

North Whatcom County Regional Source Feasibility Study

Department of Health Contract N17554

Deliverable Number 1
Progress Report and Recommendations

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Executive Summary

The Washington State Department of Health has determined that twelve community water systems in North Whatcom County serving a combined population of over 1,606 people via 512 residential and non-residential connections were out of compliance with Drinking Water standards because their ground water supplies exceed the MCL for nitrate and/or EDB's.

In 2007 a North Whatcom County Nitrates Feasibility Study concluded that the most economically viable solution would be to construct transmission mains that allow individual water systems to receive service through inter-ties with the City of Lynden. However, Lynden and DOE have been unable to reach an agreement on the quantity of water that Lynden has available for distribution and therefore Lynden has been unwilling or unable to provide water to the neighboring utilities with nitrate contamination. The alternative and more costly solution identified in the study was for each water system to build a treatment facility. Unfortunately even if the treatment alternative were economically viable, it would further stress the already anemic technical, managerial, and financial capacity of these small rural community water systems.

In response to the conclusions of the 2007 Nitrate Study, a grass roots effort identified the possibility of wheeling water from the City of Sumas through adjacent water systems as a possible third alternative solution to the regional contamination problem. Sumas agreed to support the study and in March 2009 the Public Utility District No. 1 of Whatcom County commissioned the North Whatcom County Regional Source Feasibility Study funded by DOH to explore the viability of this new alternative.

The study collected information on the region's water systems and determined that Sumas did not have an adequate quantity of water to meet the entire region's demand. Based on the initial water available from Sumas the study region was reduced to the "Northwood Region" located between Lynden and Sumas. The service areas and existing infrastructure of the water systems in and around the revised study area were identified and mapped to show the proximal relationship between the systems service areas and facilities. Preliminary hydraulic analysis was performed to explore what improvements would be necessary to achieve the objective.

The study reviewed operations, maintenance, and governance issues of the water entities and determined that there are significant financial and operational benefits to be gained through a regional water supply and consolidation. A review of Sumas and Meadowbrook water quality indicated that treatment is not required and it will be compatible when blended. Using water from Sumas potentially eliminates the need for existing and proposed treatment of contaminated sources further reducing costs. The study also projected capital costs and this information was used to submit an application for Drinking Water State Revolving Funds.

The study confirmed that Sumas has water right quantities available to address some of the needs in the Northwood Region but it was determined that a water right "change of use" and "additional point of withdrawal" was required to achieve the goal. Accordingly, a water right change application was submitted in 2009 and approved February 12, 2010. Other water rights issues related to individual contaminated sources will need to be addressed but are secondary and not expected to negatively impact the proposed solution.

Part I of the study finds that there is sufficient evidence to recommend proceeding with Part II of the feasibility study. Part II will focus on Public Outreach, Hydraulic Analysis, Recommended Improvements, and Cost Estimates. Successful completion of Part II will also support subsequent steps necessary to achieve the goal such as: Water System Planning, Agreements & Governance, Financial Planning & Funding, Construction Documents, and ultimately Project Completion.

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Introduction

The Washington State Department of Health (DOH) has entered into an interagency agreement with the Public Utility District No. 1 of Whatcom County (PUD) to prepare and submit a North Whatcom County Regional Source Feasibility Study (See [Map 1: Regional Vicinity Map](#)). Cornerstone Management has been retained as a consultant by the PUD to manage this study.

The primary goal of this feasibility study is to evaluate the possibility of wheeling drinking water from the City of Sumas (Sumas) through adjacent utilities to one or more existing small water systems (<1000 connections) southwest of Sumas who have groundwater supplies that approach or exceed the maximum contaminant limits (MCL) for nitrate and/or EDB's. In addition to source contamination, some utilities exceed the action level for Lead and/or Copper and are also required to implement corrosion control treatment.

The secondary goal is to evaluate the possibility of consolidating and/or restructuring these and other neighboring water systems in the study area. The regional source solution is not intended to provide water for irrigation or to support future growth beyond the service areas of the region's existing water systems.

Background

Prior to 2007 the Washington State Department of Health determined that twelve community water systems in North Whatcom County serving a combined population of over 1,605 people via 512 residential and non-residential connections were out of compliance with Drinking Water Standards because their groundwater supplies exceeded the MCL for nitrate and/or EDB's. These 12 systems are represented on [Map 2: Regional Nitrate Contamination](#).

Covenant Christian School (green pin) has installed Reverse Osmosis treatment and is compliant at this time. Ehlers Labor Camp and Rader Farms Labor Camp (yellow pins) each entered into a bilateral compliance agreement with DOH whereby they agreed to stop using their contaminated ground water sources and provide an alternate source of potable water to their customers. Alternate sources include hauling water in for redistribution or providing bottled water. Both systems chose to distribute bottled water and are believed to be in compliance at this time.

Meadowbrook Water Association was ordered by DOH in 1992 to stop using their primary source of water that serves 12 dairy farms and 129 single family residences because their groundwater wells exceeded the MCL allowed for ethylene dibromide (EDB) and nitrate. Meadowbrook is currently meeting the needs of its customers on an emergency basis by over pumping its secondary groundwater source. Over pumping is not an acceptable long term solution and if another source is not secured in a timely manner Meadowbrook may be ordered to stop this practice which would cause catastrophic economic hardship to the agricultural and residential community.

In February 2007 DOH entered into Bilateral Compliance Agreements with the eight remaining systems whereby each system agreed to take steps to reduce the nitrate levels in their potable water sources to meet Drinking Water Standards. The majority of these systems appear willing to participate in a local or regional solution and they are reluctant to pursue individual treatment options because ongoing water resource negotiations indicate that one or more viable regional solutions maybe available. A regional solution is also expected to be economically superior long term.

In September 2007 Reichhardt and Ebe Engineering completed the North Whatcom County Nitrates Feasibility Study (2007 Nitrate Study) for the City of Lynden. The study evaluated the City of Lynden as a regional source of supply as well as alternative solutions for reducing the elevated nitrate concentrations in each separate water system groundwater source.

The 2007 Nitrate Study concluded in general that the most economically viable, sustainable solution would be to construct transmission mains that allow individual water systems to be serviced through inter-ties with the City of Lynden. However, Lynden and DOE have been unable to reach an agreement on the quantity of water that Lynden has available for distribution and therefore Lynden has been unwilling or unable to provide water to the neighboring utilities with nitrate contamination. Unfortunately, the alternative and more costly solution identified in the Nitrate Study was for each water system to build a treatment facility. Even if the water treatment alternative were economically viable, it would further stress the already anemic technical, managerial, and financial capacity of these small rural water systems.

Table 1 below is summary of alternatives that address North Whatcom County Wells with High Nitrate Concentrations (>10 mg/L).

Table 1: Summary of Alternatives That Address North Whatcom County Well Contaminations		
Alternative	Description	Anticipated Result
No Action	Alternative Source(s) of water not available or feasible to affected water systems – DOH takes further actions to seek compliance.	Water systems have received orders from WDOH to reduce nitrate concentrations to < 10 mg/l. If the water systems cannot meet nitrate standards by the extended deadlines, they might incur penalties, or end up in court-ordered receivership, where assessments could be imposed on customers for a long-term solution.
Water Provided by City of Lynden	Lynden would provide water to the affected system, in exchange for an (as yet) undetermined quantity of water rights. The water would be conveyed by pipes, paid for collectively by the water systems.	Ostensibly the most cost-effective solution to the problem. Lynden must first agree before it becomes a viable alternative. Expected to be technically and financially feasible.
Water Provided by Cities of Sumas and Lynden	Some systems east of Lynden would be served by Sumas, and water systems west of Lynden would be served by Lynden. Water would be piped by the providers at the shared cost of the water systems.	Presumably similar in cost to the Lynden alternative. Still conceptual, Lynden and/or Sumas must agree to distribute wholesale water before this becomes a viable alternative. Expected to be technically and financially feasible.
Affected Water Systems Reduce Nitrate Concentrations by Treating Well Water	The affected systems reduce nitrate concentrations in the well water to an acceptable level, individually or collectively where feasible.	The most costly alternative, not financially feasible for most or all of the affected systems. (e.g. estimated cost for Rathbone Water Association. \$750,000). Technically feasible.

