



# Little Campbell River Integrated Stormwater Scoping Study VOLUME 2: REPORT FIGURES

Final Report  
March 2011



# Little Campbell River Integrated Stormwater Scoping Study VOLUME 2: REPORT FIGURES

Final Report  
March 2011

KWL File No. 471.180

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









Figure 12-2: Upper Little Campbell River Floodplain and Inventory

Figure 13-1: McNally Creek ISMP Area and Sampling Locations

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City of Surrey/Township of Langley  
Little Campbell River ISMP  
Scoping Study

Legend

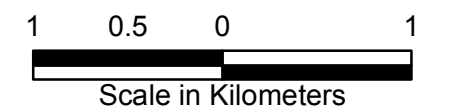
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-  ISMP Area ID
-  ISMP Area Boundary
-  Catchment ID
-  Major Catchment Boundary
-  Watercourse
-  Golf Course
-  Parks
-  Wetland
-  ALR Area

ISMP Areas

- ① McNally Creek
- ② Fergus Creek
- ③ Kuhn Creek
- ④ Sam Hill / Twin Creeks
- ⑤ Jacobsen / Highland Creek
- ⑥ Fernridge / Campbell Heights
- ⑦ Upper Little Campbell River

Orthophoto Source:  
City of Surrey 2006 and Township of Langley 2007.  
City of White Rock and Washington St. ortho from  
Bing aerial map imagery.

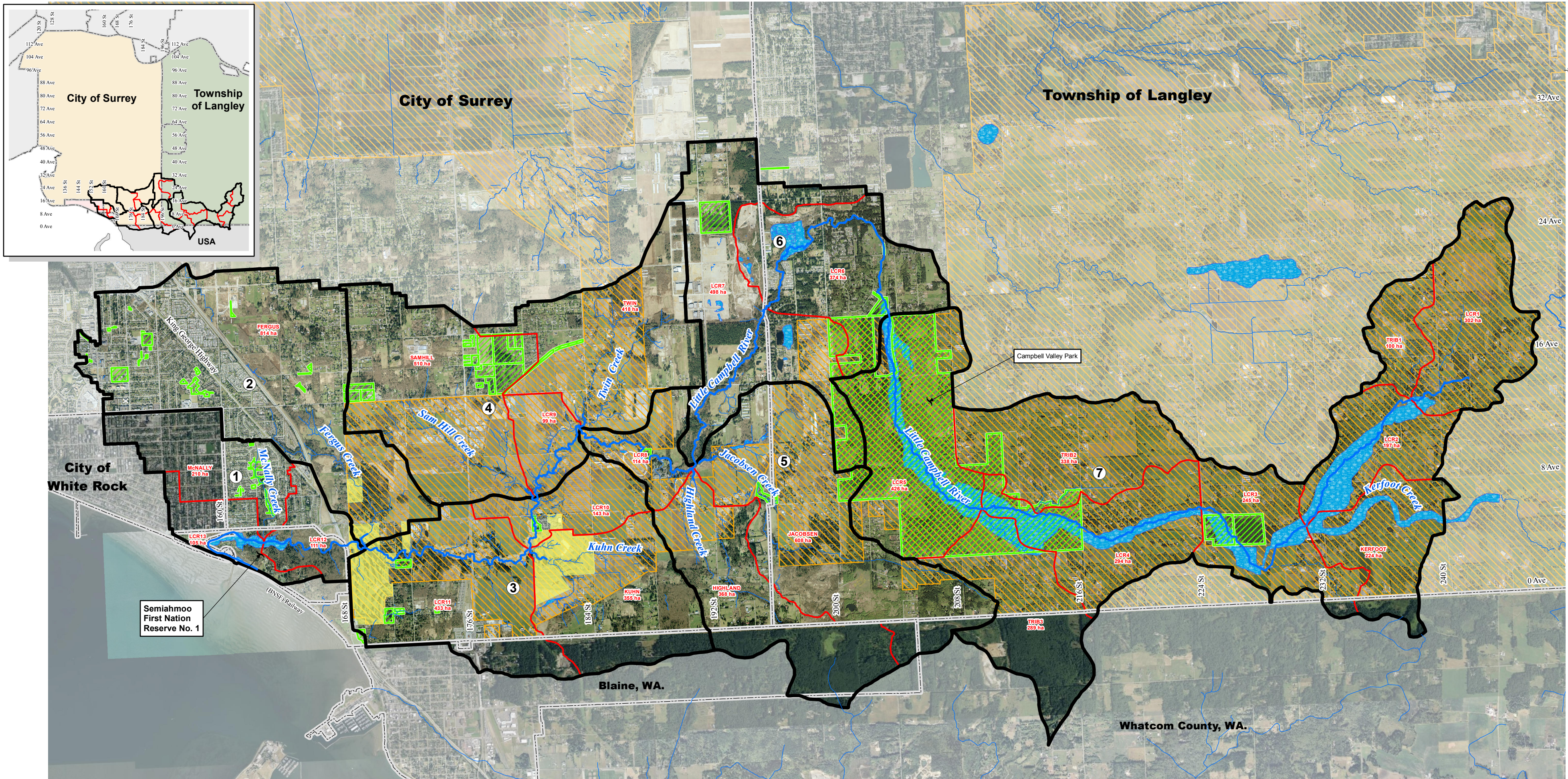
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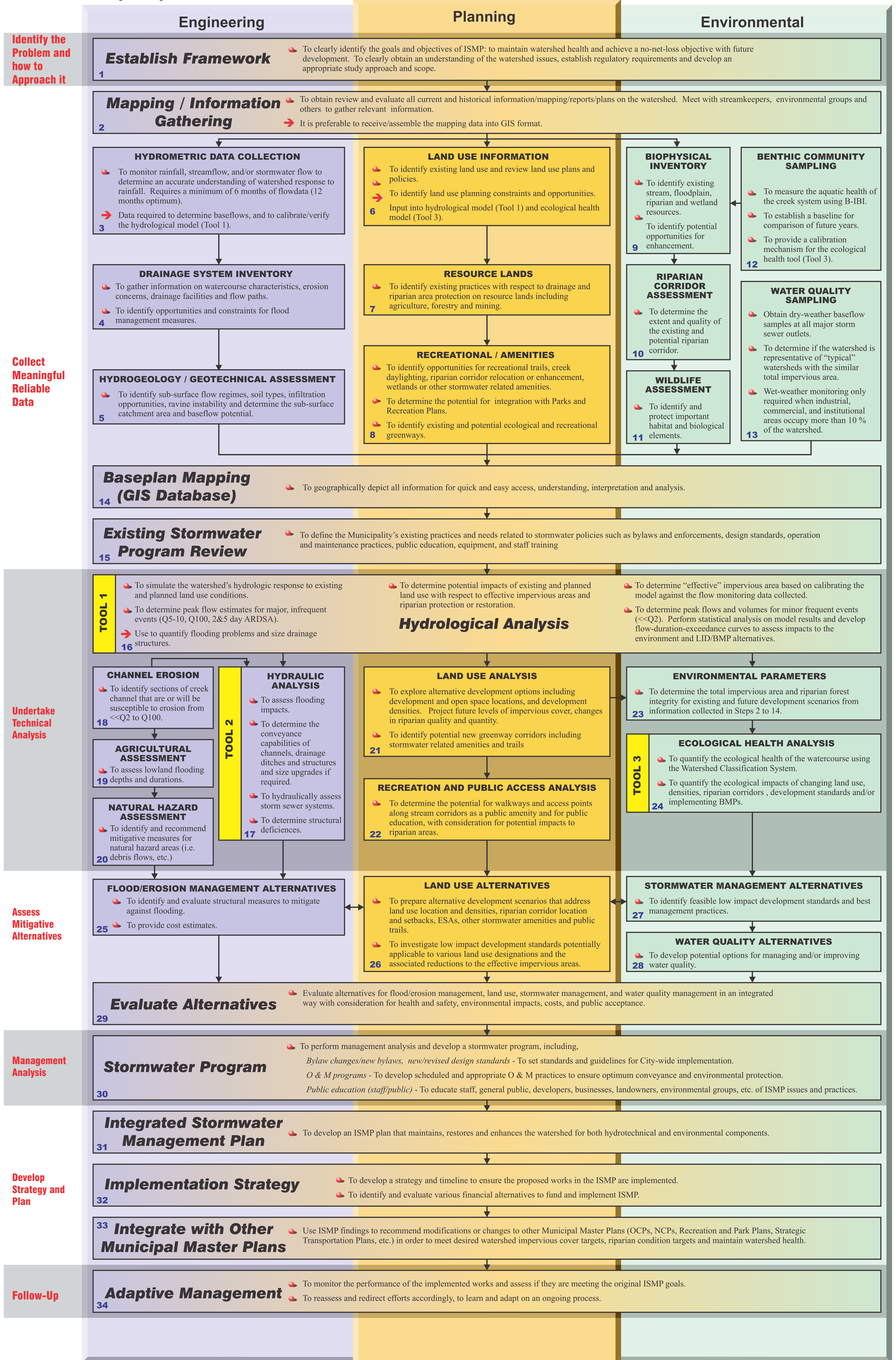
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Study Area

Figure 1-1



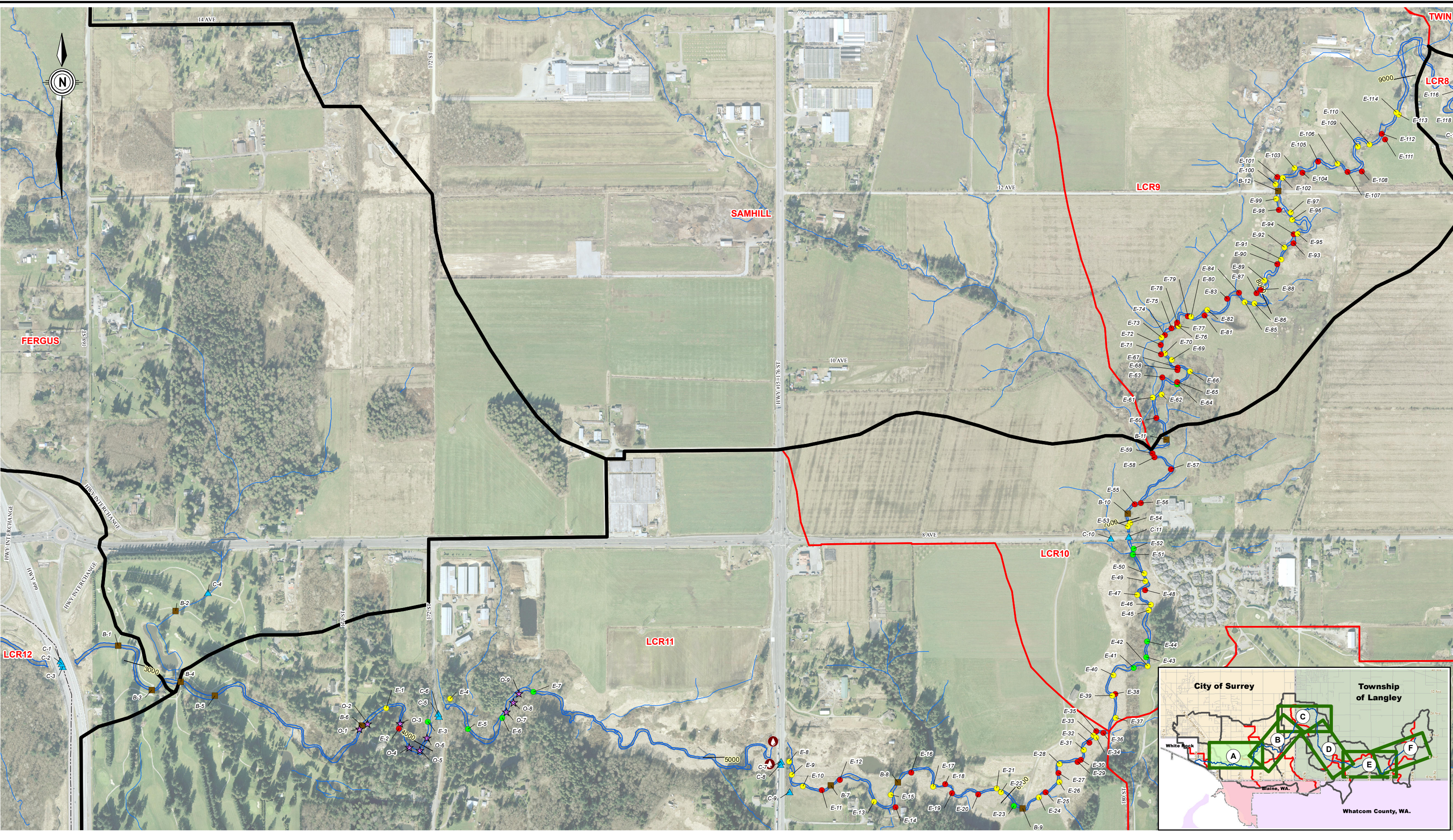
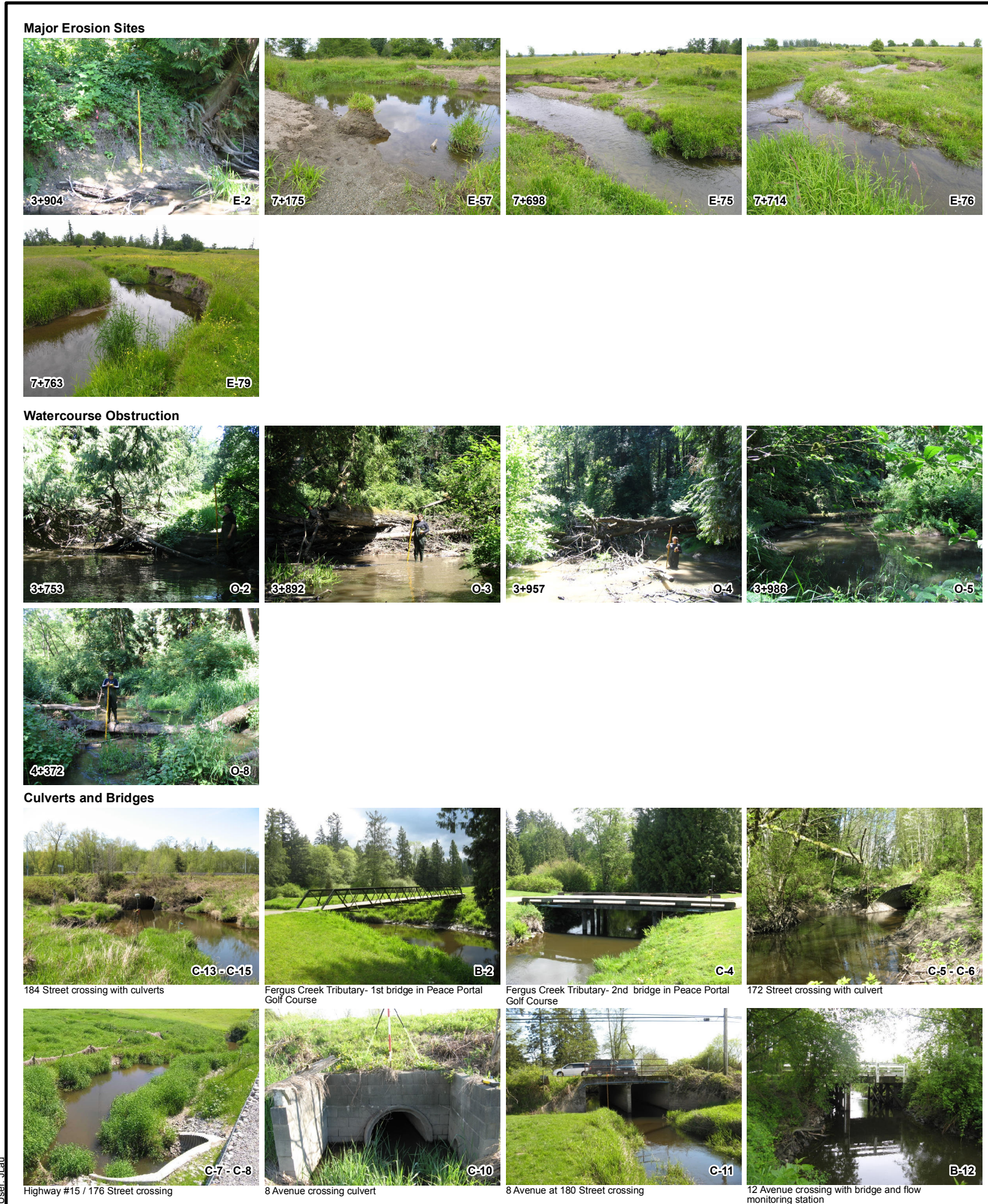
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# Integrated Stormwater Management Planning Technical Process

26 Refers to ISMP Clause Number in Appendix C

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**City of Surrey/Township of Langley  
Little Campbell River ISMP  
Scoping Study**

**Legend**

- City/Township/US Boundary
- ISMP Area Boundary
- Catchment ID
- Major Catchment Boundary
- Watercourse
- Storm Outfall
- River Chainage
- (From KWL 2007 Survey)**
- Bridge
- Culvert
- Obstruction
- Deposition
- Erosion (Severity)**
- High
- Moderate
- Low

Orthophoto Source:  
City of Surrey 2006 and Township of Langley 2007.

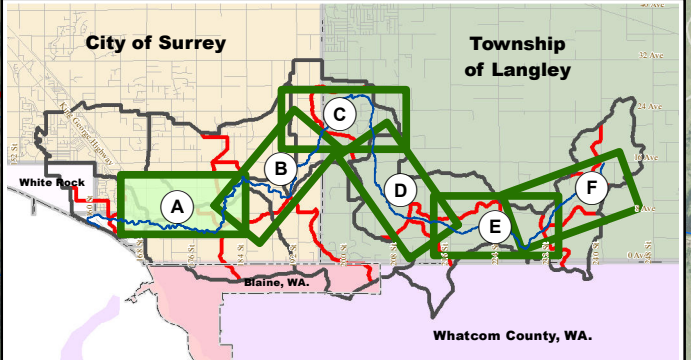
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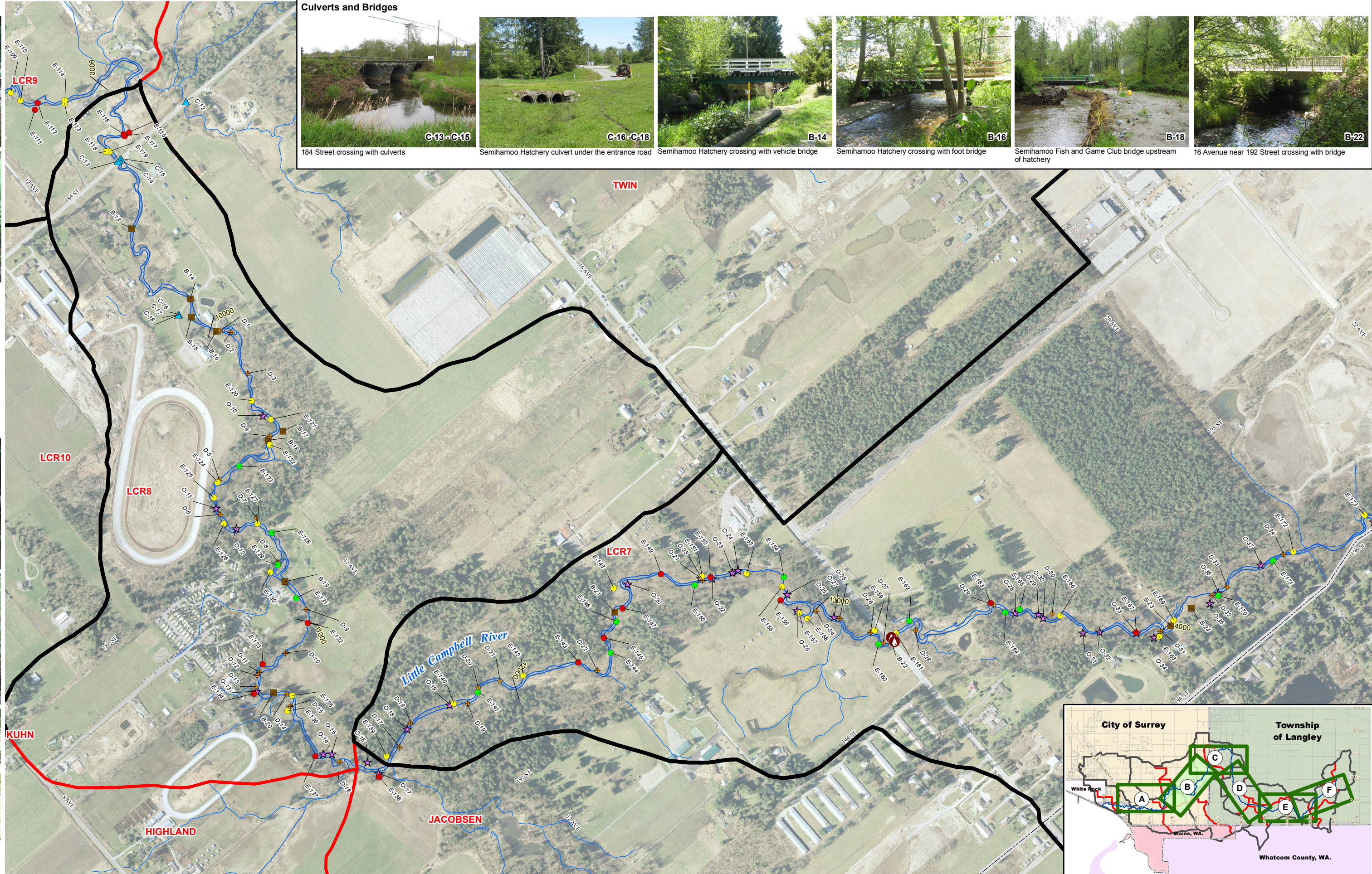
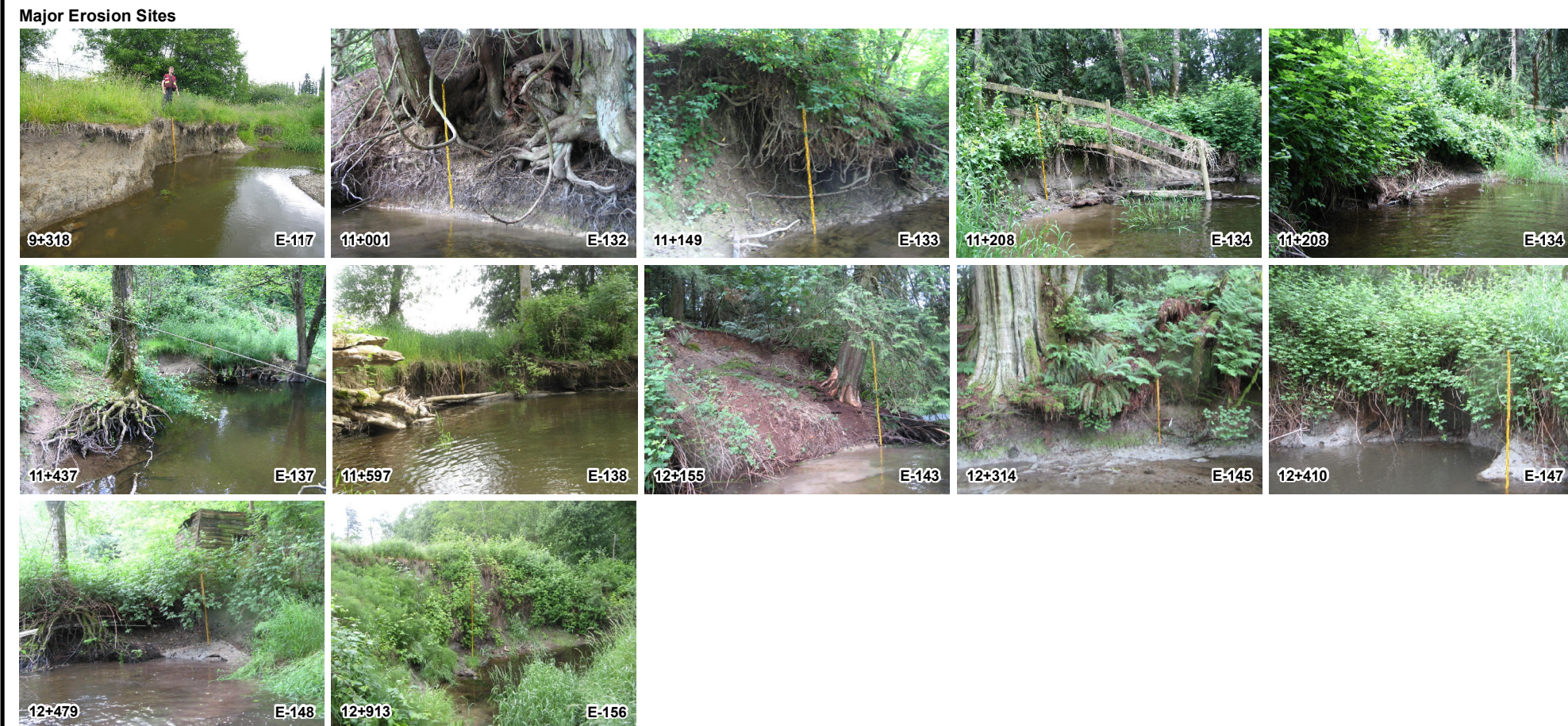
0.2 0.1 0 0.2  
Scale in Kilometers

Project No. 471-180	Date March, 2011
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**Detailed  
Drainage Inventory  
Highway 99 to  
12 Avenue**

**Figure 2-1A**

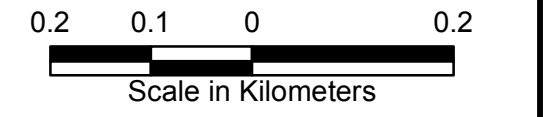




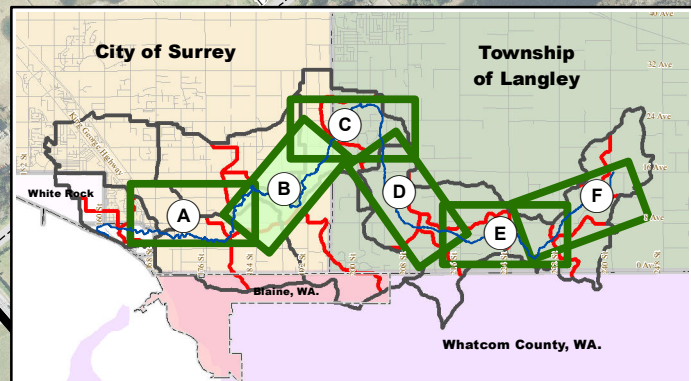
## City of Surrey/Township of Langley Little Campbell River ISMP Scoping Study

- ### Legend
- City/Township/US Boundary
  - ISMP Catchment Boundary
  - Catchment ID
  - Major Catchment Boundary
  - Storm Outfall
  - Watercourse
  - River Chainage
  - Bridge
  - Culvert
  - Obstruction
  - Deposition
- ### Erosion (Severity)
- High
  - Moderate
  - Low

Orthophoto Source:  
City of Surrey 2006 and Township of Langley 2007.

