Basin Watershed Council
Hydrological Evaluator (Technical Leader)	WW Basin Watershed Council	WW County Conservation Dist.
Hydrological Monitor	WW Basin Watershed Council	WW County Conservation Dist.
Lease Holder	WW Basin Watershed Council	WW County Conservation Dist.
Diverter WWRID	WW River Irrigation District	*None*
Conveyor WWRID	WW River Irrigation District	*None*
Conveyor Non-WWRID	WW Basin Watershed Council	Tom Page &/or AJ Wentland
Water Manager	Gordon Hall & AJ Wentland	Tom Page
Risk Underwriter(s)	*Selected by Risk Holders*	*None*
Authority	Oregon Water Resources Dept.	ODFW, CTUIR, NMFS, USFWS
Hydraulic Contractor	AJ Wentland	*Private Contractor*
Funder(s)	Washington Dept of Ecology	Oregon Watershed Enhancement Board

3.4.2 Organize the Money

Once the Sponsor/Administrator and Champion/Catalyst have assembled the complete project team, they should request that each team member prepare an operational budget for each proposed activity under two scenarios:

Scenario 1 should assume full operation of the system, including diversion of streamflow from the Walla Walla River to supplement streamflow in the East Prong Little Walla Walla River.

Scenario 2 should assume limited operation of the system, including no diversion of streamflow from the Walla Walla River and no supplementation of streamflow in the East Prong Little Walla Walla River (essentially continuation of the current operational program).

The Sponsor/Administrator should then compile two project budgets – one for each of the two scenarios.

Next, the Sponsor/Administrator should contact WDOE, OWEB, the Walla Walla Water Management Initiative (WMI) board, Funding Working Group and other prospective funders to determine the level of funding available for the project.

Finally, the Sponsor/Administrator should secure an associated grant contract – and execute associated subcontracts with each subcontractor as indicated in Figure 3-2 (chart of money flow).

3.4.3 Implement the Current Possibilities

Clarifying the source(s) and amount(s) of available funding will greatly clarify how much is possible to accomplish at this juncture. It may prove possible to accomplish both the primary and secondary goals identified in Section 3.1. However, it may also become evident that sufficient funding is only available to accomplish the primary goal – and not the secondary goal – at this time.

4.0 Long-Term Implementation Strategy

4.1 Desired Outcome

The primary goal of the long-term implementation strategy is to catalyze and sustain long-term, seasonal replenishment of McEvoy Spring.

4.2 System Description

The primary elements of the hydrologic system associated with the Hall-Wentland Recharge Project were described and illustrated in Section 2.4.

4.3 Assumptions & Risks

An appropriate strategy for accomplishing the stated primary goal should carefully consider the following key assumptions and critical risks:

1. McEvoy Spring is one of over 30 springs associated with the shallow gravel aquifer and distributary stream systems flowing through and across the floor of the Walla Walla Basin.

2. No particular party is currently clearly responsible to seasonally replenish and sustain the flow of water into and through the shallow gravel aquifer to McEvoy Spring and other springs similar to McEvoy Spring.

3. Management of water to recharge McEvoy Spring is likely to occur in the context of a comprehensive regional groundwater management program, rather than an independent effort targeted specifically at McEvoy Spring.

4. The specific recharge areas and water flow paths through which water flows to McEvoy Spring – and other springs similar to McEvoy Spring – are currently unknown. However, groundwater monitoring results suggest that the water table slope and flow gradient generally follow the topographical gradient of the ground surface.

5. Operation of the Hall-Wentland Recharge System – or a modified version of this system – may prove to be an effective method for replenishing upgradient groundwater flows and sustaining seasonal discharge from McEvoy Spring.

6. Sustaining year-round streamflows in the streams and ditches within the Walla Walla River Irrigation District may prove to be an effective method for replenishing upgradient groundwater flows and sustaining seasonal discharge from McEvoy Spring (and other springs similar to McEvoy Spring).

7. Developing new recharge systems and/or retrofitting bulges within the Walla Walla River Irrigation District may prove to be an effective method for replenishing upgradient groundwater flows and sustaining seasonal discharge from McEvoy Spring (and other springs similar to McEvoy Spring.

8. Decreasing pumping of groundwater from the shallow gravel aquifer upgradient from McEvoy Spring may prove to be an effective method for sustaining seasonal discharge from McEvoy Spring (and other springs similar to McEvoy Spring)

4.4 Strategic Path

To accomplish the stated goal of long-term, seasonal replenishment of McEvoy Spring, Fountainhead recommends an iterative, adaptive process featuring four main steps:

- Step One. <u>Measure</u> the location and timing of current water flow paths
- Step Two. <u>Communicate</u> monitoring results and cultivate the engagement of water users
- Step Three. Establish increasingly clear <u>goals</u> regarding desirable water flow paths
- Step Four. <u>Experiment</u> with systems that can potentially improve water flow paths

4.4.1 Measure Current Water Flow Paths

Over the past five-to-six years, the Walla Walla Basin Watershed Council has developed an extensive monitoring system to measure streamflows, groundwater table levels, and spring discharges throughout the alluvial fan associated with the Walla Walla River and Little Walla Walla River system. McEvoy Spring and McEvoy Spring Branch have been included in this monitoring program. Results of these monitoring efforts have been addressed in independent reports that should be consulted for details in this regard. This basic hydrological information provides an excellent foundation upon which to develop a long-term program for adaptive management of water flowing through the Walla Walla River and Little Walla Walla River system – and it should be continued into the future to inform future water management decisions and to evaluate the effects of water management activities.

The Walla Walla Basin Watershed Council has clearly demonstrated its capacity to lead this effort on both sides of the Oregon-Washington state line. Possible organizations potentially suited to add value to this effort include: Walla Walla County Conservation District (WWCCD); Walla Walla Water Management Initiative (WMI); Native Creek Society; Tri-State Steelheaders; McEvoy Spring Branch Restoration Group (an informal group of landowners currently restoring McEvoy Spring Branch); and individuals, such as Tom Page or AJ Wentland. The United States Geological Survey (USGS) and professional hydrogeologists and water resource engineers may also be able to add value to this effort.