This table is from November 11, 2009 Email correspondence with Doug Allen, WSDOE, Bellingham Office

In response to the conclusions of the 2007 Nitrate Study, a grass roots effort identified wheeling water from Sumas through adjacent water systems as a possible third alternative solution to the regional contamination problem. In March 2009 Public Utility District No. 1 of Whatcom County commissioned a feasibility study funded by DOH to explore the viability of this new alternative.

Methodology

The 2007 Nitrate Study grouped nitrate contaminated water supplies into two general geographical areas as indicated by the red dashed circles in Map 2: Regional Nitrate Contamination Map. The area located west of Lynden along Birch Bay Lynden Road is referred to as: “Bertrand Creek Area” and; the area located northeast of Lynden near the intersection of Northwood Road and East Badger Road is referred to as the “Northwood Area”. These geographic areas can be seen in more detail on Map 2A: Bertrand Creek Area West of Lynden and Map 2B: Northwood Area Northeast of Lynden. These maps also highlight the water ways and tributaries in each area and this information will be important to the water right discussion later in the study.

Based on preliminary information gathered for this study it was concluded early on that:

- Wheeling water from Sumas to the Bertrand Area West of Lynden was not geographically or financially viable and;
- Sumas does not have adequate supply of water available to support the needs of both the Bertrand Creek Area and the Northwood Area.

Therefore, the primary intent of this study is to determine the most feasible means of providing safe and reliable potable water by wheeling water to existing customers in the Northwood Region between Lynden and Sumas including the Northwood Area. The regional source solution is focused on resolving health related issues and is not intended to provide water for irrigation or to support future growth in the region. The feasibility study will also evaluate the possibility of consolidation among the regions nine Group A and multiple Group B water systems with the goal of improving long term technical, managerial, and financial capacity within the region.

There are seven Group A Community Water systems in the Northwood Region northeast with contaminated groundwater supplies that serve a combined population of over 1,069 people via 369 residential and non-residential connections. The seven water systems include: Northwood Park Water System, Northwood Water Association, Meadowbrook Water Association, Delta Water Association, Ehlers Labor Camp, Rader Farms Labor Camp, and Covenant Christian School.

It is recognized at the outset that a complete feasibility study may require several parts, each building on the other, and ultimately resulting in a local Water System Plan (WSP) that can be implemented with proper governance and funding. Below are the parts identified as necessary to ultimately reach the goals.

- Part I - Gather data to determine if the essential elements are present to continue and engage parties;
- Part II - Prepare a hydraulic analysis with recommended improvements and cost estimates;
- Part III - Complete a local WSP, outline agreements and governance, and identify funding;
- Part IV - Develop construction reports and implement solution (beyond feasibility stage).

This remaining portion of this study is focused on Part I of the feasibility study and will follow the tasks as outlined for Part I in the approved scope of work.

Feasibility Study Part I: Preliminary Findings

Task 1: Biographical & Technical Data Collection and Analysis of Affected Water Systems

1.1 WATER SYSTEMS: *Identify Group A and B water systems in the study area. Summarize current water facilities inventory information for each participating water system.*

All the Group A and B water systems in the General Region were identified and the source of supply for each is shown on Map 3: Regional Water System Service Areas. Water system facility information was collected for those Group A and B Water Systems in and around the Northwood Region between Lynden and Sumas from the Nooksack River to the Canadian Border. A hard copy of the information collected is available upon request and will be included in the final draft of the feasibility study but it is not available in electronic format at this time. Below is a list of the information that has been collected as appropriate and where available:

- General Information (WFI)
- Source Information
- Water Quality/Exceedances
- Compliance Action
- Bi-lateral compliance agreement
- DOH Order/Correspondence
- Water Rights
- Water Supply Agreement
- Governing Documents-Articles/Bylaws

Table 2 on the following page provides a Summary of the Group A Water System in and around the Northwood Region.

1.2 SERVICE AREAS: *Identify and map the service area of participating and neighboring water systems. Identify service area of potential consolidated systems and the regional supply service area.*

We used the information collected in Task 1.1 to prepare Map 3: Regional Water System Service Areas. The Group A Service Areas shown are consistent with the excerpt from the Coordinated Water System Plan (CWSP) represented in Map 3A: Regional Coordinated Water System Plan (CWSP) Designated Water Service Areas unless more current information was available.

At this point we felt that it was important to establish a formal Study Area. We began the delineation process by including the service areas of those systems in the Northwood Area with contaminated sources. We then took into consideration both geographic and political boundaries such as: the Nooksack River, the Canadian Border, and city limits (Lynden, Everson, Nooksack, and Sumas). Finally we included any water system that has expressed interest in consolidation and/or restructuring (i.e. Hampton Water Association and Everson Water Association). The resulting Study Area Boundary is represented by the bold green border shown on Map 4: Study Area as well as Maps 3-6.

Table 2: Summary of Group A Water System General Information

Water System Name	ID	Existing Connections / Population Served	DOH Design Approval – Connections/Storage	DOE Water Rights (Qi/Qa)
Primary Need – Contamination With No Alternate Source of Water				
Northwood Park Water System 40-03E-10-SE/SW	62135	18 residential (50 pop)	No capacity approval No storage	G1-00144C 100gpm / 12.5af/yr
Northwood Water Assoc. 40-03E-14-NW/NW	62150	17 residential (49 pop) includes Ag/non-irrigation	17 residential No storage	GWC 02114 70gpm / 112af/yr
Meadowbrook Water Assoc. 10-03E-15-NE/NW 40-04E-07-SE/NE	53250	129 residential 12 res/ag large users (440 pop) includes Ag/non-irrigation	141 232,000 storage	GWC 02519 and G1-00123C 150 gpm / 100 af/yr *
Secondary Need – Restructuring/Consolidation				
Hampton Water Assoc.	30800	21 residential (54 res pop)	No capacity approval No storage	City of Everson Well Field
Everson Water Assoc.	24195	55 residential 11 res/ag large users (130 res pop) includes Ag/non-irrigation	66 No storage	City of Everson Well Field
Alternate Source Being Used or Pursued				
Delta Water Association 40-03E-03-SE/SE	18750	116 residential 58 non-res Incl. res/Ag large users (420 pop)	116 residential 58 non-res 200,200 gal storage	GWC 02418 and G1-24815 C 566gpm / 192.3 af/yr*
Ehlers Labor Camp 41-03E-36-SW/SE	58951	2 residential 8 non-res (5 res/35 non-res pop)	No capacity approval No storage	G1-108877CL? G1-050025CL - 201/2 G1-050026CL - 201/2
Rader Farms Labor Camp 40-03E-10-SE/SW	56829	7 non-residential (30 non-res pop)	No capacity approval No storage	CG1-*05773C 230 gpm. 56 af/yr
Covenant Christian School 40-03E-10	15596	2 non-residential (40 non-res pop)	2 non-res. POU RO Treatment No storage	No water right found.
Neighboring Systems				
City of Sumas	84870	622 (1,326 res/295 non-res pop) Ind./comm.	unspecified 500,000 gal storage	Sumas Well Fields
Nooksack Valley Water Assoc.	59850	312 residential 44 res/ag large users (900 res/440 non-res pop)Ag/non-irrigation	356 510,000 gal storage w/ City of Nooksack	Sumas Intertie 84870
City of Nooksack	59800	462 (1,163 res/852 non-res pop) Comm.	Unspecified 700,000 gal storage w/Nooksack Valley	Sumas Intertie 84870 Wheeled Through Nooksack Valley
City of Lynden	49150	5,409	Unspecified 9,000,000 gal storage	Nooksack River
City of Everson	24200	789 (2,050 res/420 non-res pop) Ind./Comm.	Unspecified 480,000 gal storage	Everson Well Fields

* The water system and DOE may not be in agreement

1.3 HYDRAULICS: *Identify and map the existing primary capital infrastructure of each system to provide an overview of the proximal relationship between system facilities. Explore what improvements would be necessary to achieve the objective.*

EXISTING INFRASTRUCTURE

Information for this task was collected from existing water system plans, engineering files, public records, water system records, and interviews with water system representatives. Based on the information available we assembled a representative map of the known primary infrastructure in the study area. This information is presented in Map 5: Study Area Existing Infrastructure.