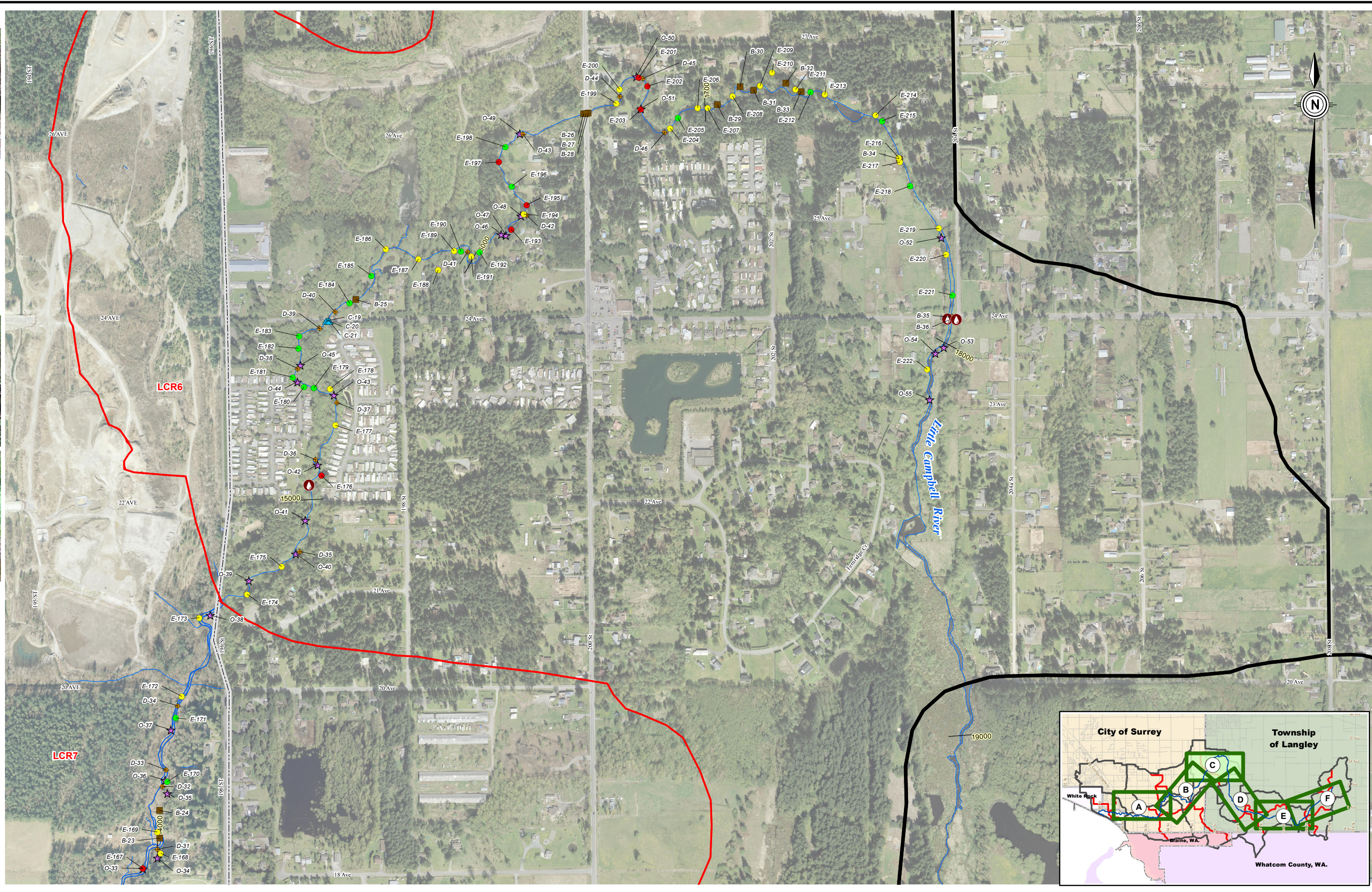


Project No. 471-180	Date March, 2011
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## Detailed Drainage Inventory 12 Avenue to 196 Street Figure 2-1B

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**City of Surrey/Township of Langley  
Little Campbell River ISMP  
Scoping Study**

**Legend**

- City/Township/US Boundary
- ISMP Area Boundary
- Catchment ID
- Major Catchment Boundary
- Watercourse
- Storm Outfall
- River Chainage
- (From KWL 2007 Survey)**
- Bridge
- Culvert
- Obstruction
- Deposition
- Erosion (Severity)**
- High
- Moderate
- Low

Orthophoto Source:  
City of Surrey 2006 and Township of Langley 2007.

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0.2 0.1 0 0.2  
Scale in Kilometers

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**Detailed  
Drainage Inventory  
196 Street to  
Station 19000**

**Figure 2-1C**

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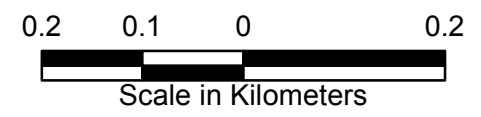




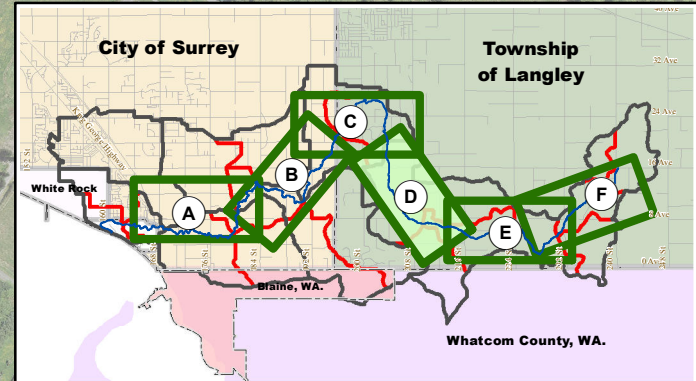
**City of Surrey/Township of Langley  
Little Campbell River ISMP  
Scoping Study**

- Legend**
- City/Township/US Boundary
  - ISMP Area Boundary
  - Catchment ID
  - Major Catchment Boundary
  - Watercourse
  - Storm Outfall
  - 10000 — River Chainage
  - (From KWL 2007 Survey)**
  - Bridge
  - Culvert
  - Obstruction
  - Deposit
  - Erosion (Severity)**
  - High
  - Moderate
  - Low

Orthophoto Source:  
City of Surrey 2006 and Township of Langley 2007.



Project No. 471-180	Date March, 2011
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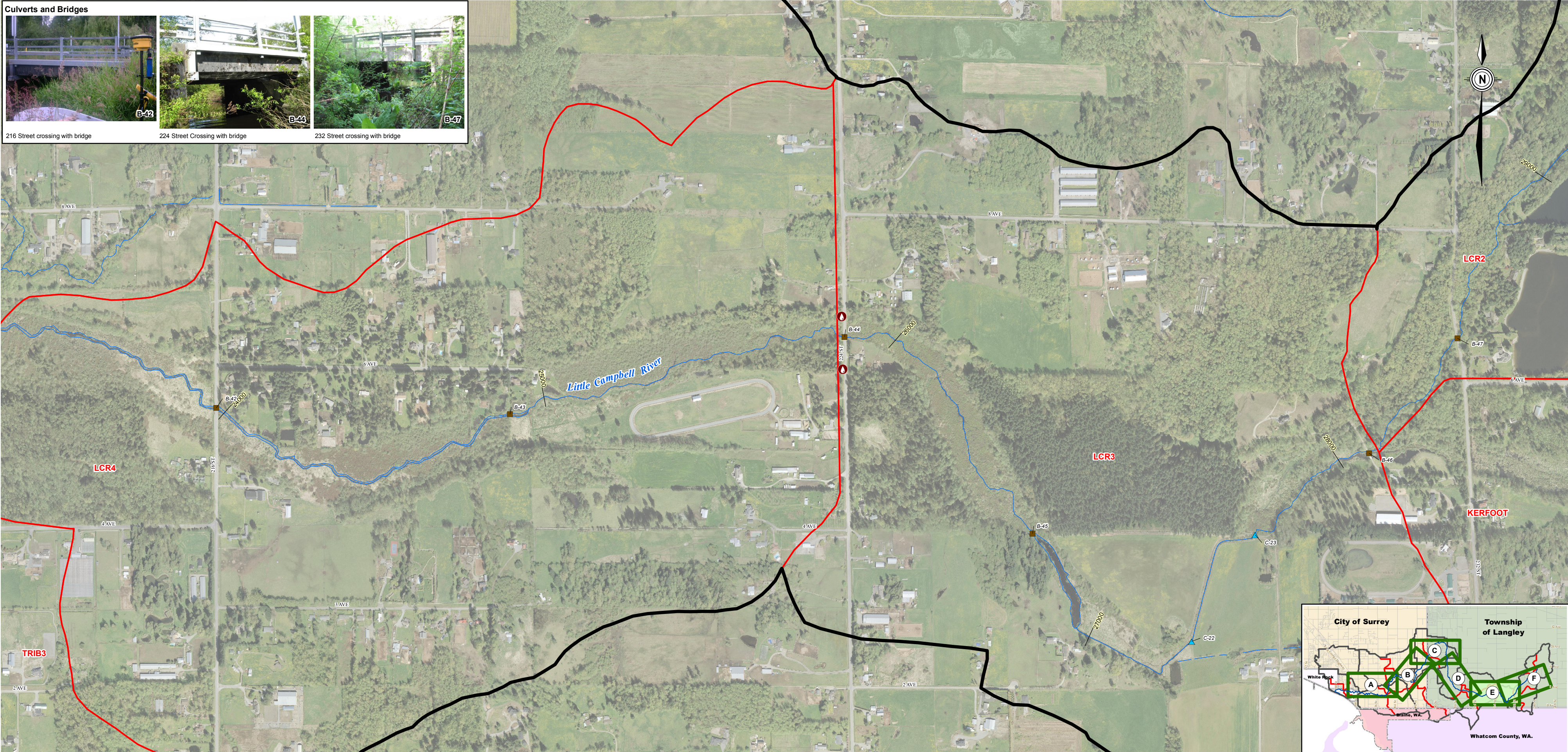


**Detailed  
Drainage Inventory  
Station 19000 to  
216 Street  
Figure 2-1D**

**Culverts and Bridges**



216 Street crossing with bridge      224 Street Crossing with bridge      232 Street crossing with bridge

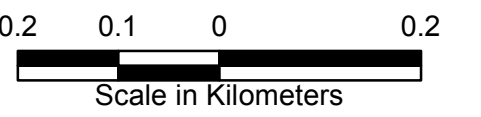


**City of Surrey/Township of Langley  
Little Campbell River ISMP  
Scoping Study**

**Legend**

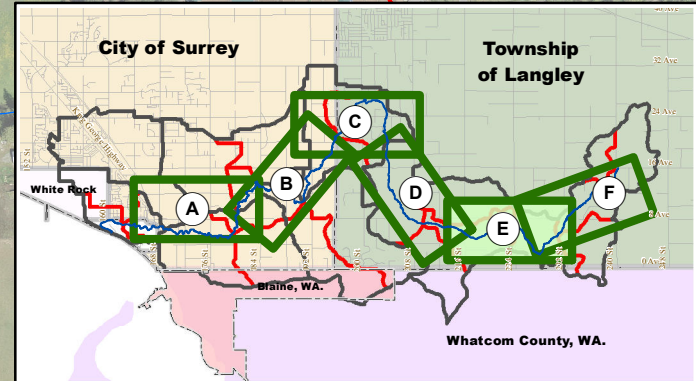
- City/Township/US Boundary
- ISMP Area Boundary
- Catchment ID  
Major Catchment Boundary
- Watercourse
- Storm Outfall
- River Chainage
- (From KWL 2007 Survey)**
- Bridge
- Culvert
- Obstruction
- Deposit
- Erosion (Severity)**
- High
- Moderate
- Low

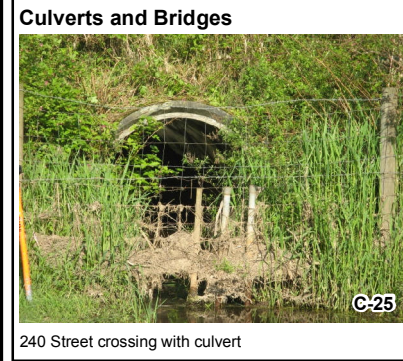
Orthophoto Source:  
City of Surrey 2006 and Township of Langley 2007.



Project No. 471-180	Date March, 2011
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**Detailed  
Drainage Inventory  
216 Street to 232 Street  
Figure 2-1E**



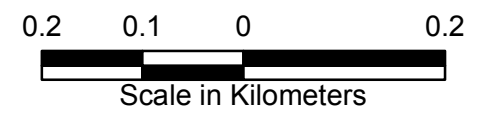


**City of Surrey/Township of Langley  
Little Campbell River ISMP  
Scoping Study**

**Legend**

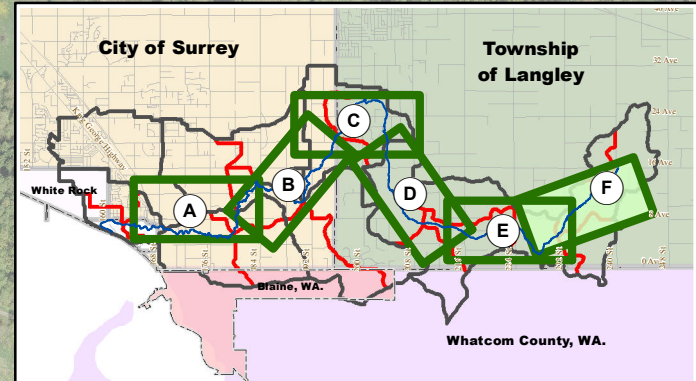
- City/Township/US Boundary
- ISMP Area Boundary
- Catchment ID  
Major Catchment Boundary
- Storm Outfall
- Watercourse
- River Chainage
- (From KWL 2007 Survey)**
- Bridge
- Culvert
- Obstruction
- Deposit
- Erosion (Severity)**
- High
- Moderate
- Low

Orthophoto Source:  
City of Surrey 2006 and Township of Langley 2007.



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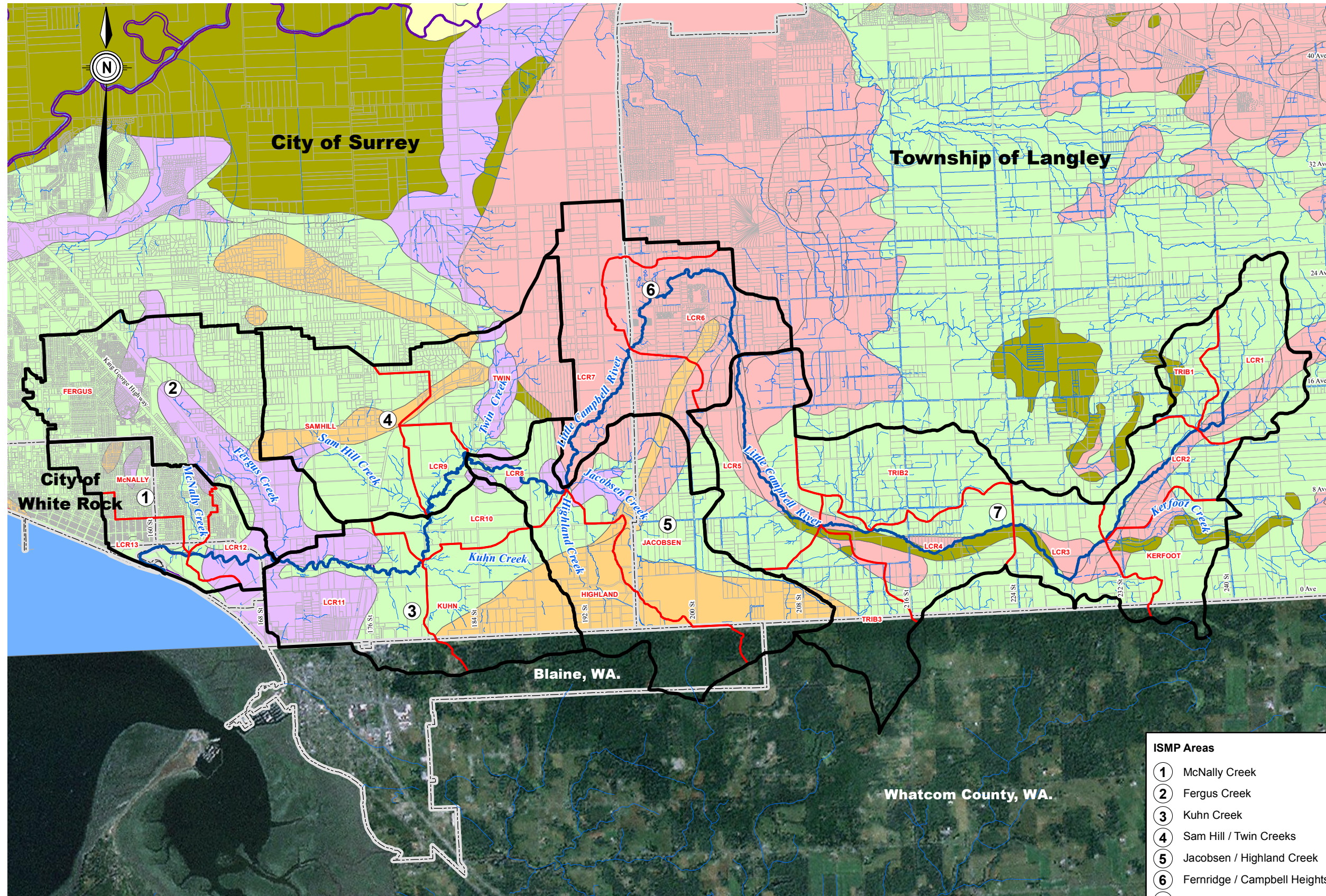
**Detailed  
Drainage Inventory  
232 Street to 16 Avenue**



**Figure 2-1F**

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**City of Surrey/Township of Langley  
Little Campbell River ISMP  
Scoping Study**



**Legend**

- City/Township/US Boundary
- ISMP Area ID
- ISMP Area Boundary
- Catchment ID
- Major Catchment Boundary
- Watercourse

**Soil Material**

- Gravel and Sand
- Peat
- Sand
- Sand and Silt
- Silt and Clay
- Steepland Sediments
- Till
- Water

This information is not warranted as to its accuracy by Kerr Wood Leidal Associates. This information is provided for illustrative purposes only.

Surficial Geology Information: Natural Resource Canada and the Geological Survey of Canada



Project No.  
471-180

Date  
March, 2011

**ISMP Areas**

- McNally Creek
- Fergus Creek
- Kuhn Creek
- Sam Hill / Twin Creeks
- Jacobsen / Highland Creek
- Fernridge / Campbell Heights
- Upper Little Campbell River

Orthophoto Source:  
Washington ortho from Bing  
aerial map imagery.

**Soils Map**

**Figure 2-2**

**City of Surrey/Township of Langley  
Little Campbell River ISMP  
Scoping Study**

**Legend**

- City/Township/US Boundary
- ISMP Area ID
- ISMP Area Boundary
- Catchment ID
- Major Catchment Boundary
- Watercourse

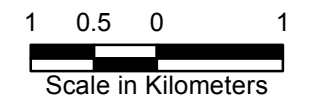
**City of Surrey Aquifers**

- Grandview
- Hazelmere
- Hazelmere Valley
- Whiterock

**Township of Langley Aquifers**

- Abbotsford
- Border
- Brookwood
- Central Hopington
- Langley Upland Intertill
- South of Hopington

Aquifer information for the City of Langley from the Ministry of Environment. City of Surrey aquifer from Bc Land and Resource Data Warehouse.

