

WRIA 1  
WATERSHED MANAGEMENT PLAN

NEW SECTION

“AUTHORIZED EXEMPT GROUNDWATER  
WITHDRAWALS, DOMESTIC”

ESSB 6091 – 90.94 RCW

January , 2019

**(DRAFT)** Version 1 – Jan 7, 2019

Product of

WRIA 1 Planning Unit  
Washington Department of Ecology  
Whatcom County, Lead Agency

## WRIA 1 WATERSHED PLAN (1-7-19, v)

### NEW SECTION – AUTHORIZED EXEMPT GROUNDWATER WITHDRAWALS, DOMESTIC

JANUARY 2019

#### Table of Contents

1.0	Introduction
1.1	Regulatory Context
1.2	Development and Approval Process
1.3	Coordination with Existing Plans and Programs
2.0	Assessment of Potential DGWPE Well Consumptive Use
2.1	Aggregated Sub-basins
2.2	Projected Population Growth and DWPE Well Connections
2.3	DGWPE Well Consumptive Use Calculations
2.4	Analysis of Uncertainty Associated with DGWPE Well Consumptive Use Calculations
2.4.1	Number of DGWPE Well Connections
2.4.2	Household Consumptive Water Use
2.4.3	Consumptive Water Use per Aggregated Sub-basin
3.0	Development and Selection of Actions
3.1	Identification and Characterization of Potential Actions
3.1.1	Process for Identifying Actions
3.1.2	Characterization of Potential Actions
3.2	Selection of Actions
3.2.1	Projects and Programs
3.2.2	Policy Recommendations
3.2.3	Analysis of Uncertainty Associated with Selected Projects and Programs
4.0	Evaluation of Impacts and Selected Actions
4.1	Consumptive Use Offsets and an Analysis of Associated Uncertainty
4.2	Ecological Effects Assessment
4.2.1	Spatial Distribution of Impacts and Actions
4.2.2	Temporal Distribution of Impacts
4.2.3	Ecological Implications
4.2.4	Uncertainty Analysis
5.0	Action Implementation
5.1	Governance and Administration
5.2	Funding
5.3	Implementation Schedule
6.0	Additional Actions and Program Concepts in Development

## **NEW PLAN SECTION - APPENDICES**

**Appendix A** – ESSB 6091, Executed January 19, 2018

**Appendix B** – 90.94 RCW

**Appendix C** – Ecology-RH2 Contract C1700012, Work Assignment no. RH2111

**Appendix D** – Invitation letters to tribes

**Appendix E** – Whatcom County Resolution 2018-16

**Appendix F** – RH2 Task 1 Memorandum – FINAL, August 21, 2018

**Appendix G** – BERK Memorandum, August 2, 2018 including its Appendix A and the “WRIA 1 – Whatcom and Skagit County” table updated by BERK on August 3

**Appendix H** – Ecology Interim Guidance, use

**Appendix I** – RH2 Task 2 Memorandum

**Appendix J** – Associated Earth Sciences, Memorandum June 19, 2017, re Groundwater Model Capabilities

**Appendix K** – N/A

## 1.0 Introduction – Authorization

On January 19, 2018, ESSB 6091 “Water Availability” was signed into law:

“AN ACT Relating to ensuring that water is available to support development; amending RCW19.27.097, 58.17.110, 90.03.247, and 90.03.290; adding a new section to chapter 36.70A RCW; adding a new section to chapter 36.70 RCW; adding a new chapter to Title 90 RCW; creating a new section; providing an expiration date; and declaring an emergency.” **Appendix A** - ESSB 6091, enactment as executed

The new chapter that was added to Title 90 RCW was codified as 90.94 RCW. See **Appendix B** - 90.94 RCW

This modification of the adopted water resources inventory area (WRIA 1) Watershed Management Plan (“WMP”) is the product of the WRIA 1 Planning Unit to meet the required watershed planning goals articulated by the legislature.

90.94.020 (4)(b): “At a minimum, the watershed plan must include those actions that the planning units determine to be necessary to offset potential impacts to instream flows associated with permit-exempt domestic water use.”

