DRAFT MEMORANDUM

Project No.: 180249

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To: Mike Hermanson – Spokane County Environmental Services, Lead Agency
WRIA 55 Planning Unit Members

From:

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Re: **Evaluation of Future Exempt Well Demand**
ESSB 6091/RCW 90.94 Watershed Plan Update

Background

The passage of Engrossed Substitute Senate Bill (ESSB) 6091, as codified by RCW 90.94, requires that an update to the existing Watershed Plan for Water Resource Inventory Area (WRIA) 55, the Little Spokane Watershed, be approved by the Washington Department of Ecology (Ecology) by February 1, 2021. Spokane County Environmental Services is serving as the lead agency for this process. The WRIA 55 Initiating Governments for the watershed planning process are Spokane County, Stevens County, Pend Oreille County, the City of Spokane, and Whitworth Water District. The process is supported by convening the WRIA 55 Planning Unit to review technical tasks and memorandums, policy decisions, and the pending watershed plan update. Aspect Consulting, LLC (Aspect) has been contracted by Spokane County to facilitate planning unit meetings, conduct supporting technical tasks, and prepare the Watershed Plan update.

Section 202 of ESSB 6091, which is applicable to WRIA 55, contains several provisions regarding how updated watershed plans are to offset or account for projected water use.

Specifically, Section 202(4)(b) states, in part:

> *"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. 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."*

In March 2018, Ecology issued Recommendations for Water Use Estimates[1] for ESSB 6091 that provides guidance on evaluation of future exempt well demand. Key excerpts from this document include:

[1] https://fortress.wa.gov/ecy/publications/documents/1811007.pdf

- **Timeframe:** To evaluate and offset potential consumptive impacts from permit-exempt domestic wells, a timeframe over which new domestic[2] use will be considered must be designated. Since a "subsequent twenty years" is referenced throughout other sections of ESSB 6091 (such as sections 202(4)(c), Ecology interprets the timeframe for 202(4)(b) … to be the next **twenty years**. In its *Interim Guidance for Determining Net Ecological Benefit*[3], Ecology further clarified that this 20-year planning horizon begins on the date ESSB 6091 was signed into law – January 19, 2018.
- **Scope of "water use":** Ecology interprets all projected water use referenced in sections 202(4)(c)…to refer to only **consumptive** permit-exempt domestic groundwater water use (as opposed to water use associated with municipalities, for example).
- **Consumptive use:** Water Resources Program Policy 1020 (1991) states, "Consumptive water use causes diminishment of the source at the point of appropriation," and that, "Diminishment is defined as to make smaller or less in quantity, quality, rate of flow, or availability." This guidance document is focused on estimating only quantity diminishment, so for the purposes described here, consumptive water use is considered water that is evaporated, transpired, consumed by humans, or otherwise removed from an immediate water environment due to the use of permit-exempt domestic wells.
- **Subbasins:** ESSB 6091 is written in the context of WRIA-wide mitigation, so Ecology interprets the words "same basin or tributary" to refer to subareas or subbasins as opposed to entire WRIAs. For the purposes of this document, the term "subbasin" is equivalent to the words "same basin or tributary" as used in sections 202(4)(b).

This memorandum presents an evaluation of future exempt well demand on a subbasin level and on a 20-year horizon within WRIA 55 that is intended to meet the requirements of ESSB 6091. Figure 1 presents a map of WRIA 55 delineating the subbasins used in the evaluation, which are the Washington Department of Natural Resources Watershed Administrative Units and are consistent with subbasin boundaries used in previous watershed planning and management.

WRIA 55 extends into Spokane, Stevens, and Pend Oreille Counties. All three counties have conducted analysis and worked cooperatively together to develop estimates of future residential permits in WRIA 55 outside of public water districts to support the development of the exempt well demand estimates.

General Approach

Prior to conducting the exempt well demand analysis described in this memorandum, staff from Spokane, Stevens, and Pend Oreille Counties, Aspect, and Ecology discussed potential approaches with consideration of Ecology's Recommendations for Water Use Estimates for ESSB 6091. The following approach was agreed upon and implemented:

Each county developed growth projections on a subbasin level for single family residential units (SFUs) relying on exempt wells on the mandated 20-year horizon. Each county used professional

[2] Ecology's *ESSB 6091-Streamflow Restoration Initial Policy Interpretations* defines domestic use as "indoor and outdoor uses for a household (including watering of a lawn and noncommercial garden)." https://fortress.wa.gov/ecy/publications/documents/1811008.pdf
[3] https://fortress.wa.gov/ecy/publications/documents/1811009.pdf

judgment in developing the forecast based on available county specific information. Specific approaches for each county are summarized below.