The infrastructure of neighboring systems outside the study area has been left off intentionally where it does not directly impact this study. However, where appropriate, inter-ties were taken into account when evaluating the possibilities under which various water systems could be consolidated or restructured to accomplish the goals. Generally speaking various emergency and supply inter-ties are indicated where water mains cross service area boundaries. These inter-ties will be evaluated further as part of the hydraulic modeling scheduled in Part II of the Feasibility Study.

CONSOLIDATED/RESTRUCTURING

Based on the information collected about the water systems and their existing infrastructure we considered a variety of options for wheeling water throughout the study area and performed preliminary hydraulic analysis to confirm our hypotheses. The primary considerations from a hydraulic perspective were the availability of infrastructure, source of supply and the proximity of infrastructure to each system. The second consideration was the inherent culture and governance of each water system. Three basic options emerged from this analysis: Consolidate multiple systems into one or more larger systems; Systems remain independent and wheel water to and from neighboring systems; or some combination of both.

The preferred and simplest option to govern is the consolidation of as many systems as possible. Assuming that maximum consolidation is the desired option we have prepared a map that represent the most likely option for consolidation and restructuring based on the information available at this time. See Map 6: Study Area: Proposed Consolidated Service Area.

PROPOSED IMPROVEMENTS

The distribution improvements that would be necessary to accomplish the goal of wheeling water throughout the consolidated service area are represented in Map 6A: Study Area Proposed Improvements/Restructuring and listed below in order of priority:

- A. 12" main upgrade along Garrison from Halverstick to Clearbrook Road.
- B. 10" main upgrade along Clearbrook from Garrison to Nooksack Road.
- C. 8" main - new along Clearbrook from Nooksack Road to Meadowbrook Well Field.
- D. 8" main road crossing East Badger to connect Meadowbrook Water and Northwood Water.
- E. 8" main - new along East Badger to loop Meadowbrook and provide for Northwood Park.
- F. 8" main - new to connect Meadowbrook and Everson Water Association.
- G₁ 8" main - new to connect Meadowbrook and Hampton Water Association.
- G₂ 8" main - new to complete Meadowbrook loop to Hampton and Everson Water Associations.
- H. 8" emergency inter-tie Nooksack.
- I. 4" main - new extension from Meadowbrook to Covenant Christian School.
- J. 8"-12" main new extension from Clearbrook/VanBuren intersection to Delta Water Well Field.

1.4 OPERATIONS & MAINTENANCE: *Identify water facility maintenance and operations issues between wheeling entities that need to be addressed to meet the objective. Also identify the cost savings achieved through use of a regional water supply and any consolidation or cooperation achieved as a result of the recommendations.*

During the process of gathering information on the various systems it became clear that if Sumas water was used as a regional source of supply many if not all of the contaminated sources could be eliminated from use on a regular basis and this would significantly reduce the maintenance and operation of several systems. Direct cost savings include reduced water quality monitoring labs and labor, electricity, and general maintenance and management labor.

Probably the most significant savings would be from avoiding the high capital and operational cost of treatment that will be required for many water systems if an alternate source is not secured. Further operational and capital cost analysis will be necessary to determine the true cost savings of this alternative but we believe that the consolidation and restructuring of multiple systems into one system to facilitate wheeling quality water from Sumas is the most viable solution available.

1.5 WATER QUALITY: *Identify current water quality issues for each individual utility. Also identify potential water quality issues that may arise by wheeling water with varying levels of treatment mixing in the distribution system such as disinfection by-products.*

Table 3 below summarizes water quality data for the Group A systems with contaminated sources in the study area. The water quality data was collected from the 2007 Nitrate Feasibility Study, DOH water quality database, and other sources including records of the water systems represented.

Table 3: Water Quality Parameters

Water system Name	Contaminant	Highest Nitrate Level (mg/L)	Average Nitrate Level (mg/L)	EDB Range Level (ppb)	Corrosive Water
Covenant Christian School	Nitrate	21.0	21.0	N/A	Uncertain
Rader Farms Labor Camp	Nitrate	19.4	15.3	N/A	N/A
Ehlers Labor Camp	Nitrate	15.6	14.1	N/A	N/A
Northwood Park	Nitrate	20.1	16.9	N/A	Treated
Northwood Water Assoc.	Nitrate	15.7	13.8	N/A	No
Meadowbrook Water Assoc.	Nitrate/EDB	Unavailable (11.0 in 2009)	Unavailable (11.0 in 2009)	0.000 - 0.130 (0.072 in 1984) (0.078 in 2009)	No
Delta Water Assoc.	Nitrate	19.7	15.5	N/A	Yes

During our evaluation of water quality for each system we spoke at length with various water quality professionals including Steve Hulsman with the Washington State Office of Drinking Water. We concluded that the water from the Sumas Kneuman Well Field and the Meadowbrook Water Association VanBuren well field meet current Drinking Water Standards, do not require treatment, and are inherently very compatible. With proper maintenance and operational management we do not anticipate any significant problems with using either source as needed.

As part of our broad analysis we also explored the possibility of blending water from Sumas and Meadowbrook with the various individual contaminated sources noted in Table 3 and concluded that this is not a feasible option. For example it is theoretically possible to blend Meadowbrook Water 50/50 with Northwood Water Association and reduce the average nitrate level from 13.8 mg/L to 6.9 mg/L. However, this option is significantly more complex and costly because it would require additional transmission lines, storage, control, and monitoring. The same is generally true for the other contaminated systems. If there is an adequate source of uncontaminated water and related water rights

available, the preferred option is to simply wheeling water throughout the study area. The only reason blending may need to be reconsidered is if there are not adequate water rights available from Sumas to meet the demand. The feasibility of blending Sumas water with contaminated sources will be reconsidered briefly during the hydraulic analysis in Part II of the feasibility study.

Based on the preferred alternative of using water only from Sumas and the Meadowbrook Water Association VanBuren well field we do not anticipate any significant water quality issues related to the blending of these two sources. Neither the water from Sumas or VanBuren required treatment. Sumas will periodically disinfect the distribution system by adding chlorine at the source until there is a residual throughout the system for a short period of time. Because disinfection is not required and is only used for a short period of time during annual maintenance there should be no concern about varying levels of treatment mixing in the distribution system such as disinfection by-products.

Task 2: Analysis of Affected Water system's Water rights and governance Issues

2.1 WATER RIGHTS: *Identify the source of water, corresponding water rights, and surplus or deficit of supply for each system. This element may require some basic water system planning and analysis to estimate supply and demand if the system does not have a current Water System Plan or Small water System Management Program to draw information from. Explore willingness of existing governing bodies to participate in sharing water right resources to meet the objective.*

The Sumas City Council has fully supported the alternative of wheeling water to help meet the needs of existing water systems west of Sumas. Sumas has proposed committing 500 gpm and 500 Acre Feet/Per Year for at this time.

This feasibility study was initiated on the premise that Sumas has adequate source of supply and corresponding water rights to meet the needs of water systems in the study area. Substantiating this has been the single most important element in Part I of the feasibility study. In August 2009 Sumas filed Proof of Appropriation for an existing industrial water right that had been put to full beneficial use and received a Water Right Certificate on December 7, 2009. Shortly thereafter Sumas submitted a Water Right Change Application which was necessary for Sumas to wheel water to systems in the study area. Sumas has water available for redistribution to systems in the study area because of conservation measures put in place by the Sumas industrial customers. On February 12, 2010 the Water Right Change Application and related Report of Exam was approved. Sumas now has the Water Rights and is believed to have adequate quantity and quality of water to supply at minimum 500 gpm and 500 acre feet per year to wholesale water customers in the study area.