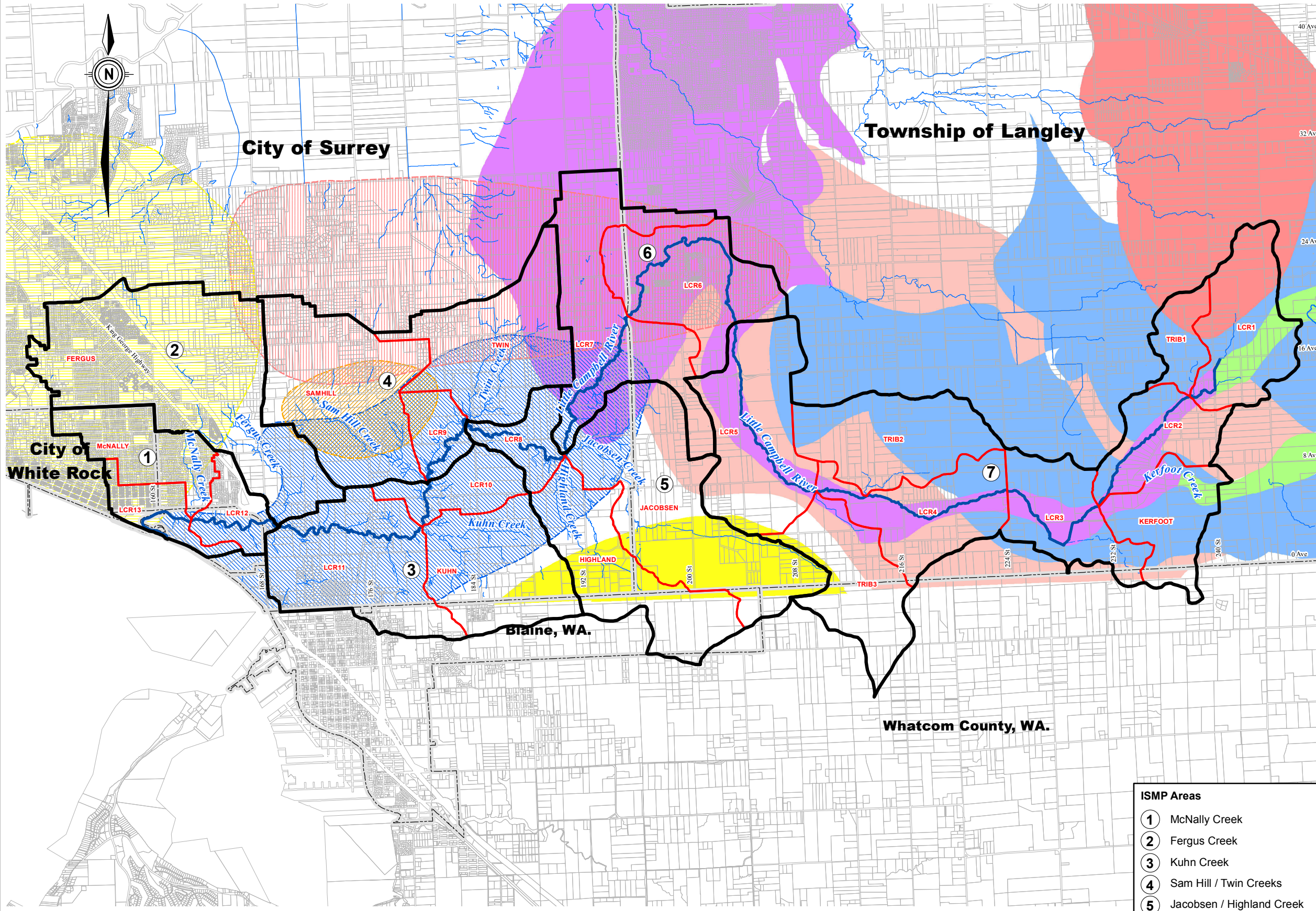


Project No.  
471-180

Date  
March, 2011

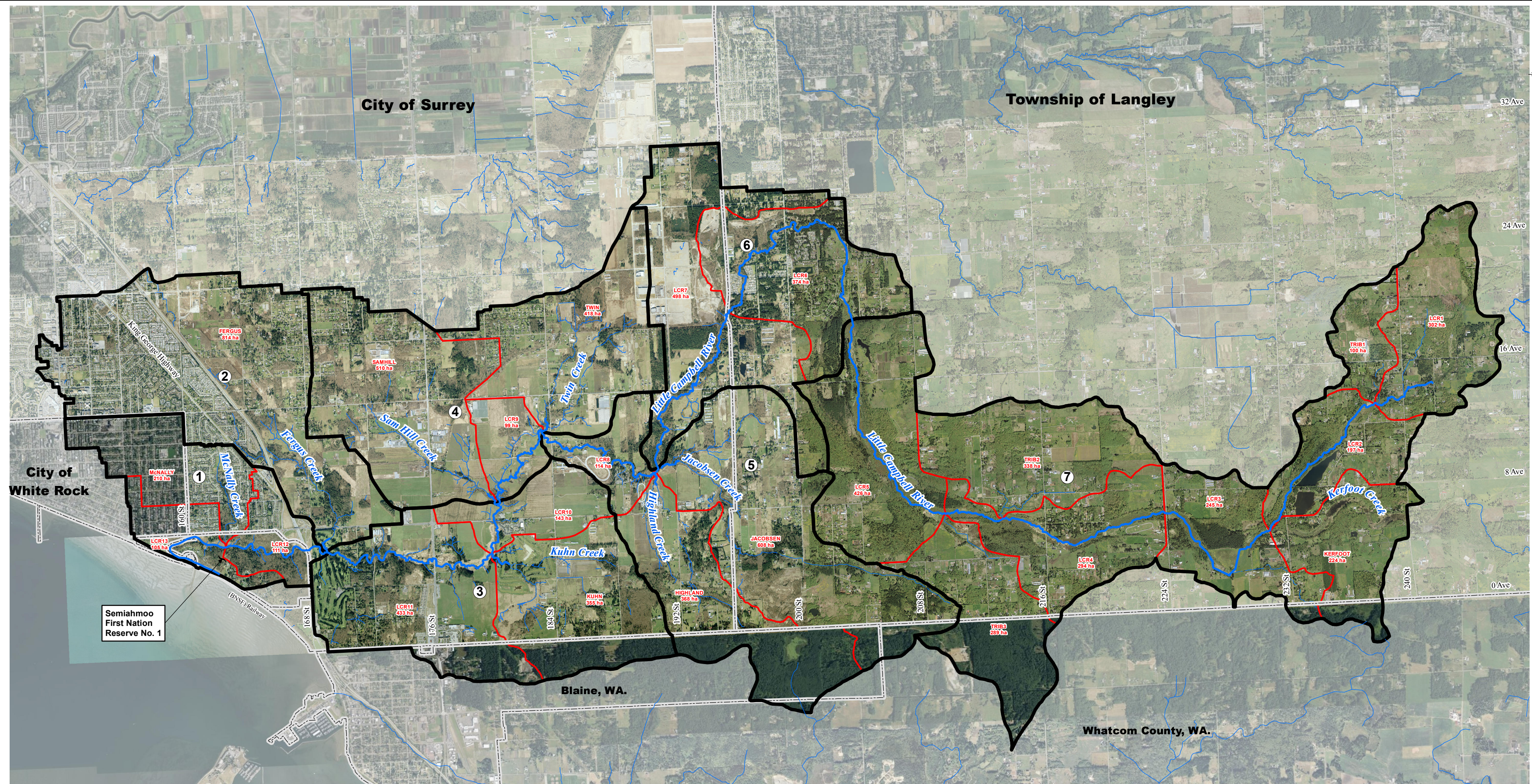
**Aquifers**

**Figure 2-3**



- ISMP Areas**
- ① McNally Creek
  - ② Fergus Creek
  - ③ Kuhn Creek
  - ④ Sam Hill / Twin Creeks
  - ⑤ Jacobsen / Highland Creek
  - ⑥ Fernridge / Campbell Heights
  - ⑦ Upper Little Campbell River

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**City of Surrey/Township of Langley  
Little Campbell River ISMP  
Scoping Study**

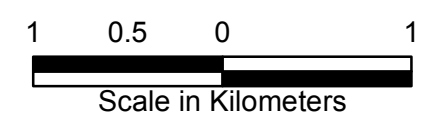
**Legend**

- City/Township/US Boundary
- ISMP Area ID
- ISMP Area Boundary
- Catchment ID
- Major Catchment Boundary
- Watercourse

**ISMP Areas**

- ① McNally Creek
- ② Fergus Creek
- ③ Kuhn Creek
- ④ Sam Hill / Twin Creeks
- ⑤ Jacobsen / Highland Creek
- ⑥ Fernridge / Campbell Heights
- ⑦ Upper Little Campbell River

Orthophoto Source:  
City of Surrey 2006 and Township of Langley 2007.  
Washington ortho from Bing aerial map imagery.

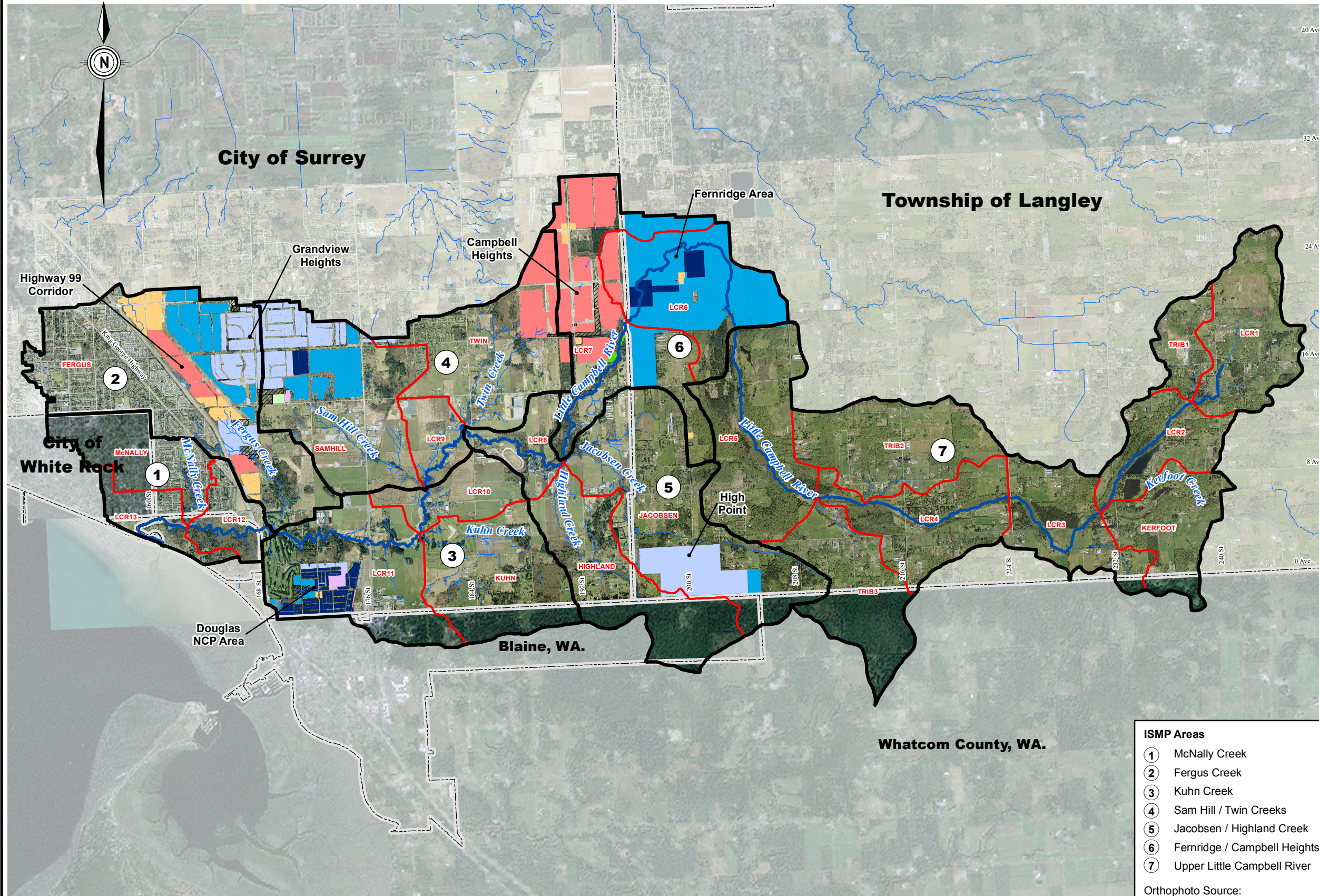


Project No. 471-180	Date February 2011
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**Existing Land Use**

**Figure 2-4**

**City of Surrey/Township of Langley  
Little Campbell River ISMP  
Scoping Study**

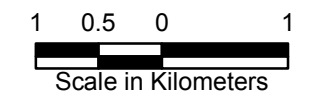


**Legend**

- City/Township/US Boundary
  - ISMP Area ID
  - ISMP Area Boundary
  - Catchment ID
  - Major Catchment Boundary
  - Watercourse
- Land Use**
- Agricultural
  - Commercial
  - Industrial
  - Institutional
  - Open Space
  - Park
  - Residential Low Density
  - Residential Medium Density
  - Residential High Density

**Note:**  
For greater detail refer to figures:  
8-2 Fernridge / Campbell Heights  
9-2 Sam Hill / Twin Creeks  
10-2 Kuhn Creek  
11-2 Jacobsen / Highland Creeks

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**ISMP Areas**

- ① McNally Creek
- ② Fergus Creek
- ③ Kuhn Creek
- ④ Sam Hill / Twin Creeks
- ⑤ Jacobsen / Highland Creek
- ⑥ Fernridge / Campbell Heights
- ⑦ Upper Little Campbell River

Orthophoto Source:  
City of Surrey 2006 and Township of  
Langley 2007. City of White Rock and  
Washington St. ortho from Bing aerial  
map imagery.

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**Future Land Use  
Changes**

**Figure 2-5**

City of Surrey/Township of Langley  
Little Campbell River ISMP  
Scoping Study

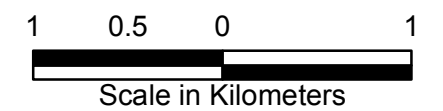
Legend

- City/Township/US Boundary
- ISMP Area ID
- ISMP Area Boundary
- Catchment ID
- Major Catchment Boundary
- Contour (5m Interval)
- Watercourse
- Rain Gauge
- Modelled Channels (MIKE 11)
- Cross Section Location
- Crossings Undersized for 200-Year Flow

ISMP Areas

- ① McNally Creek
- ② Fergus Creek
- ③ Kuhn Creek
- ④ Sam Hill / Twin Creeks
- ⑤ Jacobsen / Highland Creek
- ⑥ Fernridge / Campbell Heights
- ⑦ Upper Little Campbell River

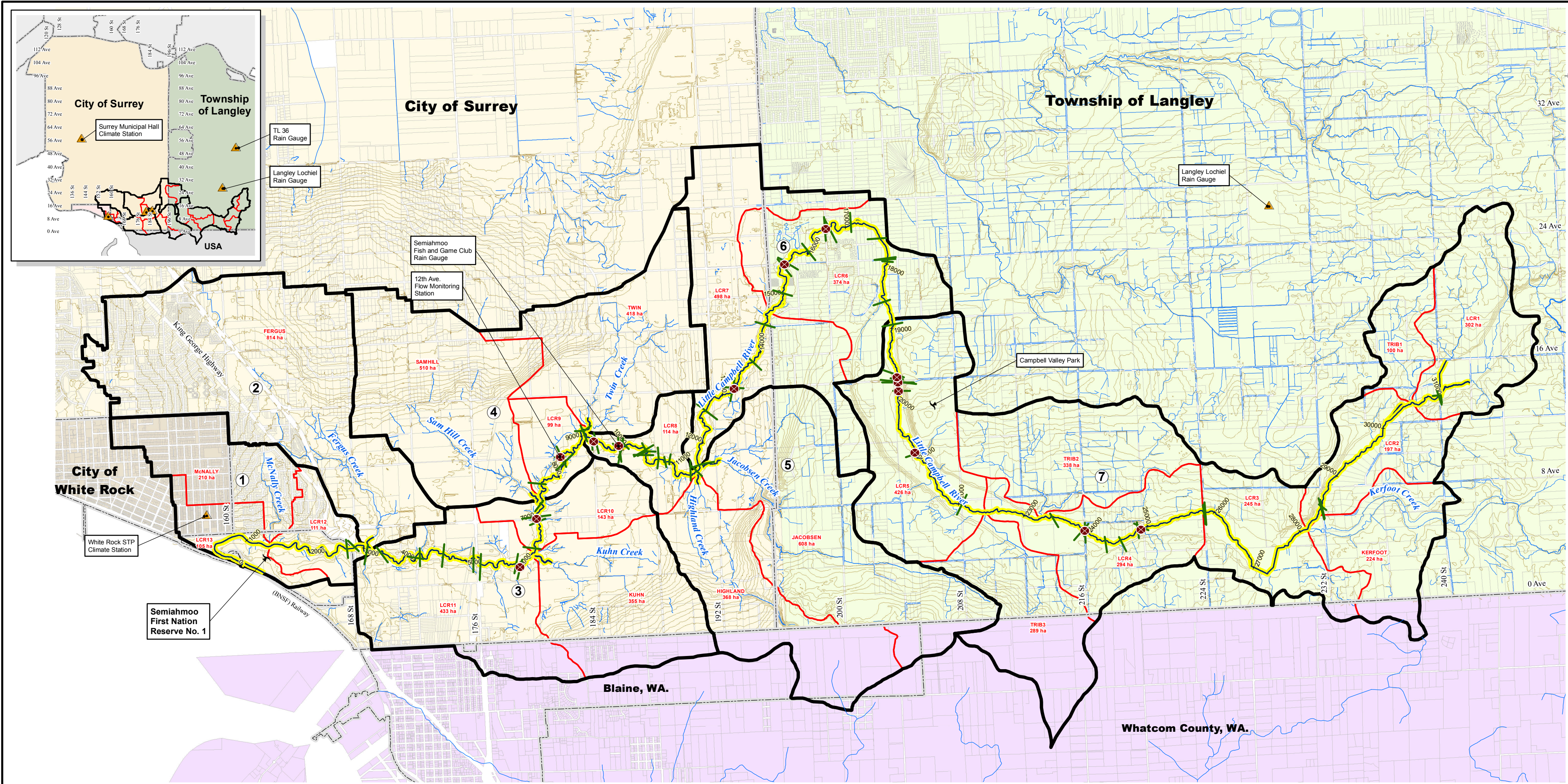
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Modelled Catchments  
and Channels

Figure 3-1



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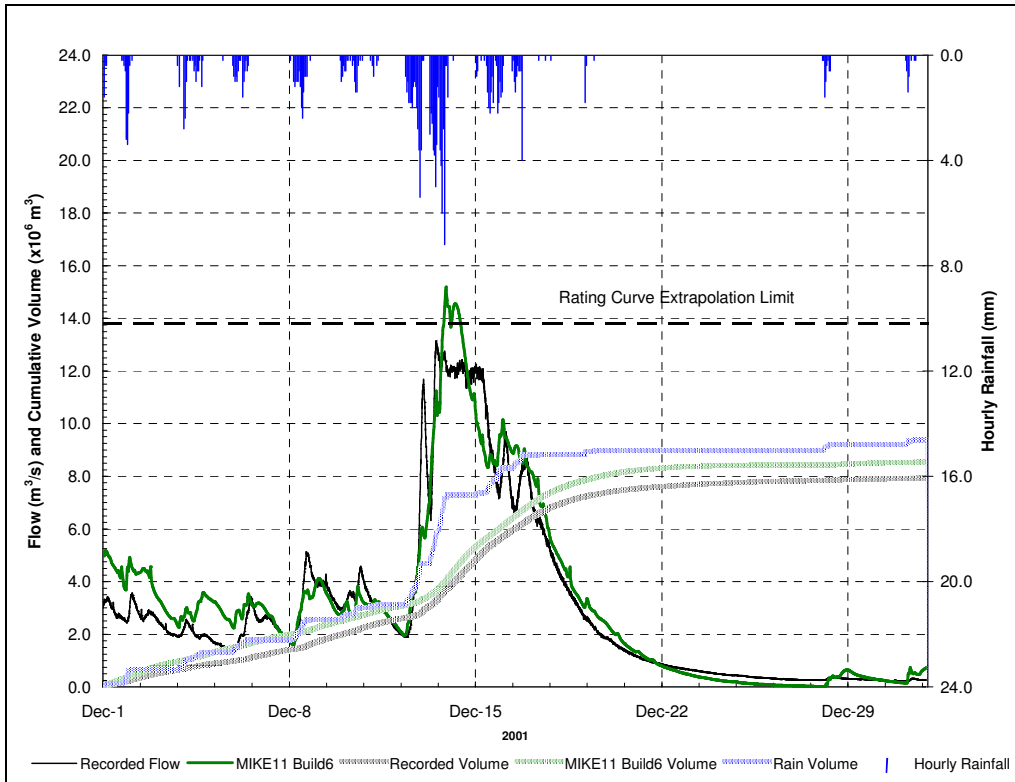


