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**Daniel A. Sullivan, Mayor**

# **2014 Dry Weather Screening Report**

## **APDES Permit No. AKS-052558**

**MUNICIPALITY OF ANCHORAGE**  
**WATERSHED MANAGEMENT SERVICES**

November 2014

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# **1 Introduction**

## **1.1 Background**

The U.S. Environmental Protection Agency (EPA) issued the Municipality of Anchorage (MOA) and the Alaska Department of Transportation and Public Facilities (ADOT&PF) a Municipal Separate Storm Sewer System (MS4) permit under the National Pollutant Discharge Elimination System (NPDES) in 1999. The permit is now administered under the Alaska Pollutant Discharge Elimination System (APDES). To meet the requirements of the permit, MOA initiated a dry weather screening program in 1999 to identify the potential illicit discharges to the MS4 and conducted this program during the dry season (typically May through mid July) each year through 2009.

EPA re-issued the permit prior to the state receiving primacy to operate the NPDES program. The state soon took over operation of the re-issued permit, now an APDES MS4 permit. The permit became effective February 1, 2010. The permit continues the requirement of dry weather screening and subsequent follow-up actions to identify illicit discharges and associated pollutants from the MS4.

## **1.2 Program Definition**

Dry weather screening is conducted to identify illicit discharges to the MS4 within the MOA. Illicit discharges, such as those from industrial process wastewater, domestic wastewater, car wash wastewater and other sources, can introduce pollutants inadvertently both directly and indirectly to the storm sewer system. Identification is the first step to eliminating these illicit discharges. Flow from storm drain outfalls during dry weather is generally an indicator of improper discharges to the MS4. To identify potential illicit discharges, field screening and laboratory testing techniques are used to identify obvious pollutant concentrations in what is expected to be clean stormwater. Guidance on illicit discharge screening identifies a list of 15 indicator parameters that can be used to confirm the presence of illicit discharges, noting that generally only 3 to 5 of these parameters need to be used to characterize the discharge for subsequent identification and elimination of the discharge (CWP and Pitt, 2004).

## **1.3 Screening Program**

The MS4 permit (Section II part B.5.d) requires the MOA to sample flow from at least 15 stormwater outfalls and to have an additional 30 outfalls prioritized each year for sampling as alternate sites, should an outfall be dry. The permit also requires that outfalls be geographically dispersed and represent all major land uses within the municipality. The permit specifies screening for seven parameters including: pH, total chlorine, detergents, total copper, total phenol, fecal coliform, and turbidity. Benchmark or threshold exceedances are used to trigger further action and provide information to support that action.

When a dry weather screening parameter exceeds a threshold, field crews will immediately notify the MOA Project Manager of the location and parameter of exceedance so that follow-up actions can be initiated. For fecal coliform results that exceed the thresholds, the laboratory Project Manager will be requested to notify the Contract QA Officer immediately after the

analysis is complete (within approximately 24 hours). The Contract QA Officer will immediately notify the MOA Project Manager for follow-up action. Follow-up actions are described in the flow chart in Attachment F-1 of Appendix F (Dry Weather Screening Monitoring Plan) in the QAP (MOA, 2012).

## **2 Project Summary**

### **2.1 Sampling Location Selection**

Dry weather screening sampling locations were selected in a semi-systematic way. Twelve watersheds were identified for inclusion in this study (MOA, 2011). Over the duration of the permit, qualifying outfalls representing a variety of land uses in all 12 watersheds will be sampled. The method established for ranking these watersheds takes into consideration many attributes of the watershed. These include;

- outfalls that discharge to an impaired water body
- evidence of contamination in the three years prior to ranking
- percentage of impervious cover
- the proportion of commercial/industrial land uses (including schools and parks)

To prioritize the target watersheds for this permit cycle, the 12 watersheds were ranked using the criteria and scoring system provided below. Typically, three watersheds are selected for sampling during a single year. The ranking system will be used for the duration of the permit cycle to determine which watersheds are examined during a given year. During the first year (2011) of the sampling effort the top three watersheds were studied; during the second year (2012), those ranked 3-6 were studied; and so on throughout the permit cycle.

The criteria used for ranking watersheds are described in the following six-step process:

1. Does the watershed drain to a Category 4 water body (water body with a Total Maximum Daily Load (TMDL) in place, an active pollution control program, or impaired by something other than a pollutant (i.e. channelization)) or a 303(d) listed Category 5 water body (polluted water body that has no TMDL in place, but requires TMDLs or pollution control plan) for one of the pollutants of concern (POCs)?
  - a. If no, assign 1 point to the watershed.
  - b. If yes, assign 5 points to the watershed.
2. Calculate the number of outfalls with threshold exceedances over the 2007 to 2009 period divided by the number of outfalls sampled in that watershed over the three year period, and compare to table below for point assignments. If an outfall had exceedances for 2 or more POCs on the same date, count each exceedance.

| <b>% of outfalls sampled with threshold exceedances</b> | <b>Points</b> |
|---|---------------|
| >90   | 20            |
| 80-89   | 18            |
| 70-99   | 16            |
| 60-69   | 14            |
| 50-59   | 12            |
| 40-49   | 10            |
| 30-39   | 8             |
| 20-29   | 6             |
| 10-19   | 4             |
| 1-9   | 2             |
| 0   | 0             |

3. Assign points to the watersheds based on the relative impervious area within the Anchorage bowl, Eagle River, and Girdwood areas as listed in the table below:

| <b>% Impervious Area</b> | <b>Points</b> |
|--------------------------|---------------|
| >90                      | 5             |
| 70-89                    | 4             |
| 50-69                    | 3             |
| <50                      | 1             |

4. Assign points to the watersheds based on the percentage of commercial and industrial land uses within the Anchorage bowl, Eagle River, and Girdwood areas as listed in the table below:

| <b>C/I%</b> | <b>Points</b> |
|-------------|---------------|
| >80         | 6             |
| 60-79       | 5             |
| 40-59       | 4             |
| 20-39       | 3             |
| <20         | 2             |

5. Add the points for each watershed.  
6. Rank the watersheds from highest to lowest.

Using the above criteria, the 12 watersheds were scored and ranked as shown in Table 1.

**Table 1. Criteria scores and ranking of watersheds.**

| Rank | Watershed           | Category 4 or 5 Water Body | Percent Exceedances | Impervious Area | Commercial Industrial | Total Score |
|------|---------------------|----------------------------|---------------------|-----------------|-----------------------|-------------|
| 1    | <b>Fish Cr.</b>     | 5                          | 20                  | 3               | 2                     | 30          |
| 2    | <b>Campbell Cr.</b> | 5                          | 18                  | 1               | 2                     | 26          |
| 3    | <b>Eagle River</b>  | 5                          | 16                  | 1               | 2                     | 24          |
| 4    | <b>Ship Cr.</b>     | 5                          | 14                  | 1               | 2                     | 22          |
| 5    | Chester Cr.         | 5                          | 12                  | 1               | 2                     | 20          |
| 6    | Furrow Cr.          | 5                          | 0                   | 1               | 2                     | 8           |
| 6    | Rabbit Cr.          | 5                          | 0                   | 1               | 2                     | 8           |
| 8    | Mirror Cr.          | 1                          | 0                   | 1               | 2                     | 4           |
| 8    | Peters Cr.          | 1                          | 0                   | 1               | 2                     | 4           |
| 8    | Hood Cr.            | 1                          | 0                   | 1               | 2                     | 4           |
| 8    | Potter Cr.          | 1                          | 0                   | 1               | 2                     | 4           |
| 8    | Glacier Cr.         | 1                          | 0                   | 1               | 2                     | 4           |