4.4.2 Communicate Monitoring Results and Cultivate Water User Engagement

As more water flow information is collected, it will become increasingly important to convert raw data into useful information that can guide on-the-ground water management activities. It will become equally important to publicize the results in a manner that increases public awareness and facilitates public engagement in decisionmaking and improved water management actions. As more citizens become able and accustomed to accessing information via the Internet, this medium will undoubtedly be the preferred way to provide members of the general public with open and direct access to historical and current hydrological information.

Recent efforts have been made to provide a central link to the large and increasing volume of hydrological and ecological data associated with the Walla Walla Basin. The EKO-System program created by Paladin Data Systems in the context of the Bi-State Habitat Conservation Plan is probably the most notable and recent. Unfortunately, there have been various barriers to participation in the Paladin program. At this writing, the system has not been robustly adopted as the primary gateway to ecological information pertaining to the Walla Walla Basin.

In the context of current projects related to the Hydro North groundwater/spring monitoring program and the Walla Walla Water Management Initiative, the Walla Walla Basin Watershed Council and other parties are revisiting the universe of existing data and current data streams. In light of almost certain advancement in the realm of information-based decision-making, this area is worthy of substantial focus and investment.

Walla Walla Basin Watershed Council, Tri-State Steelheaders, the Confederated Tribes of the Umatilla Indian Reservation, state and federal water and fisheries agencies (OWRD, ODFW, WDOE, and WDFW), Walla Walla County Conservation District, the three local county governments (Umatilla, Walla Walla and Columbia Counties), Walla Walla Water Management Initiative (WMI), Native Creek Society, McEvoy Spring Branch Restoration Group (an informal group of landowners currently restoring McEvoy Spring Branch), and individuals, such as Tom Page have all demonstrated capacity to contribute to this effort. The United States Geological Survey (USGS) and professional hydrogeologists and water resource engineers may also be able to add value to this effort.

4.4.3 Establish Increasingly Clear Goals Regarding Desirable Water Flow Paths

As more water flow information is collected, it will become increasingly important to convert these raw data into useful information that can guide on-the-ground water management activities. It will become equally important to publicize the results in a manner that increases public awareness and facilitates public engagement in decisionmaking and improved water management actions.

Ultimately, the members of the Walla Walla watershed community should develop clearly identified management points (specific groundwater wells and springs that will be used to indicate hydrological performance) and clearly stated goals regarding the desirable hydrological performance at each of these management points. These performance goals will likely be based on known or estimated historical performance, balanced with other current demands on the hydrologic system.

An example would be to identify McEvoy Spring as a hydrological monitoring point, and to establish the following as a working goal for the desired performance of McEvoy Spring:

Performance Goal for McEvoy Spring
The flow of water is managed upgradient from McEvoy Spring such that discharge from McEvoy Spring fluctuates from a minimum of 3 cfs during the summer-fall season to 6 cfs during the winter-spring season.

Similar goals should be identified for all the springs of social, ecological and/or economic importance in the Walla Walla River system – and adaptively refined over time. In time, it may become possible to correlate spring discharges to groundwater table elevations, such that multiple (and somewhat problematic) surface flow measurements can be replaced with groundwater table elevation measurements in dedicated monitoring wells.

4.4.4 Experiment with Systems to Improve Water Flow Paths

As citizens become more aware of how water is flowing – and how we desire for water to flow – the remaining step will be to learn the most effective ways to control the flow of water to generate the desired results. This should include experimentation with a variety of water management techniques, including the following systems.

4.4.4.1 Operate Hall-Wentland Recharge Project Through Limited License Period

At a meeting of interested stakeholders on January 19, 2007, the participants discussed and unanimously agreed that continuing operation of the Hall-Wentland Recharge Project – at least through the duration of the Limited License with Oregon Water Resources Department – would continue to yield desired value on the investments made to date. Participants also noted that continuing the project will also demonstrate due diligence in the pursuit of innovative solutions to local water management challenges.

The participants agreed that operation of the Hall-Wentland Recharge System – or a modified version of this system – may prove to be an effective method for replenishing upgradient groundwater flows and sustaining seasonal discharge from McEvoy Spring. They also agreed that, in the long-term, operation of the Hall-Wentland Recharge Project might be terminated in favor of other methods of groundwater management. However, results of continued project activities were required to evaluate the value of ongoing recharge activities at this particular location.

A strategy for short-term implementation of the Hall-Wentland Recharge Project was presented in Section 3 of this document.

Figure 4-1 illustrates an alternative for continuing operation of the Hall-Wentland Recharge Project in the same manner that has been conducted for the past two years.

Figure 4-2 illustrates an alternative for enhancing operation of the Hall-Wentland Recharge Project by diverting streamflow from the Walla Walla River in order to supplement streamflow in the East Prong Little Walla Walla River, so that this additional flow can be diverted into Wells Ditch and applied to the recharge site.

Figure 4-3 illustrates another alternative for enhancing operation of the Hall-Wentland Recharge Project by reconfiguring Wells Ditch to flow primarily to the Hall-Wentland recharge site, and then flowing into a gravity-fed pipeline to serve the downgradient reach currently served by Wells Ditch. This reconfiguration would improve positive control of water to the downstream end of Wells Ditch in a manner that would path surplus water into the shallow gravel aquifer rather than the existing outfall to Walsh Creek.

4.4.4.2 Evaluate Effects of Sustaining Year-Round Flow in Streams/Ditches within WWRID

Sustaining year-round streamflows in the streams and ditches within the Walla Walla River Irrigation District may also prove to be an effective method for replenishing upgradient groundwater flows and sustaining seasonal discharge from McEvoy Spring (and other springs similar to McEvoy Spring). This water management strategy is illustrated in Figure 4-4.