Based on the assumption that only water from Sumas and the Meadowbrook VanBuren well fields will be used there are several systems that have valid water rights that might not be needed in the future. Careful consideration will need to be given to how any unused water rights are managed, especially in light of the current municipal water law which says that non municipal water rights are subject to relinquishment if they are not actively put to beneficial use during a five year period. The discussion of water rights will be revisited in detail once a strategy and plan has been developed that identifies which water rights are needed. This review will be based on current DOE and DOH interpretation of Municipal Water Law.

WATER SUPPLY AND DEMAND

Table 4 presents preliminary Instantaneous (Qi) and Annual (Qa) Water Supply and Demand information for water systems in the Study Area. We interviewed representatives from a majority of systems in the Study Area, and collected information from the 2007 Nitrate Study, Water System Plans, public documents and water system records. Based on the data collected we believe that the information in the table provides a good overall picture from which to proceed. However, additional information will be needed during part II of the study to ensure that the hydraulic modeling and related conclusions are correct.

Table 4: Water System Supply & Demand Estimate

	ID	Certificated Water Rights Available in Study Area		Uncontaminated Certificated Water Rights Available in Study Area w/out Blending		Current Water Demand in Study Area (best available info)		Current Certificated Water Rights Surplus (Deficit) in Study Area w/out Blending	
System Name		Qi (gpm)	Qa (afy)	Qi (gpm)	Qa (afy)	Qi (gpm)	Qa (afy)	Qi (gpm)	Qa (afy)
Primary Need - Contaminated w/No Alternate Source		470.01	226.50	150.00	100.00	396.00	361.68	(246.00)	(261.68)
Northwood Park	62135	100.00	12.50	-	-	49.00	8.04	(49.00)	(8.04)
Northwood Water Association	62150	70.01	112.00	-	-	47.00	57.24	(47.00)	(57.24)
Meadowbrook Water Association	53250	300.00	102.00	150.00	100.00	300.00	296.40	(150.00)	(196.40)
Secondary Need - Restructuring/Consolidation		-	-	-	-	249.15	159.85	(249.15)	(159.85)
Hampton Water Association	30800	-	-	-	-	29.15	8.35	(29.15)	(8.35)
Everson Water Association	24195	-	-	-	-	220.00	151.50	(220.00)	(151.50)
Primary + Restructuring/Consolidation Need		470.01	226.50	150.00	100.00	645.15	521.53	(495.15)	(421.53)
Alternate Source Being Pursued		565.94	192.30	283.00	192.30	566.00	491.00	(283.00)	(298.70)
Delta Water Association	18750	565.94	192.30	283.00	192.30	566.00	491.00	(283.00)	(298.70)
Adequate Source/Treatment Being Used		450.79	63.60	-	-	40.00	16.94	(40.00)	(16.94)
Rader Farms Labor Camp (TNC)	56829	229.79	56.00			12.50	8.07	(12.50)	(8.07)
Ehlers Labor Camp (TNC)	58951	201.00	2.00			10.50	6.72	(10.50)	(6.72)
Covenant Christian School (NTNC)	15596	20.00	5.60			17.00	2.15	(17.00)	(2.15)
Group B Systems - Long Term Consideration									
Bath Labor Camp (Group B)	56852								
Pangborn Water Association (Group B)	65900								
Vogel, Harriet A (Group B)	1146								
East Badger Water Association (Group B)	37823								
Line Road Water Association (Group B)	47385								

Note: Transferring water rights from a contaminated source to a potable source may be possible but it is usually complex, source specific, and in some cases has already been tried unsuccessfully. Pending Municipal Water Law litigation may also have significant impact on the options available for transferring water rights.

2.2 GOVERNANCE: *Gathered information and agreements concerning individual utilities governing structure. Identify governance and administrative issues and options to permit wheeling of water between systems and consolidation of water systems including (as applicable): dissolution, annexation, water rights transfer, obtaining easements and/or franchises, service meters, and conformance with local ordinances, the Coordinated Water System Plan, and with WAC 246-290-100 and -230.*

We have collected and reviewed various Articles, Bylaws, Water Supply Agreements and other Documents that govern the individual utilities and there does not appear to be evidence of anything significant that would prevent the associations who are interested from participating in consolidation and/or restructuring. Copies of these documents are in the appendix. Most if not all of the participants to consolidation are private nonprofit organizations and this makes it relatively straight forward to facilitate consolidation under one or more nonprofit entities.

Once we have a clear picture of what is required hydraulically to consolidate the participating systems we will have better framework to begin discussing how governance among the entities might proceed. Governance will be a significant portion in Part III of the feasibility study.

RECOMMENDATIONS

Based on the information available and analysis completed to date during Part I of the feasibility study it is our recommendation that Part II of the North Whatcom County Regional Source Feasibility Study begin immediately once funding is approved.

Part II Scope of Work will focus on three primary areas:

- Public Outreach, Support, and Participation
- Hydraulic Analysis, Recommended Improvements, and Cost Estimates
- Preparation for Feasibility Study Part III & IV
 - Part III
 - Water System Planning
 - Agreements and Governance
 - Funding and Financial Planning
 - Part IV
 - Construction Documents
 - Project Completion

Appendix

Maps

- Map 1: Regional Vicinity Map
- Map 2: Regional Nitrate Contamination Map
- Map 2A: Bertrand Area Water Ways & Tributaries
- Map 2B: Northwood Area Water Ways & Tributaries
- Map 3: Regional Water System Service Areas
- Map 3A: Regional CWSP Designated Water Service Areas
- Map 4: Study Area
- Map 5: Study Area Existing Infrastructure
- Map 6: Study Area Proposed Consolidated Service Area
- Map 6A: Study Area Proposed Improvements/Restructuring

Exhibits: Water System Information

*Items included for Each Water System as Appropriate

- h) General Information and/or WFI
- i) Source Information
- j) Water Quality/Exceedances/Compliance Action
- k) Bi-lateral compliance agreement
- l) DOH Order/Correspondence
- m) Water Rights
- n) Water Supply Agreement
- o) Governing Documents-Articles/Bylaws

Primary Need – Contamination With No Alternate Source of Water

- 16. Northwood Park Water Association (Group A)
- 17. Northwood Water Association (Group A)
- 18. Meadowbrook Water Association (Group A)