**Bold** indicates watersheds sampled in 2014.

To identify the outfalls to be examined within the watersheds, the following procedures were used:

1. Outfalls that did not both 1) fit the definition of outfall provided at 40 CFR 122.25(b)(9) and 2) are owned by the Municipality of Anchorage or ADOT & PF were eliminated from consideration. Outfalls fitting these criteria were preliminarily identified from the MOA and ADOT's storm sewer inventory and mapping before field mobilization. Samples from privately owned pipes or ditches were not considered part of the dry weather screening program. Pipes that convey streamflow were also not considered except when these pipes function as storm sewers.
2. The list of complaints received by MOA in the previous year that involve discharges from the MS4 was examined. Within each watershed to be sampled, outfalls directly associated with these complaints were targeted for sampling. No complaints were identified for the watersheds examined during the 2014 sampling effort.
3. Each watershed was divided approximately in half (an upper watershed and a lower watershed). Since no complaint outfalls could be targeted, outfalls were added beginning at the mouth of the lower half of the watershed and at the beginning of the upper half of the watershed with the goal of identifying five sample sites in the watershed. These were to be the primary sampling sites within that watershed. An additional ten alternate outfall sites were also to be identified (five in the lower and five in the upper watershed). An alternate site was sampled when a primary site could not be sampled.

Prior to the 2014 Dry Weather Screening effort all identified watersheds with an MS4 in the MOA had been examined. In order to reach a total of 15 primary and 30 alternate outfalls four different watersheds were re-examined.

## 2.2 Outfall Sample Locations

Prior to any field effort sampling sites were identified through a GIS analysis using the 2013 hydrography geodatabase (HGDB). The field team performed reconnaissance trips to verify the data and to ensure the outfalls were otherwise suitable for sampling (safe access, flowing water, etc.). Notes recorded during the reconnaissance trip were recorded in a field log book (Appendix B).

Table 2 lists the outfalls that were investigated in each of the watersheds. Outfall codes (numbers assigned to all nodes in the HGDB MS4 network) in parenthesis are those selected as primary outfalls for sampling. The bold outfall codes in the table indicate outfalls that were sampled. Outfall codes that are underlined are sites that were visited, but had no flowing water. Maps of the watersheds and the outfalls investigated are presented in Appendix A.

**Table 2. Sampling Site Locations**

| <b>Watershed</b> | <b>Outfall Code</b> | <b>Latitude</b> | <b>Longitude</b> | <b>Location Description and Notes</b>  |
|------------------|---------------------|-----------------|------------------|--|
| Ship Creek       | <b>(436-1)</b>      | 61.22406        | -149.88733       | North bank of Ship Creek, east of C St bridge.   |
| Ship Creek       | <b>(550-2)</b>      | 61.22343        | -149.88535       | South bank of Ship Creek just east of the Bridge Restaurant.   |
| Ship Creek       | 119-1               | 61.22326        | -149.88040       | Downstream of dam on left bank near access steps. Rusted pipe with slow trickle.   |
| Ship Creek       | 46-1                | 61.22405        | -149.88038       | Just upstream of sport fishing cut-off line on right bank. Sample only at lowest tide  |
| Ship Creek       | <b>(213-1)</b>      | 61.22363        | -149.86916       | North of Allied property   |
| Ship Creek       | <b>(491-1)</b>      | 61.22328        | -149.87575       | On Ship Creek trail near Alaska Flor-Wall Distributors   |
| Ship Creek       | 189-1               | 61.22305        | -149.85827       | Near Post Rd crossing. Submerged, sample only if you can reach into pipe.  |
| Fish Creek       | <b>(595-1)</b>      | 61.18977        | -149.93208       | Between W 34 <sup>th</sup> Ave and Kona Lane   |
| Fish Creek       | 584-1               | 61.18545        | -149.93403       | Right bank opposite of park on Turnagain Blvd. Under a lot of debris and end of pipe clogged with dirt. Flow coming out from under rusted portion of pipe. |
| Fish Creek       | 1312-19             | 61.18353        | -149.93357       | Behind fence of a storage lot between the park on Turnagain Blvd and Spenard Rd. Trickling water.  |
| Fish Creek       | 686-1               | 61.18217        | -149.93486       | Near parking lot just off of Spenard Rd on Turnagain Blvd. Submerged, sample only if you can reach up into pipe.   |
| Fish Creek       | <b>(388-201)</b>    | 61.17831        | -149.92818       | Corner of Northwood Drive and Haru Lane  |
| Fish Creek       | 480-1               | 61.17944        | -149.92810       | At bend in creek halfway in between West 45 <sup>th</sup> and West 46 <sup>th</sup> . Potentially standing water.  |



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| <b>Watershed</b> | <b>Outfall Code</b> | <b>Latitude</b> | <b>Longitude</b> | <b>Location Description and Notes</b>  |
|------------------|---------------------|-----------------|------------------|--|
| Fish Creek       | 1003-1              | 61.18119        | -149.91848       | Plastic pipe at edge of parking lot near Spenard Building Supply on West Tudor Rd. Dripping water.                                   |
| Fish Creek       | <b>(37-1)</b>       | 61.18677        | -149.90759       | Chugach Way near Spenard Road  |
| Fish Creek       | 411-8               | 61.18068        | -149.84473       | Tudor Rd. west of Lake Otis on south side of road next to culvert crossing. Trickle of water.  |
| Eagle River      | <u>(541-1)</u>      | 61.29843        | -149.52203       | East of Mountain Point Circle  |
| Eagle River      | <b>(1417-1)</b>     | 61.29865        | -149.51363       | South of Eagle Place addresses 19920 and 19862 Driftwood Bay Drive   |
| Eagle River      | <b>(1451-1)</b>     | 61.29965        | -149.50851       | Near west corner of Riverside Drive  |
| Eagle River      | <b>(646-71)</b>     | 61.31722        | -149.55438       | South bank; Chain of Rock Street and Teklanika Drive about 100 feet downstream of street crossing. On Meadow Creek.                  |
| Eagle River      | <u>(ER-4)</u>       | 61.29866        | -149.52623       | East of Mountain Point Circle  |
| Eagle River      | <b>1375-99</b>      | 61.31725        | -149.55412       | North bank; Chain of Rock Street very near culvert – Not included in HGDB. On Meadow Creek. 1375-99 is a temporary placeholder name. |
| Campbell Creek   | 685-1               | 61.13729        | -149.92497       | South side of Dimond Blvd crossing.  |
| Campbell Creek   | 556-2-1             | 61.14355        | -149.90879       | Inlet to sedimentation pond west of Minnesota Dr.  |
| Campbell Creek   | 297-1               | 61.14522        | -149.89607       | Near Summerset Dr at access to bike path.  |
| Campbell Creek   | <b>(581-1)</b>      | 61.14640        | -149.89273       | Near bike path at Arctic Blvd.   |
| Campbell Creek   | <b>(1488-1)</b>     | 61.14674        | -149.89046       | Near C St. and Dimond behind restaurant parking lot.   |
| Campbell Creek   | 546-1               | 61.15200        | -149.88192       | Near parking lot of Taku Lake.   |
| Campbell Creek   | 111-1               | 61.15508        | -149.87957       | Access from Huntaman Circle.   |
| Campbell Creek   | 100-1               | 61.15903        | -149.87516       | Near Fairweather Park Loop   |
| Campbell Creek   | 468-1               | 61.16605        | -149.87359       | Near bike path at Dowling Rd.  |
| Campbell Creek   | 1454-2              | 61.16281        | -149.87692       | Near Lynwood Drive.  |
| Campbell Creek   | 271-1               | 61.17263        | -149.87023       | Near Old Seward Hwy and International Airport Rd.  |
| Campbell Creek   | <b>(496-1)</b>      | 61.14994        | -149.82643       | Adjacent to Nadine Street.   |