Each county then developed the estimates of average lawn size, on a subbasin level, through geographical information system (GIS) analysis of suitable aerial photos for homes relying on exempt wells built between 2001 to 2017. Each county analyzed a sufficient sample size from the set of exempt well properties to attain an approximate 95 percent confidence interval with a 5 percent margin of error, within that county's portion of WRIA 55 that is served by exempt wells.

Aspect then used this information to estimate the average amount of consumptive use associated with the growth projections for SFUs relying on exempt wells, using the following methodology:

- Indoor consumptive use estimates were based on examples presented in Ecology's Recommendations for Water Use Estimates for ESSB 6091 and a review of US Census data on average persons per household by county.
- Outdoor consumptive use estimates were made based on average irrigation lawn size determined on a subbasin level and methods described in Ecology Guidance 1210 (Determining Irrigation Efficiency and Consumptive Use), using crop demand estimates provided in the Washington Irrigation Guide (WIG) for pasture/turf for the Spokane and Newport stations.

County-specific approaches and the number of estimated new SFUs relying on exempt wells per subbasin are summarized below, followed by estimates of indoor, outdoor, and total consumptive use.

Spokane County Growth Projections and Estimated Lawn Sizes

Approaches to Projecting Future Residential Units

Spokane County estimated the projected increase over the next 20 years in residential units relying on permit exempt wells within the Spokane County portion of WRIA 55, outside of the area covered by WAC 173-557. Spokane County estimated the projected increase in two ways:

- The first approach is based on the Spokane Regional Transportation Council (SRTC) Horizon 2040 projected increase in SFUs. The SRTC Horizon 2040 growth projections are derived from and consistent with the Washington Office of Financial Management (OFM) 2017 Growth Management Act population projections for counties in the category: 2010 to 2040 medium growth.
- The second approach is based on extrapolating the historical growth rate based on the average number of new homes built annually from 2001 – 2017.

Estimates of New SFUs Based on OFM Medium Growth Projections

The SRTC projected increase in single family residential units are spatially distributed into Transportation Analysis Zones (TAZs). TAZ boundaries do not conform to subbasin boundaries or areas served by public water supplies versus permit exempt wells. A GIS analysis was completed to allocate the distribution of the projected increase in SFUs and within each TAZ into each subbasin, followed by allocations between areas served by public water supplies and areas served by permit exempt wells in proportion to the distribution of existing SFUs derived from Spokane County Assessor data. Table 1, below provides an example of this approach, using TAZ 487, which has

area within the City of Deer Park water service area, the Dragoon Creek subbasin, and the Beaver Creek subbasin (Figure 1).

Table 1. Example of SFU Allocation Approach by TAZ

TAZ 487	Existing		Projected Growth in SFUs (20-Year Planning Horizon)
	Units	% of Total	
Total Residential Units	354		56
Within Public Water Supply	242	68.4	38
Outside Public Water Supply	112	31.6	18
Dragoon Subbasin	54	15.3	9
Beaver Creek Subbasin	58	16.3	9

Based on the allocation methodology described above, Table 2 presents the projected increases in SFUs by subbasin within Spokane County that are estimated to rely on a permit exempt well for domestic water supply in the next 20 years.

Table 2. Projected Growth in SFUs Relying on Exempt Wells in Spokane County (WRIA 55), based on OFM Medium Growth Projections

Subbasin	Projected increase in SFUs (20-Year Planning Horizon)
Dartford Creek	265
Dragoon Creek	281
Deadman Creek/Peone Creek	319
Beaver Creek	155
Little Spokane/Deer Creek	261
Little Deep Creek	98
West Branch	67
Otter Creek	156
Total	***1602***

Estimates of New SFUs Based on 2001-2017 Historical Growth Rate

Between 2001 and 2017 there were 1,901 new residences that rely on permit exempt wells in Spokane County's portion of WRIA 55. This equates to an average growth rate of 112 homes per year. Based on this rate, there will be an estimated 2,235 new homes relying on permit exempt wells built within WRIA 55 in Spokane County in the next 20 years. Table 3 presents the historical growth data, along with the 20-year planning horizon projected growth estimated based on extrapolating the historical growth rate, with a comparison to the SRTC/OFM medium growth rate projected growth as outlined in Table 2. In both cases, the TAZ analysis approach discussed above was used to allocate the projected growth to each subbasin, which changes the percentages of growth estimated within each subbasin from the historical 2001-2017 distribution, based on where new growth is expected to occur.