Secondary Need – restructuring /Consolidation

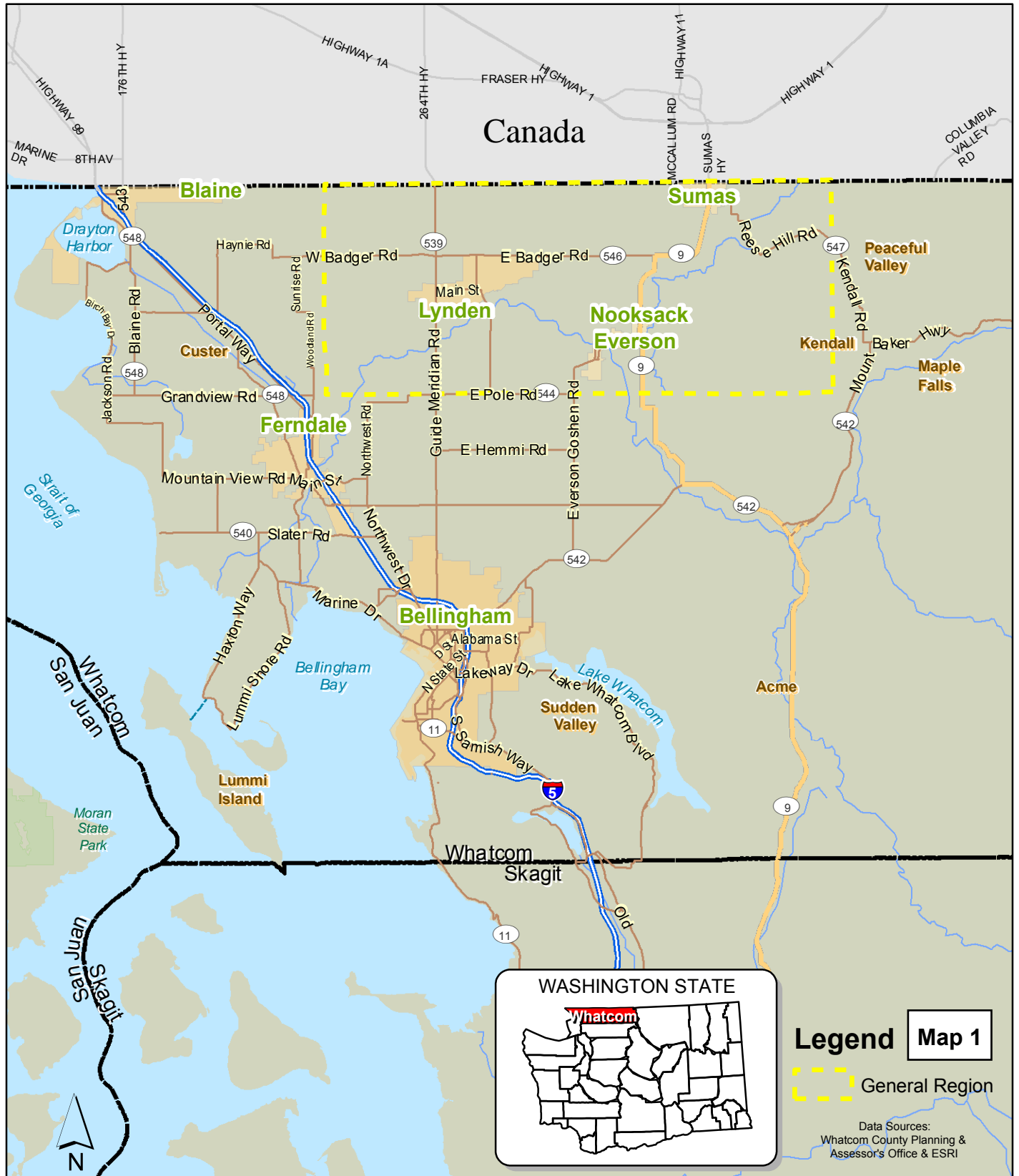
- 19. Hampton Water Association (Group A)
- 20. Everson Water Association (Group A)

Alternate Source Being Used or Pursued

- 21. Delta Water Association (Group A)
- 22. Ehlers Labor Camp (TNC)
- 23. Rader Farms Labor Camp (TNC)
- 24. Covenant Christian School (NTNC)

Neighboring and Other Systems

- 25. City of Sumas (Municipal)
 - a. Water Right Certificate/Change Application
 - b. Approved Report of Examination
- 26. Nooksack Valley Water Association (Group A)
- 27. City of Nooksack (Municipal)
- 28. City of Lynden (Municipal)
- 29. City of Everson (Municipal)
- 30. Group B Systems
 - a. Bath Labor Camp (Group B)
 - b. Pangborn Water Association (Group B)
 - c. Vogel, Harriet A (Group B)
 - d. East Badger Water Association (Group B)
 - e. Line road Water Association (Group B)



1 inch = 5 miles

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WHATCOM COUNTY PUD NO. 1

WHATCOM COUNTY

WASHINGTON

North County Feasibility Study Regional Vicinity Map

DATE
FEB 2008

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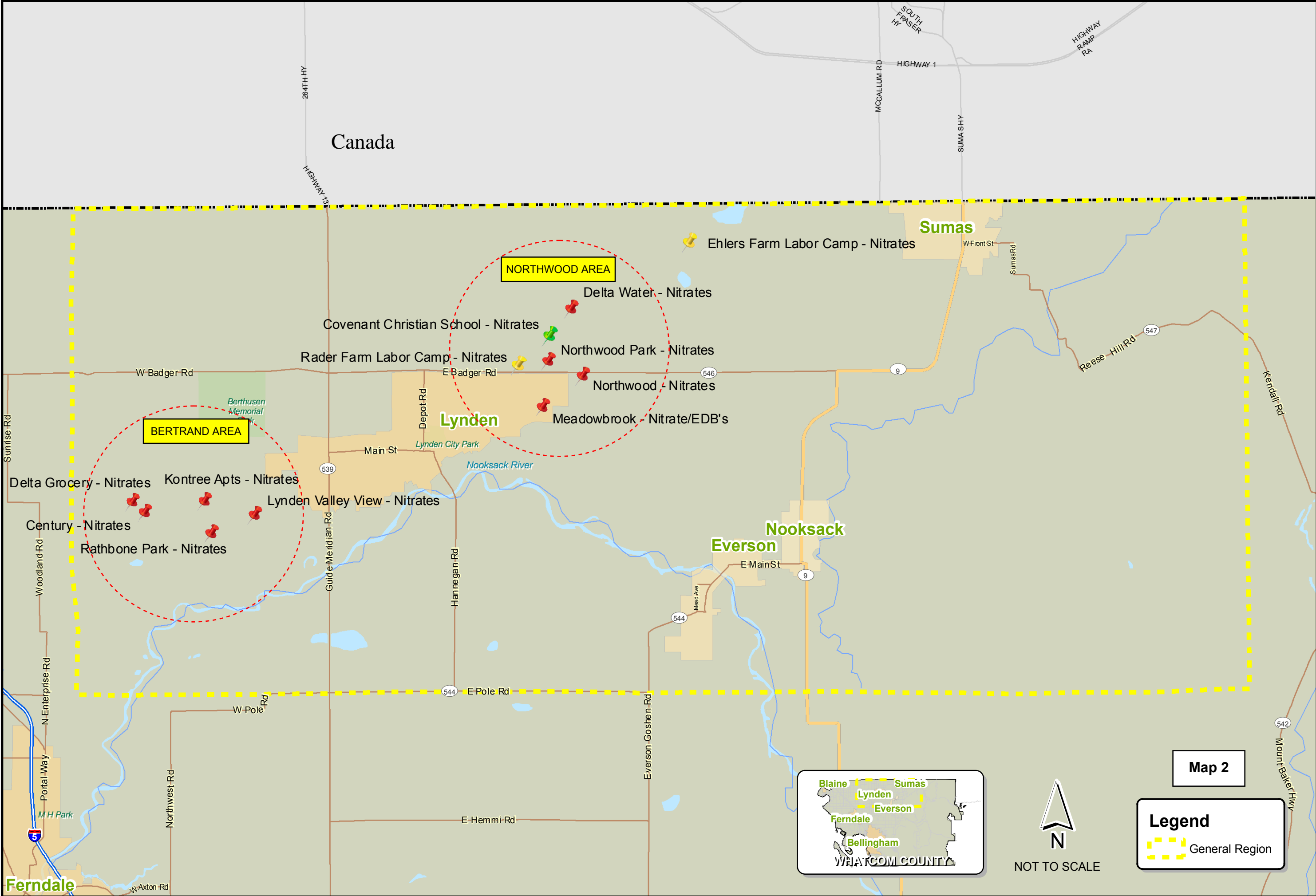
JOB NUMBER
2009-035

SHEET

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OF

6



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Coordinate System:
UTM Zone 10
Washington North