| Watershed      | Outfall Code      | Latitude | Longitude  | Location Description and Notes   |
|----------------|-------------------|----------|------------|--|
| Campbell Creek | 18-107C           | 61.14942 | -149.82296 | Multiple ends-of-pipe for outfall 18-107. This is labelled "C" and drains into small pond through Oil and Grit Separator on 80 <sup>th</sup> . |
| Campbell Creek | 364-1             | 61.14926 | -149.81944 | Very low flow. On Spruce Street north of 80 <sup>th</sup> .  |
| Campbell Creek | 551-1             | 61.15018 | -149.82574 | Located behind duplex where Travis Lane dead ends into Snow View Dr. Access from Grey Wolf Circle.   |
| Campbell Creek | 475-1             | 61.14845 | -149.85826 | On 80 <sup>th</sup> near Greenwood Street. Slightly flowing.   |
| Campbell Creek | 692-24            | 61.15931 | -149.85329 | On 68 <sup>th</sup> Avenue near Brayton Drive.   |
| Campbell Creek | 692-15            | 61.15930 | -149.85373 | A, B, C denote three ends-of-pipe into sedimentation basin at 68 <sup>th</sup> Avenue and meadow Street.                                       |
| Campbell Creek | <b>(1056-117)</b> | 61.16103 | -149.82492 | Southwest corner of Carriage Drive   |
| Campbell Creek | 1056-8            | 61.16106 | -149.82550 | "A" marks inlet to sedimentation basin near Carriage Drive.  |
| Campbell Creek | 446-1             | 61.15736 | -149.80449 | On Elmore Road near end of Redhawk Circle.   |

- 1) Sites in parenthesis ( ) are sites selected as primary sites.
- 2) **Bold** font indicates outfalls that were sampled.
- 3) Underlined font indicates outfalls that were dry at the time of sampling.
- 4) Standard font indicates sites that were selected as alternates, but were not visited because the sample quota had been met.

### 2.3 Measured Parameters

The 2014 dry weather screening sampling effort was conducted similar to the 2013 effort. A sample was collected for laboratory analysis of fecal coliform while all the other parameters were analyzed in the field using test kits or water quality meters.

Table 3 provides the screening parameters required by the permit and the thresholds that were used to compare outfall sample results. Appendix F, Dry Weather Screening Monitoring Plan, of the QAP (2012) provides rationale for screening parameter thresholds. Thresholds are established at concentrations sufficiently different from clean stormwater to detect potential illicit discharges. In a guidance manual the Center for Watershed Protection and Robert Pitt (2004) recommend benchmarks (thresholds) orders of magnitude higher than ambient stormwater quality to reduce the incidences of false positives. Thresholds in Table 3 were established based on available environmental data and field test kit specifications. Values below the threshold are considered to be within an acceptable range for background concentrations. Values at or above the threshold concentration for a parameter indicate that the parameter may be above background concentrations. Outfalls with results that exceeded the threshold (or outside the pH range) for one or more of the pollutant indicators were targeted for follow-up action.

**Table 3. List of parameters and the methods and thresholds.**

| Parameter      | Method  | Reporting Range                      | Threshold        |
|----------------|---|--------------------------------------|------------------|
| pH             | pH test strips, YSI 556   | 0 - 14 STD                           | ≤ 4 or ≥9 STD    |
| Total Chlorine | LaMott Total Chlorine Octa-Slide Bar kit (3314) (EPA 330.5)                       | 0.1 - 6.0 mg/L                       | ≥ 1.0 mg/L       |
| Detergents     | Hach model DE-1 Toluidine blue colorimetric (Analytical Chemistry Method #38-791) | 0.05 - 1 mg/L                        | ≥ 1.0 mg/L       |
| Total Copper   | Zincon colorimetric (LaMOTTE® EC-70 Code 3619)                                    | 0.05 – 1.0 mg/L                      | ≥ 1.0 mg/L       |
| Total Phenols  | LaMott 4 Amino Anti-Pyrene (4 AAP) colorimetric (SM 5530C)                        | 0.1 - 1 mg/L                         | ≥ 0.5 mg/L       |
| Turbidity      | Hach 2100P Turbidimeter   | 0.1 - 1,000 NTU                      | ≥ 250 NTU        |
| Fecal Coliform | Standard Methods 9222D  | 1 col/100 mL – too numerous to count | ≥ 400 col/100 mL |

## 2.4 Sample Collection Procedures

### 2.4.1 Arrival at Sampling Site

Field sampling was conducted after at least 48 hours of dry weather following a storm event that created runoff in the MS4. The National Weather Service Forecast website (NWS, 2014) was consulted to determine appropriate sample timing when necessary. The field team conducted calibration and equipment blank analyses at the beginning of each day of sampling prior to entering the field. This equipment blank analysis examined each test kit by testing deionized water provided by the laboratory. The calibration and field test kit equipment blank data were recorded in the field data sheets and are provided in Appendix C. The team took the following items into the field:

- Outfall list
- YSI 556 water quality meter
- Hach turbidity meter
- Laboratory supplied fecal coliform bottles
- Water analysis sampling protocols
- GPS unit
- Site maps
- pH test strips
- LaMotte and Hach water quality field test kits
- Field sampling supplies
- Digital camera
- Field sheets with guidelines

Each day before departing for field sampling the team went through a safety briefing. Upon arriving at the site, the team completed the General Information data collection as described on the back of the field form (Appendix C). Completed forms are also provided in Appendix C. Additional information not included on data sheets was recorded in the field log book (Appendix B).

### **2.4.2 Flow Analyses**

After the general site information was recorded, the field crew determined the outfall flow using one of the methods described below (determined by site conditions). Results of the flow analysis can be found in Table 4 in section 4.0.

Primary method: Measure the length of time required to fill 1 gallon of a calibrated bucket or a 1-liter bottle using a stop watch.

Secondary method (if the team member is unable to measure the flow): visually estimate the flow as one of the following:

- Low - flow of water is not intense and moving very slowly
- Medium - flow of water is moving at a moderate pace
- High - flow of water is intense and moving very quickly

### **2.4.3 Water Quality Sampling**

After measuring flow, pH was measured using a YSI 556 and verified using pH test strips. The probe was placed directly into flowing water where deep enough to submerge the probe. When the flow in the pipe was not deep enough to submerge the probe, a bucket was used to capture outfall water. The outfall water was permitted to continue to flow into and out of the bucket while the pH probe was submerged. The test strips were dipped directly into the flowing water.

A grab sample of the water flowing out of the end of pipe was then collected using a clean 1-liter HDPE plastic bottle. This water was used for all of the field test kits. Next, the sample bottle for laboratory analysis of fecal coliform was filled directly from the outfall flow.

After the water samples were collected, the field team recorded visual observations and measurements about the clarity of the water and its color.