90.94.020 (4)(c): “Prior to adoption of the updated watershed plan, the department must determine that actions identified in the watershed plan, after accounting for new projected uses of water over the subsequent twenty years, will result in a net ecological benefit to instream resources within the water resource inventory area.”

90.94.020 (7)(a): Deadline for completion February 1, 2019

## 1.1 Regulatory Context

ESSB 6091 Section 202 (90.94.020 RCW) correctly identified WRIA 1 “Nooksack” as a watershed that “has an instream flow rule that does not explicitly regulate permit-exempt groundwater, with a watershed plan adopted under chapter 90.82 RCW.”

Whatcom County Council opted-in to 90.82 RCW in May 1998. Whatcom County Council is the “county legislative authority” and Whatcom County serves as “Lead Agency.” The WRIA 1 Planning Unit was established in December 1999 and actively operates under adopted rules (Policy and Procedure Agreement), with the participation of local citizens, interests, and local jurisdictions (entities) that include the category “initiating governments” in keeping with the “Purpose” and “Finding” sections of the Watershed Planning Act (90.82.005 and .010 RCW respectively), and its “Definitions” section (90.82.020 RCW).

90.82.020(6) RCW states: “ “WRIA plan” or “plan” means the product of the planning unit including any rules adopted in conjunction with the product of the planning unit.”

Washington State Department of Ecology (“Ecology”) is the administrator of public water resources (“waters of the state”). Through numerous departmental agreements,

Ecology coordinates plan review and implementation with participating state agencies. Ostensibly the laws, statutes, and regulatory processes and procedures within Washington State harmonize 90.82 and 90.84 RCW *in pari materia*.

The existing watershed plan adopted in 2005 that was expanded in 2007 does not contain a section that specifically addresses exempt groundwater withdrawals suitable for this watershed plan update. Therefore, this addendum is added as a new section (“update section”) to the WRIA 1 Watershed Management Plan to meet the mandatory objectives of the legislation.

This plan also includes a wide spectrum of additional (“may” element) recommendations

This new section of the WRIA 1 Watershed Management Plan is entitled “**Authorized Exempt Groundwater Withdrawals, Domestic**”.

## 1.2 Development and Approval Process

Ecology was required to “...work with the initiating governments and the planning unit[s] ... to review existing watershed plans to identify the potential impacts of exempt well use, identify evidence-based conservation measures, and identify projects to improve watershed health” 90.94.020 (2).

Ecology selected RH2 Engineering as its technical consultant “to assist with completing the analysis and drafting the Watershed Management Plan update.” Ecology collaborated locally to develop a contract scope of work required by the legislation to estimate the permit-exempt domestic consumptive use of water over a twenty year planning period, and required offset for that consumptive use including recommendations for actions and projects. The start date for the assignment was March 19, 2018:

“RH2 will provide directed analysis and prepare a technical memorandum and summary report that will become the update to the existing Plan.” See **Appendix C** – Ecology-RH2 Contract C1700012, Work Assignment no. RH2111.

The Lead Agency invited representatives from the federally recognized Indian tribes with a usual and accustomed harvest area in the inventory area (Lummi, Nooksack), to participate in the watershed plan update as directed by 90.94.020 (3) RCW. The invitations to participate as part of the planning unit were declined by both. See **Appendix D** – Invitation letters and responses

Whatcom County Council clarified the Initiating Governments’ role in Resolution 2018-16 on May 8, 2018. Resolution Section 4, Pg. 4, says, “Under RCW 90.82, the Initiating Governments developed the scope of work for watershed planning and organized the WRIA 1 Planning Unit. Under ESSB 6091, the Initiating Governments have the additional

task of collaborating with the Planning Unit to update the WRIA 1 Watershed Management Plan.” See **Appendix E** – Whatcom County Council Resolution 2016-16

### 1.3 Coordination with Existing Plans and Programs

The actions related to this plan update section must coordinate with existing plans and programs within the WRIA.