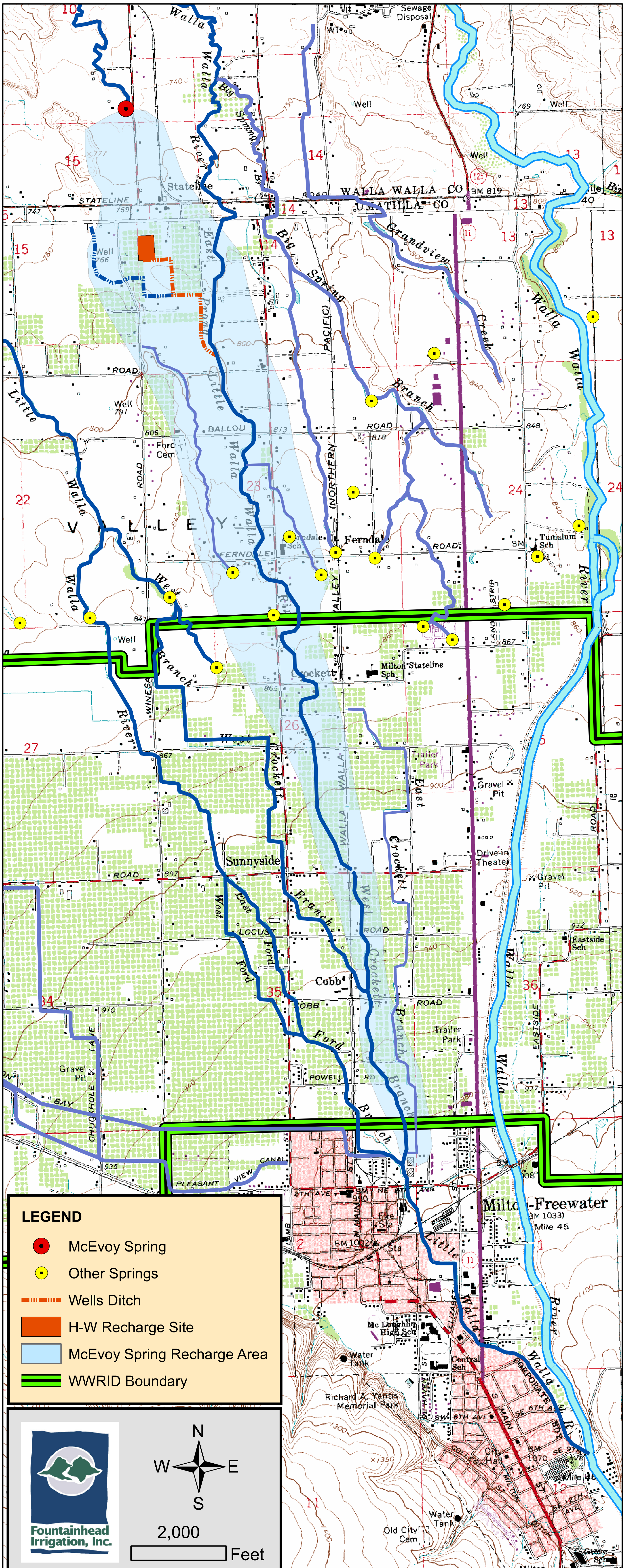
4.4.4.3 Evaluate Effects of Retrofitting Bulges within WWRID to Recharge Groundwater

Developing new recharge systems and/or retrofitting bulges within the Walla Walla River Irrigation District may prove to be an effective method for replenishing upgradient groundwater flows and sustaining seasonal discharge from McEvoy Spring (and other springs similar to McEvoy Spring). This water management strategy is illustrated in Figure 4-5.

With support from the Walla Walla Watershed Alliance, Walla Walla Basin Watershed Council, and Walla Walla River Irrigation District, Fountainhead recently initiated an experimental project of this nature. However, early in this project, it became apparent that the timing was not conducive to successful implementation of this experiment. So the project was cancelled in lieu of better timing.

4.4.4.4 Investigate Potential Ways to Decreasing Groundwater Pumping in M-F Vicinity

Decreasing pumping of groundwater from the shallow gravel aquifer upgradient from McEvoy Spring may prove to be an effective method for sustaining seasonal discharge from McEvoy Spring (and other springs similar to McEvoy Spring). This water management strategy is illustrated in Figure 4-6.



PERFORMANCE GOAL

Discharge from McEvoy Spring fluctuates from 3 cfs (minimum) during summer-fall to 6 cfs during winter-spring (3,260 acre-feet).

MANAGEMENT STRATEGY

SPONSOR/ADMINISTRATOR guides team activities
AUTHORITY grants permission to LIMITED LICENSEE
HYDRO MONITOR monitors flow of water through system
HYDRO MONITOR provides flow data to HYDRO EVALUATOR
HYDRO EVALUATOR directs actions of WATER MANAGER

WATER MANAGER diverts water from the East Prong Little Walla Walla River, conveys water via Wells Ditch to the Hall-Wentland Recharge Site, and applies it to land parcels owned by LANDOWNERS to augment water flow in the shallow gravel groundwater aquifer.

POTENTIAL PARTNERS

CONTRIBUTOR	POTENTIAL PARTNERS
Champion/Catalyst	Tom Page
Sponsor/Administrator	WW Basin Watershed Council
Funder	WA Dept of Ecology and OWEB
Landowners	Gordon Hall and Loren Wentland
Land Lease Holder	WWBWC or WWCCD
Authority	Oregon Water Resources Dept.
Limited Licensee	WW River Irrigation District
Hydrological Evaluator	WWBWC, WWCCD or Contractor
Hydrological Monitor	WWBWC, WWCCD or Contractor
Water Manager	AJ Wentland, Tom Page or WWBWC
Risk Underwriters	TBD by Risk Holders

REQUIRED FUNDING

CONTRIBUTOR	REQ'D FUNDING
Champion/Catalyst	TBD
Sponsor/Administrator	TBD
Landowners	TBD
Land Lease Holder	TBD
Limited Licensee	TBD
Hydrological Evaluator	TBD
Hydrological Monitor	TBD
Water Manager	TBD