Using the water from the 1-liter bottle, the field crew measured total chlorine, detergents, turbidity, total phenols, and total copper with field kits as described on the back of the field data form (Appendix C). Field measurements were recorded and compared against the thresholds described in Table 3.

The field crew conducted replicate sample analyses at a rate of at least 15% per day per parameter (once per day). The field crew also collected replicate samples for the laboratory fecal coliform analysis at a rate of 15% per day per parameter (once per day).

## **2.5 Chain of Custody**

The field crew team leader completed a chain of custody form which included each sample collected during a single field day for sample tracking. The original form was delivered with the samples to SGS North America, Inc (SGS), the laboratory conducting fecal coliform analysis. Copies of the chain of custody are provided in Appendix D.

## **2.6 Laboratory Sampling Parameters**

Fecal coliform samples were transported to SGS for analysis. Fecal coliform was analyzed using standard method 9222D (Table 3). The samples were collected in laboratory-provided sample

bottles. The project name, sample ID, sample date and time, and name of sampler were clearly marked on the sample container labels. Samples were stored in a cooler with gel ice and a temperature blank while in the field. The samples were delivered to the laboratory within six hours to satisfy the short hold time of the fecal coliform samples.

An expedited turn-around time was requested for results from SGS in order to expedite follow-up sampling in the event of sampling thresholds being exceeded. Follow-up tasks were planned to take place after the laboratory results were available to reduce the field effort. To expedite the receipt of results, SGS provided the results through Engage, an on-line document portal.

## **2.7 Deviation from the QAP**

No deviations from the QAP were necessary.

The QAP (MOA, 2012) allows for sites to be passed over for sample consideration if the team could not access the outfall due to lack of safe access or private property concerns. Although the HGDB for the watersheds in the Anchorage bowl is fairly accurate, the precise location and nature of an outfall is not always provided in the GIS data. For example, many outfalls drain into a culvert passing under a road, or are open drainage ditches. Both of these conditions disqualify the outfall from sampling consideration. These conditions were recorded and the team moved to the next outfall.

## **3 Results**

### **3.1 Field and Laboratory Results**

The results of 2014 dry weather screening are provided in Table 4. Complete laboratory results are provided in Appendix E. No site had an exceedance for any of the parameters.

**Table 4. Sample Results for Field Parameters and Laboratory Analyses**

| Watershed      | Site ID          | Date    | Flow (g/min) | pH           | Total Chlorine (mg/L) | Detergents (mg/L) | Total Phenols (mg/L) | Turbidity (NTU) | Total Copper (mg/L) | Fecal Coliform (colonies/100mL) |
|----------------|------------------|---------|--------------|--------------|-----------------------|-------------------|----------------------|-----------------|---------------------|---------------------------------|
| Ship Creek     | 436-1            | 7/16/14 | Low          | 7.32         | <0.5                  | <0.05             | <0.1                 | 1.50            | <0.05               | ND                              |
| Ship Creek     | 550-2 Duplicate  | 7/16/14 | Medium       | 7.30<br>7.26 | <0.5<br><0.5          | <0.05<br><0.05    | <0.1<br><0.1         | 20.1            | <0.05<br><0.05      | 118                             |
| Ship Creek     | 213-1            | 7/16/14 | High         | 6.88         | <0.5                  | <0.05             | <0.1                 | 1.36            | <0.05               | ND                              |
| Ship Creek     | 491-1 Duplicate  | 7/16/14 | Medium       | 6.83         | <0.5                  | <0.05             | <0.1                 | 3.57            | <0.05               | 300<br>230                      |
| Fish Creek     | 595-1 Duplicate  | 7/17/14 | 0.2,<br>Low  | 6.93<br>6.90 | <0.5<br><0.5          | <0.05<br><0.05    | <0.1<br><0.1         | 5.46<br>5.37    | <0.05<br><0.05      | ND<br>ND                        |
| Fish Creek     | 388-201          | 7/17/14 | Medium       | 6.39         | <0.5                  | <0.05             | <0.1                 | 15.2            | <0.05               | 2                               |
| Fish Creek     | 37-1 Duplicate   | 7/17/14 | Low          | 6.70         | <0.5                  | <0.05             | <0.1                 | 154<br>158      | <0.05               | 16                              |
| Eagle River    | 1417-1           | 7/18/14 | Medium       | 6.80         | <0.5                  | <0.05             | <0.1                 | 2.25            | <0.05               | 4                               |
| Eagle River    | 1451-1 Duplicate | 7/18/14 | Low          | 6.55<br>6.51 | <0.5<br><0.5          | <0.05<br><0.05    | <0.1<br><0.1         | 0.67<br>0.62    | <0.05<br><0.05      | 2<br>ND                         |
| Eagle River    | 646-71           | 7/18/14 | High         | 7.18         | <0.5                  | <0.05             | <0.1                 | 0.73            | <0.05               | 48                              |
| Eagle River    | 1375-99          | 7/18/14 | High         | 6.77         | <0.5                  | <0.05             | <0.1                 | 0.31            | <0.05               | ND                              |
| Campbell Creek | 581-1 Duplicate  | 7/21/14 | Low          | 7.19<br>7.20 | <0.5<br><0.5          | 0.45<br>0.55      | <0.1<br><0.1         | 2.22            | <0.05               | 17<br>31                        |
| Campbell Creek | 1488-1 Duplicate | 7/21/14 | 5,<br>Medium | 6.88         | <0.5                  | 0.10              | <0.1                 | 21.8<br>21.7    | <0.05               | 12                              |
| Campbell Creek | 496-1            | 7/21/14 | Medium       | 7.14         | <0.5                  | 0.15              | <0.1                 | 40.1            | <0.05               | 30                              |
| Campbell Creek | 1056-117         | 7/21/14 | 1.5,<br>Low  | 6.44         | <0.5                  | <0.05             | <0.1                 | 7.14            | <0.05               | 12                              |

1) *Italicized* results are notably higher results than other sites, but are not exceedances.

### 3.2 Quality Assurance and Quality Control

Quality Assurance and Quality Control (QA/QC) procedures were followed according to the Monitoring, Evaluation, and Quality Assurance Plan (MOA, 2012). The procedures included analytical checks (field replicates, equipment blanks), instrument calibration, and procedures to assess data for precision, accuracy, representativeness, comparability, and completeness.

### 3.3 Data Validation

Verification analyses for laboratory parameters were conducted by SGS. The data review was focused on criteria for the following quality assurance (QA) and quality control (QC) parameters and their overall effects on the data:

- Data validation
- Sample handling (chain of custody)
- Holding time compliance
- Field replicate comparison

Samples were taken from the water flowing from the storm drain outfall to avoid mixing with the stream water. Field analyses met the sensitivities prescribed in the QAP (MOA, 2012).

Field replicate samples were taken at; Ship Creek 550-2, Fish Creek 137-1 and 595-1, Eagle River 1451-1, and Campbell Creek 581-1 and 1488-1 to determine field precision and variability. Results of the field duplicate samples are presented in Table 5. For the field test kits, the QAP requires that percent difference between primary and duplicate samples is calculated. The results need to be within the precision of the equipment used. For the fecal coliform samples analyzed at the laboratory, the QAP requires that relative percent difference (RPD) be calculated between the primary and duplicate samples and be within 60%.