Figure 3-2: Hydrologic Model Calibration - December 2011 Wet Event

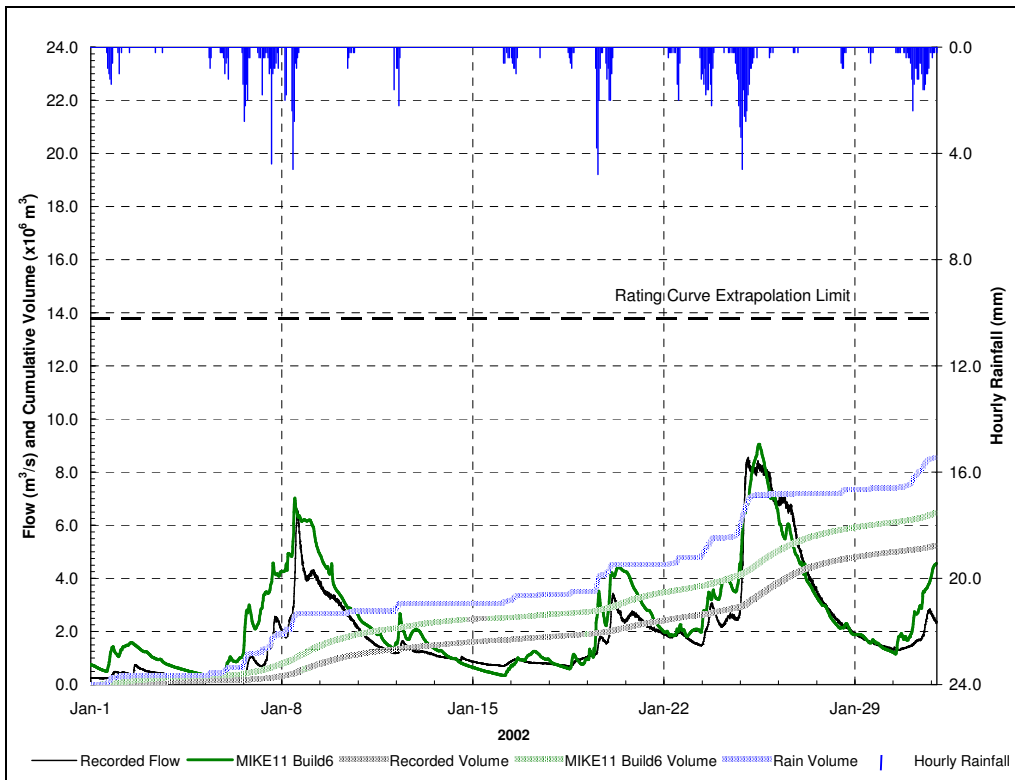


Figure 3-3: Hydrologic Model Calibration - January 2012 Wet Event

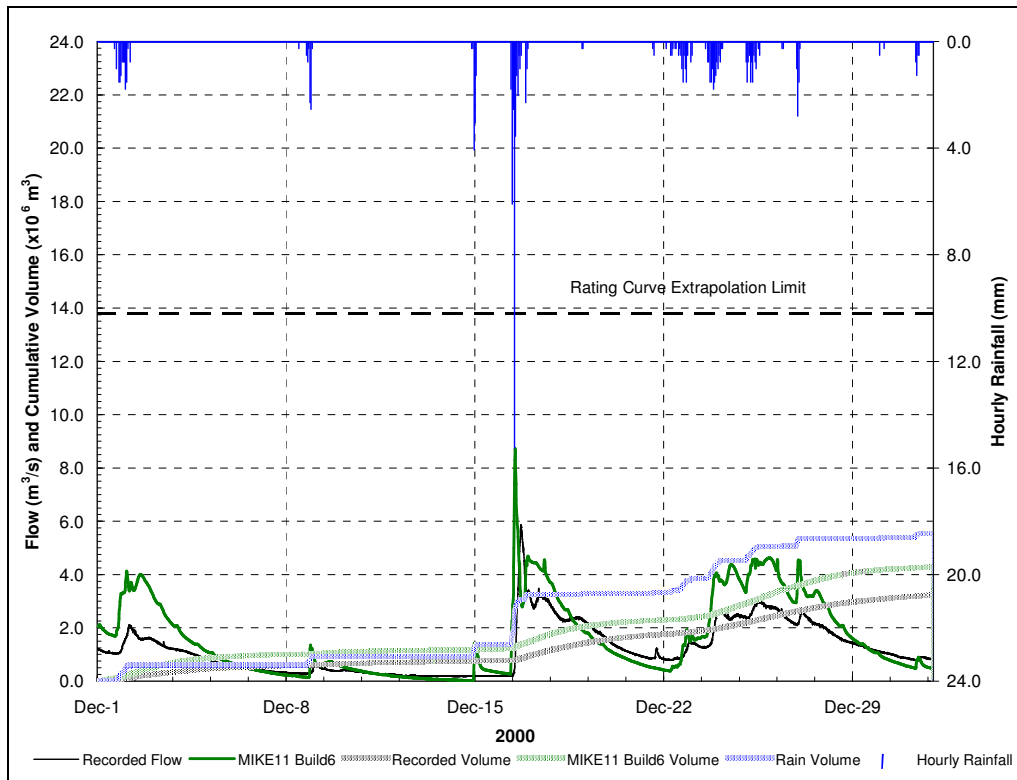


Figure 3-4: Hydrologic Model Validation - December 2000 Wet Event

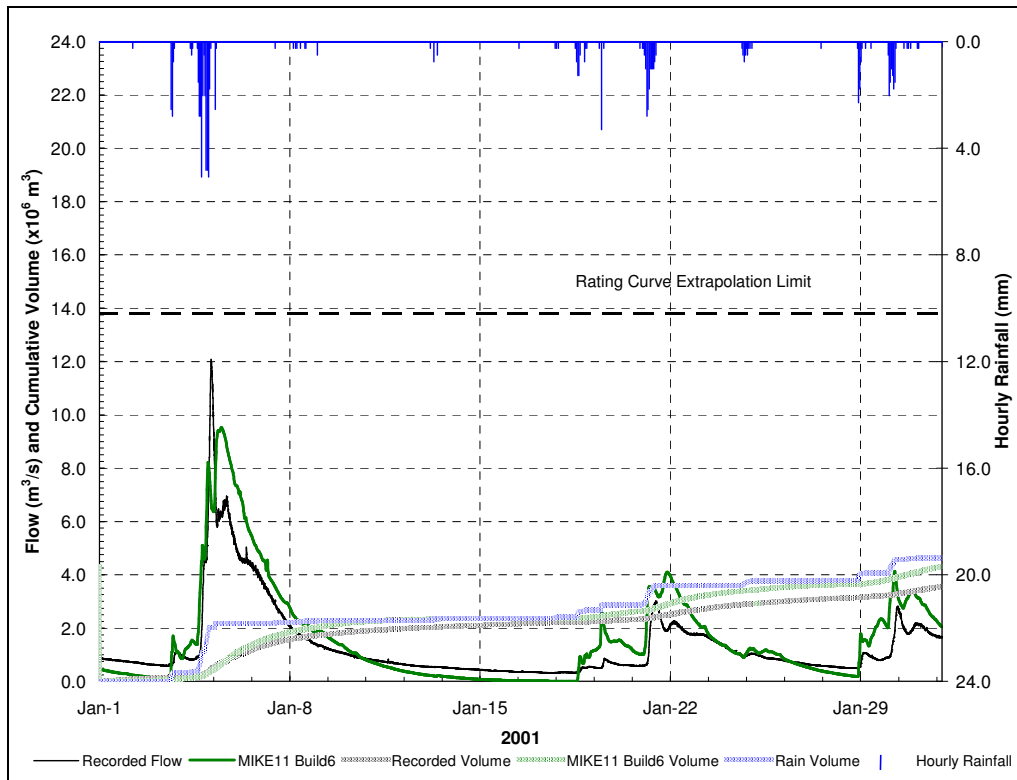


Figure 3-5: Hydrologic Model Validation - January 2001 Wet Event

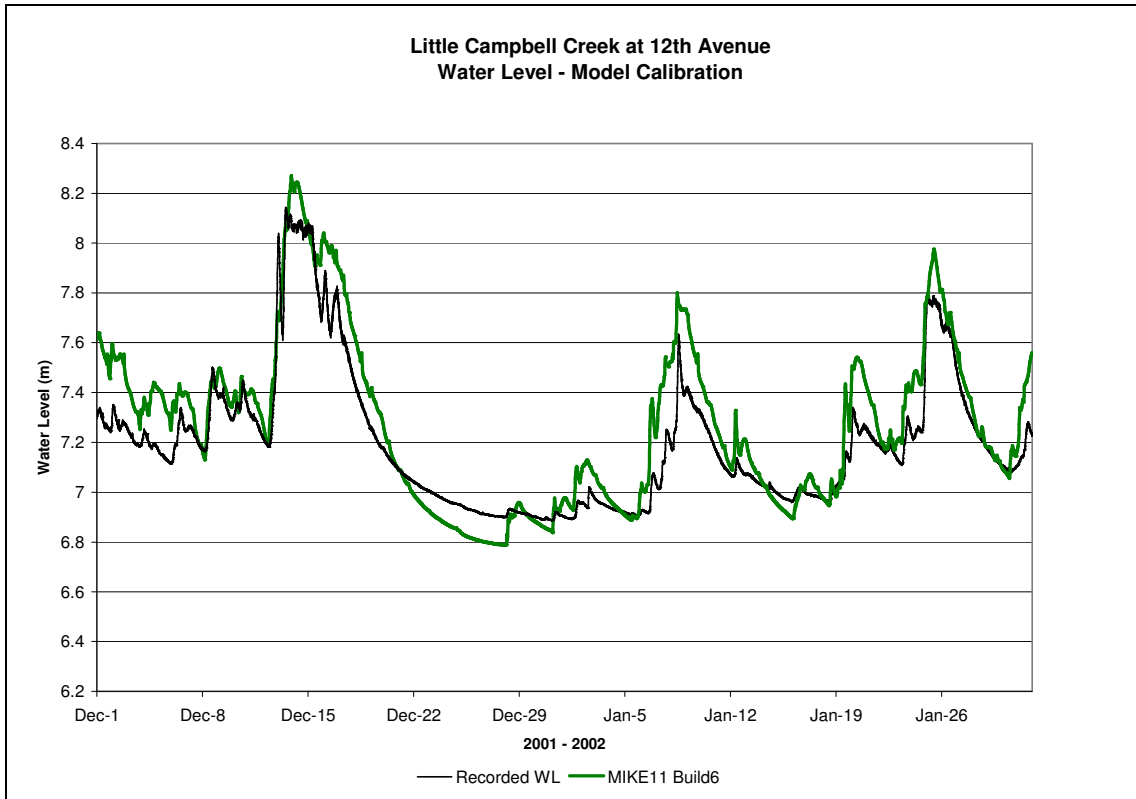


Figure 3-6: Hydraulic Model Wet Weather Calibration December 2001 - January 2002

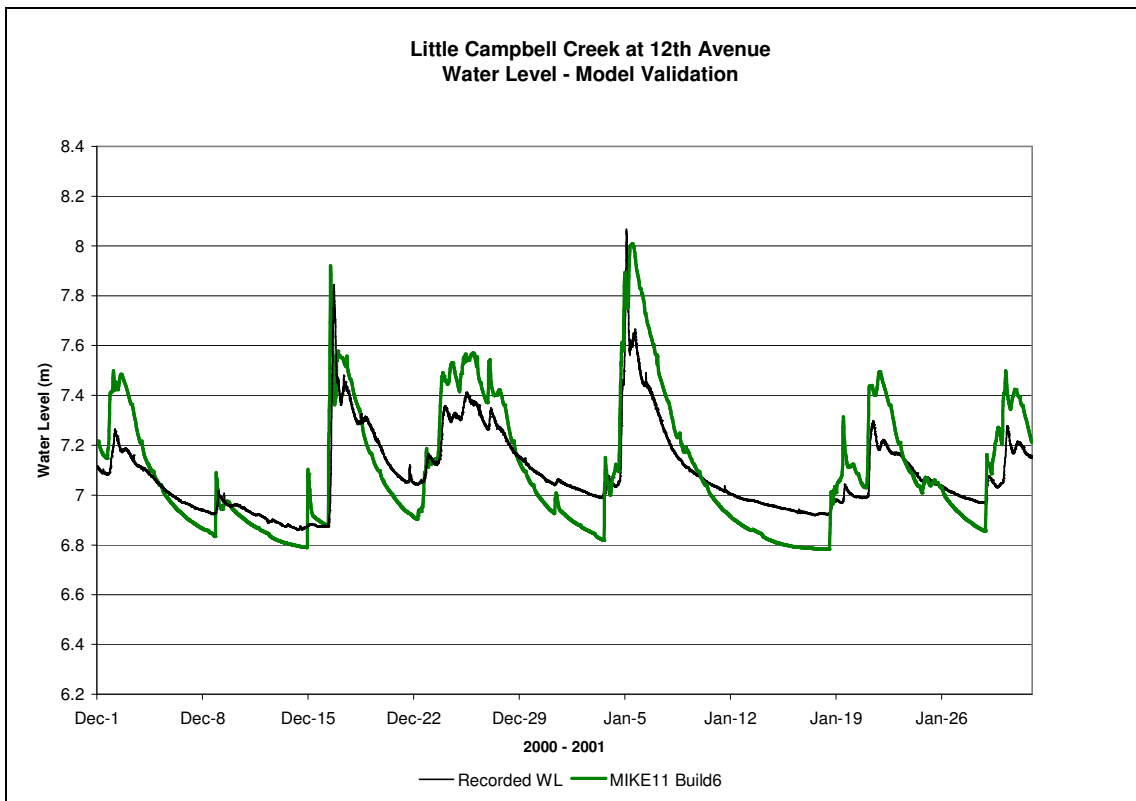
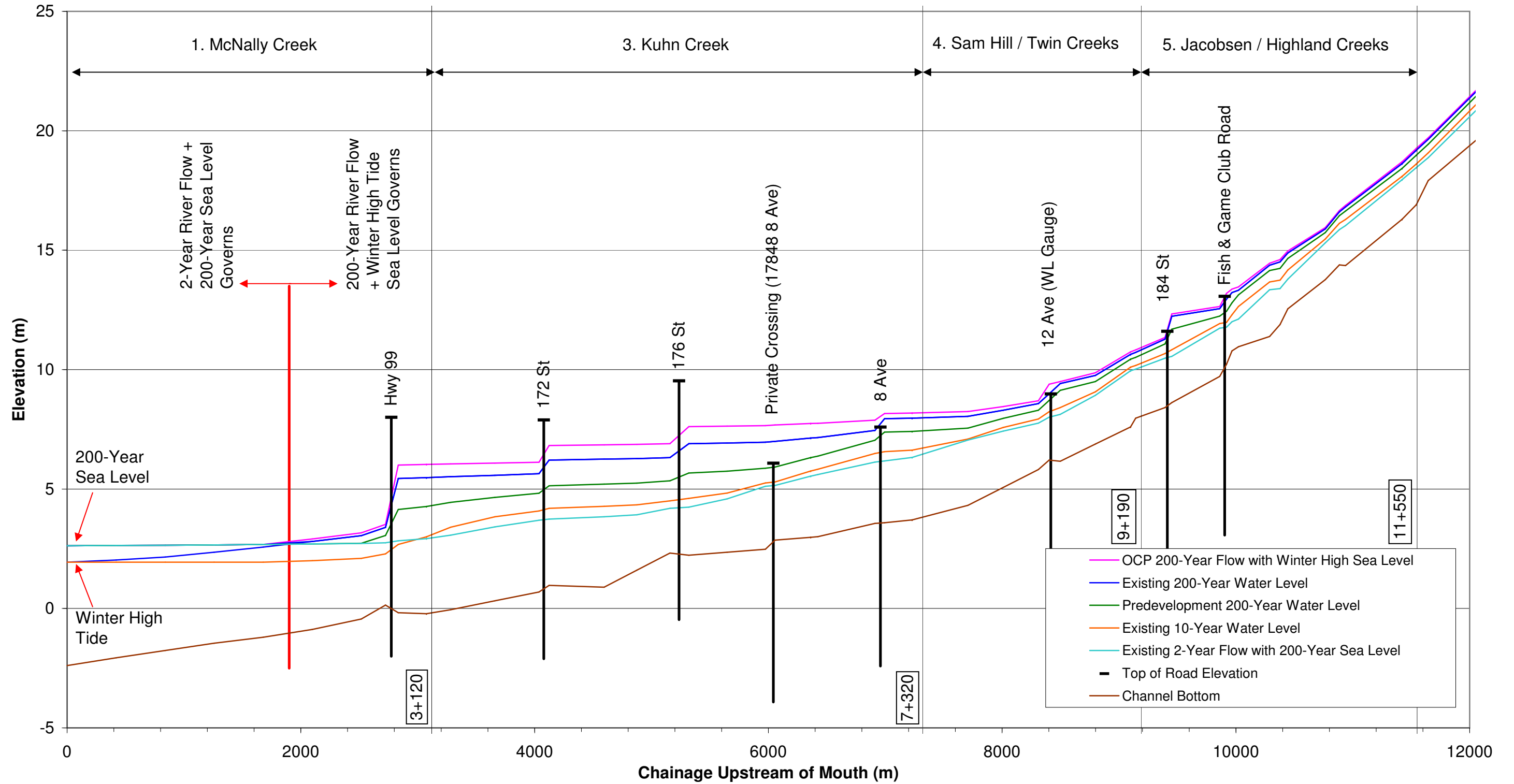
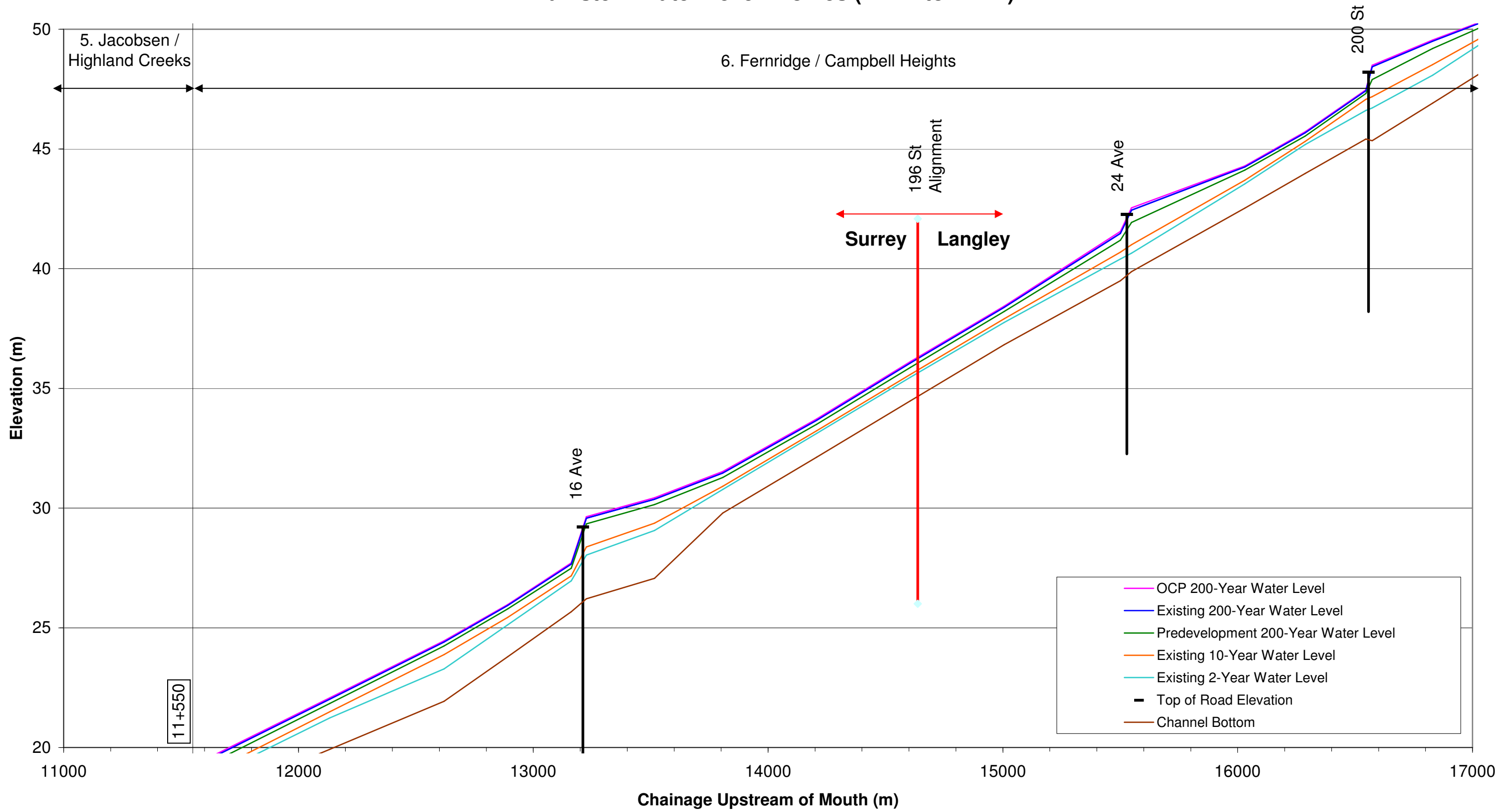


Figure 3-7: Hydraulic Model Wet Weather Validation December 2000 - January 2001

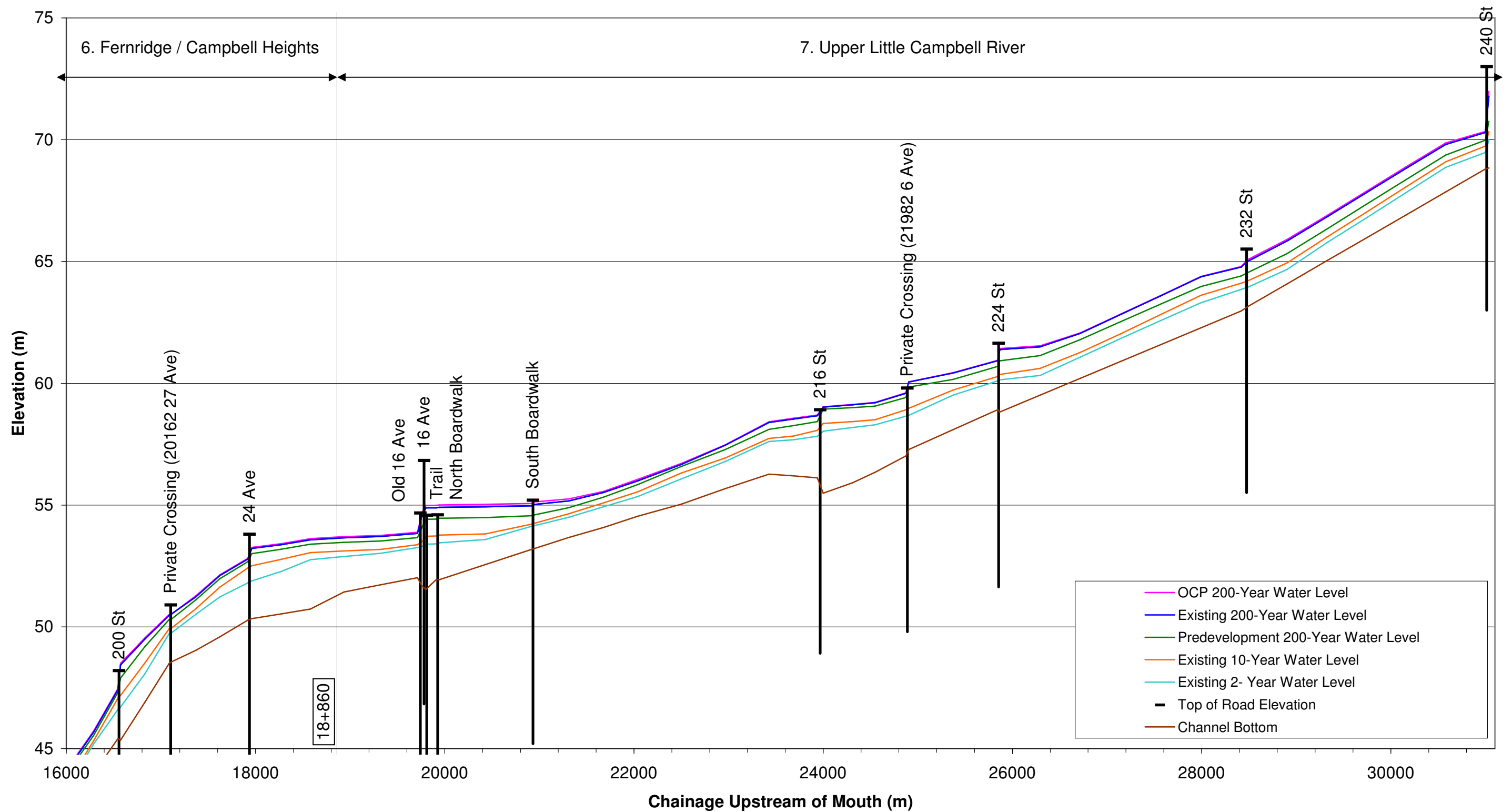
### Little Campbell River Integrated Stormwater Scoping Study Mainstem Water Level Profiles (0km to 12km)



**Little Campbell River Integrated Stormwater Scoping Study  
Mainstem Water Level Profiles (12km to 17km)**



### Little Campbell River Integrated Stormwater Scoping Study Mainstem Water Level Profiles (17km to 31km)



City of Surrey/Township of Langley  
Little Campbell River ISMP  
Scoping Study

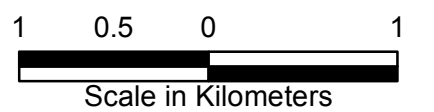
Legend

- City/Township/US Boundary
- ISMP Area ID
- ISMP Area Boundary
- Catchment ID
- Major Catchment Boundary
- Watercourse
- Crossings Undersized for 200-Year Flow
- 200-Year Floodplain Extents (as estimated in this study)

ISMP Areas

- ① McNally Creek
- ② Fergus Creek
- ③ Kuhn Creek
- ④ Sam Hill / Twin Creeks
- ⑤ Jacobsen / Highland Creek
- ⑥ Fernridge / Campbell Heights
- ⑦ Upper Little Campbell River

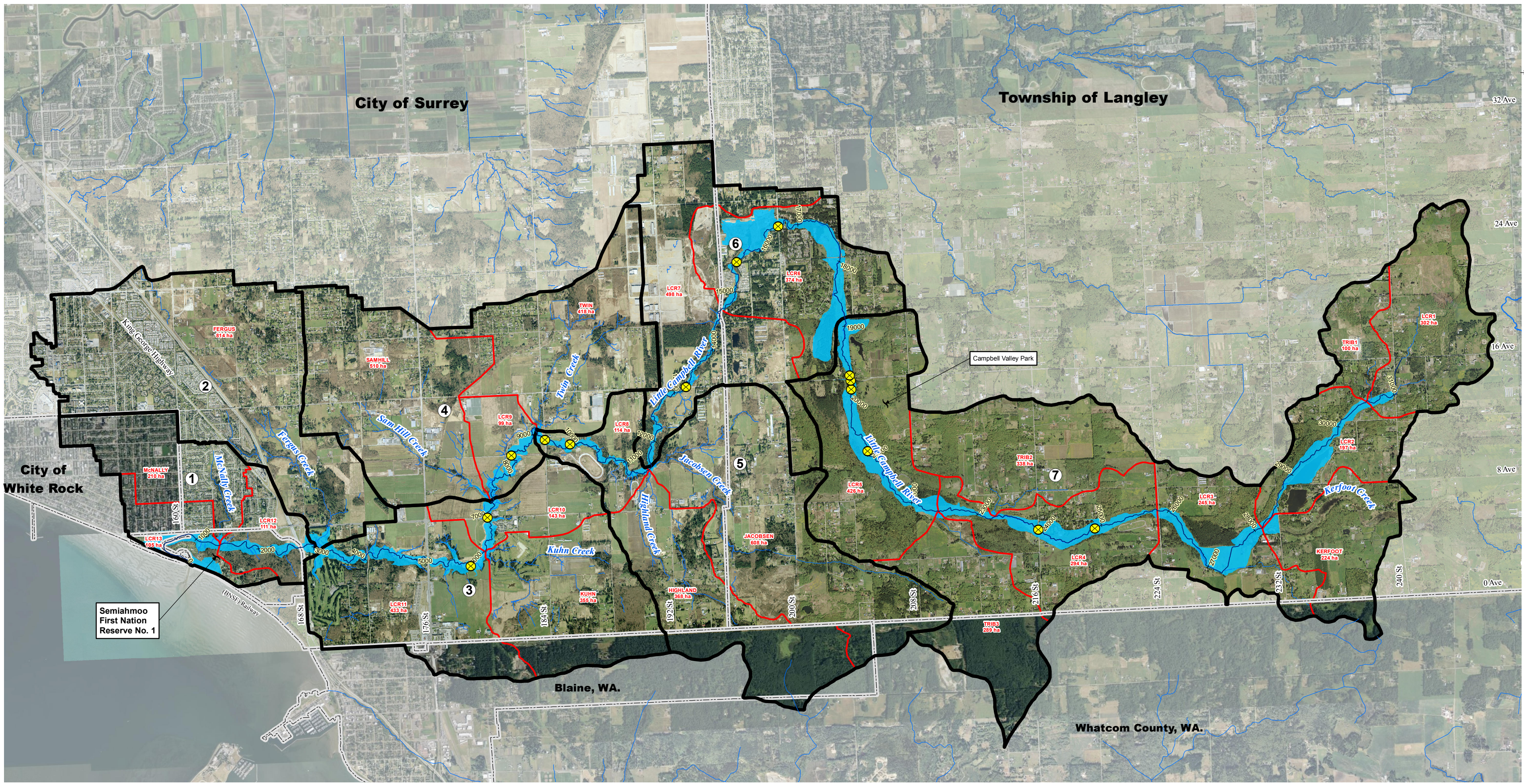
Orthophoto Source:  
City of Surrey 2006 and Township of Langley 2007.  
City of White Rock and Washington St. ortho from  
Bing aerial map imagery.



Project No. 471-180	Date March, 2011
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Modelled 200-Year  
Floodplain Extents

Figure 3-9



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










Project No.