Data Sources:
Whatcom County Planning &
Assessor's Office & ESR1

WHATCOM COUNTY
North County Feasibility Study
Regional Nitrate Contamination Map

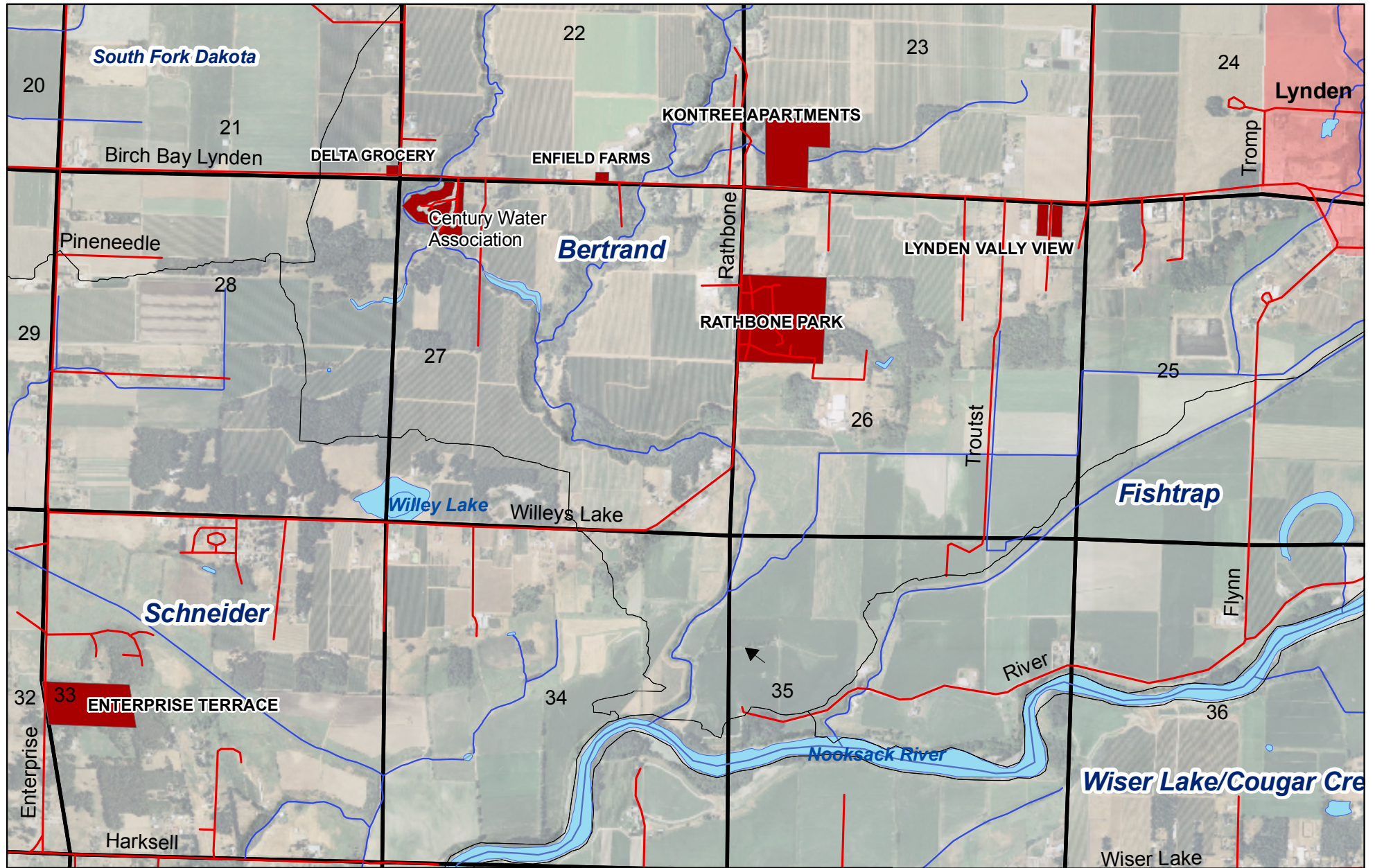
WHATCOM COUNTY PUD NO.1

DATE: FEB 2 010
SCALE: 1" = 85,000
JOB NUMBER: 2009-035

SHEET: 2
OF: 6

BERTRAND CREEK AREA - Contaminated Source Locations High Nitrate Water Systems - (West of Lynden)

0 0.5 1 Miles



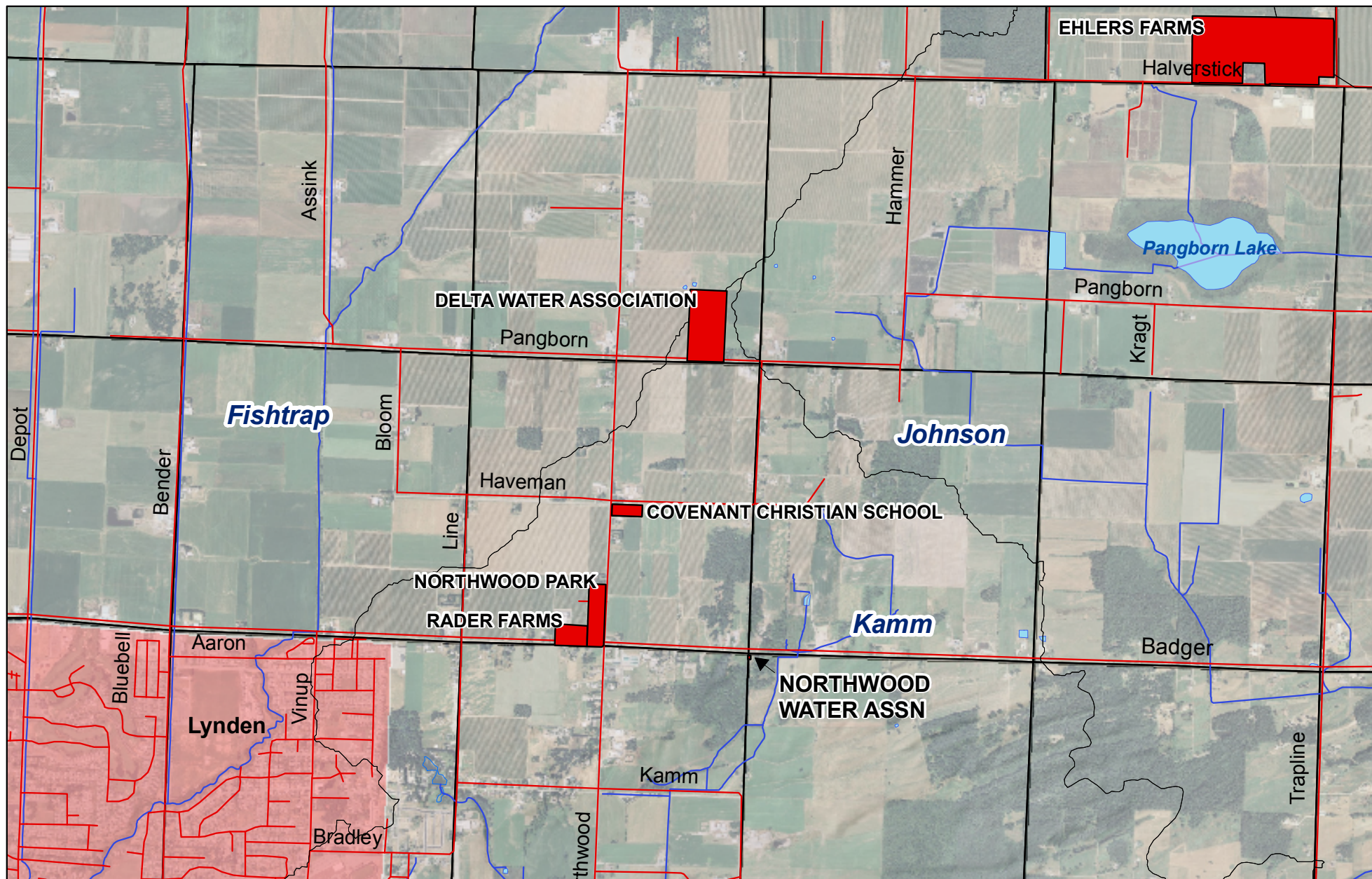
This map showing surface water and nitrate contaminated sources is from November 11, 2009 E-mail correspond with Doug allen, WSDOE, Bellingham Office