## 2.0 Assessment of Potential DGWPE Well Consumptive Use

90.94 (4)(b) RCW says, “At a minimum, the watershed plan must include those actions that the planning units determine to be necessary to offset potential impacts to instream flows associated with permit-exempt domestic use.” The WRIA 1 Planning Unit recognizes that domestic water use is both beneficial and lawful.

The task of estimating the amount of domestic groundwater use over twenty years was undertaken by Ecology, staff, RH2, and BERK for nine “aggregated sub-basins.” See **Appendix F** – “RH2 Technical Memorandum (Task 1), Potential Consumptive Use Impacts of Domestic Groundwater Permit-Exempt Wells Over the Next 20 Years in WRIA 1 – FINAL UPDATED,” August 21, 2018

### 2.1 Aggregated Sub-basins

WRIA 1’s sub-basins were previously grouped into nine separate “aggregated sub-basin” (geographic) areas in the course of other local planning work. RH2 and staff recommended that this watershed plan update work align with GIS overlays provided to consultants by Whatcom County. The WRIA 1 Planning Unit approved the preparation of estimates using the nine geographic “Aggregated Sub-basins” listed below in Table 1: Coastal North, Coastal South, Coastal West, Lake Whatcom, Lower Nooksack, Middle Fork Nooksack, South Fork Nooksack, Sumas.

**Table 1**  
**WRIA 1 Aggregated Sub-Basins**

Aggregated Sub-Basin
1 - Coastal North
2 - Coastal South
3 - Coastal West
4 - Lake Whatcom
5 - Lower Nooksack
6 - Middle Fork Nooksack
7 - North Fork Nooksack
8 - South Fork Nooksack
9 - Sumas

## 2.2 Projected Population Growth and DGWPE Well Connections

BERK was engaged as the technical consultant to re-aggregate population projections adopted in Whatcom County's most recently updated Comprehensive Plan ("expected growth between the years 2013 and 2036") in the County's rural unincorporated areas. The projections were refined and adjusted by BERK in response to various requests, and the Planning Unit found the level of precision to be adequate for the purpose of this plan update. See **Appendix G** – BERK Memorandum, August 2, 2018 and the "WRIA 1 – Whatcom and Skagit County" table updated by BERK on August 3.

RH2 calculated the total estimated number of "DGWPE Connections" by dividing the BERK population projection estimates for each Aggregated Sub-basin by 2.56 "persons-per-household." The WRIA 1 Planning Unit found the estimate acceptable for the purposes of this plan update. See **Appendix G** – BERK Memorandum, and **Appendix C** – Ecology-RH2 Contract, Pg. 3 (Task 1.1)

## 2.3 DGWPE Well Consumptive Use Calculations

The calculation of consumptive use assumes that a substantial portion of groundwater that is withdrawn for domestic use is returned to ground. On the parcel scale the groundwater return is considered "in-time and in-place" for all practical purposes. Simply put, the difference between the withdrawal and return of well water is "consumptive use." See **Appendix H** – ESSB 6091 – Streamflow Restoration, Initial Policy Interpretations and **Appendix C** – Ecology-RH2 Contract, Page 2

The RH2 Contract's Task 1.2 was, "Estimate DGWPE domestic water use per connection using Ecology guidance." The RH2 Task 1 Technical Memorandum - FINAL UPDATED (August 21, 2018), Page 13 provides an estimate of "15.4 gpd (gallons per day) per household of consumptive indoor water use for homes served by septic systems."

RH2 also calculated an "Outdoor Water Use Estimate" ("amount of household irrigation water use") for each Aggregated Sub-basin, using multiple factors including an adjustment for differences in precipitation among the Sub-basins. See Table 8 on Pg. 17 of **Appendix F** - RH2 (Task 1) Technical Memorandum FINAL

## 2.4 Analysis of Uncertainty Associated with DGWPE Well Consumptive Use Calculations

RH2 performed uncertainty analyses for each groundwater-use-estimate category, and each section of the final memorandum was organized in this way:

- Methods used
- Assumptions Made
- Uncertainty Analysis
- Findings

See **Appendix F** - RH2 (Task 1) Technical Memorandum FINAL

#### 2.4.1 Number of DGWPE Well Connections

Based on work completed by staff, RH2 and BERK, an array of “options and scenarios” was prepared for consideration by the Planning Unit. See the detailed explanation of this approach on Pgs. 19-20 of **Appendix F – RH2 (Task 1) Technical Memorandum FINAL**, and its “Appendix A”

The “**option**” types relate to various growth projection approaches employed by BERK to estimate “New DGWPE Served Home” (connections). The options reflect the manner of water supply anticipated in the nine Aggregated Sub-basins.