Date



City of Surrey/Township of Langley  
Little Campbell River ISMP  
Scoping Study

**Legend**

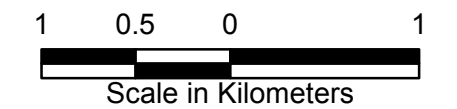
-  City/Township/US Boundary
-  ISMP Area ID
-  ISMP Catchment Boundary
-  Catchment ID
-  Major Catchment Boundary
-  Watercourse
-  Golf Course
-  Parks
-  River Segment
-  Photo ID
-  Photo Location

**ISMP Areas**

- ① McNally Creek
- ② Fergus Creek
- ③ Kuhn Creek
- ④ Sam Hill / Twin Creeks
- ⑤ Jacobsen / Highland Creek
- ⑥ Fernridge / Campbell Heights
- ⑦ Upper Little Campbell River

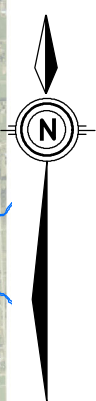
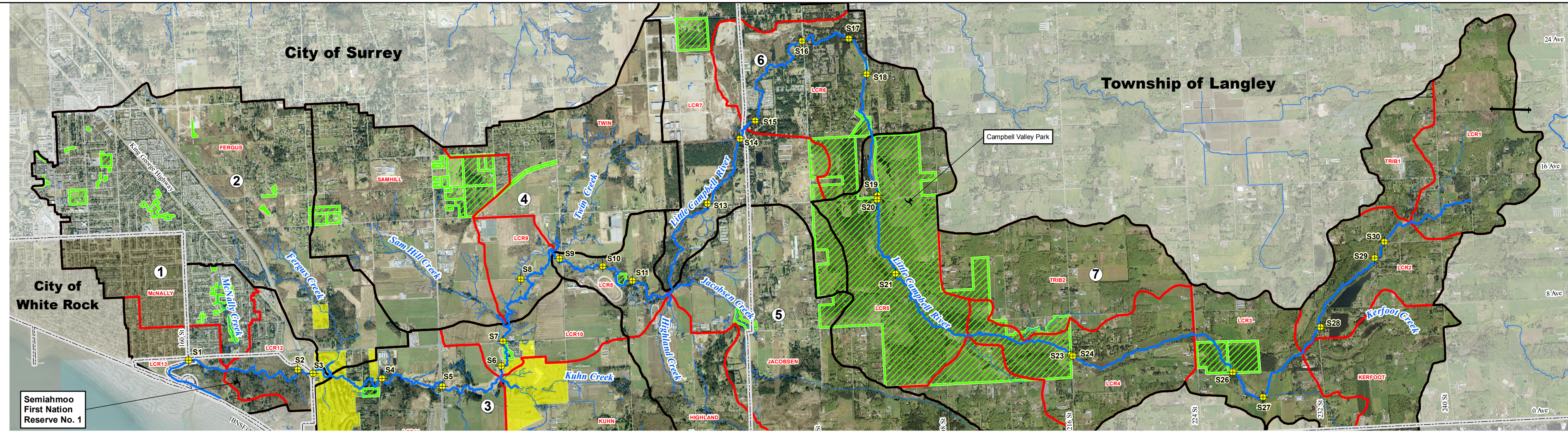
Orthophoto Source:  
City of Surrey 2006 and Township of Langley 2007.  
City of White Rock and Washington St. ortho from  
Bing aerial map imagery.

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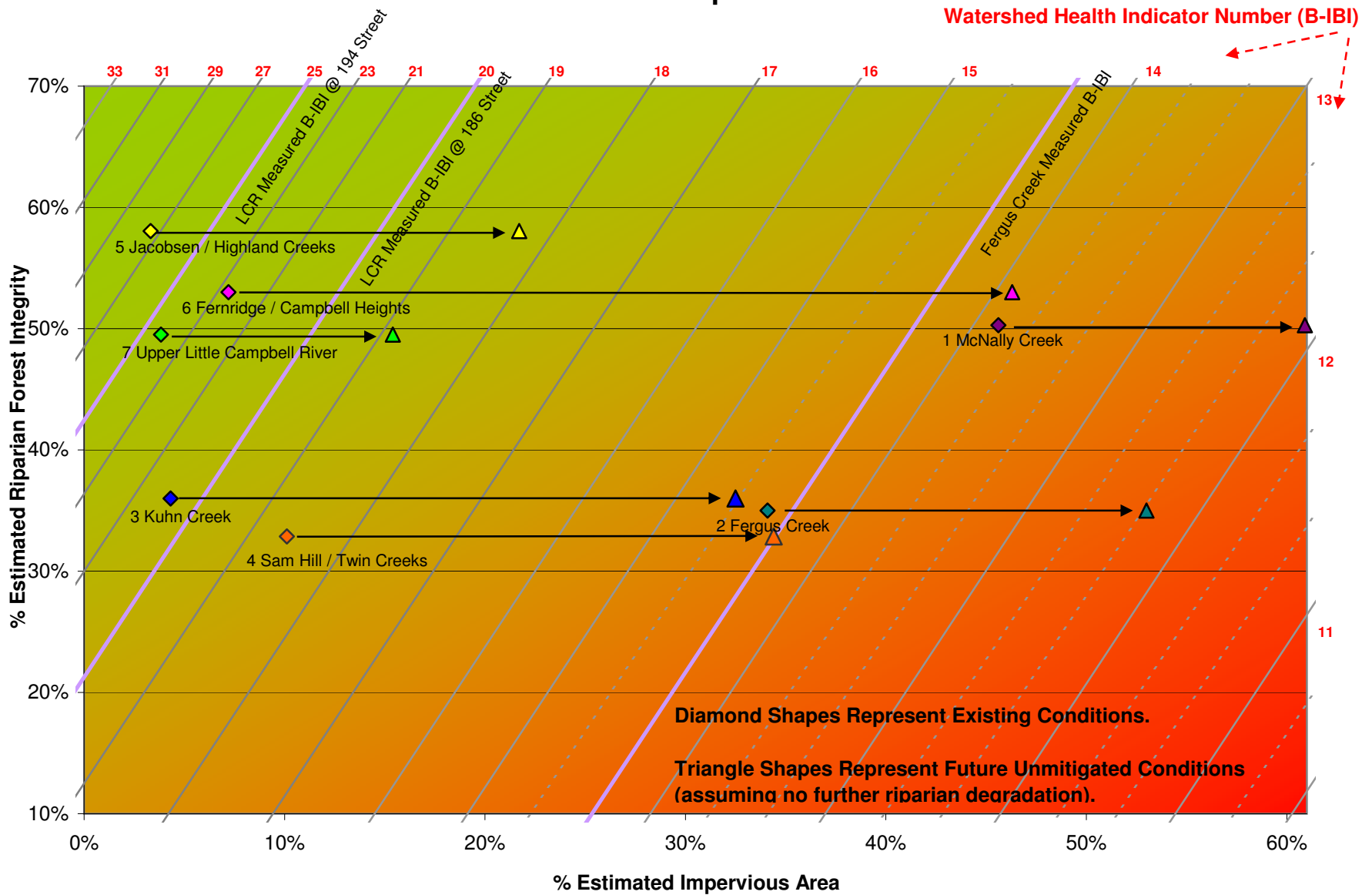
Project No. 471-180	Date March, 2011
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**River Segments and  
Photo Locations**

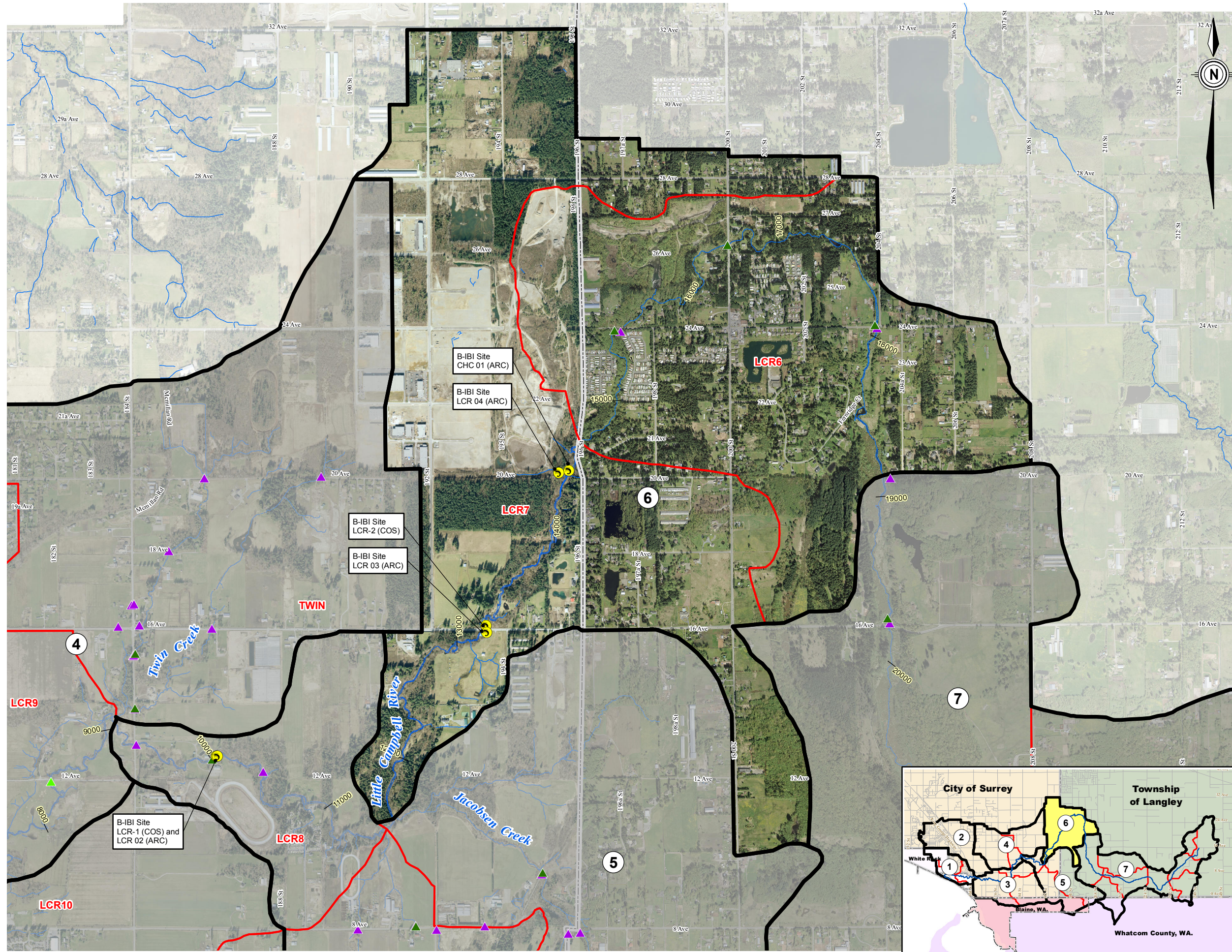


**Figure 5-1**

# Watershed Health Tracking System for Little Campbell River



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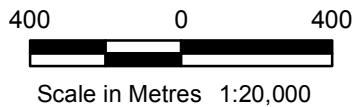


**City of Surrey/Township of Langley  
 Little Campbell River ISMP  
 Scoping Study**

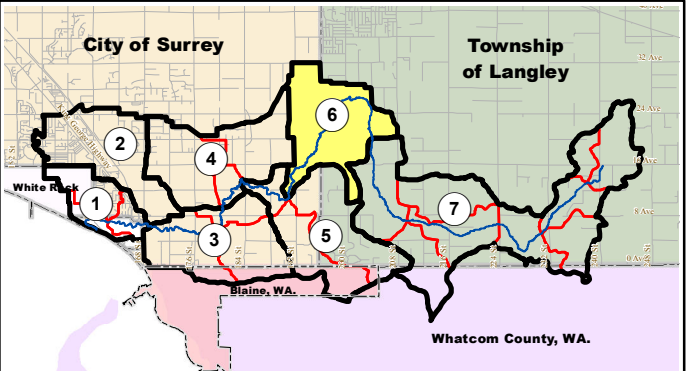
**Legend**

- City/Township/US Boundary
- ISMP Area ID
- ISMP Area Boundary
- Catchment ID
- Major Catchment Boundary
- Watercourse
- Benthic Site
- Water Quality Station**
- Attainment Monitoring (1971-2007)
- Hydrolab Site (2005-2008)
- LCWS Study (2000-2003)
- Longitudinal Survey (2006-2007)
- Seasonal Monitoring - Agricultural Runoff (2006)
- Seasonal Monitoring - On-site Sewage Disposal Systems (2006-2007)
- Seasonal Monitoring - Urban Runoff (2006-2007)
- Temperature Logger Sites (2005-2010)

Orthophoto Source:  
 City of Surrey 2006 and Township of Langley 2007.



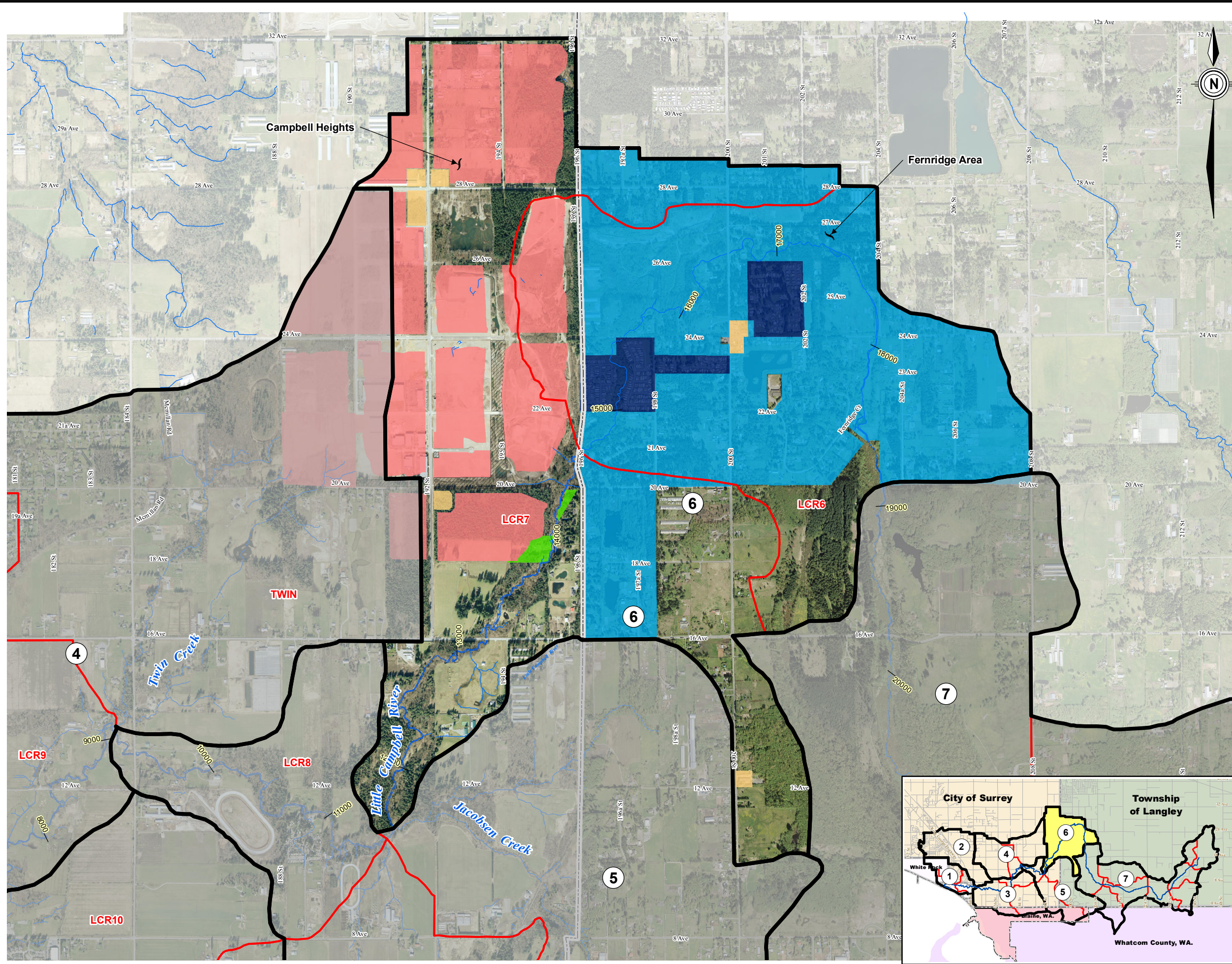
Project No. 471-180	Date March, 2011
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**Fernridge /  
 Campbell Heights  
 ISMP Area and  
 Sampling Locations**

**Figure 8-1**

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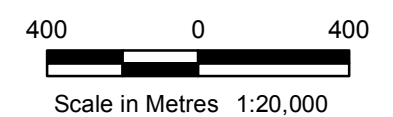


**City of Surrey/Township of Langley  
 Little Campbell River ISMP  
 Scoping Study**

**Legend**

- City/Township/US Boundary
- ISMP Area ID
- ISMP Area Boundary
- Catchment ID
- Major Catchment Boundary
- Watercourse
- Land Use**
- Agricultural
- Commercial
- Industrial
- Institutional
- Open Space
- Park
- Residential Low Density
- Residential Medium Density
- Residential High Density

Orthophoto Source:  
 City of Surrey 2006 and Township of Langley 2007.












Project No. 471-180	Date March, 2011
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**Fernridge /  
 Campbell Heights  
 Future Land Use  
 Changes**





**Figure 8-2**

**City of Surrey/Township of Langley  
Little Campbell River ISMP  
Scoping Study**

**Legend**

-  City/Township/US Boundary
-  ISMP Area ID
-  ISMP Area Boundary
-  Catchment ID
-  Major Catchment Boundary
-  Watercourse
-  200-Year Floodplain Extents (as estimated in this study)
-  Storm Outfall
-  Crossings Undersized for 200-Year Flow

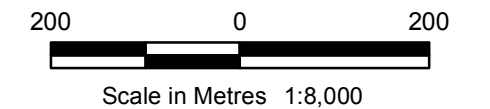
**(From KWL 2007 Survey)**

-  <sup>ID</sup> Bridge
-  <sup>ID</sup> Culvert
-  <sup>ID</sup> Obstruction
-  <sup>ID</sup> Deposit

**Erosion (Severity)**

-  <sup>ID</sup> High
-  <sup>ID</sup> Moderate
-  <sup>ID</sup> Low

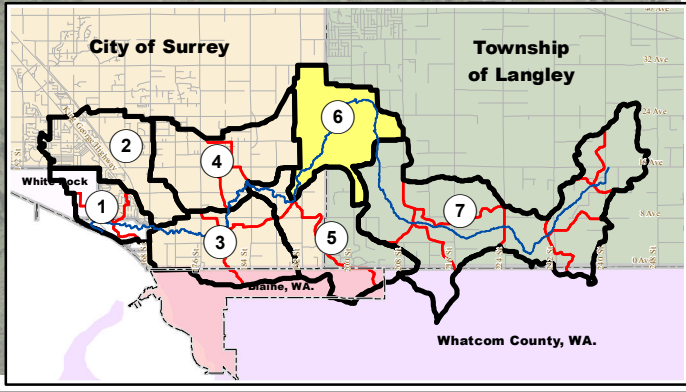
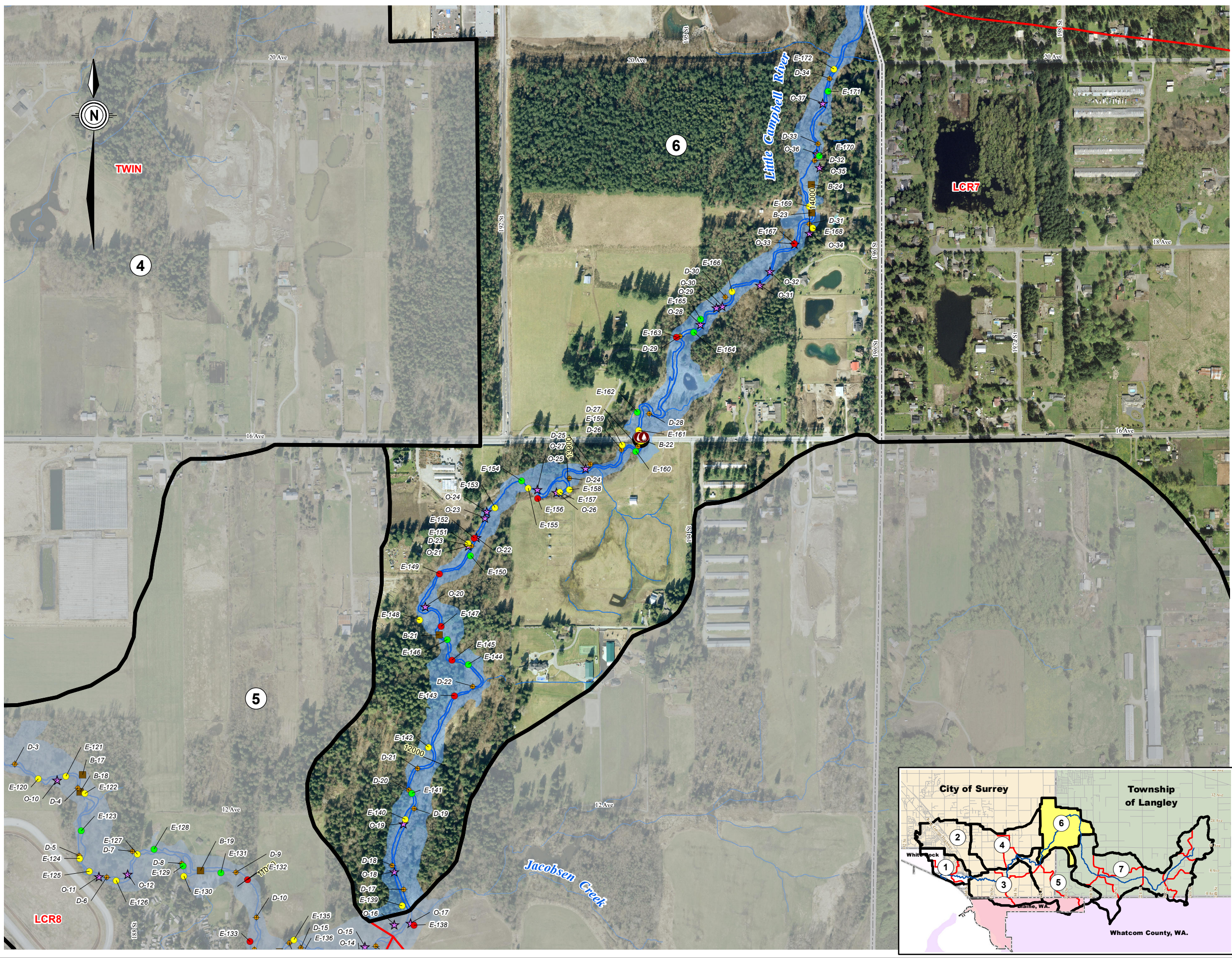
Orthophoto Source:  
City of Surrey 2006 and Township of Langley 2007.