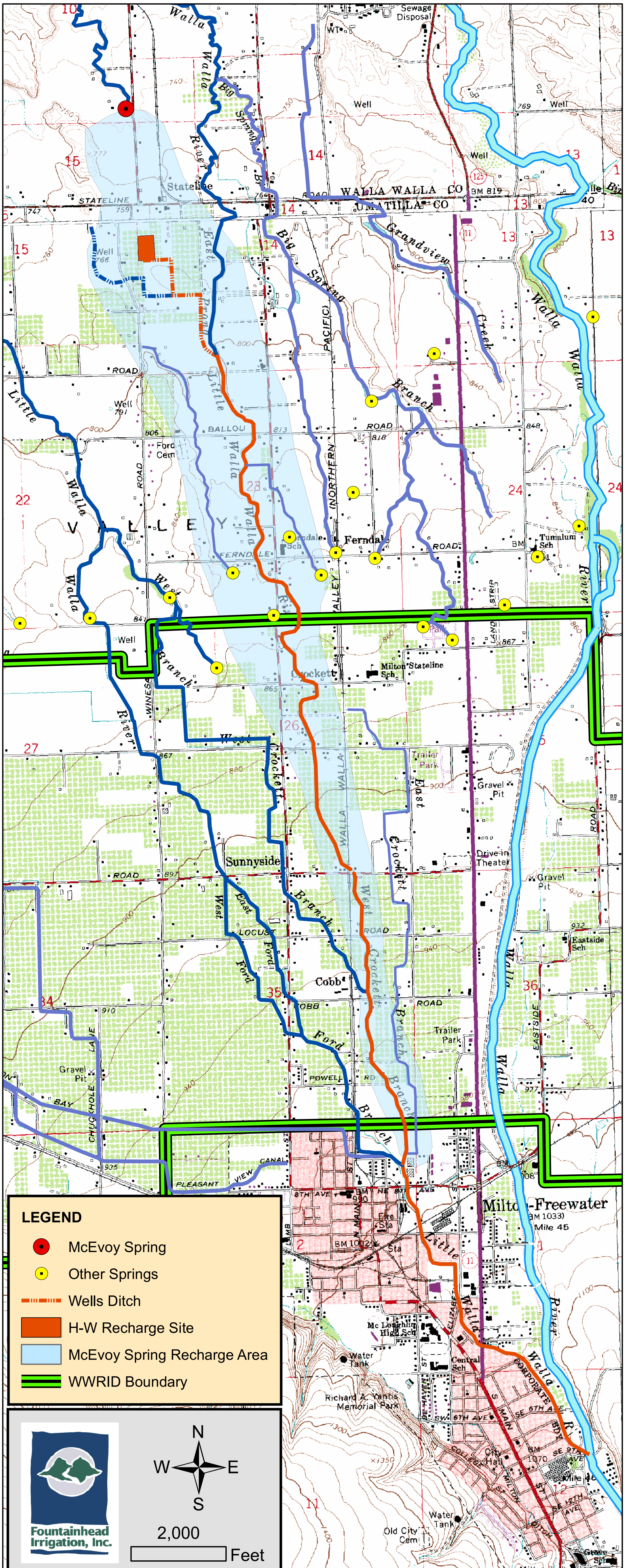
STRATEGIC PATH

1. Champion/Catalyst identify new Sponsor/Administrator
2. Champion and new Sponsor secure other partners
3. Project partners estimate required funding by task
4. Sponsor/Administrator assemble budget estimates
5. Sponsor/Administrator and Champion identify funders
6. Sponsor/Administrator negotiate contracts
7. Project partners implement project

FIGURE 4-1

ALTERNATIVE 1
Continue Operating Hall-Wentland SAR Site

Revised 09 MAY 2007 by John Warinner, PE



PERFORMANCE GOAL

Discharge from McEvoy Spring fluctuates from 3 cfs (minimum) during summer-fall to 6 cfs during winter-spring (3,260 acre-feet).

MANAGEMENT STRATEGY

SPONSOR/ADMINISTRATOR guides team activities
AUTHORITY grants permission to LIMITED LICENSEE
HYDRO MONITOR monitors flow of water through system
HYDRO MONITOR provides flow data to HYDRO EVALUATOR
HYDRO EVALUATOR calls for water from LIMITED LICENSEE
LIMITED LICENSEE directs actions of DIVERTER WWRID
LIMITED LICENSEE directs actions of CONVEYOR WWRID
HYDRO EVALUATOR directs actions of CONVEYOR non-WWRID
HYDRO EVALUATOR directs actions of WATER MANAGER

DIVERTER WWRID diverts water from WW River to Little WW River
CONVEYOR WWRID conveys water through WWRID
CONVEYOR non-WWRID conveys water WWRID to Wells Ditch

WATER MANAGER diverts water from the East Prong Little Walla Walla River, conveys water via Wells Ditch to the Hall-Wentland Recharge Site, and applies it to land parcels owned by LANDOWNERS to augment water flow in the shallow gravel groundwater aquifer.

POTENTIAL PARTNERS

CONTRIBUTOR	POTENTIAL PARTNERS
Champion/Catalyst	Tom Page
Sponsor/Administrator	WW Basin Watershed Council
Funder	WA Dept of Ecology and OWEB
Landowners	Gordon Hall and Loren Wentland
Land Lease Holder	WWBWC or WWCCD
Authority	Oregon Water Resources Dept.
Limited Licensee	WW River Irrigation District
Hydrological Evaluator	WWBWC, WWCCD or Contractor
Hydrological Monitor	WWBWC, WWCCD or Contractor
Hydraulic Contractor	WWBWC, WWCCD or Contractor
Diverter WWRID	WW River Irrigation District
Conveyor WWRID	WW River Irrigation District
Conveyor non-WWRID	WWBWC, WWCCD or Contractor
Water Manager	AJ Wentland, Tom Page or WWBWC
Risk Underwriters	TBD by Risk Holders

REQUIRED FUNDING

CONTRIBUTOR	REQ'D FUNDING
Champion/Catalyst	TBD
Sponsor/Administrator	TBD
Funder	TBD
Landowners	TBD
Land Lease Holder	TBD
Authority	TBD
Limited Licensee	TBD
Hydrological Evaluator	TBD
Hydrological Monitor	TBD
Hydraulic Contractor	TBD
Diverter WWRID	TBD
Conveyor WWRID	TBD
Conveyor non-WWRID	TBD
Water Manager	TBD
Risk Underwriters	TBD