The six “**scenario**” types then presented different approaches to providing offset for the four Sub-basin growth (“option”) projections. The base-case (Scenario 1) was a single 90.44.050 “domestic” connection, which estimated the indoor consumptive use of 2.56 persons-per-connection/household (estimate computed in gallons). The following two cases (Scenarios 2 and 3) expanded to add 90.44.050 “watering” to “domestic” offset, with “Square Feet Irrigated” increased from Scenario 2 to 3. The next case (Scenario 4) was larger still, also presenting additional 90.44.050 “watering” offset but using turf crop-consumption factors “Variable by Subbasin.” The next cases (Scenarios 5A, 5B, and 6) presented additional “watering” offset estimates based on “combined exempt use” examples. Full details of the option-scenario array are described in detail in **Appendix F**.

After substantial deliberation, the Planning Unit selected “Scenario 4, Option 4” as best to provide offset for the “domestic” with some modest adjustment for Sub-basin precipitation.

The “6091 offset” based on this array selection over the 20 year period totals:  
Year 2038: 2,150 Total Homes, 647.51 acre-feet

#### 2.4.2 Household Consumptive Water Use

“The household indoor water use has been estimated at 153.6 gpd. Ten percent of the household indoor water use equal 15.4 gpd per household of consumptive indoor water use for homes served by septic systems.”Pg 13, **Appendix F - RH2 Engineering (Task 1) Technical Memorandum**.

RH2 also conducted a detailed analysis of various scenarios regarding household outdoor water use, using crop irrigation ratios (“CIR’s”), precipitation for each of Sub-basins. Using Scenario 4, Option 4, total consumptive water use at the end of 20 years was estimated at 647.51 acre feet per year (“afy”).

The offset amount of *this* estimated use-per-year (107.50 houses per year), for each of the 20 years, for both indoor domestic use and outdoor watering use computes to 32.38 acre feet per year. In the first year of data, Year 2018, eight permits for exempt domestic groundwater wells were issued in WRIA 1.

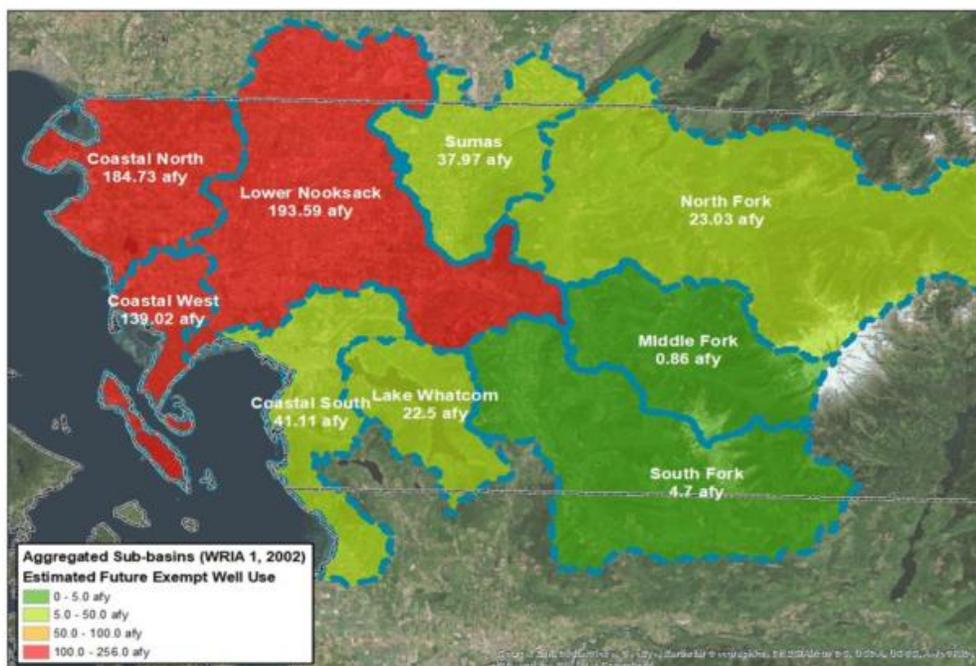
**!!** See **Recap of mandatory offset** on Page 16 of this plan as it pertains to exempt “domestic” use as defined in RCW 90.44.050, below.