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**Fernridge /  
Campbell Heights:  
LCR Mainstem Floodplain  
and Inventory**

**Figure 8-3A**



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Author: J.Lau

City of Surrey/Township of Langley  
Little Campbell River ISMP  
Scoping Study

Legend

- City/Township/US Boundary
- ISMP Area ID
- ISMP Area Boundary
- Catchment ID
- Major Catchment Boundary
- Watercourse
- 200-Year Floodplain Extents (as estimated in this study)
- Storm Outfall
- Crossings Undersized for 200-Year Flow

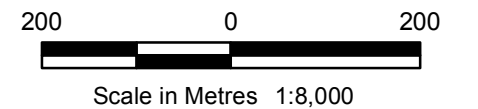
(From KWL 2007 Survey)

- ID Bridge
- ID Culvert
- ID Obstruction
- ID Deposit

Erosion (Severity)

- ID High
- ID Moderate
- ID Low

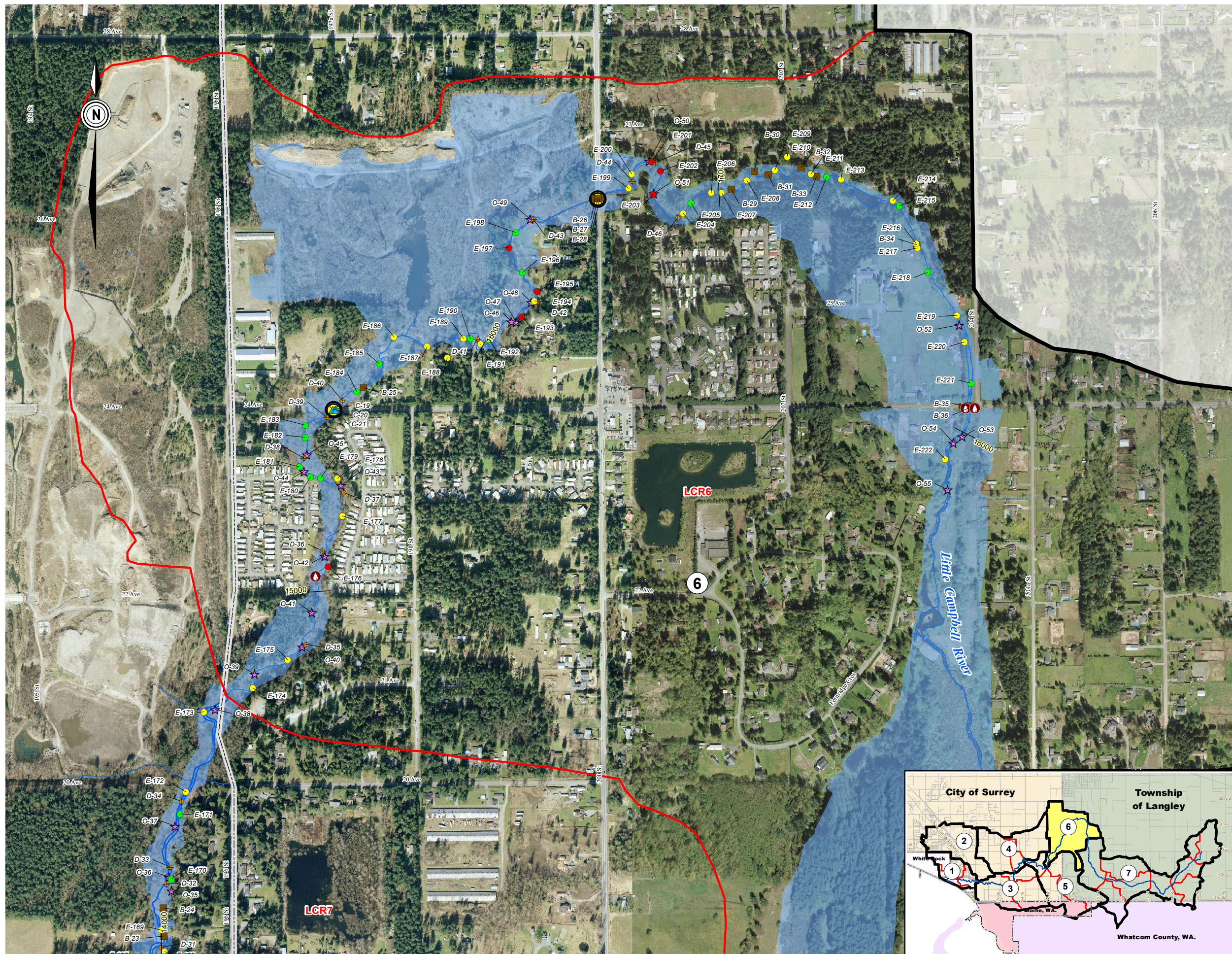
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Project No. 471-180	Date March, 2011
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**Fernridge /  
Campbell Heights:  
LCR Mainstem Floodplain  
and Inventory**

Figure 8-3B



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Author: J.Lau

City of Surrey/Township of Langley  
Little Campbell River ISMP  
Scoping Study

Legend

- City/Township/US Boundary
- ISMP Area ID
- ISMP Area Boundary
- Catchment ID
- Major Catchment Boundary

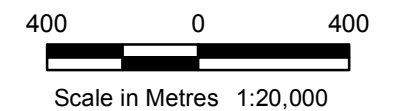
- Watercourse
- Benthic Site

Water Quality Station

- Attainment Monitoring (1971-2007)
- Hydrolab Site (2005-2008)
- LCWS Study (2000-2003)
- Longitudinal Survey (2006-2007)
- Seasonal Monitoring - Agricultural Runoff (2006)
- Seasonal Monitoring - On-site Sewage Disposal Systems (2006-2007)
- Seasonal Monitoring - Urban Runoff (2006-2007)
- Temperature Logger Sites (2005-2010)

Orthophoto Source:  
City of Surrey 2006 and Township of Langley 2007.

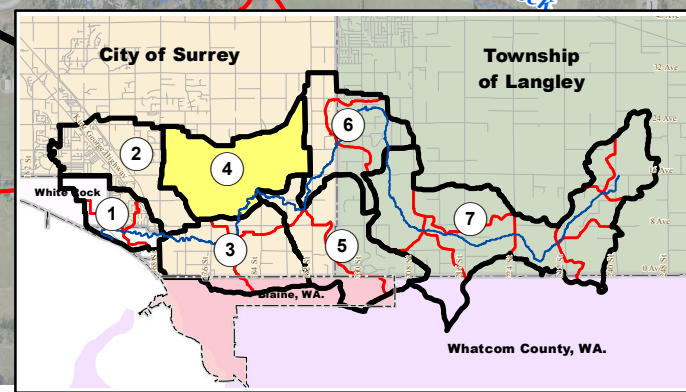
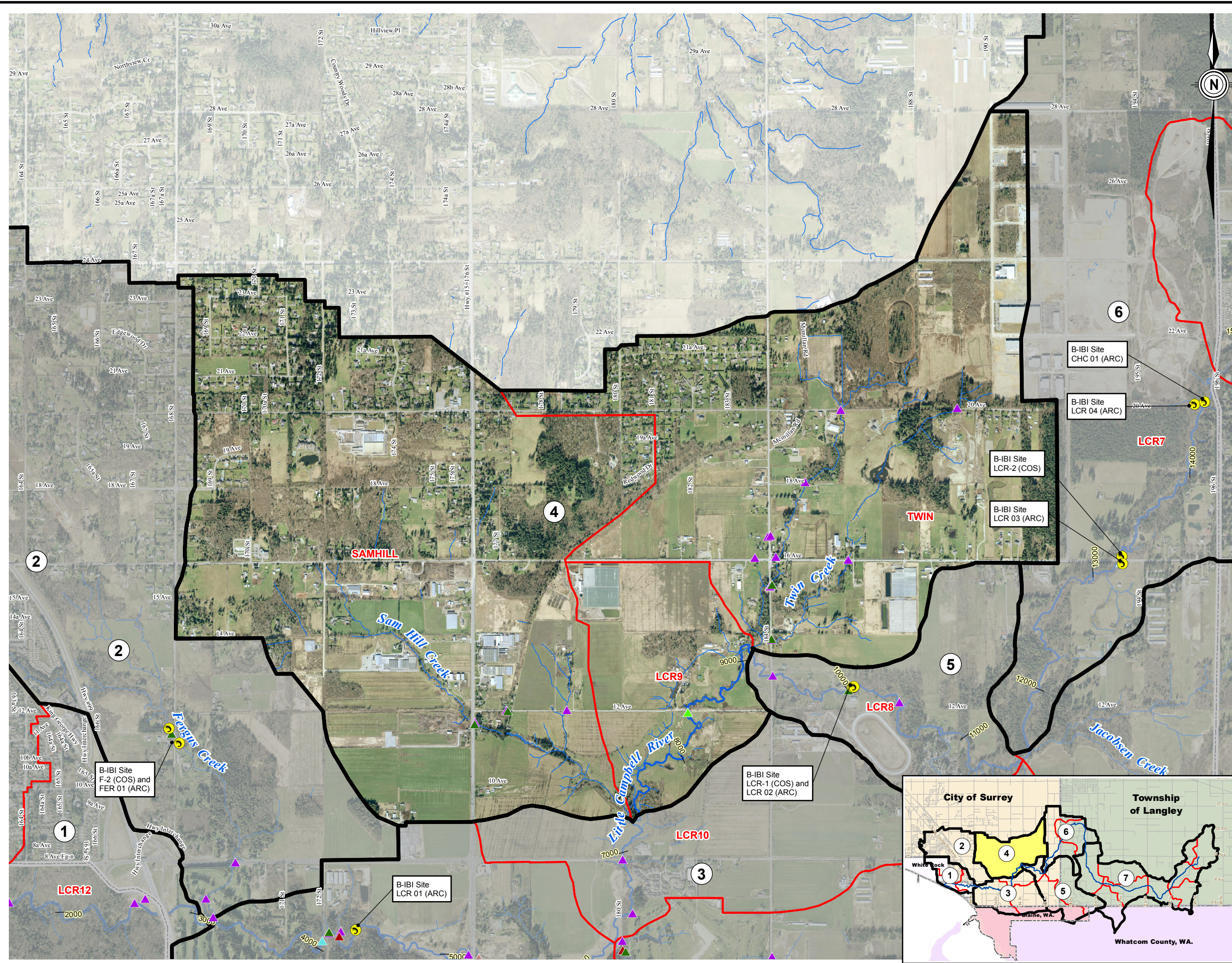
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Project No.	Date
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Sam Hill / Twin Creeks  
ISMP Area and  
Sampling Locations

Figure 9-1



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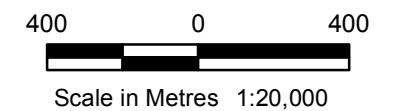
City of Surrey/Township of Langley  
Little Campbell River ISMP  
Scoping Study

Legend

- City/Township/US Boundary
- ISMP Area ID
- ISMP Area Boundary
- Catchment ID
- Major Catchment Boundary
- Watercourse
- Land Use**
- Agricultural
- Commercial
- Industrial
- Institutional
- Open Space
- Park
- Residential Low Density
- Residential Medium Density
- Residential High Density

Orthophoto Source:  
City of Surrey 2006 and Township of Langley 2007.

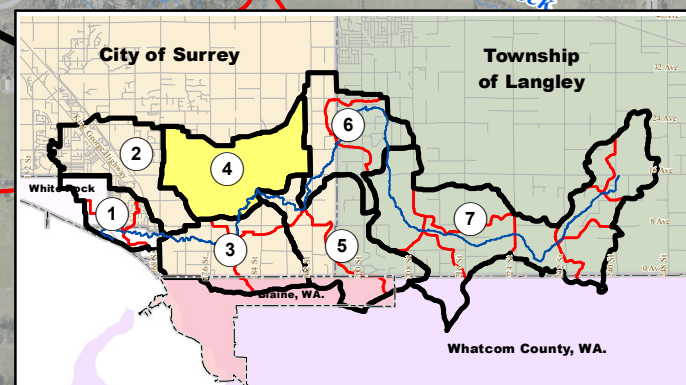
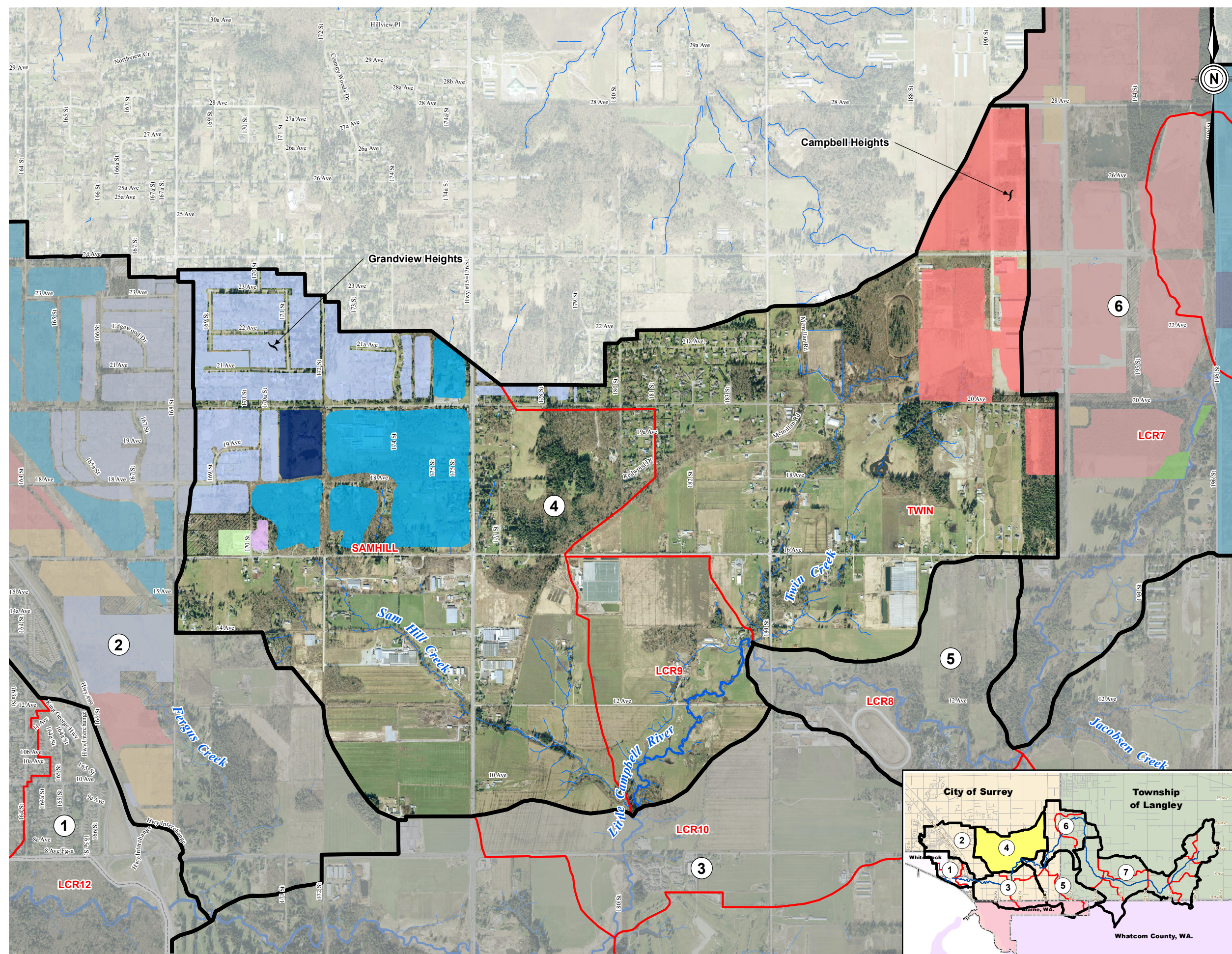
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Project No. 471-180	Date March, 2011
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**Sam Hill / Twin Creeks  
Future Land Use  
Changes**

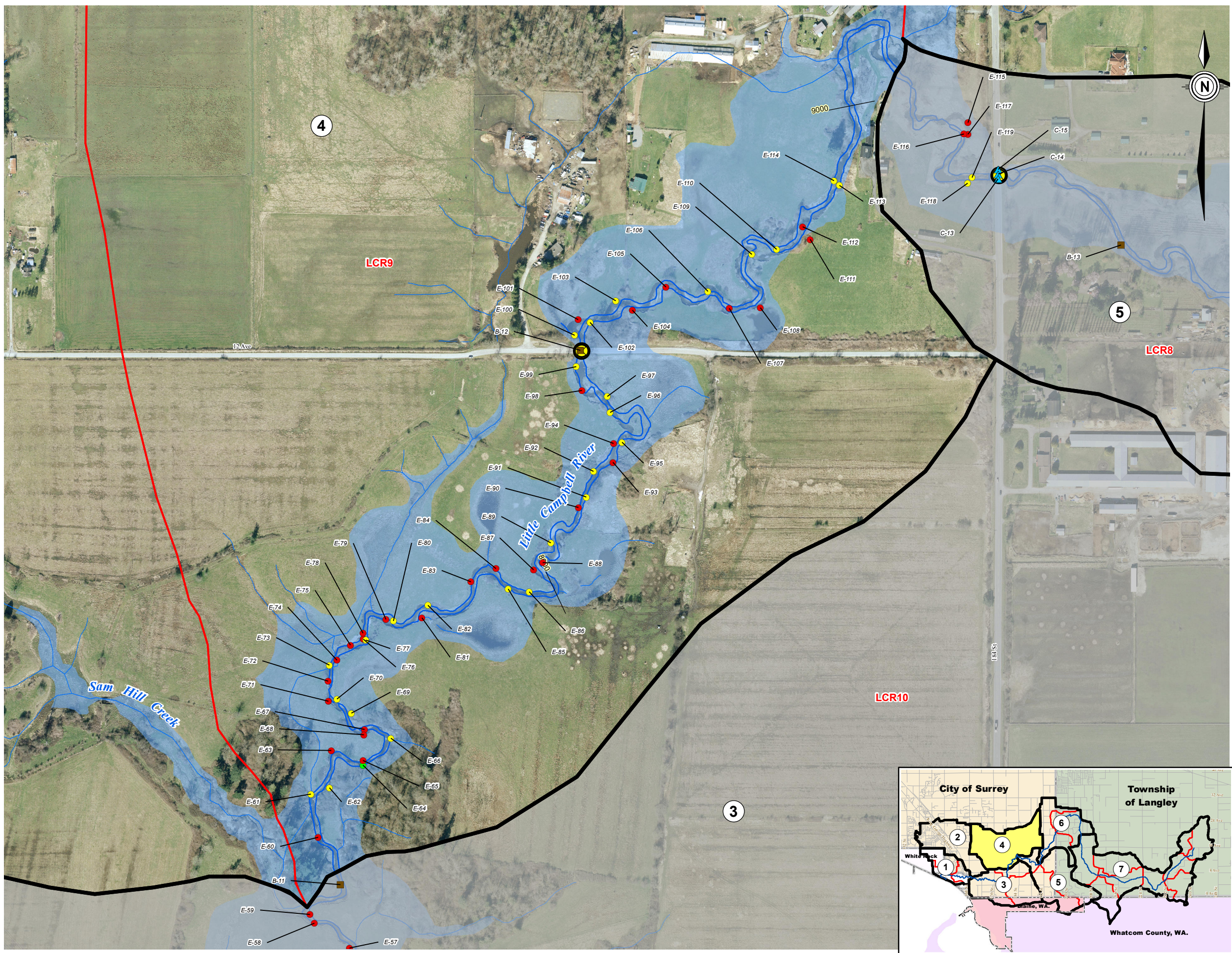
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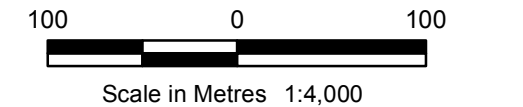


**City of Surrey/Township of Langley  
 Little Campbell River ISMP  
 Scoping Study**

**Legend**

- City/Township/US Boundary
  - ISMP Area ID
  - ISMP Area Boundary
  - Catchment ID
  - Major Catchment Boundary
  - Watercourse
  - 200-Year Floodplain Extents (as estimated in this study)
  - Storm Outfall
  - Crossings Undersized for 200-Year Flow
- (From KWL 2007 Survey)**
- Bridge
  - Culvert
  - Obstruction
  - Deposit
- Erosion (Severity)**
- High
  - Moderate
  - Low

Orthophoto Source:  
 City of Surrey 2006 and Township of Langley 2007.



Project No. 471-180	Date March, 2011
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**Sam Hill / Twin Creeks:  
 LCR Mainstem Floodplain  
 and Inventory**

**Figure 9-3**

**City of Surrey/Township of Langley  
Little Campbell River ISMP  
Scoping Study**

**Legend**

- City/Township/US Boundary
- ISMP Area ID
- ISMP Area Boundary
- Catchment ID
- Major Catchment Boundary

Watercourse

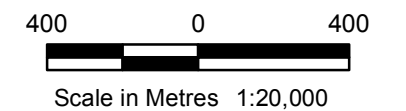
Benthic Site

**Water Quality Station**

- Attainment Monitoring (1971-2007)
- Hydrolab Site (2005-2008)
- LCWS Study (2000-2003)
- Longitudinal Survey (2006-2007)
- Seasonal Monitoring - Agricultural Runoff (2006)
- Seasonal Monitoring - On-site Sewage Disposal Systems (2006-2007)
- Seasonal Monitoring - Urban Runoff (2006-2007)
- Temperature Logger Sites (2005-2010)

Orthophoto Source:  
City of Surrey 2006 and Township of Langley 2007.  
City of White Rock and Washington St. ortho from  
Bing aerial map imagery.

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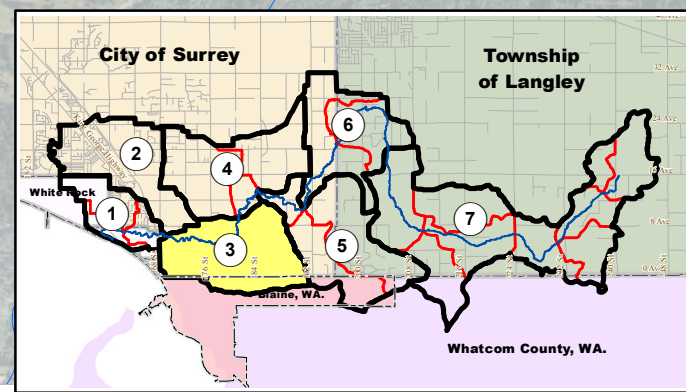
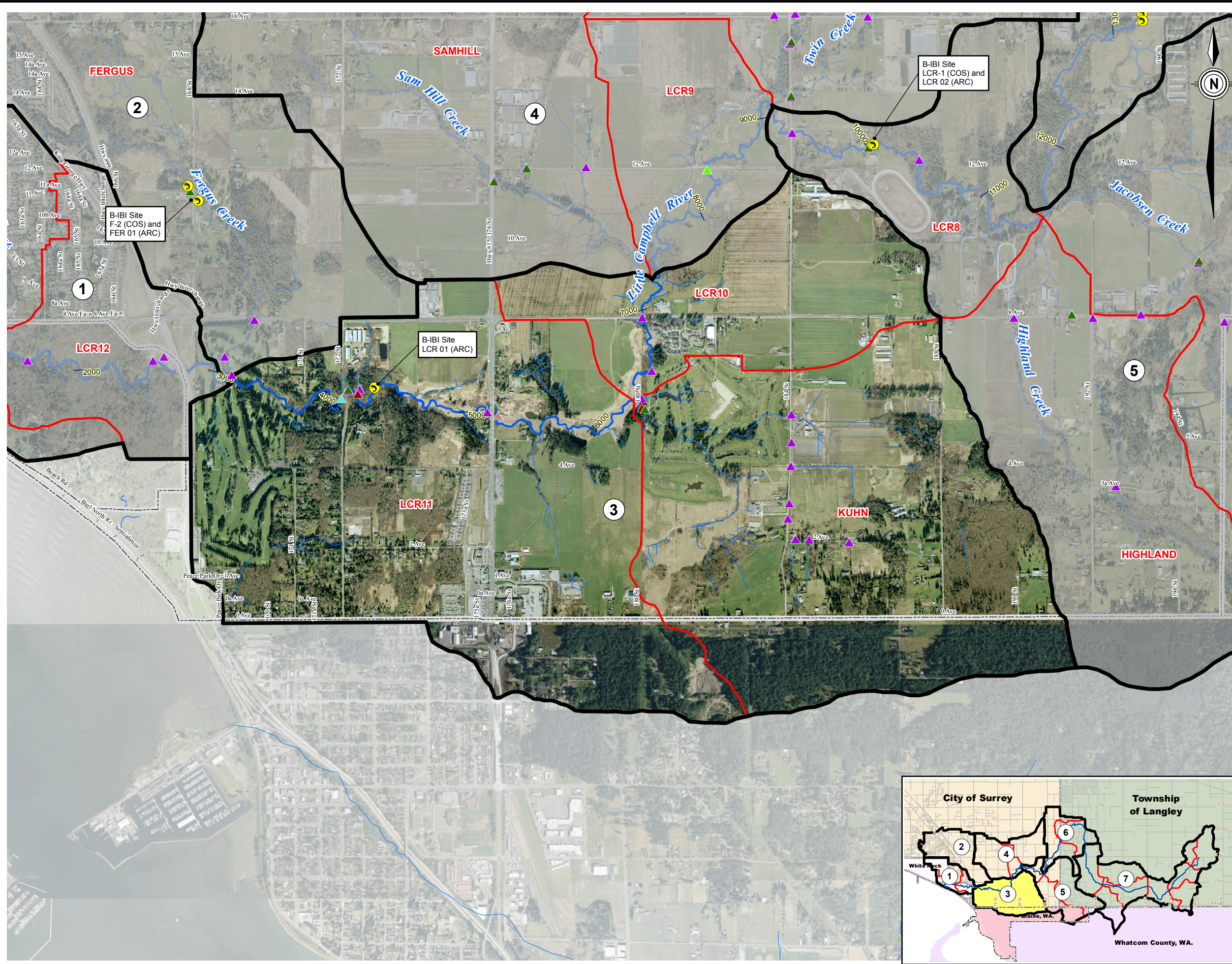


Project No.  
471-180

Date  
March, 2011
















**Kuhn Creek  
ISMP Area and  
Sampling Locations**

**Figure 10-1**

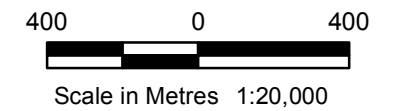


City of Surrey/Township of Langley  
Little Campbell River ISMP  
Scoping Study

Legend

-  City/Township/US Boundary
-  ISMP Area ID
-  ISMP Area Boundary
-  Catchment ID
-  Major Catchment Boundary
-  Watercourse
- Land Use**
-  Agricultural
-  Commercial
-  Industrial
-  Institutional
-  Open Space
-  Park
-  Residential Low Density
-  Residential Medium Density
-  Residential High Density