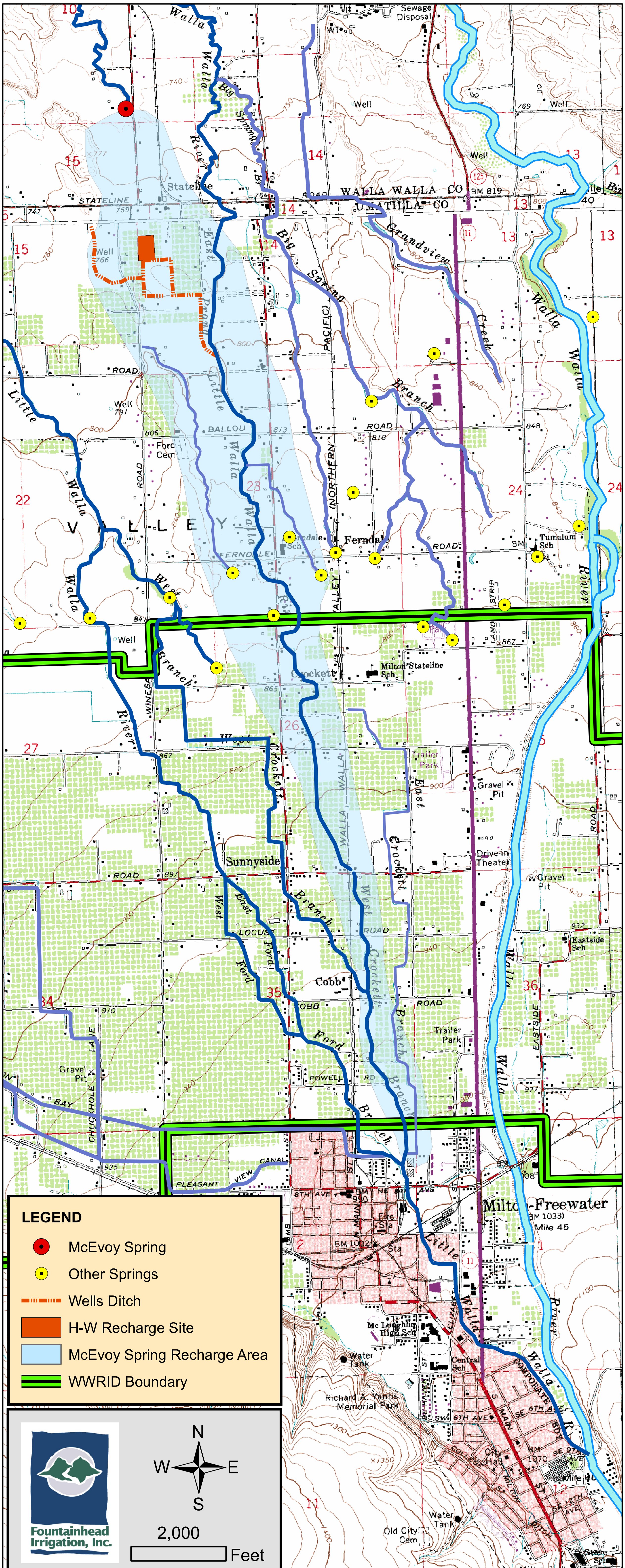
STRATEGIC PATH

1. Champion/Catalyst identify new Sponsor/Administrator
2. Champion and new Sponsor secure other partners
3. Project partners estimate required funding by task
4. Sponsor/Administrator assemble budget estimates
5. Sponsor/Administrator and Champion identify funders
6. Sponsor/Administrator negotiate contracts
7. Project partners implement project

FIGURE 4-2

ALTERNATIVE 2
Increase Flow to Hall-Wentland SAR Site

Revised 10 MAY 2007 by John Warinner, PE



PERFORMANCE GOAL

Discharge from McEvoy Spring fluctuates from 3 cfs (minimum) during summer-fall to 6 cfs during winter-spring (3,260 acre-feet).

MANAGEMENT STRATEGY

SPONSOR/ADMINISTRATOR guides team activities
AUTHORITY grants permission to LIMITED LICENSEE
HYDRO MONITOR monitors flow of water through system
HYDRO MONITOR provides flow data to HYDRO EVALUATOR
HYDRO EVALUATOR directs HYDRAULIC CONTRACTOR actions
HYDRO EVALUATOR directs WATER MANAGER actions

HYDRAULIC CONTRACTOR reconfigures lower Wells Ditch so all water flows to Hall-Wentland pond/bulge and only flows downstream on-demand via pressurized pipe.

WATER MANAGER diverts water from the East Prong Little Walla Walla River, conveys water via Wells Ditch to new pond/bulge at Hall-Wentland Recharge Site. Water delivered to downgradient Wells Ditch users on-demand via pressurized pipe. Surplus water routed to recharge groundwater via current spreading method and/or vertical or horizontal well(s).

Can be combined with Alternative 2 (increased flow to HW site).

POTENTIAL PARTNERS

CONTRIBUTOR	POTENTIAL PARTNERS
Champion/Catalyst	Tom Page
Sponsor/Administrator	WW Basin Watershed Council
Funder	WA Dept of Ecology and OWEB
Landowners	Gordon Hall and Loren Wentland
Land Lease Holder	WWBWC or WWCCD
Authority	Oregon Water Resources Dept.
Limited Licensee	WW River Irrigation District
Hydrological Evaluator	WWBWC, WWCCD or Contractor
Hydrological Monitor	WWBWC, WWCCD or Contractor
Hydraulic Contractor	WWBWC, WWCCD or Contractor
Water Manager	AJ Wentland, Tom Page or WWBWC
Risk Underwriters	TBD by Risk Holders

REQUIRED FUNDING

CONTRIBUTOR	REQ'D FUNDING
Champion/Catalyst	TBD
Sponsor/Administrator	TBD
Funder	TBD
Landowners	TBD
Land Lease Holder	TBD
Authority	TBD
Limited Licensee	TBD
Hydrological Evaluator	TBD
Hydrological Monitor	TBD
Hydraulic Contractor	TBD
Water Manager	TBD
Risk Underwriters	TBD