**RCW 90.44.050 “Permit to withdraw”** public groundwaters distinctly lists four exempt use categories, with provisions, as follows:

“After June 6, 1945, no withdrawal of public groundwaters of the state shall be begun, nor shall any well or other works for such withdrawal be constructed, unless an application to appropriate such waters has been made to the department and a permit has been granted by it as herein provided: EXCEPT, HOWEVER, That any withdrawal of public groundwaters for stock-watering purposes, or for the watering of a lawn or of a noncommercial garden not exceeding one-half acre in area, or for **single or group domestic uses in an amount not exceeding five thousand gallons a day**, or as provided in RCW [90.44.052](#), or for an industrial purpose in an amount not exceeding five thousand gallons a day, is and shall be exempt from the provisions of this section, but, to the extent that it is regularly used beneficially, shall be entitled to a right equal to that established by a permit issued under the provisions of this chapter: PROVIDED, HOWEVER, That the department from time to time may require the person or agency making any such small withdrawal to furnish information as to the means for and the quantity of that withdrawal: PROVIDED, FURTHER, That at the option of the party making withdrawals of groundwaters of the state not exceeding five thousand gallons per day, applications under this section or declarations under RCW [90.44.090](#) may be filed and permits and certificates obtained in the same manner and under the same requirements as is in this chapter provided in the case of withdrawals in excess of five thousand gallons a day.”

#### 2.4.3 Consumptive Water Use per Aggregated Sub-basin

For planning purposes only, RH2 generated a map of Sub-basins that illustrates the possible sub-division and distribution of 647.51 afy using “Option 4, Scenario 4”



“Aggregated Sub-basins (WRIA 1, 2002) Estimated Future Exempt Well Use”  
 Appendix F – RH2 Technical Memorandum, **Appendix F**

### 3.0 Development and Selection of Actions

90.94.020 (4)(b) states, “At a minimum, the watershed plan must include those actions that the planning units determine to be necessary to offset potential impacts to instream flows associated with permit-exempt domestic water use.” Domestic water use is clearly defined in RCW 90.44.050.

During the development of the scope of work, the approach to meeting the legislative assignment as presented by staff, Ecology and RH2 to the Planning Unit was that the amount (quantity) of consumptive use would equate directly to the amount required to offset “potential impact.”

Ecology’s guidance and the contract with RH2 focused on quantifying the net amount of consumptive domestic use in WRIA 1. Work assignment 1.6 of Ecology’s contract with RH2 was

“1.6 Using the existing conceptual groundwater model information and Ecology guidance, as appropriate, calculate the impact of consumptive withdrawals on WRIA 1 surface waters on an aggregated subbasin level.”

NOTE - Regarding the use of the conceptual groundwater model under development: A June 19, 2017 memorandum was written by Associated Earth Sciences (“AES”), a licensed

hydrogeology contractor conducting scientific field work to measure and model the impact of groundwater withdrawals on streamflow on Bertrand Creek, located in the Lower Nooksack Aggregated Sub-basin. In response to staff questions, the AES memorandum included an “Implications of the Example Analysis” sub-section that explained limits of measurability of groundwater withdrawal(s) on streamflow impact on one square mile. The memorandum significant technical information about the local groundwater model work and instrument measurement, (key excerpts):

Pg. 1 “ > It is important to note that models do not provide data. Rather, models synthesize available data into a framework that captures the essential elements of a complex natural system. The model is being developed with the intent of being able to provide Ecology with information necessary for the evaluation of water right applications and to provide estimates of impacts that could be used to develop mitigation plans. The overall reliability of the model to predict potential impacts associated with a proposed water right appropriation will vary throughout the model domain, depending on the amount and quality of the available model input/calibration data and the specific characteristics of the water right application.”