**Table 5. Field Replicate Variance From Primary Sample**

| Parameter      | QAPP standard  | Ship Creek 550-2 | Ship Creek 491-1 | Fish Creek 37-1 | Fish Creek 595-1 | Eagle River 1451-1 | Campbell Creek 581-1 | Campbell Creek 1488-1 |
|----------------|----------------|------------------|------------------|-----------------|------------------|--------------------|----------------------|-----------------------|
| pH             | ± 0.2 pH units | 0 pH units       | -                | -               | 0 pH units       | 0 pH units         | 0 pH units           | -                     |
| Total Chlorine | 30%            | 0%               | -                | -               | 0%               | 0%                 | 0%                   | -                     |
| Detergents     | 30%            | 0%               | -                | -               | 0%               | 0%                 | 20%                  | -                     |
| Total Copper*  | 30%            | 0%               | -                | -               | 0%               | 0%                 | 0%                   | -                     |
| Total Phenols  | 30%            | 0%               | -                | -               | 0%               | 0%                 | 0%                   | -                     |
| Turbidity      | ± 1 NTU        | -                | -                | <b>4.00 NTU</b> | 0.09 NTU         | 0.05 NTU           | -                    | 0.10 NTU              |
| Fecal Coliform | 60%            | -                | 26.42%           | -               | 0                | <b>200%</b>        | 58.33%               | -                     |

\* The QAP does not define a standard for total copper analyzed with field test kits. Samples were previously analyzed in a laboratory. The precision of the field test kit matches the precision of the other field test kits so 30% was used for the total copper kit.

\*\***Bold** font indicates replicate variance that exceeds the QAP standard.

Most of the results fall within the QAP standards. One QC sampling location did not fall within the range for turbidity. The results of the samples collected at Fish Creek 37-1 (154 and 158 NTU) are in a similar range and it is unlikely that the difference could be discerned with the naked eye. Therefore, the data is not flagged as invalid or suspect. The Eagle River sample at site 1451-1 had a percent difference from the primary to duplicate fecal coliform sample of 200%, but only because one sample was a non-detect and the other resulted in 2 colonies detected. The laboratory test detection limit is 1.64 colonies and anything under that would be marked as a non-detect. Even at two colonies for one sample and zero colonies for another the difference is not great enough to flag this data as invalid or suspect.

The QAP standard for turbidity is based on the precision of the turbidity meter. However, this does not take into consideration the natural variation of turbidity within storm water.. Turbidity varies, to some degree, on a regular basis and more turbid water has the potential to vary more widely as the suspended particles continually move throughout the sample resulting in different readings even when the same sample is retested. As noted in the USGS *National Field Manual* (Anderson, 2005), the USEPA guidelines established in 1990 suggest reporting NTU between 10-40 to the nearest 1 NTU; 40-100 NTU to the nearest 5 NTU and; 100-400 NTU to the nearest 10 NTU. All of the primary and duplicate readings are far below the thresholds for each parameter.

The laboratory performing the fecal coliform analyses, SGS, is certified by the EPA and the Alaska Drinking Water Program and has an approved QA/QC program. Analytical methods and testing procedures were in adherence with the QAP (MOA, 2012), standard methods (APHA, AWWA 2005), and EPA-approved protocols and guidelines.

Sample custody was adequately maintained for the samples. The coolers transporting the fecal coliform samples were held at temperatures of less than 10°C. The holding times were met for all samples.

All results were determined to be valid.

## **4 Discussion**

### **4.1 Threshold exceedances**

The results of the 2014 dry weather screening sampling effort adds to the data set from previous years' sampling efforts (MOA 2008, 2009, 2011, 2012, 2013). Of the eight parameters tested at each of the 15 outfalls sampled, no parameters at any outfall had a threshold exceedance. No follow up action was necessary for any site. Fecal coliform and turbidity have been the parameters that provides the most numerous notable results throughout this permit cycle (exceedances or significantly higher results than other sites).

### **4.2 Other observations**

All of the watersheds identified for dry weather screening had been examined upon the completion of the 2013 field sampling. To complete the 2013 sampling the highest ranked watersheds were revisited. The 2014 sampling effort picked up where the 2013 sampling left off at the top of the priority list. The top four ranked watersheds needed to be visited in order to collect samples at 15 different outfalls.

During the 2014 sampling effort multiple sedimentation basins were examined, but none were selected for sampling. The drainage of sedimentation basins are identified as storm drain outfalls. Sedimentation basins frequently receive water from multiple storm drain sources making them more complicated to sample.



### 4.3 Damaged and unmapped outfalls

Since the HGDB was last updated, storm drains have been added or relocated in the MS4 network. Some of these outfalls were sampled during the 2014 sampling effort. These outfalls were labeled according to their location within the network and were added to the maps for reporting purposes. Additionally, the GIS mapping effort discovered that there are broken connections and potentially missing nodes in the network within the 2013 version of the HGDB. This will prevent accurate modeling of storm water flow throughout the network.

In addition to discovering unmapped outfalls, the field team made note of a number of outfalls that are in need of maintenance. Table 6 lists the outfalls that HDR found that were new, damaged, clogged or completely submerged. Photos for most of the sites in Table 6 are included in Appendix F.

**Table 6. New, Damaged, Clogged and Submerged Outfalls**

| Watershed      | Outfall Number | Type of Issue         | Notes   |
|----------------|----------------|-----------------------|---|
| Ship Creek     | 119-1          | Damaged               | The end-of-pipe is angled upwards. The pipe has rusted through the bottom about three feet from the end of pipe.  |
| Ship Creek     | 46-1           | Submerged             | This outfall is completely submerged and may not release water efficiently.   |
| Ship Creek     | 189-1          | Submerged,<br>Damaged | A break in the pipe exists about 4 feet from the end-of-pipe. It is submerged, but visual inspection determined that it was flowing.                        |
| Fish Creek     | 1310-201       | New                   | This area was under construction during the summer of 2014. It is likely that multiple new outfalls will exist in this area once construction is completed. |
| Fish Creek     | 584-1          | Clogged, Damaged      | The field team removed a lot of debris, but discovered the end of pipe was crushed and clogged with dirt. Water was trickling out from a break in the pipe. |
| Fish Creek     | 1277-59        | Clogged               | The outfall was dry and partially clogged with sediment.  |
| Fish Creek     | 686-1          | Submerged             | Outfall completely submerged.   |
| Fish Creek     | 391-1          | Damaged               | End-of-pipe damaged. Partially submerged  |
| Fish Creek     | 480-1          | New                   | The outfall location is new, but the HDR field team believes it is 480-1 relocated during construction in the area.   |
| Fish Creek     | 137-1          | Submerged             | Completely submerged.   |
| Fish Creek     | 37-1           | Clogged               | This culvert is undersized and clogged with vegetation. Upstream is severely backed up and near flooding creating standing water. This site was sampled.    |
| Campbell Creek | 642-1          | Submerged             | Nearly completely submerged.  |
| Campbell Creek | 474-1          | Damaged               | Pipe rusted on bottom.  |
| Campbell Creek | 551-1          | Submerged             | End-of-pipe completely submerged.   |
| Campbell Creek | 461-16         | Clogged               | End-of-pipe filled with dirt and dead grass.  |
| Campbell Creek | 447-64         | Damaged               | End-of-pipe broken and bent over.   |
| Campbell Creek | 586-1          | Clogged               | Heavily clogged. Recent rain blew out clog and debris blocking flow.  |

#### **4.4 Future Dry Weather Screening**

The QAP should be updated to account for the change in total copper testing. A standard for QC testing of samples run through the total copper field test kit needs to be defined.