Table 3. Comparison of Historical and Projected Growth in SFUs Relying on Exempt Wells in Spokane County (WRIA 55)

Subbasin	Actual 2001-2017		Historical Growth Rate - Projected 20-Year Growth		OFM Medium - Projected 20-Year Growth	
	SFUs	% of total	SFUs	% of total	SFUs	% of total
Dartford Creek	256	13%	370	17%	265	17%
Dragoon Creek	367	19%	392	18%	281	18%
Deadman-Peone Creek	338	18%	445	20%	319	20%
Beaver Creek	178	9%	216	10%	155	10%
Otter Creek	216	11%	218	10%	156	10%
West Branch	104	5%	93	4%	67	4%
Little Spokane/Deer Creek	370	19%	364	16%	261	16%
Little Deep Creek	72	4%	137	6%	98	6%
Total	***1901***		***2235***		***1602***	
Yearly Average	112		112		80	

Irrigated Area Estimate by Subbasin

A random sample of the 1,901 SFUs built between 2001-2017 were analyzed with aerial photos from 2006, 2009, 2014, 2016, and 2018. GIS methods were used to delineate the size of apparent area of lawn irrigation. A sample size of 321 was selected to achieve a 5 percent margin of error with a 95 percent confidence interval. Table 4 presents the results of this analysis.

Table 4. Estimated Irrigated Area by Subbasin in Spokane County (WRIA 55)

Subbasin	Number of Household Lawns Analyzed	Average Irrigated Lawn Size (sq. ft.)	Average Irrigated Lawn Size (acres)
Dartford Creek	47	15,290	0.35
Dragoon Creek	50	15,211	0.35
Deadman-Peone Creek	52	17,334	0.40
Beaver Creek	44	14,753	0.34
Otter Creek	42	14,282	0.33
West Branch	14	8,948	0.21
Little Spokane/Deer Creek	53	10,433	0.24
Little Deep Creek	19	7,769	0.18
WRIA 55 Average	**321**	**13,880**	**0.32**

Stevens County Growth Projections and Estimated Lawn Sizes

Projected Residential Units

Stevens County estimated the projected increase over the next 20 years in SFUs relying on permit exempt wells within the Stevens County portion of WRIA 55. The County reviewed the number of building permits issued from 2001-2017 for new homes using a private water supply. GIS methods were used to filter the data to include only parcels within both WRIA 55 and Stevens County.

The average number of new homes built annually from 2001-2017 was used to predict the number of new homes for the 20-year planning horizon. Between 2001 and 2017 there were 209 new residences that rely on permit exempt wells in Stevens County's portion of WRIA 55. This equates to an average growth rate of 12.3 homes per year. This rate was used to extrapolate growth over the next 20 years. Based on this rate, there will be an estimated 246 new homes relying on permit exempt wells built within WRIA 55 in Stevens County in the next 20 years (Table 5). That total will include an estimated 65 homes in the Beaver Creek subbasin, 179 homes in the Dragoon Creek subbasin, and 2 homes in the West Branch subbasin.

Table 5. Historical and Projected Growth in SFUs Relying on Exempt Wells in Stevens County (WRIA 55)

Year	Beaver Creek	Dragoon Creek	West Branch	Total
2001	4	12	1	17
2002	6	13		19
2003	6	16		22
2004	6	16		22
2005	6	16		22
2006	3	12		15
2007	6	10		16
2008	2	9		11
2009		8		8
2010	3	8		11
2011	3	3		6
2012	2	4		6
2013	2	3		5
2014	1	8		9
2015	1	4	1	6
2016		6		6
2017	4	4		8
Total	***55***	***152***	***2***	***209***
Projected SFUs 20-Year Horizon	**65**	**179**	**2**	**246**

Average Irrigated Area Estimate by Subbasin

Average lawn size was estimated by choosing a random sample of the building permits and using aerial imagery (2015, 2017) to make a digitally-measured estimate of irrigated lawn and garden area. The sample for the lawn size analysis was chosen randomly to obtain a 95 percent confidence level with a 5 percent margin of error. Lawns were digitally measured for a randomly selected sample of 136 out of the 209 new residences in WRIA 55, providing a 95 percent confidence level with a 5 percent margin of error. The sample's average lawn size was 6,316 square feet(sq. ft.; 0.1450 acres), with 97 out of 136 parcels having any identifiable irrigated lawn.