Pg. 5 “Even in areas of the proposed numerical model with high data density, and good calibration data (Bertrand Creek drainage), the extremely conservative estimate of maximum potential impact to surface water from the use of 100 permit-exempt wells will be significantly less than the lowest possible streamflow measurement error that will be used to calibrate the model. The more realistic potential impact of 0.027 afd is less than 6% of the potential error associated with the streamflow measurement data. Therefore, any simulated predicted impact to the stream based on this scenario would be statistically insignificant and not defensible.”

See Associated Earth Sciences Memorandum, June 19, 2017 - **Appendix J**

### 3.1 Identification and Characterization of Potential Actions

The legislature specifically required this plan update effort to “review existing watershed plans...” and that this update should “...include recommendations for projects and actions that will measure, protect, and enhance instream resources and improve watershed functions that support the recovery of threatened and endangered salmonids.” The Watershed Management Plan must reflect watershed improvement actions and projects being undertaken and planned by all agencies and entities throughout WRIA 1:

“Watershed plan recommendations may include but are not limited to, acquiring senior water rights, water conservation, water reuse, stream gaging, groundwater monitoring, and developing natural and constructed infrastructure, which includes but is not limited to, such projects as floodplain restoration, off-channel storage, and aquifer recharge. Qualifying projects must be specifically designed to enhance streamflows and not result in negative impacts to ecological functions or critical habitat.” 90.94.020 (4)(a) RCW

RH2 completed the contract Task 2 assignment, “Collaborate with the Watershed Staff Team (WST) and WRIA 1 Planning Unit (Planning Unit) to identify a range of projects and actions to offset the estimated new consumptive DGWPE water use over the next 20 years in WRIA 1. This will include projects and actions that aim to measure, protect, and enhance instream resources and improve watershed functions that support the recovery of threatened and endangered salmonids.” See **Appendix I – RH2 Task 2 Memorandum**.

Many examples of projects are currently underway in WRIA 1 that include elements that will achieve streamflow restoration and salmon recovery goals listed in 90.94.020 (4)(a). Such examples include,

- Whatcom County Public Works’ “Floodplains by Design”
- City of Bellingham’s “Middle Fork Nooksack River Fish Passage Project”
- WSDOT’s “Culverts Case” projects
- Nooksack Indian Tribe Natural Resource Department’s “North Fork Nooksack Farmhouse Reach” project
- Whatcom Conservation District’s “CREP” program
- Modifications to drainage district ditch infrastructure
- Whatcom County Public Works’ “Pollution Identification and Correction” program

### 3.1.1 Process for Identifying Actions

Ecology and staff recommended a short list of “early action projects” that were identified as eligible for funding in 2019 specific to the required DGWPE offset/net ecological benefit. The cooperative administration “WST” that included Ecology rated these projects, and the Planning Unit agreed to support three. Ecology has accepted these project applications.

### 3.1.2 Characterization of Potential Actions

In accordance with 90.94.020 (4)(b), “The highest priority recommendations must include replacing the quantity of consumptive water use during the same time as the impact and in the same basin or tributary.”

- One project, surface water to ground water conversion(s) in the Bertrand Creek watershed offered direct improvement to streamflow during the low-flow seasonally dry period.

“Lower priority projects include projects not in the same basin or tributary and projects that replace consumptive water supply impacts only during critical flow periods.”

- The second was an inter-basin transfer from Nooksack River to California Creek.

“The watershed plan may include projects that protect or improve instream resources without replacing the consumptive quantity of water where such projects are in addition to those actions that the planning unit determines to be necessary to offset potential consumptive impacts to instream flows associated with permit-exempt domestic water use.”

- The third was a purchase of development rights in land zoned agriculture.

Additional action: The three “early action” projects described above were supported on the condition that a definitive assessment of offset quantity and timing would be professionally prepared and reported to the Planning Unit when and if the projects were approved for Watershed Restoration and Enhancement funding from the state.