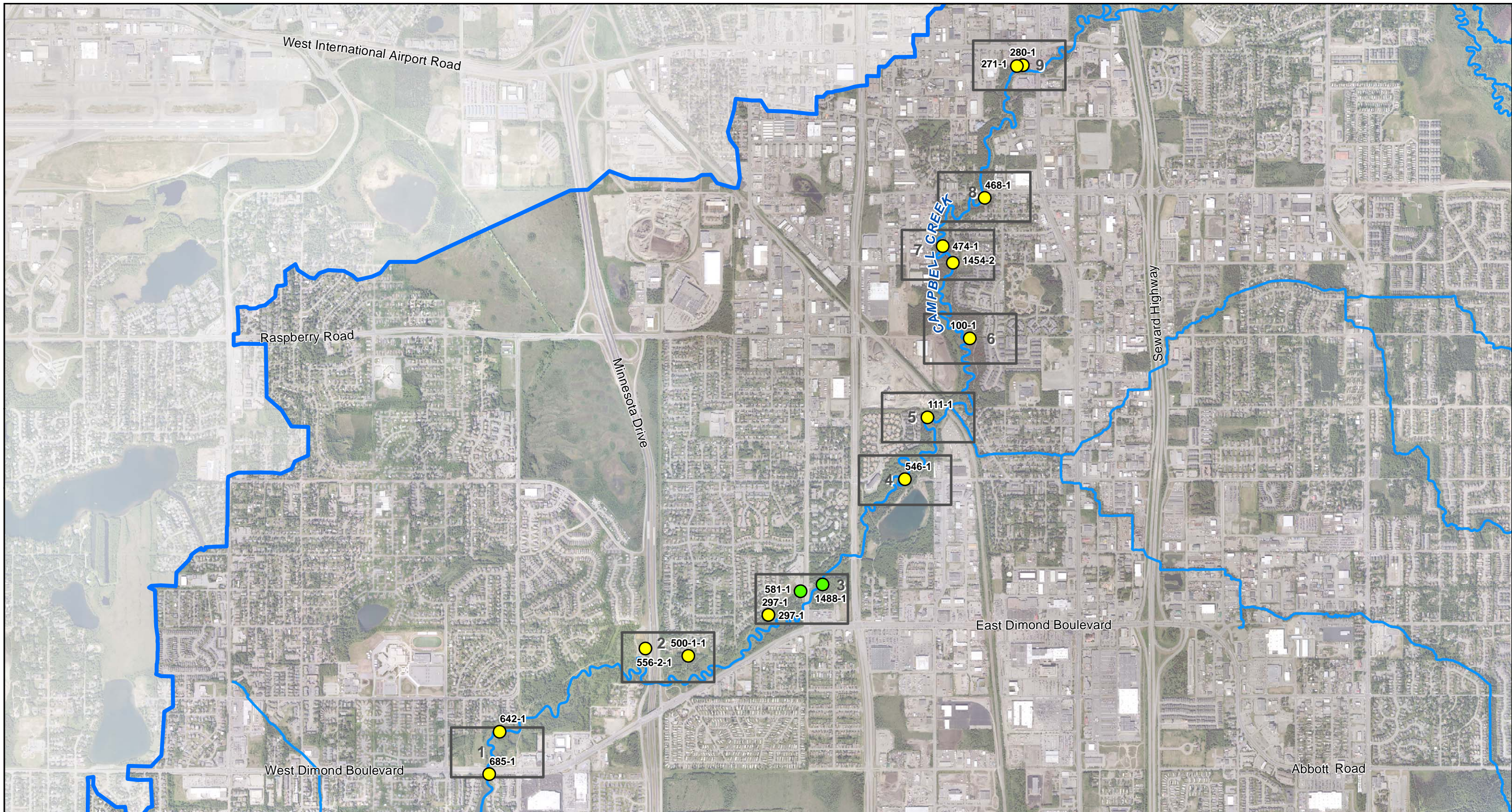
All of the identified watersheds have been examined during at least one season of dry weather screening during the current permit cycle. All watersheds have been thoroughly examined.

## **References**

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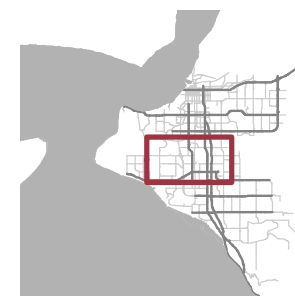
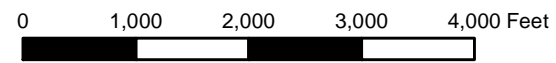
# Appendix A

## Watershed Maps



**LEGEND**

- 2014 Examined Outfall
- 2014 Sampled Outfall
- ~ Stream
- ▬ Watershed Boundry
- Map Page Index





Dry Weather Screening 2014  
**Campbell Creek**  
 Examined and Sampled Outfalls  
**Map Index**




Source: MOA HGDB  
 Imagery: MOA Pictometry 2009  
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 10/10/2014










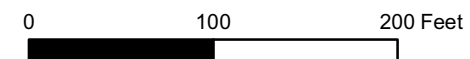


**LEGEND**

-  2014 Examined Outfall
-  Stream

- Drainage Ways**
-  Pipe
  -  Routing
  -  Open Channel

- Drainage Way Nodes**
-  Catch Basin
  -  Catchbasin Manhole
  -  Manhole
  -  OGS
  -  Outfall
  -  Outfall Major
  -  Outfall Minor






Dry Weather Screening 2014  
**Campbell Creek**  
 Examined and Sampled Outfalls  
**Page 1**






Source: MOA HGDB  
 Imagery: MOA Pictometry 2009  
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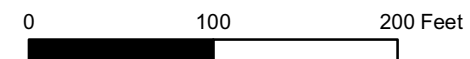


**LEGEND**

-  2014 Examined Outfall
-  Stream
-  2013 New Node

- Drainage Ways**
-  Continuity
  -  Pipe
  -  Routing
  -  Open Channel
  -  Xing Culvert