Table 6: Average Estimated Lawn Size in Stevens County for New Homes on Private Water Supply (WRIA 55)

Subbasin	Lawns Sampled	Average Lawn Size (sq. ft.)	Average Lawn Size (acres)
Beaver Creek	33	3,944	0.09
Dragoon Creek	102	7,145	0.16
West Branch	1	0	0
Total	***136***	***6,316***	***0.15***

Pend Oreille County Growth Projections and Estimated Lawn Sizes

Projected Residential Units

Pend Oreille County estimated the projected increase over the next 20 years in SFUs relying on permit exempt wells within the Pend Oreille County portion of WRIA 55. GIS methods were used to filter residential building permit data for the period 2011-2017 to include only permits that were in WRIA 55, but outside public water districts, indicating use of an exempt well. Between the years of 2011-2017 there were 116 new residential permits that are or will be relying on permit exempt wells in Pend Oreille County's portion of WRIA 55 (Table 7). The average annual growth rate of 16.6 homes was used to extrapolate growth on a 20-year horizon. Based on this rate, there will be an estimated 332 new homes relying on permit exempt wells built within WRIA 55 in Pend Oreille County in the next 20 years (Table 8). That total will include an estimated 138 homes in the West Branch subbasin and 194 homes in the Otter Creek subbasin (Table 8).

Table 7: Pend Oreille County Residential Permits Issued Outside of Public Water Districts, 2011-2017 (WRIA 55)

Year	Number	Percentage of Total
2011	15	12.9%
2012	13	11.2%
2013	9	7.8%
2014	21	18.1%
2015	20	17.2%
2016	22	19.0%
2017	16	13.8%
Total	***116***	***100.0%***
Average of 16.6 New Residential Permits a Year		

Table 8. Project SFUs Relying on Exempt Wells in Pend Oreille County (WRIA 55)

Sub Basins	Projected SFU Growth 20-Year Planning Horizon
West Branch	138
Otter Creek	194
WRIA 55 Total	***332***

Average Irrigated Area Estimate by Subbasin

An average lawn size was determined by choosing a random sample of the building permits, with a 95 percent confidence interval to achieve a 5 percent margin of error, and digitizing their irrigated lawn based off aerial photography (2011, 2015, 2017), NDVI imagery, and the Pend Oreille County Assessor photos from the field. All indefinable agricultural activity was excluded. Of the 116 newly permitted residence that rely on permit exempt wells within WRIA 55, 89 had their lawns digitized, providing a 95 percent confidence level with a 5 percent margin of error. The sample's average lawn size was 9,648 sq. ft, with 53 out of 89 having any identifiable irrigated lawn (Table 9).

Table 9. Estimated Irrigated Area by Subbasin in Pend Oreille County (WRIA 55)

Subbasin	Lawns Sampled	Average Lawn Size (sq. ft.)	Average Lawn Size (acres)
West Branch	53	5,355	0.12
Otter Creek	36	12,564	0.29
Total	***89***	***9,648***	***0.22***

Analysis of Consumptive Use by Subbasin

Aspect used the information provided by each County to estimate the average amount of consumptive use associated with the growth projections for SFUs relying on exempt wells, as described below:

Indoor Consumptive Use

Indoor consumptive use estimates were developed based on examples presented in Ecology's Recommendations for Water Use Estimates for ESSB 6091 and a review of US Census data on average persons per household by county. Key assumptions incorporated into the analysis include:

- The number of new exempt wells in the next 20 years in each subbasin is based on the analyses conducted by Spokane, Stevens, and Pend Oreille Counties discussed in this memorandum.
- US Census Data[4] tabulating the persons per household from 2013-2017 were used combined with the per capita water use noted below. The US Census Data indicates that the average number of people per household is 2.43 in Spokane County, 2.48 in Stevens County, and 2.3 in Pend Oreille County.
- Per capita water use is 60 gallons per day (gpd), based on the analysis provided in Ecology's Recommendations for Water Use Estimates for ESSB 6091:

[4] https://www.census.gov/quickfacts

- *To estimate the impacts of indoor water use, the population to be served by future permit-exempt domestic wells can be multiplied by assumed water use. A 2016 study by the Water Research Foundation (DeOreo, et al., 2016) determined an average per capita water use of 59 gallons per day (gpd) in homes provided municipal water in 23 areas across the U.S. and Canada. This result is based on actual flow monitoring and survey responses from 737 homes. The 59 gpd average is down 15.4 percent from results found during a 1999 American Water Works Association Research Foundation study (Mayer and DeOreo, 1999). Some homes supplied by Tacoma Water were monitored for the 2016 report, producing an average 51 gpd per capita indoor water use. Bearing in mind that homes supplied municipal water are more likely to be fitted with water saving appliances, an assumption of 60 gpd per capita seems reasonable when estimating water use for permit exempt wells.*

- Indoor consumptive is equal to 10 percent of total use, based on the analysis provided in Ecology's Recommendations for Water Use Estimates for ESSB 6091:
  - *A reasonable assumption for much of Washington is that about 10 percent of indoor domestic water use is consumed, and about 80 percent of outdoor domestic water use is consumed (Culhane and Nazy, 2015). A consumptive use rate of 10 percent for indoor domestic use is in keeping with recent groundwater models constructed by the U.S. Geological Survey (USGS) for the Kitsap peninsula (Frans and Olsen, 2016) and the Chamokane Creek basin (Ely and Kahle, 2012).*

Table 10 presents the 20-year projected consumptive indoor use associated with exempt wells in WRIA 55, including both the OFM medium and the historical growth scenarios for Spokane County.

Table 10. Projected Consumptive Indoor Use Associated with Exempt Wells in WRIA 55, 20-Year Planning Horizon

	Spokane County		Spokane County		Stevens County		Pend Oreille County	
	OFM Medium		Historical Growth Rate		Historical Growth Rate		Historical Growth Rate	
	SFUs	Projected Consumptive Indoor Use acre feet per year (afy)	SFUs	Projected Consumptive Indoor Use (afy)	SFUs	Projected Consumptive Indoor Use (afy)	SFUs	Projected Consumptive Indoor Use (afy)
WRIA 55 Subbasins	**Spokane County**		**Spokane County**		**Stevens County**		**Pend Oreille County**	
Dartford Creek	265	4.33	370	6.04				
Dragoon Creek	281	4.59	392	6.40	179	2.92		
Deadman-Peone Creek	319	5.21	445	7.27				
Beaver Creek	155	2.53	216	3.53	65	1.06		
Otter Creek	156	2.55	218	3.56			194	3.17
West Branch	67	1.09	93	1.52	2	0.03	138	2.25
Little Spokane/Deer Creek	261	4.26	364	5.94				
Little Deep Creek	98	1.60	137	2.24				
Total	***1,602***	***26.16***	***2,235***	***36.50***	***246***	***4.02***	***332***	***5.42***

Outdoor Consumptive Use

Outdoor consumptive use estimates were developed based on average irrigation lawn size determined on a subbasin level and methods described in Ecology Guidance 1210 (Determining Irrigation Efficiency and Consumptive Use). Key assumptions incorporated into the analysis include:

- The number of new exempt wells in the next 20 years in each subbasin is based on the analyses conducted by Spokane, Stevens, and Pend Oreille Counties discussed in this memorandum.
- Average irrigation lawn sizes in each subbasin are based on the analyses conducted by Spokane, Stevens, and Pend Oreille Counties discussed in this memorandum.
- The seasonal net irrigation requirement was taken from Washington Irrigation Guide (WIG) for pasture/turf for the Spokane station (29.81 inches) for all subbasins, with the exception of the West Branch and Otter Creek subbasins, for which the Newport station (24.11 inches) was used. Data from a relatively new (2015) AgriMet station at Deer Park was also reviewed but not used in the analysis, as it was generally consistent with Spokane WIG values, ranging between 27.08 and 30.66 inches of lawn evapotranspiration between 2015 and 2018.
- An irrigation efficiency of 75 percent was used, which is applicable to sprinkler methods typically used for lawn irrigation, such as pop-up impact or handline methods referenced in Table 1 of Ecology Guidance 1210.
- Consumptive irrigation quantities are calculated from the number of new exempt wells in each subbasin, average irrigation lawn size, net irrigation demand from the WIG, and irrigation efficiency.