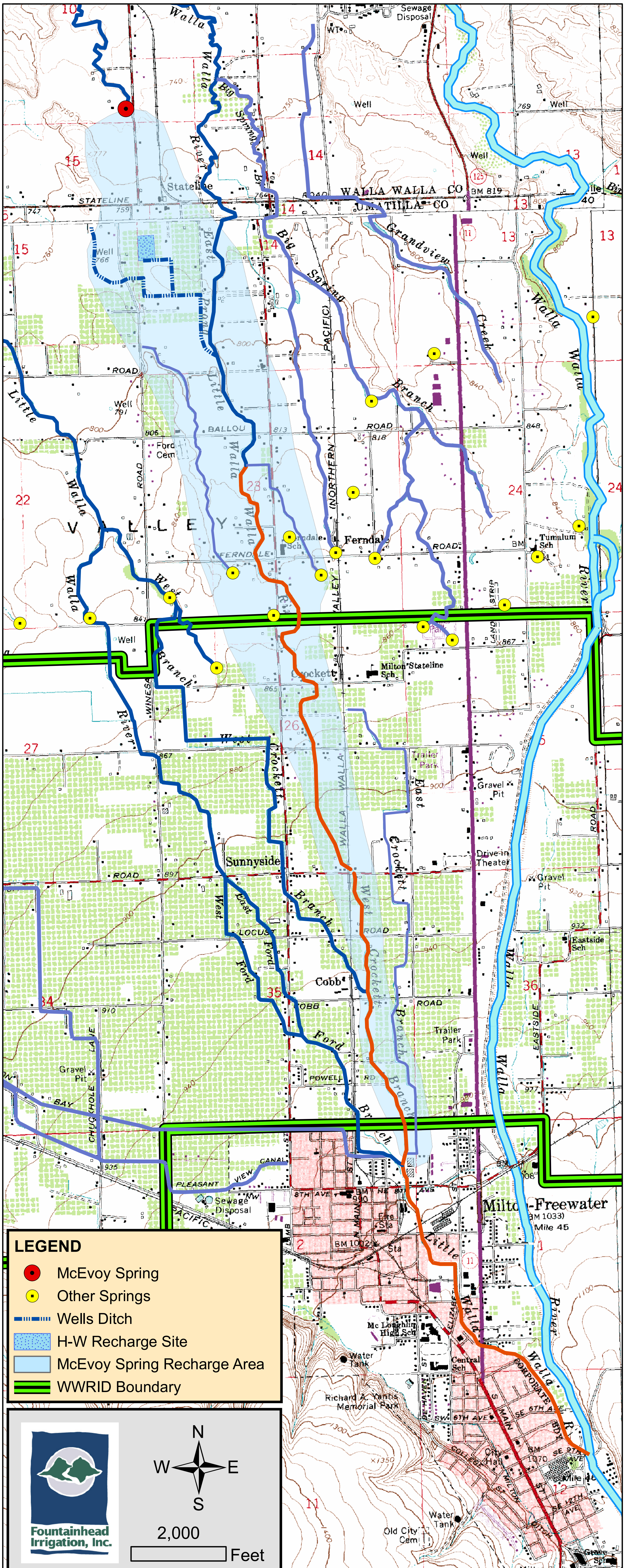
STRATEGIC PATH

1. Champion/Catalyst identify new Sponsor/Administrator
2. Champion and new Sponsor secure other partners
3. Project partners estimate required funding by task
4. Sponsor/Administrator assemble budget estimates
5. Sponsor/Administrator and Champion identify funders
6. Sponsor/Administrator negotiate contracts
7. Project partners implement project

FIGURE 4-3

ALTERNATIVE 3 Reconfigure Lower Wells Ditch System

Revised 10 MAY 2007 by John Warinner, PE



PERFORMANCE GOAL

Discharge from McEvoy Spring fluctuates from 3 cfs (minimum) during summer-fall to 6 cfs during winter-spring (3,260 acre-feet).

MANAGEMENT STRATEGY

SPONSOR/ADMINISTRATOR guides team activities
AUTHORITY grants permission to LIMITED LICENSEE
HYDRO MONITOR monitors flow of water through system
HYDRO MONITOR provides flow data to HYDRO EVALUATOR
HYDRO EVALUATOR calls for water from LIMITED LICENSEE
LIMITED LICENSEE directs actions of DIVERTER WWRID
LIMITED LICENSEE directs actions of CONVEYOR WWRID

DIVERTER WWRID diverts water from WW River to Little WW River
CONVEYOR WWRID conveys water through WWRID

POTENTIAL PARTNERS

CONTRIBUTOR	POTENTIAL PARTNERS
Champion/Catalyst	Tom Page
Sponsor/Administrator	WWRID or WWBWC
Funder	WA Dept of Ecology and OWEB
Authority	Oregon Water Resources Dept.
Limited Licensee	WW River Irrigation District
Hydrological Evaluator	WWRID or WWBWC
Hydrological Monitor	WWRID or WWBWC
Diverter WWRID	WW River Irrigation District
Conveyor WWRID	WW River Irrigation District
Risk Underwriters	TBD by Risk Holders

REQUIRED FUNDING

CONTRIBUTOR	REQ'D FUNDING
Champion/Catalyst	TBD
Sponsor/Administrator	TBD
Funder	TBD
Authority	TBD
Limited Licensee	TBD
Hydrological Evaluator	TBD
Hydrological Monitor	TBD
Diverter WWRID	TBD
Conveyor WWRID	TBD
Risk Underwriters	TBD