### 3.2 Selection of Actions

New domestic groundwater permit exempt wells are anticipated to be located in one jurisdiction alone: Whatcom County’s unincorporated rural area(s).

However, Ecology, its contractor RH2, and the staff of local jurisdictions met privately and regularly to discuss and propose projects and actions that their independent entities and agencies might undertake cooperatively to improve watershed health WRIA-wide. A rating system was proposed and employed for action and project prioritization.

The population growth estimates prepared by BERK were employed by RH2 to fulfill Task 1.6 “calculate the impact of consumptive withdrawals on WRIA 1 surface waters on an aggregated subbasin level.” Sub-section 2.4.3 above illustrates the ideal distribution of action(s) for offset that will provide net ecological benefit.

#### 3.2.1 Projects and Programs

The legislation required the determination of “actions determined to be necessary to offset potential impacts to instream flows.”

“Actions” in this new plan section include many opportunities to measure, protect, and enhance instream resources and improve watershed functions that support the recovery of threatened and endangered salmonids.

### 3.2.2 Policy Recommendations

#### 3.2.2 Policy Recommendations

Two key Planning Unit determinations required by the legislation were characterized as “policy” matters by staff during preparation of this plan. Motions were passed by majority vote of the Planning Unit on November 8, 2018:

RCW 90.94.020 (4)(e) “...modification to fees...” (\$500 fee)

**Determination: No modification to the \$500 fee.**

Record of vote, November 8, 2018

- a. **Motion** by Perry Eskridge [Land Development] and second by Alan Chapman [Fishers] to adopt the \$500 fee as presented in the legislation and have it remain as such.

**Motion Passed:**

**9 in favor:** Agriculture, Fishers, Forestry, Land Development, Non-Government Water Systems, Port of Bellingham, Private Well Owners, Public Utility District #1, Water Districts

**1 opposed:** Environmental

**2 abstain:** Whatcom County, State Government

RCW 90.94.020 (4)(e) “...water use quantities that are less than authorized under RCW 90.44.050 or more or less than authorized under subsection (5) of this section for withdrawals exempt from permitting may not be applied unless authorized by rules adopted under this chapter or under chapter 90.54 RCW.” (3,000 gpd average limit, “domestic”)

**Determination: In WRIA 1, retain the 3,000 gpd annual average in the legislation. This is a 40% reduction from 5,000 gpd specified in 90.44.050. In itself, this is a significant tangible offset.**

Record of vote, November 8, 2018

- b. **Motion** by Dan Eisses [Water Districts] and second by Steve Jilk [PUD No. 1] to keep the 3000 gpd annual average that is in the legislation and work in a voluntary metering program as part of Adaptive Management, and the Planning Unit is comfortable with RH2 estimates for consumptive use.

**Motion Passed:**

**9 in favor:** Agriculture, Environmental, Forestry, Land Development, Non-Government Water Systems, Port of Bellingham, Private Well Owners, Public Utility District #1, Water Districts

**1 opposed:** Fishers

**2 abstain:** Whatcom County, State Government

An additional motion about “policy” was made, voted, and approved by the Planning Unit on November 8, 2018. Note that this motion was not directly related to determinations required by the legislation:

Record of vote, November 8, 2018

c. **Motion** by John Mercer [Non-Government Water Systems] and second by Perry Eskridge [Land Development] to include arials as part of the Adaptive Management process as a monitoring measure.

**Motion Passed:**

**8 in favor:** Agriculture, Environmental, Forestry, Land Development, Non-Government Water Systems, Port of Bellingham, Private Well Owners, Water Districts

**2 opposed:** Fishers, Public Utility District #1

**2 abstain:** Whatcom County, State Government

### 3.2.3 Analysis of Uncertainty Associated with Selected Projects and Programs

The RH2 Engineering technical memoranda included analyses of uncertainty associated with selected projects and programs sufficient for this Update.

## 4.0 Evaluation of Impacts and Selected Actions

To determine actions necessary to offset the impacts of domestic groundwater permit exempt wells, the Planning Unit evaluated information and recommendations made by Ecology, consultants, and staff.