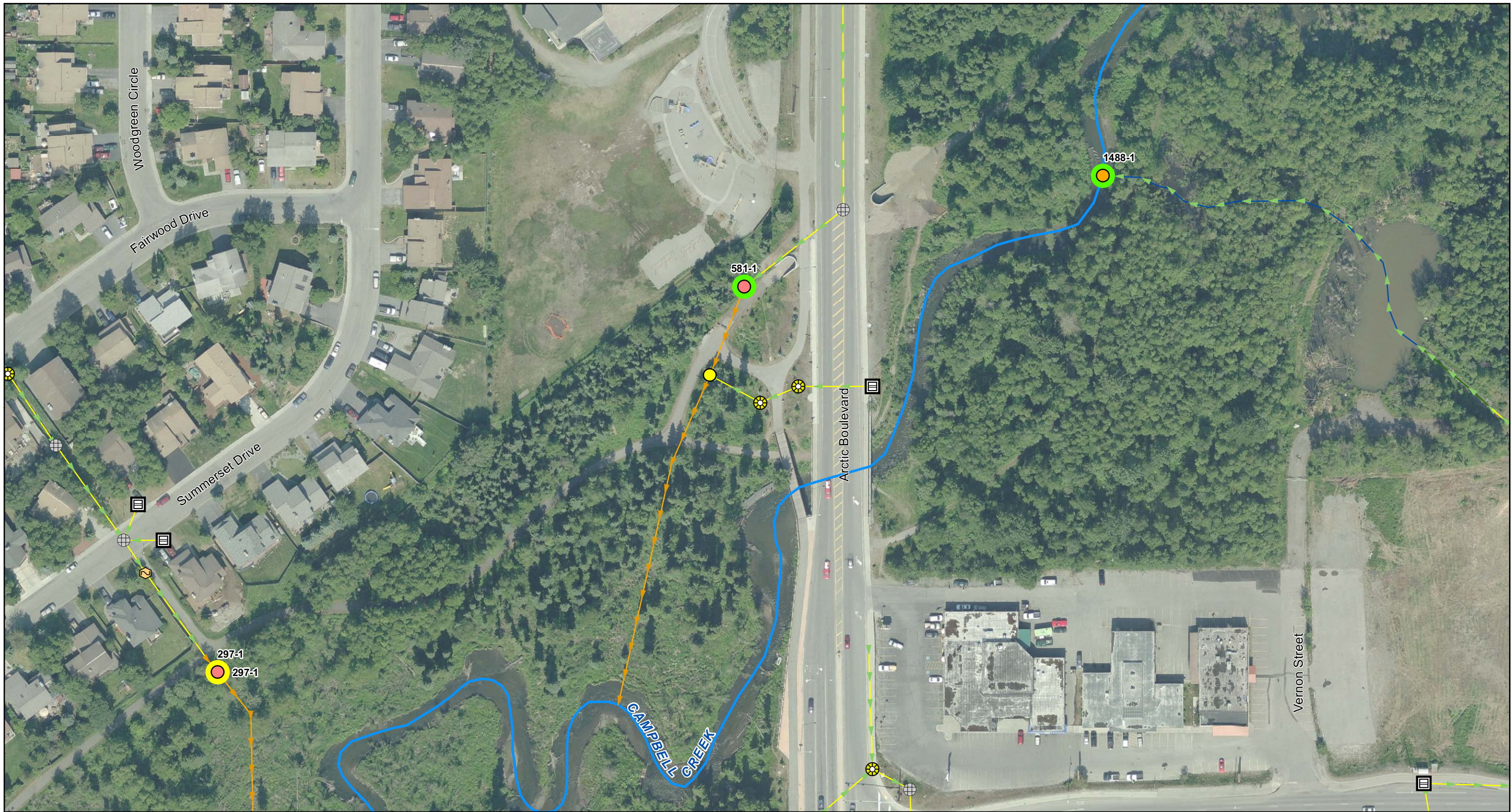
- Drainage Way Nodes**
-  Catch Basin
  -  Catchbasin Manhole
  -  Control Outlet
  -  Manhole
  -  OGS
  -  Outfall Major
  -  Outfall Minor
  -  Weir






Dry Weather Screening 2014  
**Campbell Creek**  
 Examined and Sampled Outfalls  
**Page 2**





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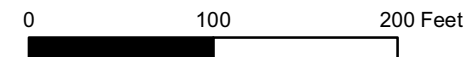


**LEGEND**

-  2014 Examined Outfall
-  2014 Sampled Outfall
-  Stream

- Drainage Ways**
-  Continuity
  -  Pipe
  -  Routing
  -  Open Channel

- Drainage Way Nodes**
-  Catch Basin
  -  Catchbasin Manhole
  -  Manhole
  -  OGS
  -  Outfall
  -  Outfall Minor
  -  Outlet

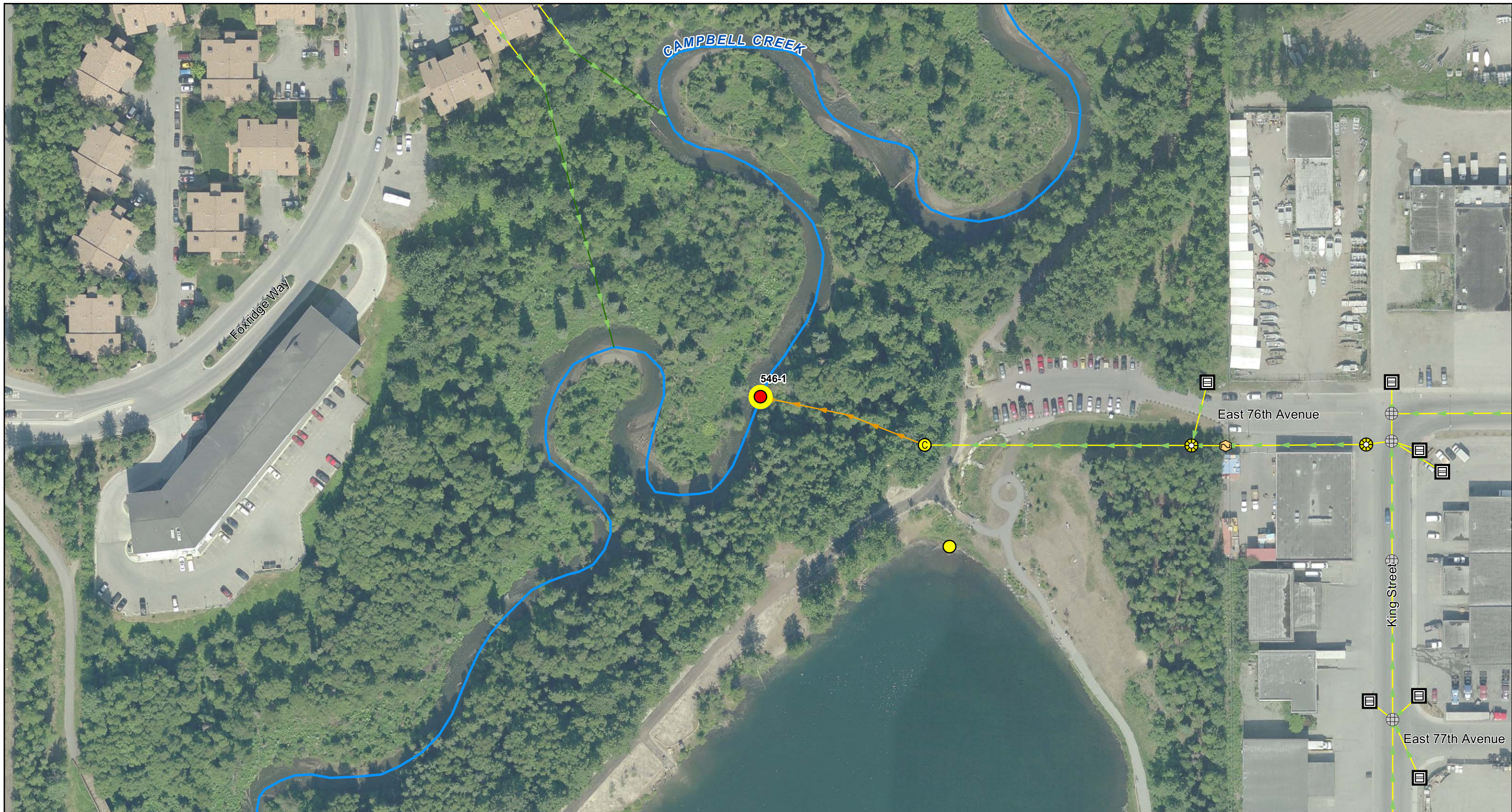


Dry Weather Screening 2014  
**Campbell Creek**  
 Examined and Sampled Outfalls  
**Page 3**