Bertrand Creek Area - Map 2A

NORTHWOOD AREA - Contaminated Source Locations

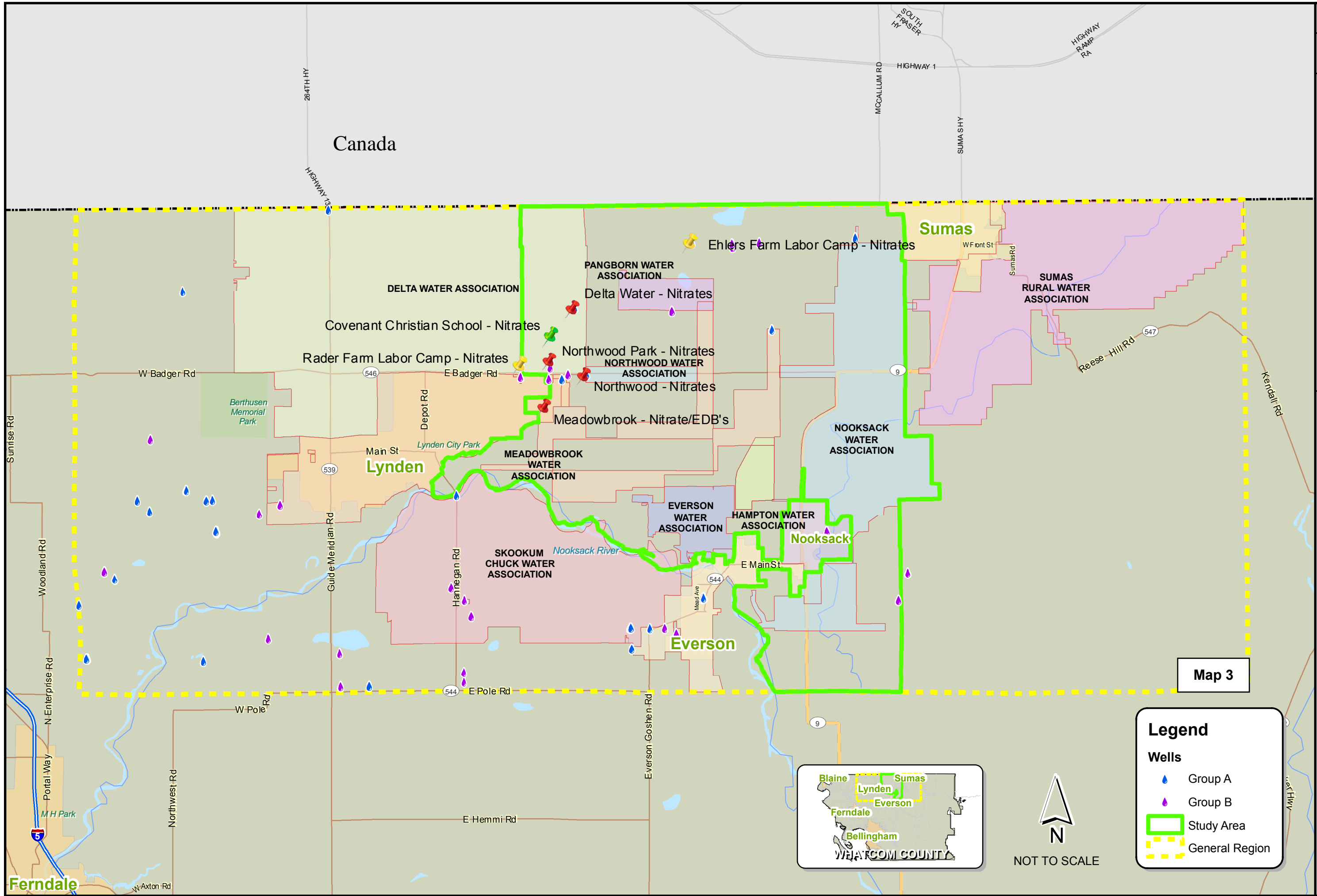
High Nitrate Water Systems - (Northeast of Lynden)

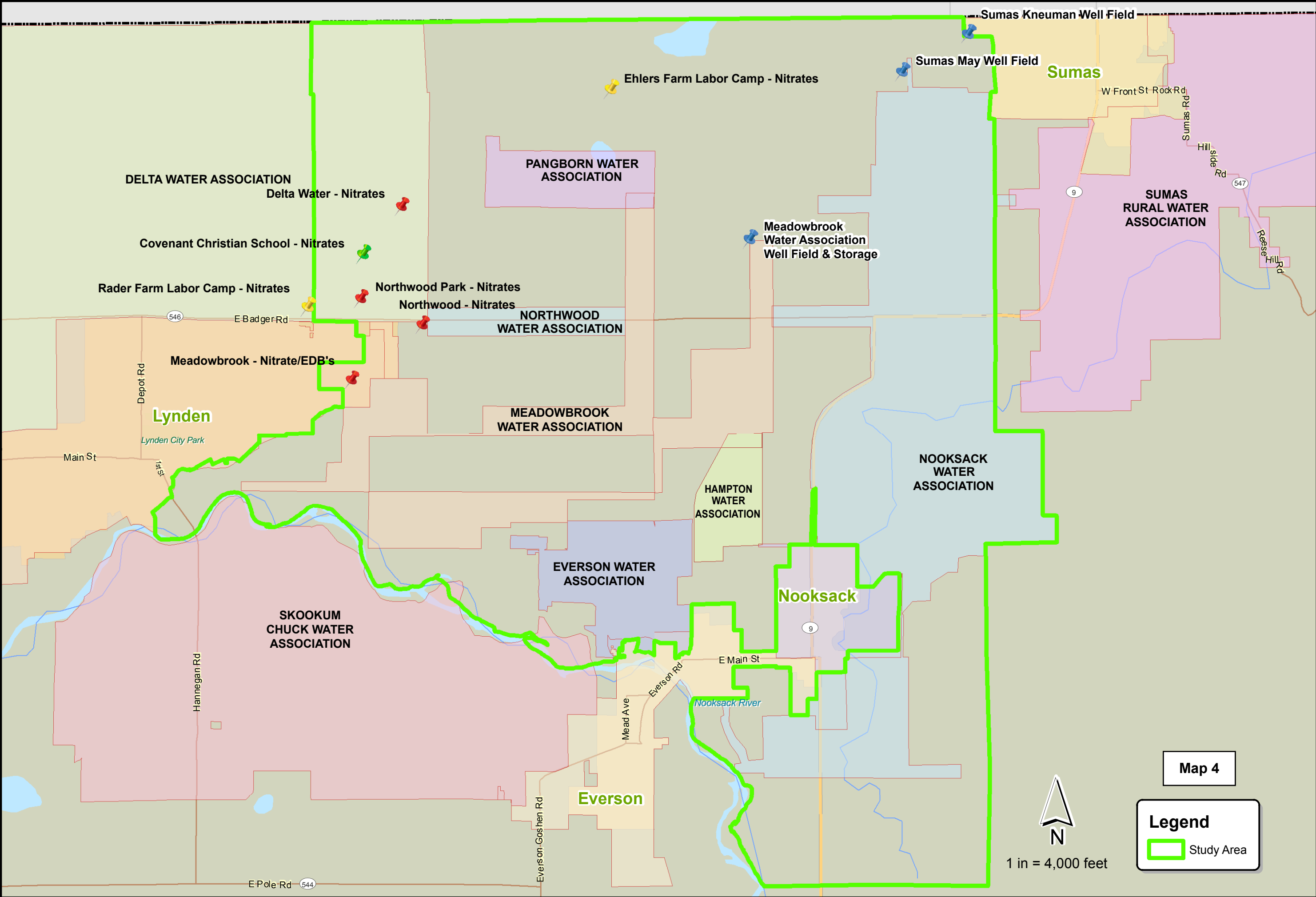
0 0.5 1 Miles




This map showing surface water and nitrate contaminated sources is from November 11, 2009 E-mail correspond with Doug allen, WSDOE, Bellingham Office