Each action undertaken under this section must include a Quality Assurance Project Plan (QAPP) for identifying and evaluating the suitability and effectiveness of offset-related work.

### 4.1 Consumptive Use Offsets and an Analysis of Associated Uncertainty

The quantification of consumptive use offset shall be an element of any proposed action, program, or project. Uncertainty analysis will depend on methods and assumptions used in the action or project proposal, and should consider the natural variability of streamflow conditions in WRIA 1 and in the Sub-basin in which the project is located or in which the action takes place or has effect.

### 4.2 Ecological Effects Assessment

The quantity of water required for offset identified by RH2 Engineering in their Task 1 memorandum and approved by the Planning Unit, 647.51 afy, is sufficiently greater than the “indoor” consumptive use calculated by RH2 Engineering and specified by 90.94.020

(1) and (8), 37 afy, that offset quantities of that magnitude would provide enormous measurable ecological effect on their own. See “Recap of mandatory offset” below.

The forty percent (40%) reduction from 5,000 gpd specified in 90.44.050 is a significant tangible contribution to offset. With all other factors being equal under Option 4 of RH2’s “option and scenario” consumptive use array, the theoretical reduction from Scenario 6’s 5,000 gpd and Scenario 5A’s 3,000 gpd computes to 3,276.46 total acre-feet per year, illustrated as follows:

Scenario 6, Option 4	5,000 gpd	8,191.16 afy
Scenario 5A, Option 4	3,000 gpd	<u>-4,914.70 afy</u>
	Reduction:	<u>3,276.46 afy</u>

**Recap of mandatory offset** for domestic groundwater permit exempt well consumptive use (per connection):

Withdrawal: 60 gpd per person x 2.56 persons per connection = 153.60 gallons per day

90% return rate (per Ecology guidance) = 10% “consumptive use” = 15.4 gpd

15.4 gallons per day (per connection) = 0.01725022 acre feet per year (afy)

Total estimated connections over 20 years = 2,510

Est. new connections, 20 years (2,510/20) = 107.5 new connections per year

107.5 new connections x 0.01725022 afy = 1.85 acre feet (addl offset)

1.85 afy new offset per year x 20 years = 37 acre feet total, Year 20

#### 4.2.1 Distribution of Impacts and Actions - Location

Per sub-section 3.0 above, RH2 produced a Sub-basin map that indicates the estimated impact of consumptive use. Proposed actions and projects must identify the specific location and quantity of the offset.

#### 4.2.2 Distribution of Impacts - Timing

90.94.020 (4)(b) says, “The highest priority recommendations must include replacing the quantity of consumptive water use during the same time as the impact and in the same basin or tributary. Lower priority projects include projects not in the same basin or tributary and projects that replace consumptive water supply impacts only during critical flow periods.” An analysis of timing-of-offset must be embedded in project design for the project to be considered by the Planning Unit for recommendation.

#### 4.2.3 Ecological Implications

Proposed actions and projects shall identify the specific, observable and or measurable ecological effects and implications of the offset.

#### 4.2.4 Uncertainty Analysis

Uncertainty analysis shall be included in proposals for offset actions and projects.

### 5.0 Action Implementation

#### 5.1 Governance and Administration

WRIA 1 is a geographic area in which independent government and municipal entities coordinate individual administrative efforts. See sub-section 1.1 above for regulatory context.

As described in sub-sections above, the domestic groundwater permit exempt wells that are the topic of this plan update section are those that are associated with building permits issued for construction in which water from the well is to be used for domestic purposes.

#### 5.2 Funding

The legislature has established a number of funding mechanisms for the collection of well fees and to otherwise fund worthwhile offset projects.

#### 5.3 Implementation Schedule

An implementation schedule for this effort will be maintained by the Planning Unit as plan-specific offset projects are approved.

### 6.0 Additional Actions and Program Concepts in Development

#### 6.1 Water Use Efficiency – education program

#### 6.2 Off-channel storage (example, state property near forks)

#### 6.3 (additional)

6.4 (additional)