- For subbasins that have land in multiple counties, the analysis was aggregated using the average lawn size and estimated number of new exempt wells for each county within that subbasin.

Table 11 presents the 20-year projected consumptive outdoor use associated with exempt wells in WRIA 55[5], including both the OFM medium and the historical growth scenarios for Spokane County.

Table 11. Projected Consumptive Outdoor Use Associated with Exempt Wells in WRIA 55, 20-Year Planning Horizon

	Spokane County				Spokane County			
	OFM Medium				Historical Growth Rate			
	SFUs	Average Irrigated Lawn Size (ft^2)	Average Irrigated Lawn Size (acres)	Projected Consumptive Outdoor Use (afy)	SFUs	Average Irrigated Lawn Size (ft^2)	Average Irrigated Lawn Size (acres)	Projected Consumptive Outdoor Use (afy)
WRIA 55 Subbasins	**Spokane County**				**Spokane County**			
Dartford Creek	265	15,290	0.35	248.36	370	15,290	0.35	346.76
Dragoon Creek	281	15,211	0.35	261.99	392	15,211	0.35	365.48
Deadman-Peone Creek	319	17,334	0.40	338.93	445	17,334	0.40	472.81
Beaver Creek	155	14,753	0.34	140.16	216	14,753	0.34	195.32
Otter Creek	156	14,282	0.33	116.62	218	14,282	0.33	162.96
West Branch	67	8,948	0.21	31.38	93	8,948	0.21	43.56
Little Spokane/Deer Creek	261	10,433	0.24	166.91	364	10,433	0.24	232.77
Little Deep Creek	98	7,769	0.18	46.67	137	7,769	0.18	65.24
Total	***1,602***	**-**	**-**	***1,351***	***2,235***	**-**	**-**	***1,885***

	Stevens County				Pend Oreille County			
	Historical Growth Rate				Historical Growth Rate			
	SFUs	Average Irrigated Lawn Size (ft^2)	Average Irrigated Lawn Size (acres)	Projected Consumptive Outdoor Use (afy)	SFUs	Average Irrigated Lawn Size (ft^2)	Average Irrigated Lawn Size (acres)	Projected Consumptive Outdoor Use (afy)
WRIA 55 Subbasins	**Stevens County**				**Pend Oreille County**			
Dartford Creek								
Dragoon Creek	179	7,145	0.16	78.39				
Deadman-Peone Creek								
Beaver Creek	65	3,944	0.09	15.71				
Otter Creek					194	12,564	0.29	127.58
West Branch	2	0	0	0.00	138	5,355	0.12	38.68
Little Spokane/Deer Creek								
Little Deep Creek								
Total	***246***	**-**	**-**	***94***	***332***	**-**	**-**	***166***

[5] In both Stevens and Pend Oreille Counties, there is a distinct reduction in average irrigated lawn size compared to Spokane County in shared subbasins. This appears to be associated with the presence of low yield granite aquifers, mobile homes, cabins, and the presence of more forested land cover in Stevens and Pend Oreille County, while Spokane County tends to have larger homes and more landscaping.

Total Consumptive Use by New Exempt Wells in WRIA 55, 20-Year Planning Horizon

Total consumptive use estimates were developed for both Spokane County growth scenarios (medium OFM and historical growth rates) and tallied with the estimates for Stevens and Pend Oreille Counties using the historical growth rate projections for those counties. The summary in Table 12 combines the results for indoor and outdoor consumptive use discussed above and presents the 20-year projected total consumptive use associated with exempt wells. The total consumptive use within WRIA 55 is estimated to range from a lower estimate of 1,646.98 afy (2.275 cubic feet per second [cfs]) to a higher estimate of 2,191.22 afy (3.027 cfs) for the 20-year planning horizon.