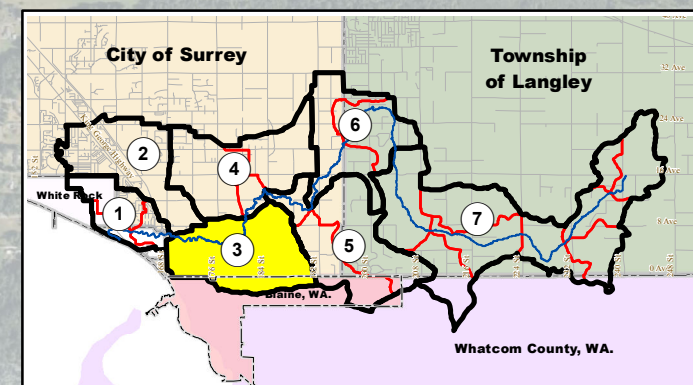
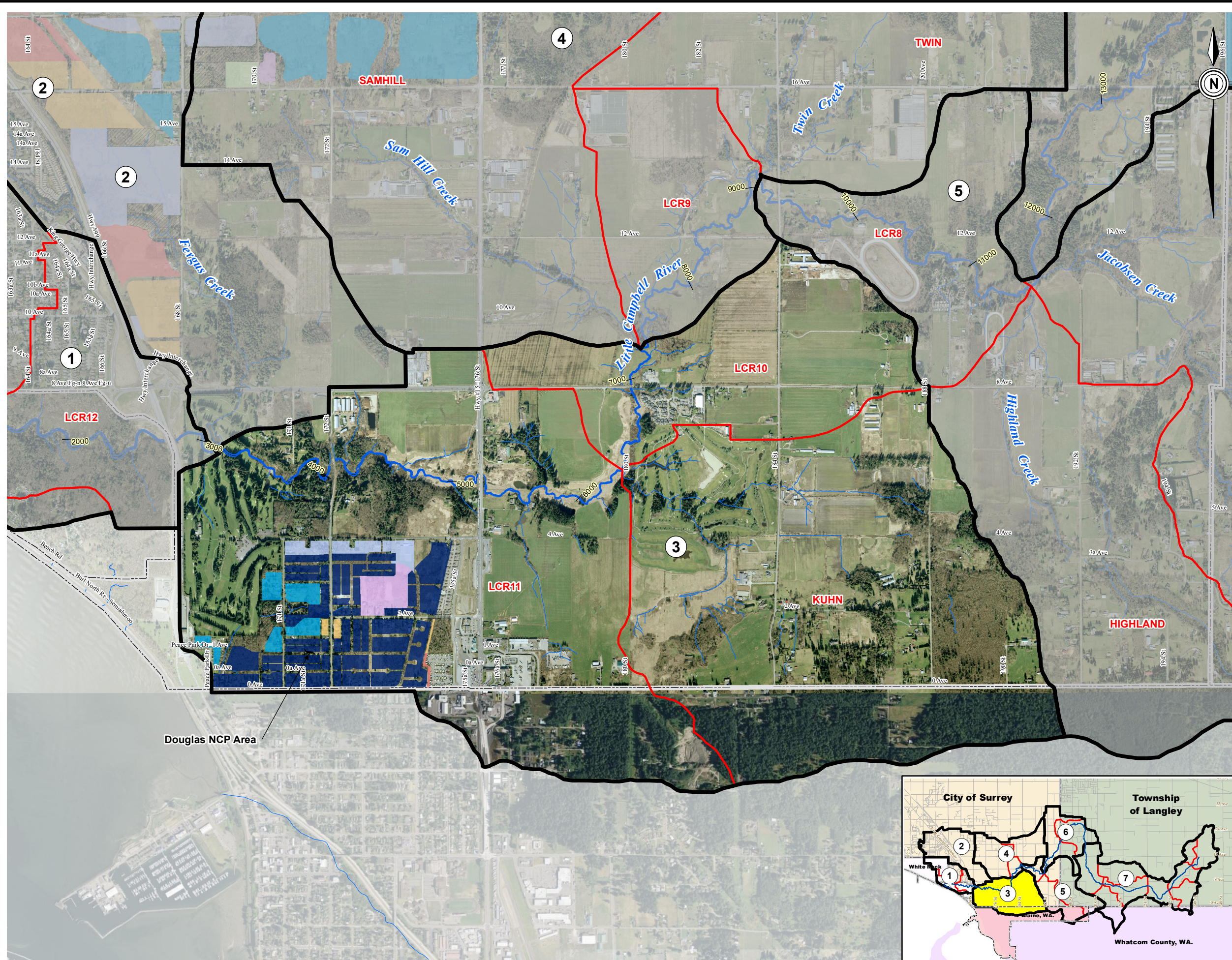
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City of White Rock and Washington St. ortho from  
Bing aerial map imagery.



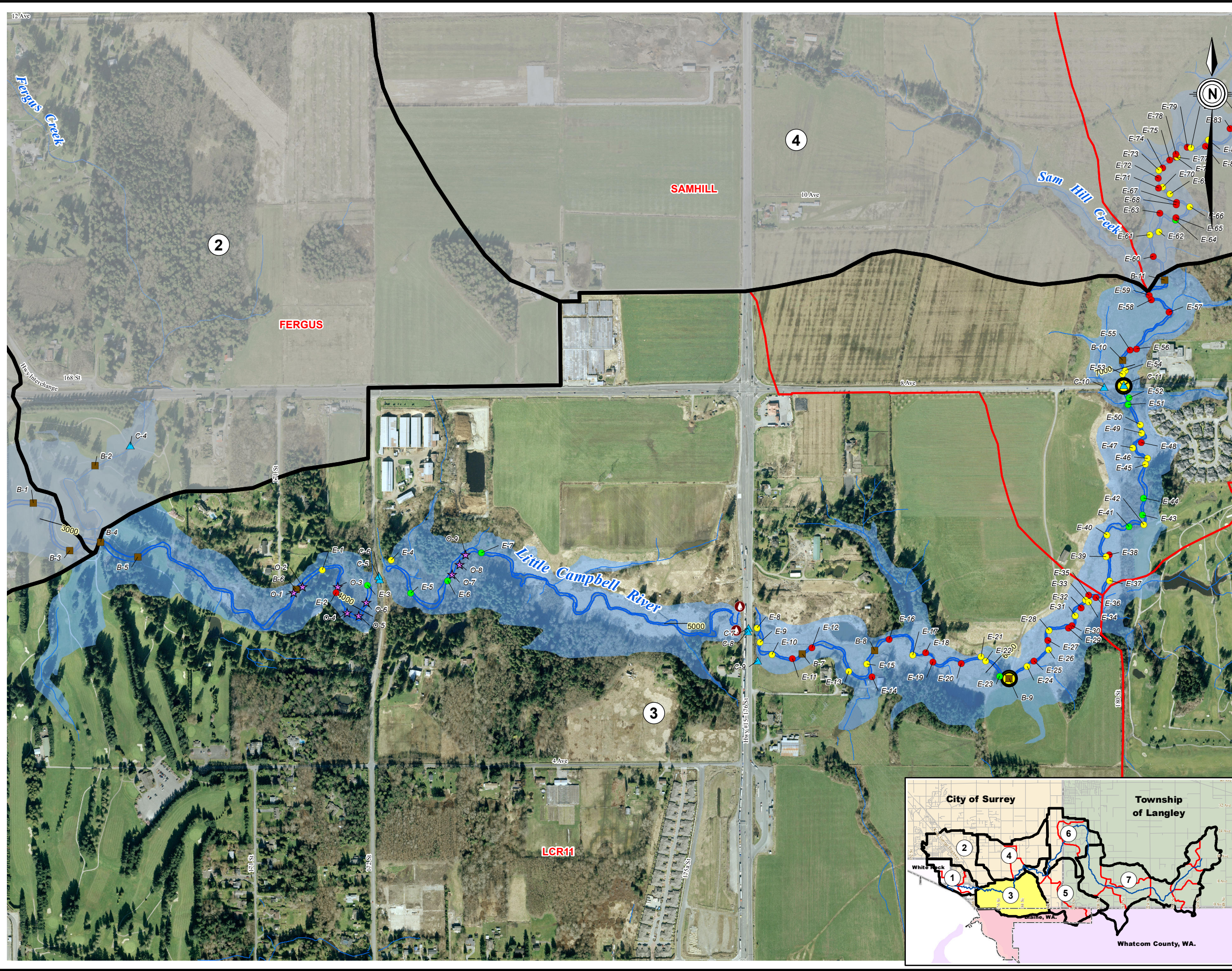
Project No. 471-180	Date March, 2011
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**Kuhn Creek  
Future Land Use  
Changes**

Figure 10-2



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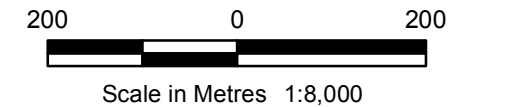


**City of Surrey/Township of Langley  
 Little Campbell River ISMP  
 Scoping Study**

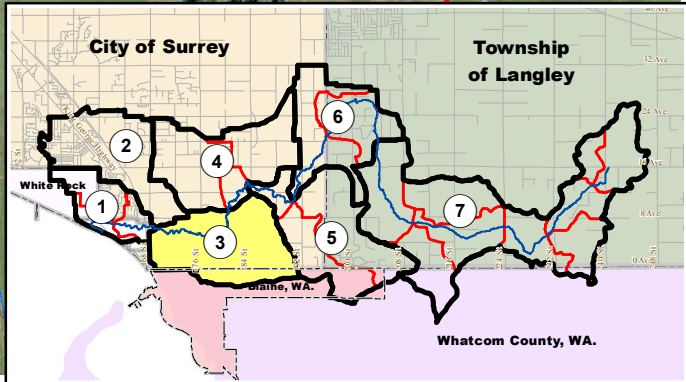
- Legend**
- City/Township/US Boundary
  - ISMP Area ID
  - ISMP Area Boundary
  - Catchment ID
  - Major Catchment Boundary
  - Watercourse
  - 200-Year Floodplain Extents (as estimated in this study)
  - Storm Outfall
  - Crossings Undersized for 200-Year Flow

- (From KWL 2007 Survey)**
- Bridge
  - Culvert
  - Obstruction
  - Deposit
- Erosion (Severity)**
- High
  - Moderate
  - Low

Orthophoto Source:  
 City of Surrey 2006 and Township of Langley 2007.



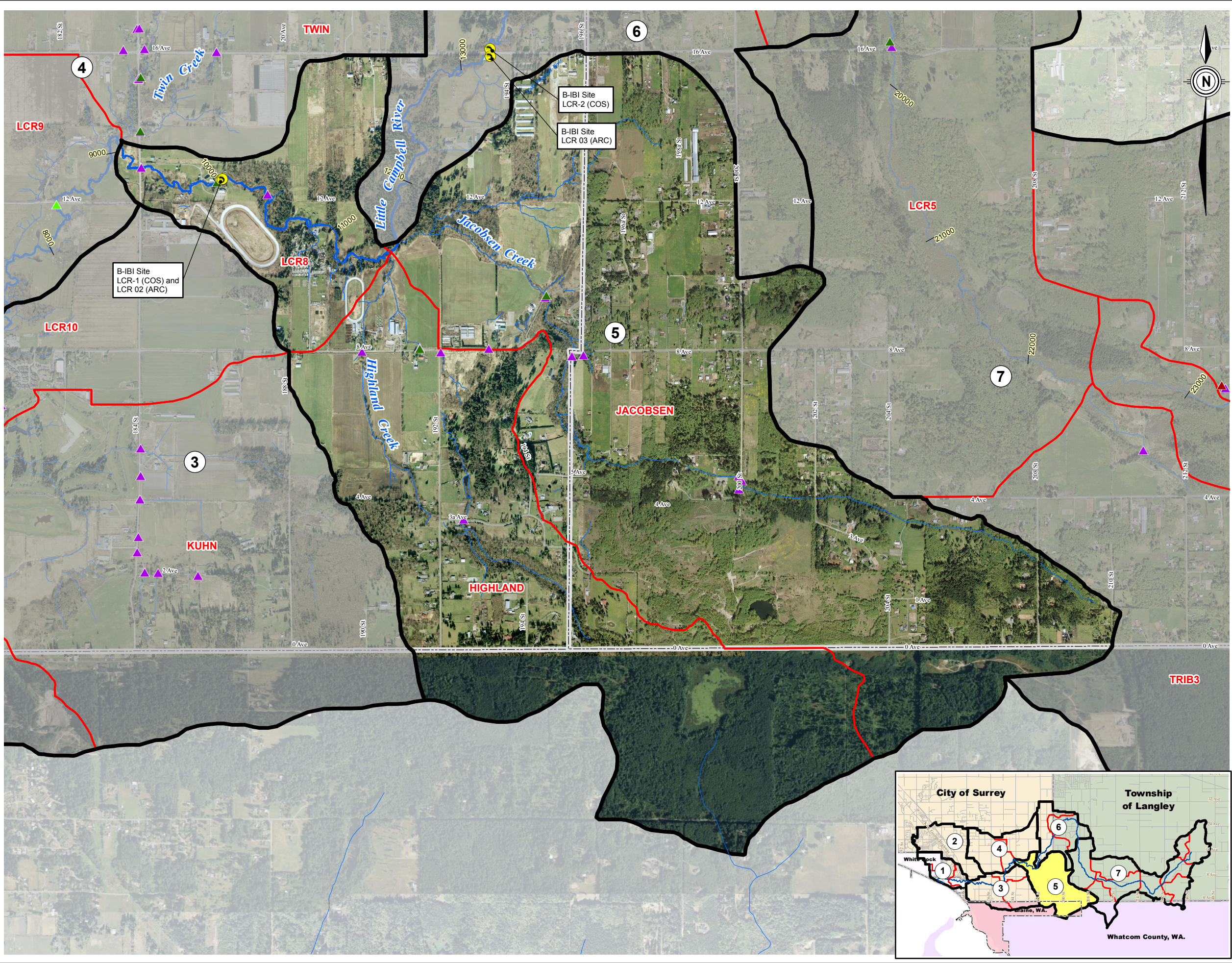
Project No. 471-180	Date March, 2011
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**Kuhn Creek:  
 LCR Mainstem Floodplain  
 and Inventory**

**Figure 10-3**

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 Author: J.Lau



**City of Surrey/Township of Langley  
 Little Campbell River ISMP  
 Scoping Study**

**Legend**

- City/Township/US Boundary
- ISMP Area ID
- ISMP Area Boundary
- Catchment ID
- Major Catchment Boundary

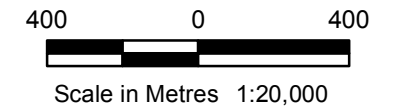
Watercourse

Benthic Site

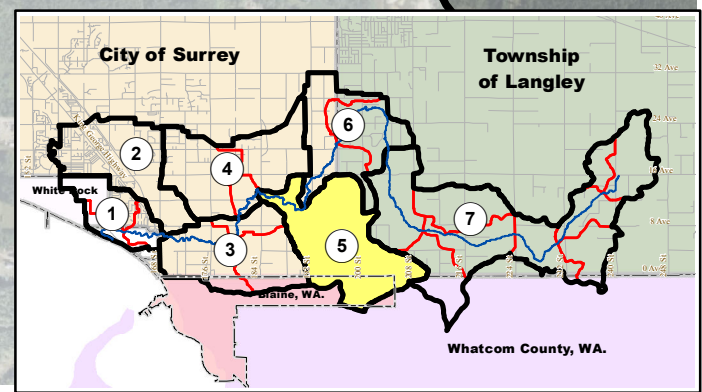
**Water Quality Station**

- Attainment Monitoring (1971-2007)
- Hydrolab Site (2005-2008)
- LCWS Study (2000-2003)
- Longitudinal Survey (2006-2007)
- Seasonal Monitoring - AgriculturalRunoff (2006)
- Seasonal Monitoring - On-site Sewage Disposal Systems (2006-2007)
- Seasonal Monitoring - Urban Runoff (2006-2007)
- Temperature Logger Sites (2005-2010)

Orthophoto Source:  
 City of Surrey 2006 and Township of Langley 2007.  
 City of White Rock and Washington St. ortho from  
 Bing aerial map imagery.



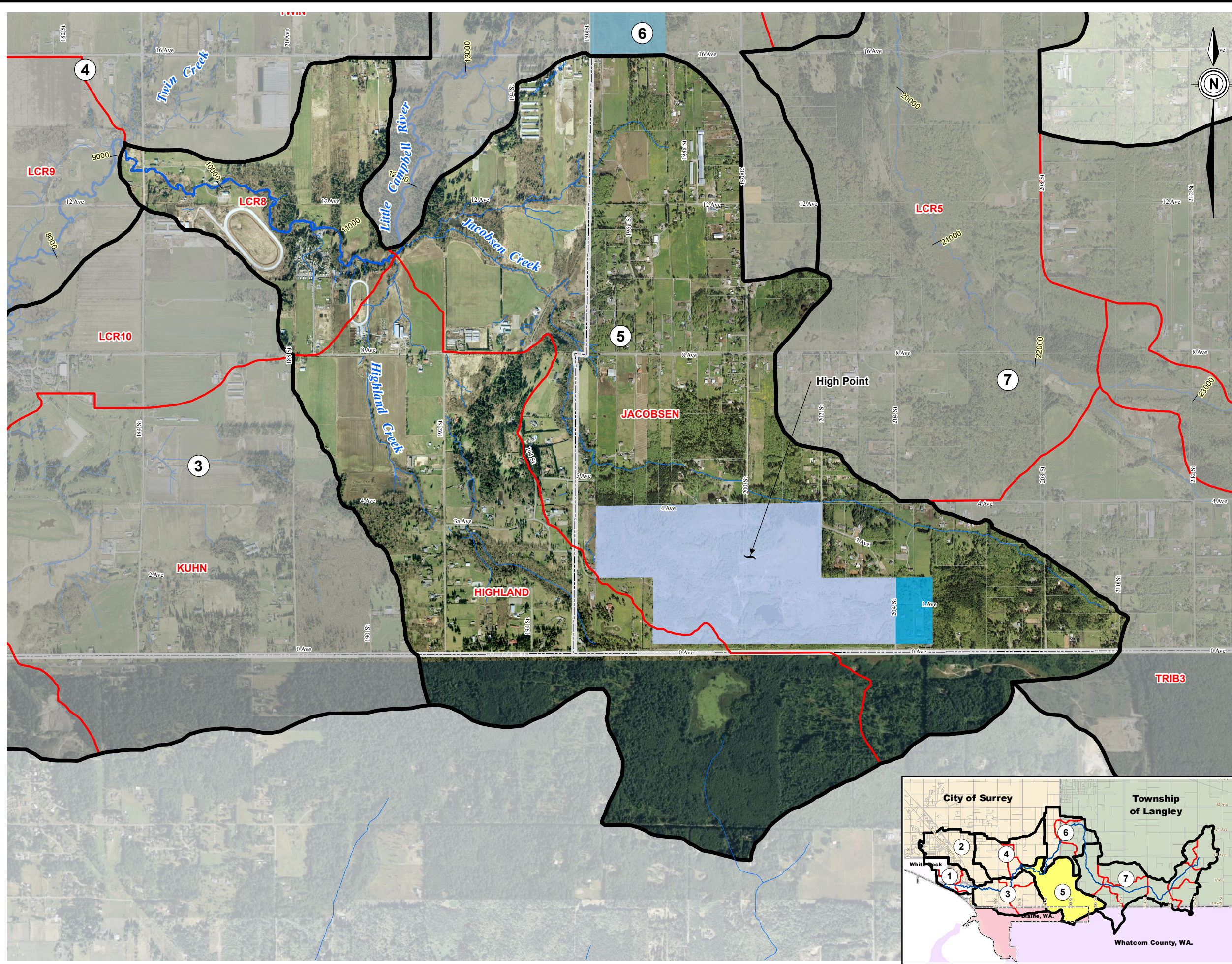
Project No. 471-180	Date March, 2011
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**Jacobsen /  
 Highland Creeks  
 ISMP Area and  
 Sampling Locations**

**Figure 11-1**

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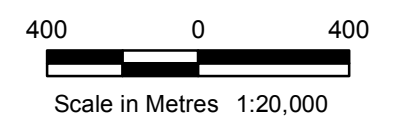


**City of Surrey/Township of Langley  
 Little Campbell River ISMP  
 Scoping Study**

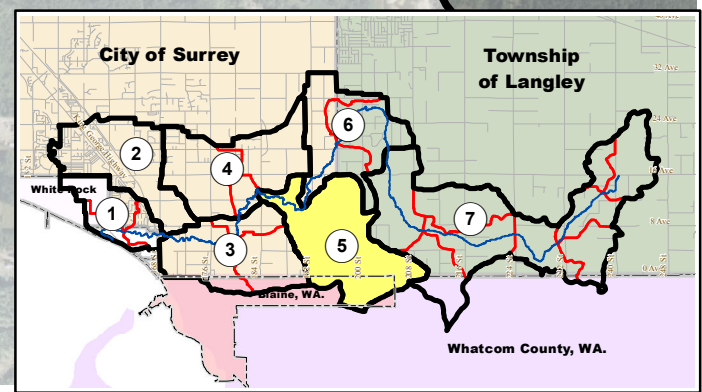
**Legend**

- City/Township/US Boundary
- ISMP Area ID
- ISMP Area Boundary
- Catchment ID
- Major Catchment Boundary
- Watercourse
- Land Use**
- Agricultural
- Commercial
- Industrial
- Institutional
- Open Space
- Park
- Residential Low Density
- Residential Medium Density
- Residential High Density

Orthophoto Source:  
 City of Surrey 2006 and Township of Langley 2007.  
 City of White Rock and Washington St. ortho from  
 Bing aerial map imagery.



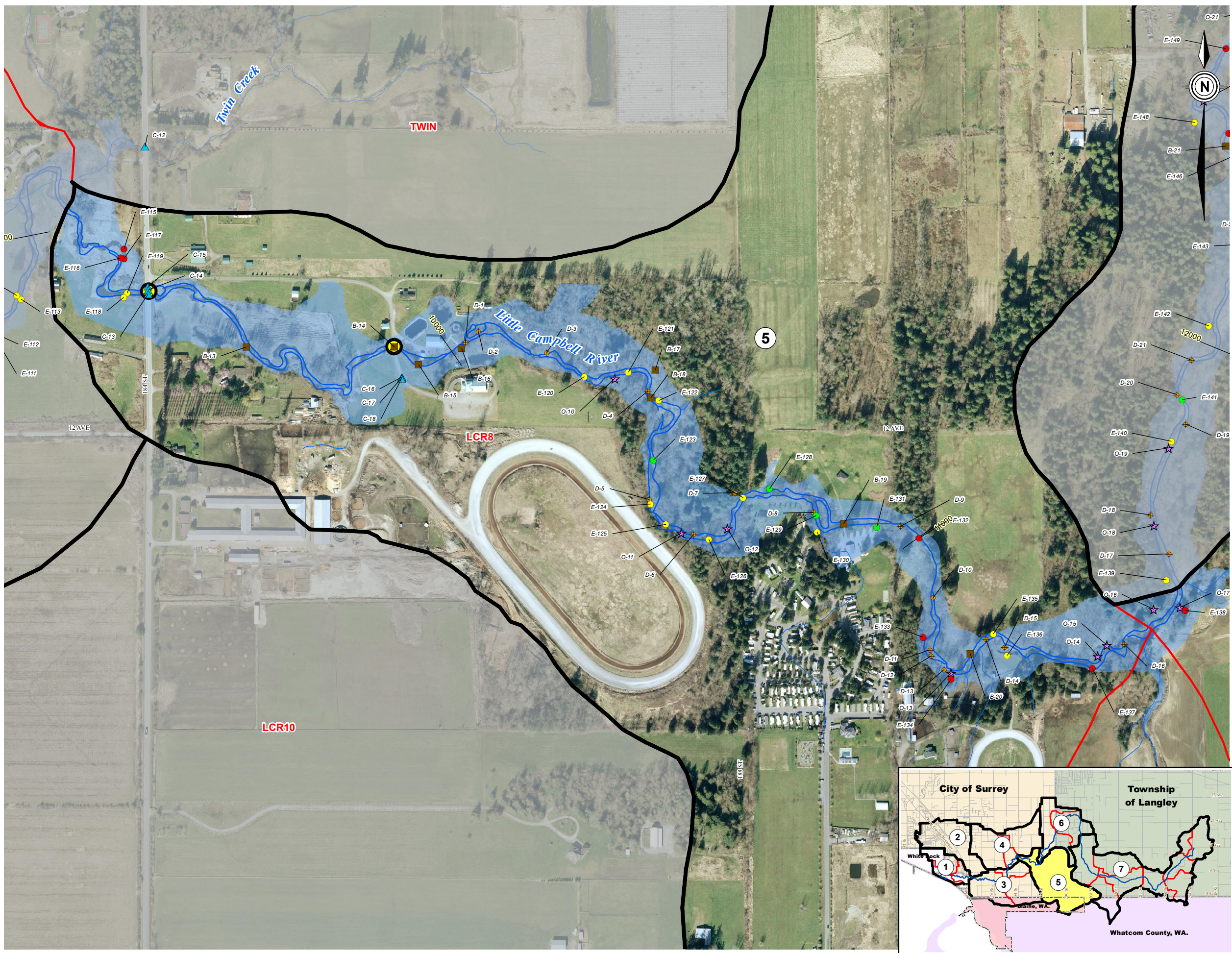
Project No. 471-180	Date March, 2011
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**Jacobsen /  
 Highland Creeks  
 Future Land Use  
 Changes**

**Figure 11-2**

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 Author: J.Lau



**City of Surrey/Township of Langley  
 Little Campbell River ISMP  
 Scoping Study**

**Legend**

- City/Township/US Boundary
- ISMP Area ID
- ISMP Area Boundary
- Catchment ID
- Major Catchment Boundary
- Watercourse
- 200-Year Floodplain Extents (as estimated in this study)
- Storm Outfall
- Crossings Undersized for 200-Year Flow

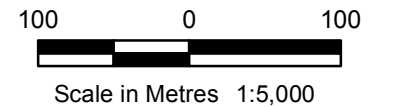
**(From KWL 2007 Survey)**

- ID Bridge
- ID Culvert
- ID Obstruction
- ID Deposit

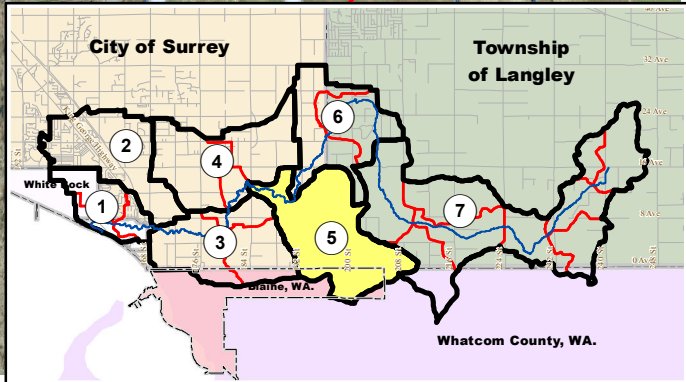
**Erosion (Severity)**

- ID High
- ID Moderate
- ID Low

Orthophoto Source:  
 City of Surrey 2006 and Township of Langley 2007.