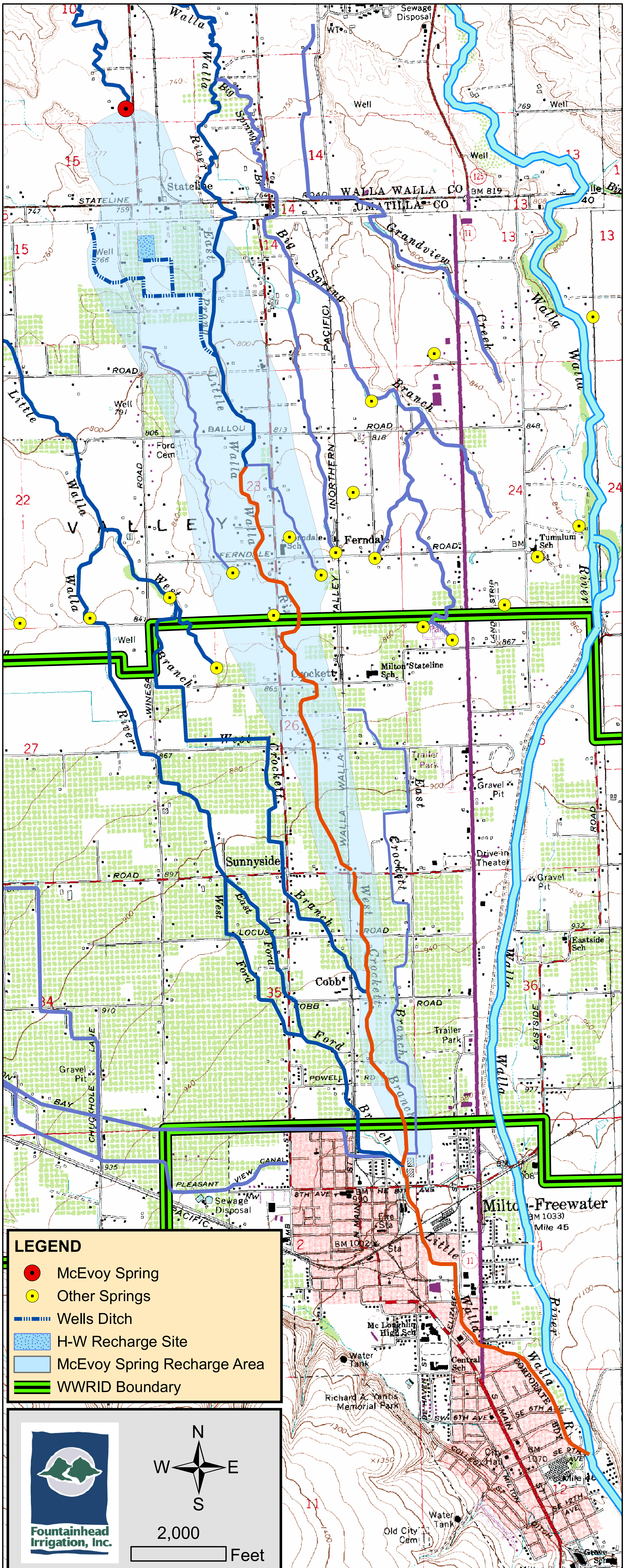
STRATEGIC PATH

1. Champion/Catalyst identify new Sponsor/Administrator
2. Champion and new Sponsor secure other partners
3. Project partners estimate required funding by task
4. Sponsor/Administrator assemble budget estimates
5. Sponsor/Administrator and Champion identify funders
6. Sponsor/Administrator negotiate contracts
7. Project partners implement project

FIGURE 4-4

ALTERNATIVE 4
Sustain Year-Round Flow in Streams & WWRID Ditches

Revised 10 MAY 2007 by John Warinner, PE



PERFORMANCE GOAL

Discharge from McEvoy Spring fluctuates from 3 cfs (minimum) during summer-fall to 6 cfs during winter-spring (3,260 acre-feet).

MANAGEMENT STRATEGY

SPONSOR/ADMINISTRATOR guides team activities
AUTHORITY grants permission to LIMITED LICENSEE
HYDRO MONITOR monitors flow of water through system
HYDRO MONITOR provides flow data to HYDRO EVALUATOR
HYDRO EVALUATOR calls for water from LIMITED LICENSEE
LIMITED LICENSEE directs actions of DIVERTER WWRID
LIMITED LICENSEE directs actions of CONVEYOR WWRID

DIVERTER WWRID diverts water from WW River to Little WW River
CONVEYOR WWRID conveys water through WWRID

POTENTIAL PARTNERS

CONTRIBUTOR	POTENTIAL PARTNERS
Champion/Catalyst	Tom Page
Sponsor/Administrator	WWRID or WWBWC
Funder	WA Dept of Ecology and OWEB
Authority	Oregon Water Resources Dept.
Limited Licensee	WW River Irrigation District
Hydrological Evaluator	WWRID or WWBWC
Hydrological Monitor	WWRID or WWBWC
Diverter WWRID	WW River Irrigation District
Conveyor WWRID	WW River Irrigation District
Risk Underwriters	TBD by Risk Holders

REQUIRED FUNDING

CONTRIBUTOR	REQ'D FUNDING
Champion/Catalyst	TBD
Sponsor/Administrator	TBD
Funder	TBD
Authority	TBD
Limited Licensee	TBD
Hydrological Evaluator	TBD
Hydrological Monitor	TBD
Diverter WWRID	TBD
Conveyor WWRID	TBD
Risk Underwriters	TBD