Table 12. Total Projected Combined Indoor/Outdoor Consumptive Use in WRIA 55, 20-Year Planning Horizon[6]

	With Spokane County Medium OFM Projection (Lower Growth Rate Scenario)		With Spokane County Historical Growth Rate Projection (Higher Growth Rate Scenario)	
	Projected Consumptive Use (afy)	Projected Consumptive Use (cfs)	Projected Consumptive Use (afy)	Projected Consumptive Use (cfs)
WRIA 55 Subbasins				
Dartford Creek	252.69	0.349	352.81	0.487
Dragoon Creek	347.90	0.481	453.20	0.626
Deadman-Peone Creek	344.14	0.475	480.07	0.663
Beaver Creek	159.47	0.220	215.63	0.298
Otter Creek	249.91	0.345	297.27	0.411
West Branch	73.44	0.101	86.04	0.119
Little Spokane/Deer Creek	171.17	0.236	238.72	0.330
Little Deep Creek	48.27	0.067	67.48	0.093
Total	***1,646.98***	***2.275***	***2,191.22***	***3.027***

March 2020 Update to Dartford Creek Subbasin Demand Analysis

Since the September 2019 draft of this demand memorandum was distributed to the Planning Unit, an updated review of Dartford subbasin demand has been conducted to 1) remove demand projected to occur in the area governed by WAC 173-557. Permit-exempt wells in this area are regulated separately, and Ecology has established a water bank to mitigate for new uses, and 2) separate demand from exempt wells in the Dartford subbasin that do not impact Dartford Creek, but do impact the mainstem Little Spokane River. Table 13 presents the results of the updated demand analysis for both the lower and higher growth rate scenarios.

[6] Note that Table 12 does not reflect the March 2020 update to the Dartford Creek subbasin demand analysis.

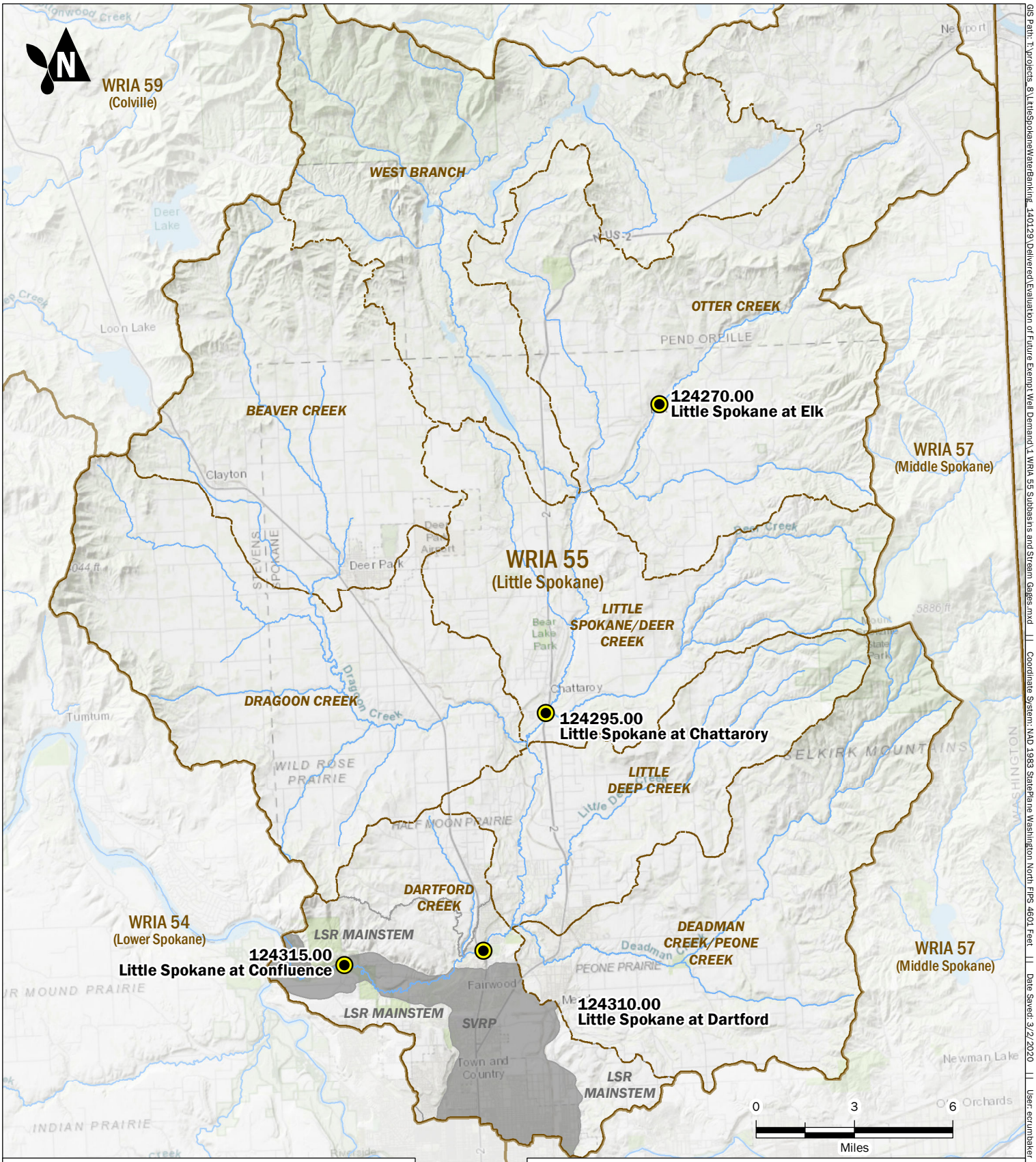
Total consumptive use estimates were developed for both Spokane County growth scenarios (medium OFM and historical growth rates) with the modified Dartford Creek demand analysis and tallied with the estimates for Stevens and Pend Oreille Counties. The summary in Table 13 combines the results for indoor and outdoor consumptive use discussed above and presents the 20-year projected total consumptive use associated with exempt wells. With the Dartford Creek demand modification included, the total consumptive use within WRIA 55 is estimated to range from a lower estimate of 1,601.21 afy (2.212 cfs) to a higher estimate of 2,127.33 afy (2.938 cfs) for the 20-year planning horizon.