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






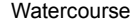
**Jacobsen /  
 Highland Creeks:  
 LCR Mainstem Floodplain  
 and Inventory**

**Figure 11-3**









**City of Surrey/Township of Langley  
Little Campbell River ISMP  
Scoping Study**

**Legend**

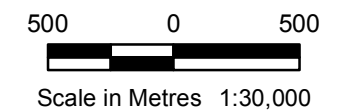
-  City/Township/US Boundary
-  ISMP Area ID
-  ISMP Area Boundary
-  Catchment ID
-  Major Catchment Boundary

 Watercourse

**Water Quality Station**

-  Attainment Monitoring (1971-2007)
-  HydroLab Site (2005-2008)
-  LCWS Study (2000-2003)
-  Longitudinal Survey (2006-2007)
-  Seasonal Monitoring - Agricultural Runoff (2006)
-  Seasonal Monitoring - On-site Sewage Disposal Systems (2006-2007)
-  Seasonal Monitoring - Urban Runoff (2006-2007)
-  Temperature Logger Sites (2005-2010)

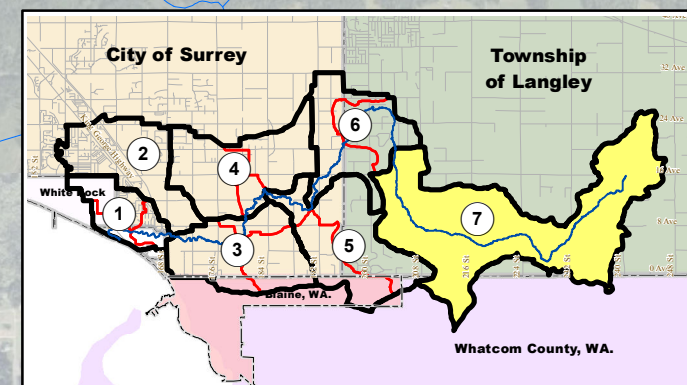
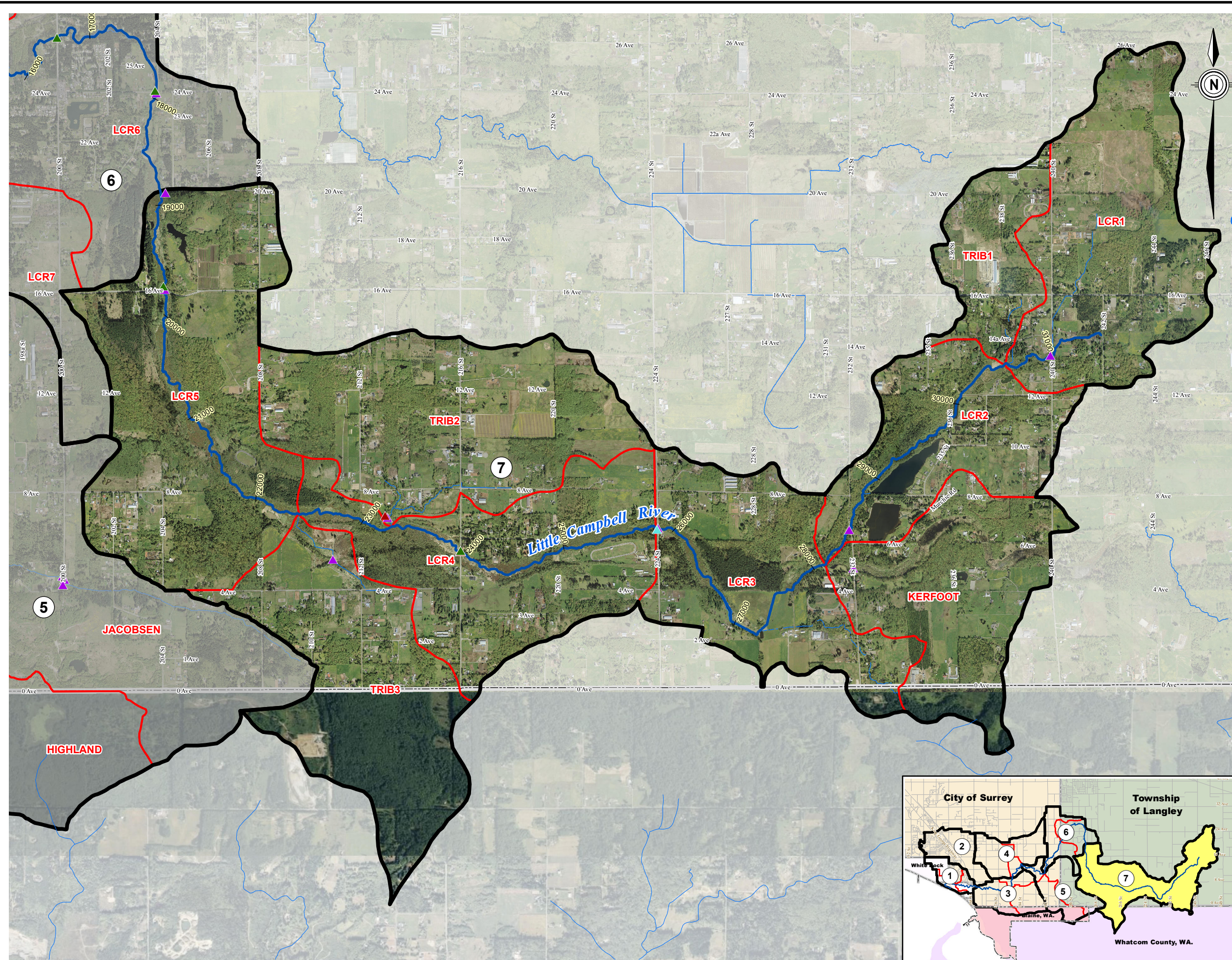
Orthophoto Source:  
City of Surrey 2006 and Township of Langley 2007.  
City of White Rock and Washington St. ortho from  
Bing aerial map imagery.



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**Upper  
Little Campbell River  
ISMP Area and  
Sampling Locations**








**Figure 12-1**









**City of Surrey/Township of Langley  
Little Campbell River ISMP  
Scoping Study**




**Legend**

-  City/Township/US Boundary
-  ISMP Area ID
-  Catchment ID
-  Watercourse
-  200-Year Floodplain Extents (as estimated in this study)
-  Storm Outfall
-  Crossings Undersized for 200-Year Flow

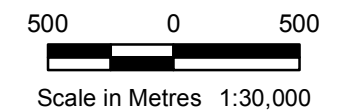
**(From KWL 2007 Survey)**

-  <sup>ID</sup> Bridge
-  <sup>ID</sup> Culvert
-  <sup>ID</sup> Obstruction
-  <sup>ID</sup> Deposit

**Erosion (Severity)**

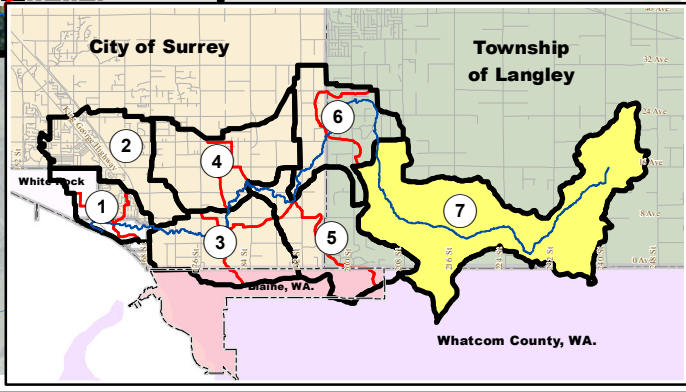
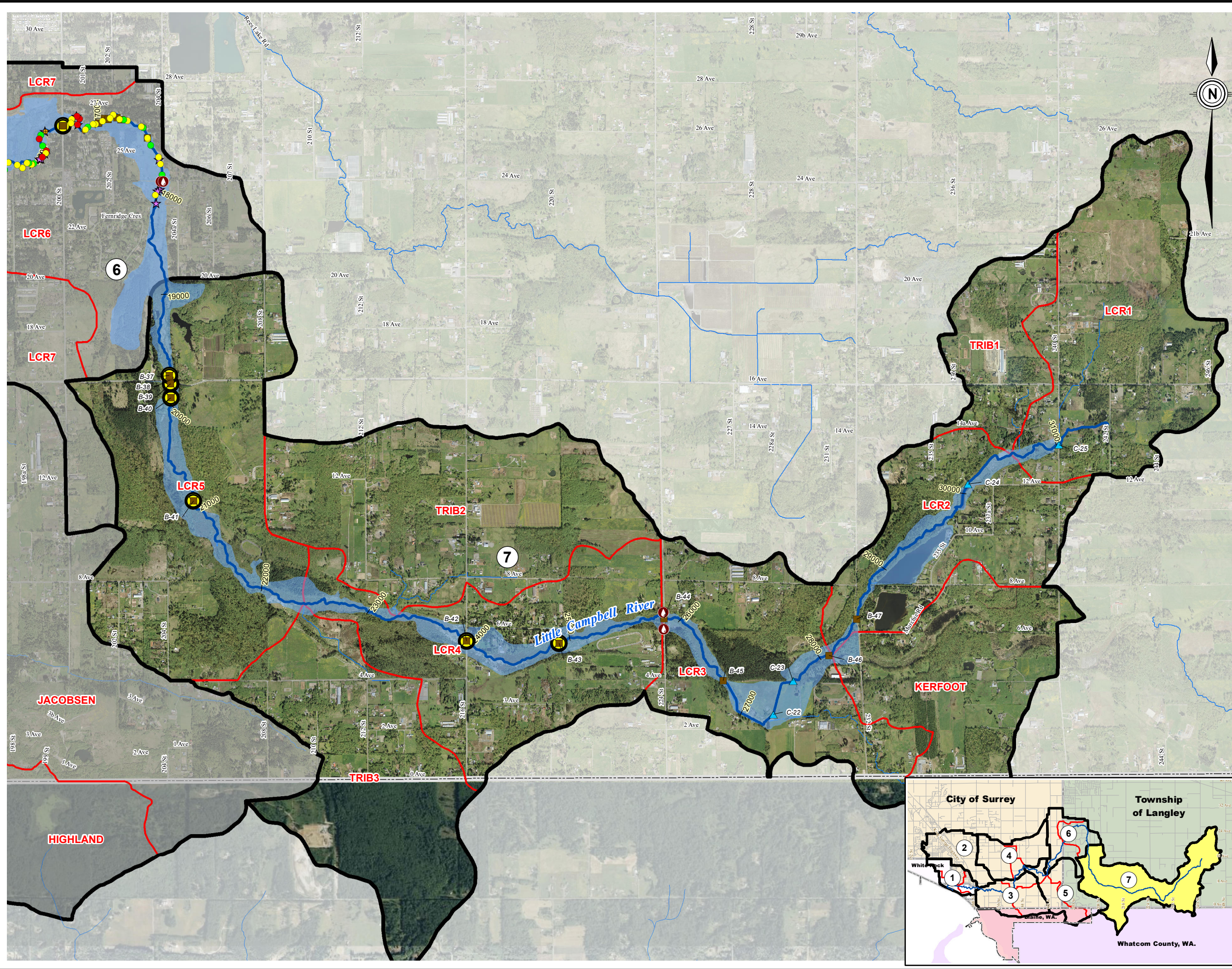
-  <sup>ID</sup> High
-  <sup>ID</sup> Moderate
-  <sup>ID</sup> Low

Orthophoto Source:  
City of Surrey 2006 and Township of Langley 2007.  
City of White Rock and Washington St. ortho from  
Bing aerial map imagery.



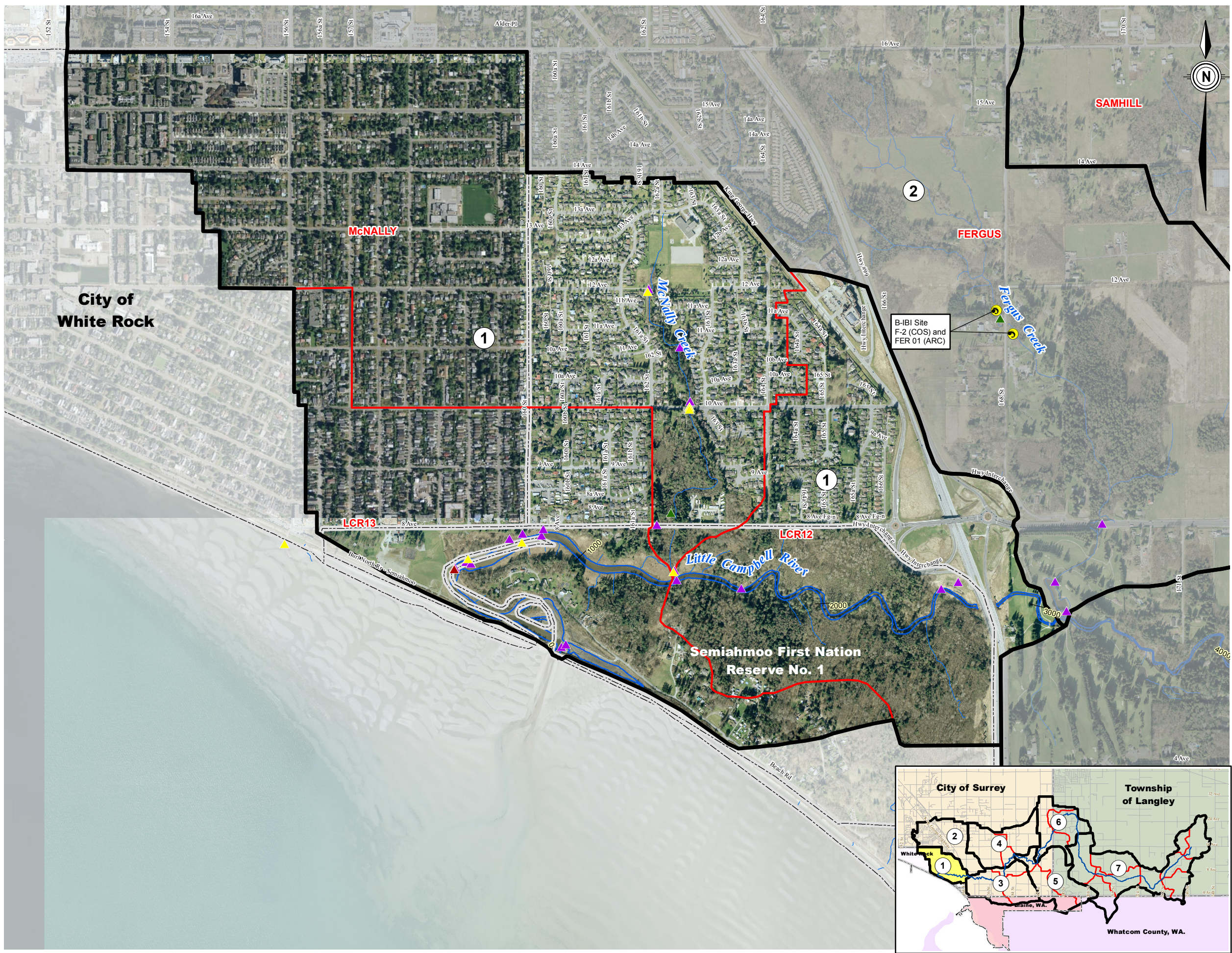
Project No. 471-180	Date March, 2011
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**Upper  
Little Campbell River  
Floodplain and Inventory**  
**Figure 12-2**



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Author: J.Lau

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 Author: J.Lau



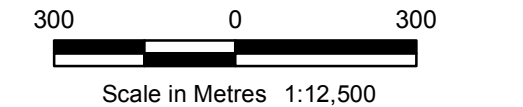
**City of Surrey/Township of Langley  
 Little Campbell River ISMP  
 Scoping Study**

**Legend**

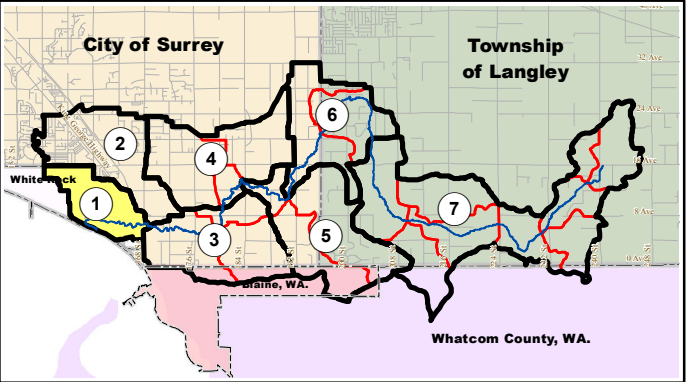
- City/Township/US Boundary
- ISMP Area ID
- ISMP Area Boundary
- Catchment ID
- Major Catchment Boundary
- Watercourse
- Benthic Site
- Water Quality Station**
- Attainment Monitoring (1971-2007)
- Hydrolab Site (2005-2008)
- LCWS Study (2000-2003)
- Longitudinal Survey (2006-2007)
- Seasonal Monitoring - Agricultural Runoff (2006)
- Seasonal Monitoring - On-site Sewage Disposal Systems (2006-2007)
- Seasonal Monitoring - Urban Runoff (2006-2007)
- Temperature Logger Sites (2005-2010)

Orthophoto Source:  
 City of Surrey 2006 and Township of Langley 2007.  
 City of White Rock and Washington St. ortho from  
 Bing aerial map imagery.

**kw** KERR WOOD LEIDAL  
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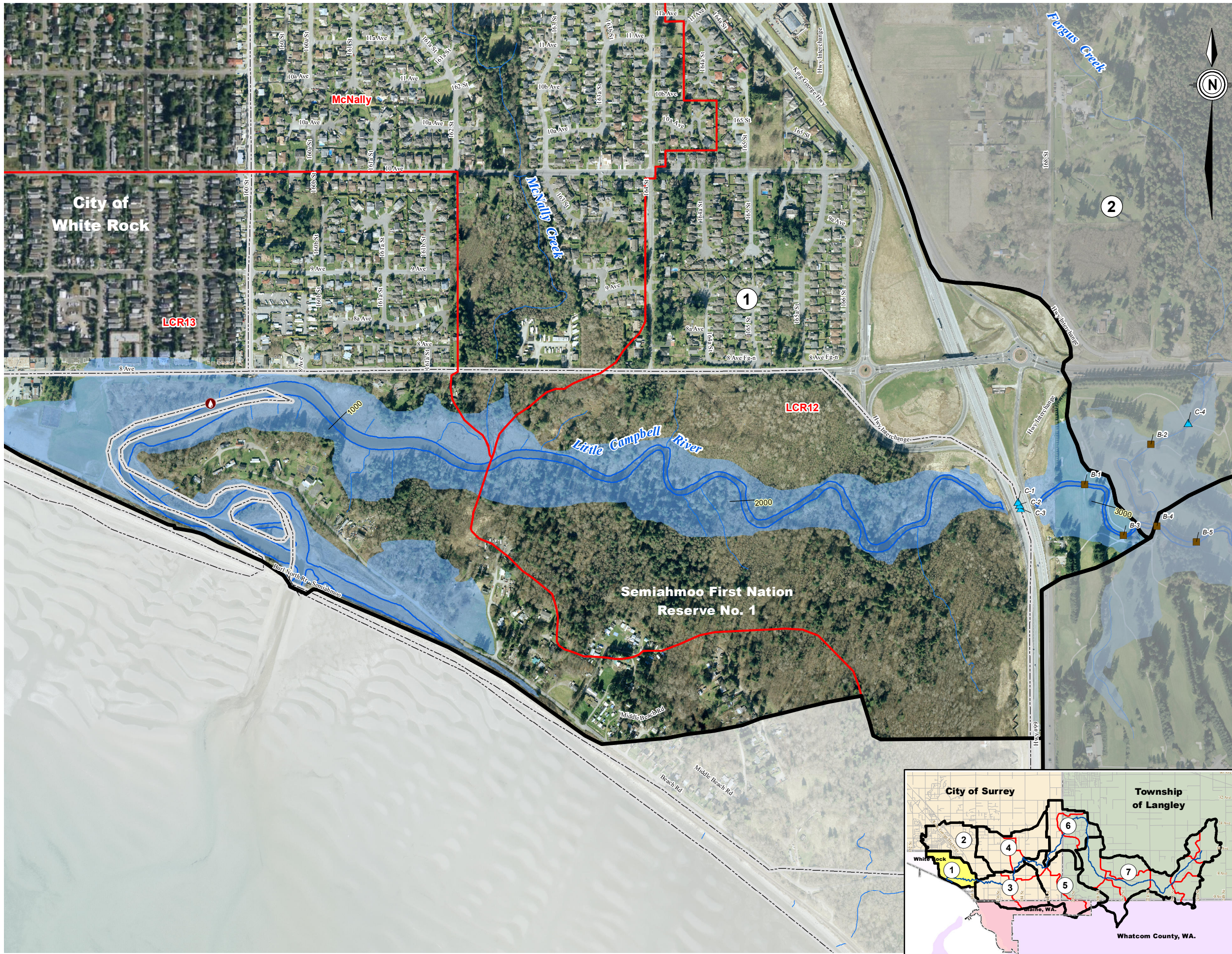
Project No. 471-180	Date March, 2011
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**McNally Creek  
 ISMP Area and  
 Sampling Locations**

**Figure 13-1**

Path: C:\0400-0499\471-180\430-CIS\IMXD-Rp471180\Fig13-2.mxd Date Saved: 3/3/2011 10:59:38 AM  
 Author: J.Lau

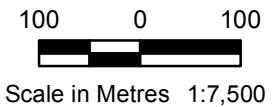


**City of Surrey/Township of Langley  
 Little Campbell River ISMP  
 Scoping Study**

**Legend**

- City/Township/US Boundary
  - ISMP Area ID
  - ISMP Area Boundary
  - Catchment ID
  - Major Catchment Boundary
  - Watercourse
  - 200-Year Floodplain Extents (as estimated in this study)
  - Storm Outfall
- (From KWL 2007 Survey)**
- Bridge
  - Culvert
  - Obstruction
  - Deposit
- Erosion (Severity)**
- High
  - Moderate
  - Low

Orthophoto Source:  
 City of Surrey 2006 and Township of Langley 2007.  
 City of White Rock and Washington St. ortho from  
 Bing aerial map imagery.



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**McNally Creek:  
 LCR Mainstem  
 Floodplain and Inventory**  
**Figure 13-2**