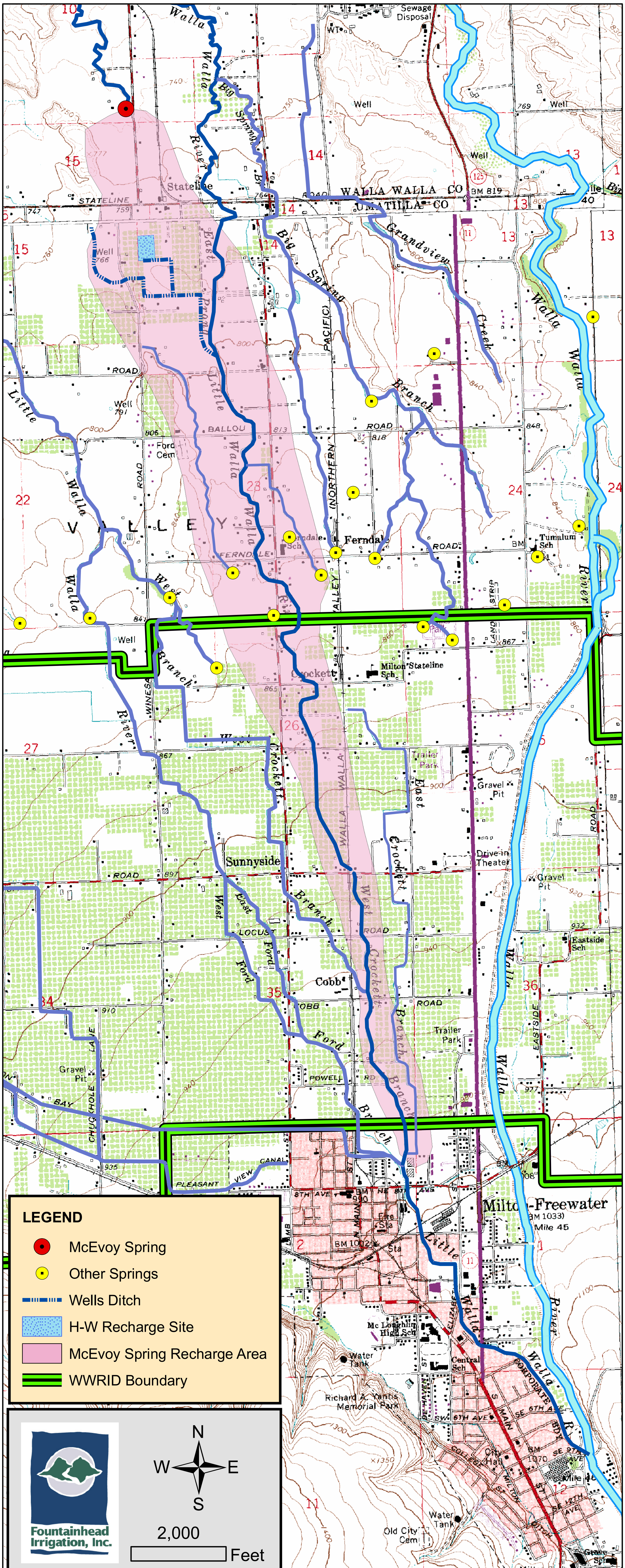
STRATEGIC PATH

1. Champion/Catalyst identify new Sponsor/Administrator
2. Champion and new Sponsor secure other partners
3. Project partners estimate required funding by task
4. Sponsor/Administrator assemble budget estimates
5. Sponsor/Administrator and Champion identify funders
6. Sponsor/Administrator negotiate contracts
7. Project partners implement project

FIGURE 4-5

ALTERNATIVE 5
Retrofit WWRID Bulges to Recharge Groundwater

Revised 10 MAY 2007 by John Warinner, PE



PERFORMANCE GOAL

Discharge from McEvoy Spring fluctuates from 3 cfs (minimum) during summer-fall to 6 cfs during winter-spring (3,260 acre-feet).

MANAGEMENT STRATEGY

SPONSOR/ADMINISTRATOR guides team activities
HYDRO MONITOR assembles data regarding well pumping
HYDRO EVALUATOR identifies wells with greatest effect on spring
HYDRO EVALUATOR communicates wtih well owners and users
HYDRO EVALUATOR identifies ways to reduce well pumping
HYDRO EVALUATOR prioritizes conservation opportunities
AUTHORITY grants permissions to implement conservation practices
OWNERS and/or HYDRO CONTRACTOR(s) implement practices

POTENTIAL PARTNERS

CONTRIBUTORS	POTENTIAL PARTNERS
Champion/Catalyst	WW Basin Watershed Council
Sponsor/Administrator	WW Basin Watershed Council
Hydrological Evaluator	WWBWC and/or Contractor
Hydrological Monitor	WWBWC and/or Contractor
Hydrological Contractor	WWBWC and/or Contractor
Well Owners/Users	TBD based on hydrological study
Authority	Oregon Water Resources Dept.

REQUIRED FUNDING

CONTRIBUTORS	REQ'D FUNDING
Champion/Catalyst	TBD
Sponsor/Administrator	TBD
Hydrological Evaluator	TBD
Hydrological Monitor	TBD
Hydrological Contractor	TBD
Well Owners/Users	TBD
Authority	TBD

STRATEGIC PATH

1. Champion/Catalyst identify Sponsor/Administrator
2. Champion and Sponsor secure required partners
3. Project partners estimate required funding by task
4. Sponsor/Administrator assemble budget estimates
5. Sponsor/Administrator and Champion identify funders
6. Sponsor/Administrator negotiate contracts
7. Project partners implement project

FIGURE 4-6

ALTERNATIVE 6
Decrease Upgradient Groundwater Pumping

Revised 10 MAY 2007 by John Warinner, PE

5.0 Bibliography

The following documents are most closely associated with the Hall-Wentland Recharge Project and this Long-Term Implementation Strategy:

1. Lindsey, Kevin, *Results of the First Season of Shallow Aquifer Recharge Testing*, June 2006.

2. Lindsey, Kevin, *Hall-Wentland Shallow Aquifer Recharge Monitoring and Testing Plan*, June 2006.

3. Newcomb, R.C. *Geology and Groundwater Resources of the Walla Walla River Basin*. Water Supply Bulletin #21. Washington Department of Conservation, Division of Water Resources, 1965.

4. Piper, A.M., T.W. Robinson, and H.E. Thomas. *Groundwater in the Walla Walla Basin, OR-WA-Part I*. Department of the Interior, United States Geological Survey, 1933.

5. Piper, A.M., T.W. Robinson, and H.E. Thomas. *Groundwater in the Walla Walla Basin, OR-WA-Part II*. Department of the Interior, United States Geological Survey, 1933.

6. Bower, Robert, *Hudson Bay Aquifer Recharge Project – Annual Report 2004*, Hudson Bay District Improvement Company and Walla Walla Basin Watershed Council, 2004.

7. Warinner, John, et al., *Shallow Aquifer Recharge – Strategy for Restoring and Seasonally Recharging Shallow Gravel Aquifer(s) and Spring-Fed Streams of the Walla Walla Watershed*, June 2006.

People desiring a comprehensive list of documents related to this subject should refer to lists compiled by Bob Bower (Walla Walla Basin Watershed Council), Tom Darnell (Oregon State University Extension), and/or HDR-EES (in association with the WRIA 32 Watershed Plan, Bi-State Habitat Conservation Plan, and Subbasin Plan).

FOR MORE INFORMATION

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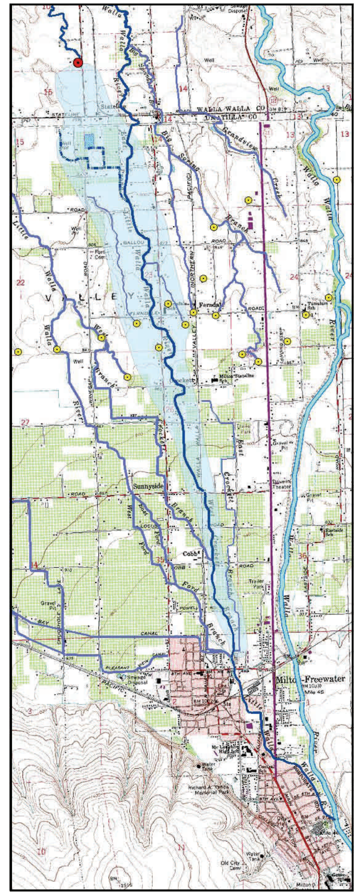

HALL-WENTLAND RECHARGE PROJECT

LONG-TERM IMPLEMENTATION STRATEGY

WALLA WALLA COUNTY
WATERSHED PLANNING DEPT.
GRANT NO. G0600312

FOUNTAINHEAD
JUNE 2007