Northwood Area - Map 2B





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WHATCOM COUNTY

WHATCOM COUNTY PUD NO.1

North County Feasibility Study
Study Area

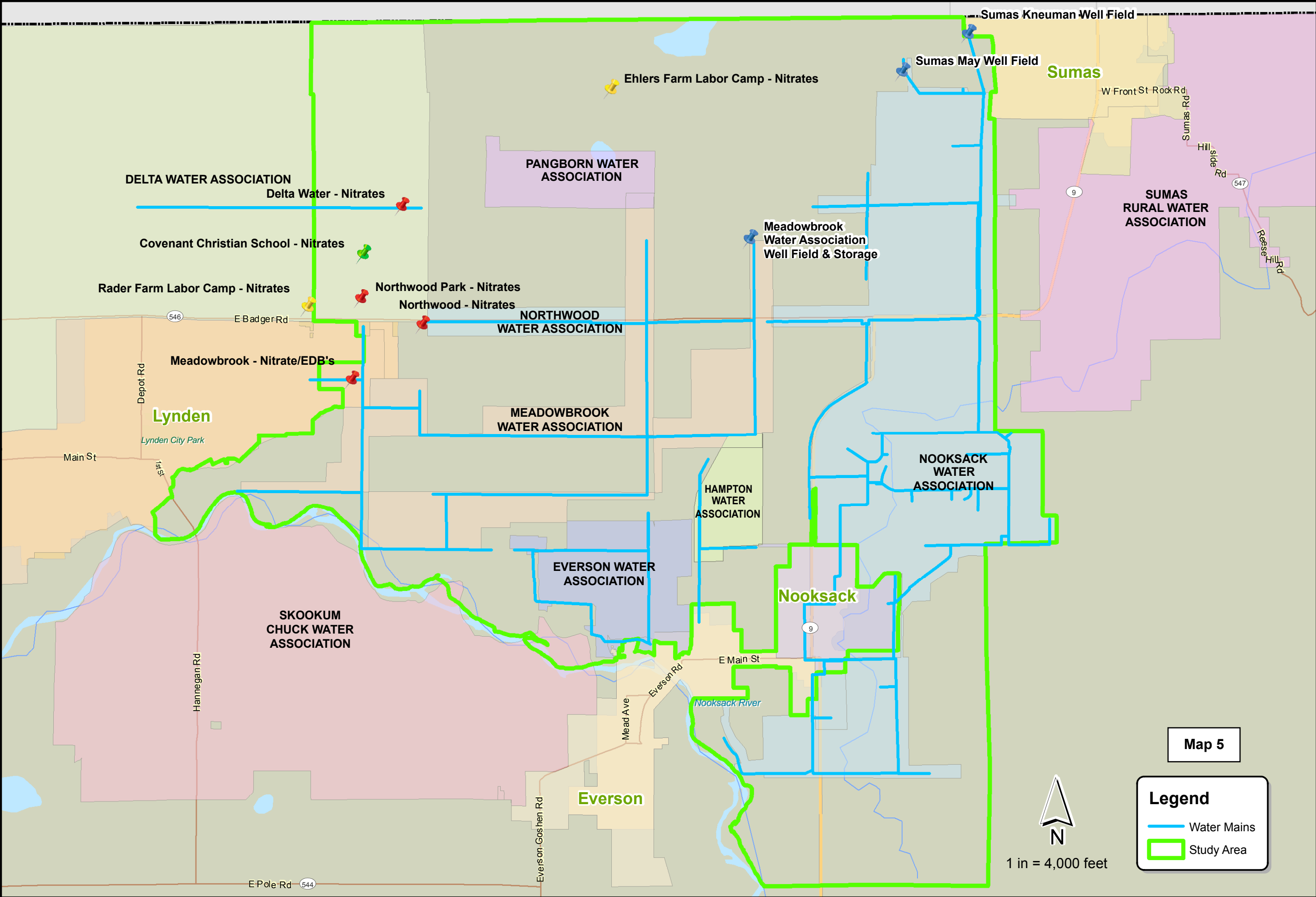
DATE
FEB 2 010

SCALE
1" = 48,000'

JOB NUMBER
2009-035

SHEET
4

OF
6



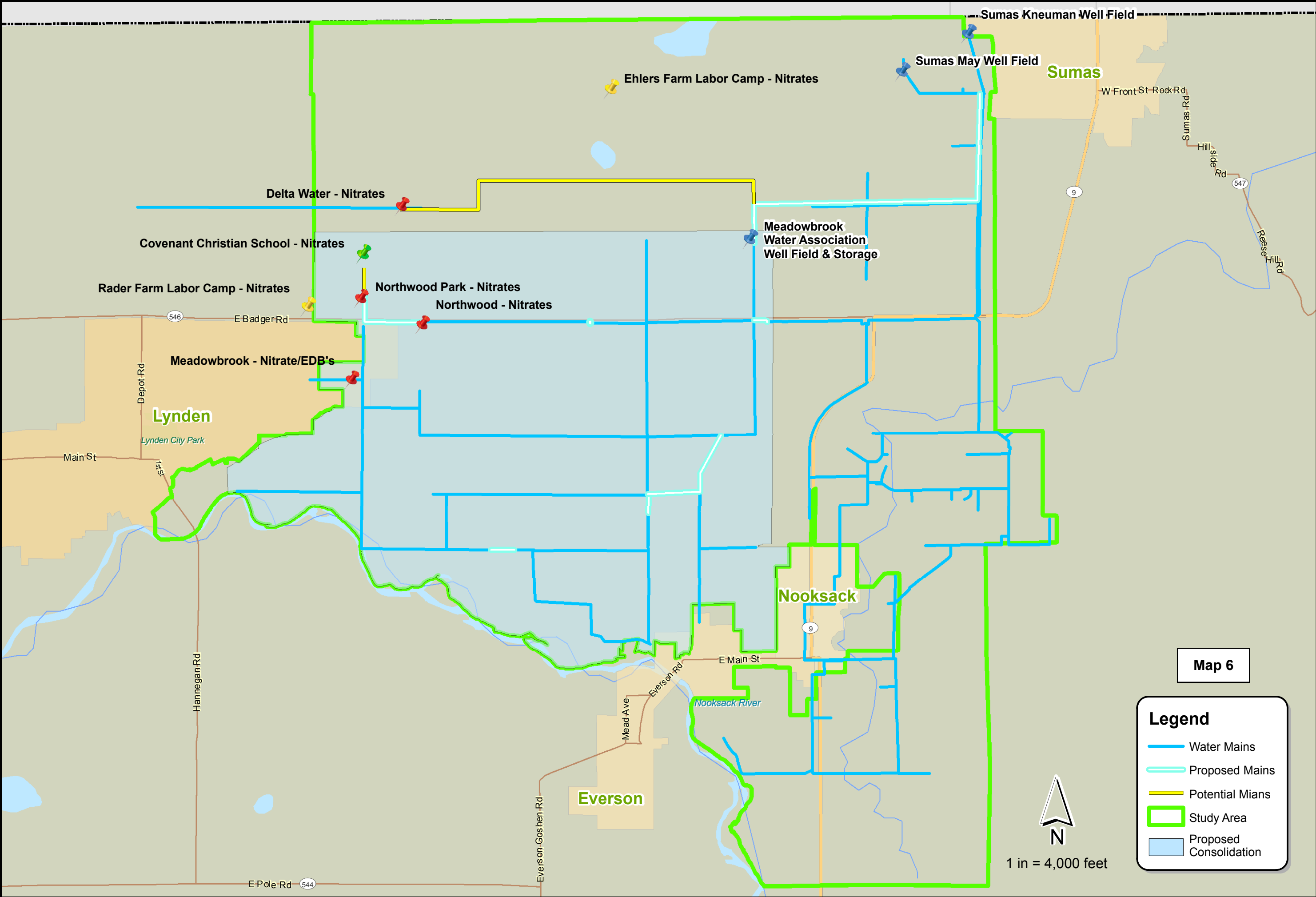
WHATCOM COUNTY	WHATCOM COUNTY PUD NO.1	
	North County Feasibility Study	
	Study Area Existing Infrastructure	
DATE FEB 2 010	SCALE 1" = 48,000'	JOB NUMBER 2009-035
SHEET 5		OF 6

Coordinate System:
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Data Sources:
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Map 6

Legend

- Water Mains
- Proposed Mains
- Potential Mians
- Study Area
- Proposed Consolidation