Table 13. Total Projected Combined Indoor/Outdoor Consumptive Use in WRIA 55, 20-Year Planning Horizon (with Dartford Creek Demand Modifications)

	With Spokane County Medium OFM Projection (Lower Growth Rate Scenario)		With Spokane County Historical Growth Rate Projection (Higher Growth Rate Scenario)	
WRIA 55 Subbasins	**Projected Consumptive Use (afy)**	**Projected Consumptive Use (cfs)**	**Projected Consumptive Use (afy)**	**Projected Consumptive Use (cfs)**
Dartford Creek	88.68	0.122	123.96	0.171
Mainstem LSR	118.24	0.163	164.96	0.228
Dragoon Creek	347.90	0.481	453.20	0.626
Deadman-Peone Creek	344.14	0.475	480.07	0.663
Beaver Creek	159.47	0.220	215.63	0.298
Otter Creek	249.91	0.345	297.27	0.411
West Branch	73.44	0.101	86.04	0.119
Little Spokane/Deer Creek	171.17	0.236	238.72	0.330
Little Deep Creek	48.27	0.067	67.48	0.093
Total	***1,601.21***	***2.212***	***2,127.33***	***2.938***

Attachments: Figure 1 – WRIA 55 Subbasins and Stream Gages

V:\180249 WRIA 55 Watershed Plan Update\Deliverables\Exempt Well Demand\Draft WRIA 55 6091 Exempt Well Demand Memo_3-2-20.docx



USGS Gaging Station/Control Station

WRIA Boundary

WRIA 55 Subbasins

Named Watercourse

Notes:
-WRIA 55 Subbasin Source: Spokane County Water Resources Division of Utilities, 2015

WRIA 55 Subbasins and Stream Gages

Evaluation of Future Exempt Well Demand
ESSB 6091/RCW 90.94 Watershed Plan Update
WRIA 55, Washington

Aspect CONSULTING	MAR-2020	BY: CME / RAA	FIGURE NO.
	PROJECT NO. 140129	REVISED BY: EAC	1

GIS Path: T:\projects_8\LittleSpokaneWaterBanking_1401291\Delivered\Evaluation of Future Exempt Well Demand\1 WRIA 55 Subbasins and Stream Gages.mxd || Coordinate System: NAD 1983 StatePlane Washington North FIPS 4601 Feet || Date Saved: 3/2/2020 || User: ecumbaker || Print Date: 3/2/2020

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