Source: MOA HGDB  
 Imagery: MOA Pictometry 2009  
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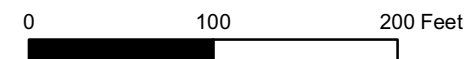


**LEGEND**

 2014 Examined Outfall  
 Stream

**Drainage Ways**  
 Pipe  
 Routing  
 Open Channel

**Drainage Way Nodes**  
 Catch Basin  
 Catchbasin Manhole  
 Control Outlet  
 Manhole  
 OGS  
 Outfall Major  
 Outlet





Dry Weather Screening 2014  
**Campbell Creek**  
 Examined and Sampled Outfalls  
**Page 4**




Source: MOA HGDB  
 Imagery: MOA Pictometry 2009  
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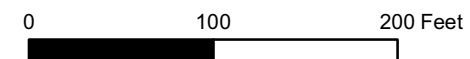


**LEGEND**

 2014 Examined Outfall  
 Stream

**Drainage Ways**  
 Pipe  
 Inlet  
 Routing

**Drainage Way Nodes**  
 Catch Basin  
 Control Outlet  
 Manhole  
 OGS  
 Outfall Minor  
 Outlet





Dry Weather Screening 2014  
**Campbell Creek**  
 Examined and Sampled Outfalls  
**Page 5**






Source: MOA HGDB  
 Imagery: MOA Pictometry 2009  
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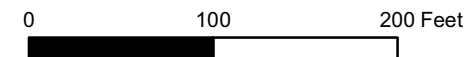


**LEGEND**

-  2014 Examined Outfall
-  Stream

- Drainage Ways**
-  Pipe
  -  Inlet
  -  Routing
  -  Open Channel
  -  Xing Culvert

- Drainage Way Nodes**
-  Catch Basin
  -  Catchbasin Manhole
  -  OGS
  -  Outfall
  -  Outlet




Dry Weather Screening 2014  
**Campbell Creek**  
 Examined and Sampled Outfalls  
**Page 6**

Source: MOA HGDB  
 Imagery: MOA Pictometry 2009  
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**LEGEND**

 2014 Examined Outfall

 Stream


**Drainage Ways**

 Continuity


 Pipe


 Routing

 Open Channel


 Xing Culvert


**Drainage Way Nodes**

 Bypass Outlet

 Catch Basin

 Manhole

 OGS

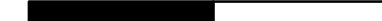
 Outfall

 Outfall Major

 Outfall Minor

 Outlet

0 100 200 Feet



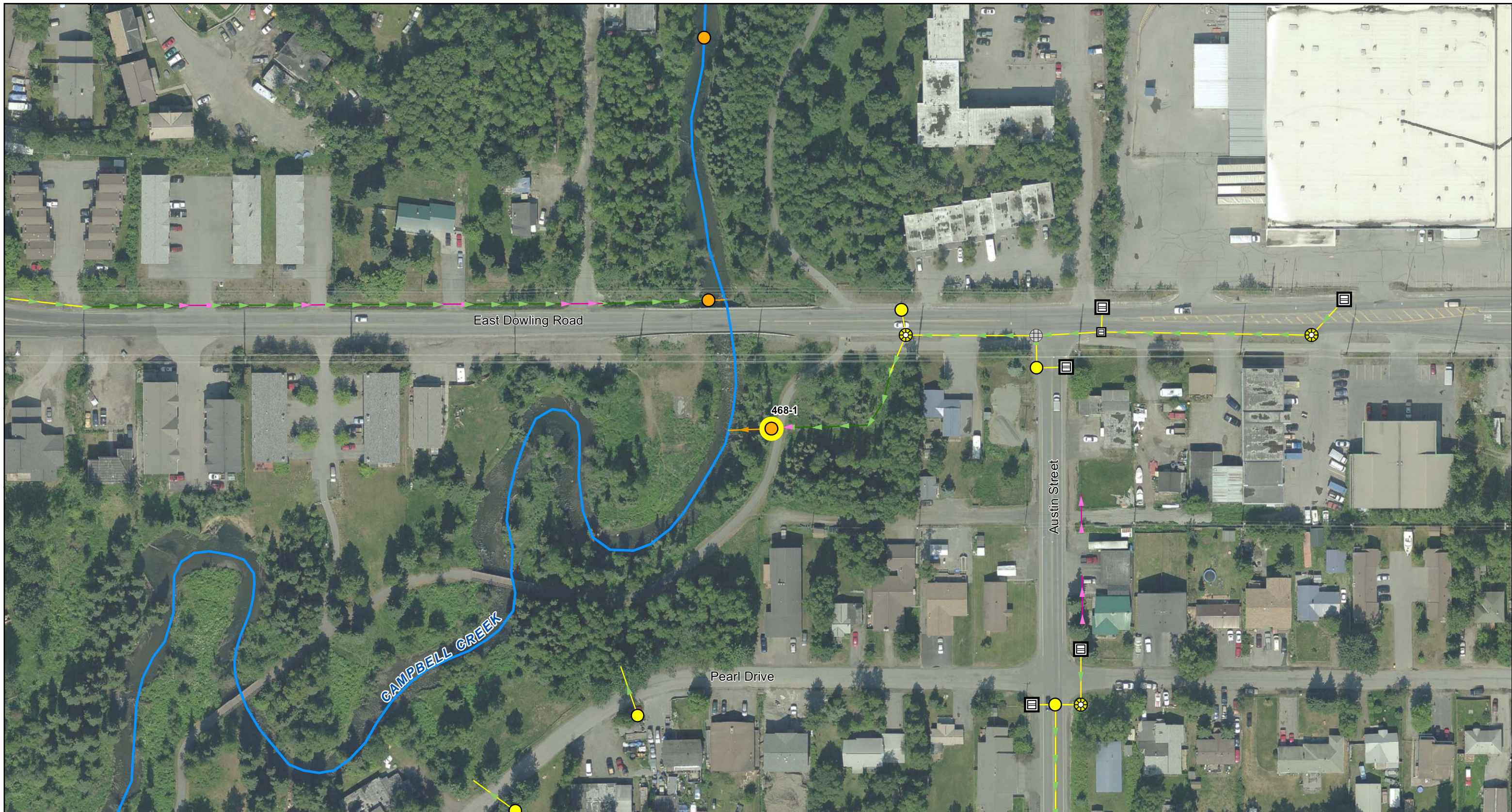
Dry Weather Screening 2014  
**Campbell Creek**

Examined and Sampled Outfalls


Page 7

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Imagery: MOA Pictometry 2009  
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**LEGEND**


 2014 Examined Outfall

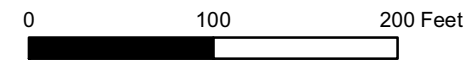
 Stream

**Drainage Ways**

-  Pipe
-  Routing
-  Open Channel
-  Xing Culvert

**Drainage Way Nodes**

-  Catch Basin
-  Catchbasin Manhole
-  Curb Inlet
-  Drywell
-  Manhole
-  Outfall
-  Outlet





Dry Weather Screening 2014  
**Campbell Creek**  
 Examined and Sampled Outfalls  
**Page 8**





Source: MOA HGDB  
 Imagery: MOA Pictometry 2009  
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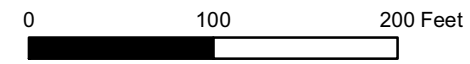


**LEGEND**

-  2014 Examined Outfall
-  Stream

- Drainage Ways**
-  Pipe
  -  Routing
  -  Open Channel
  -  Xing Culvert

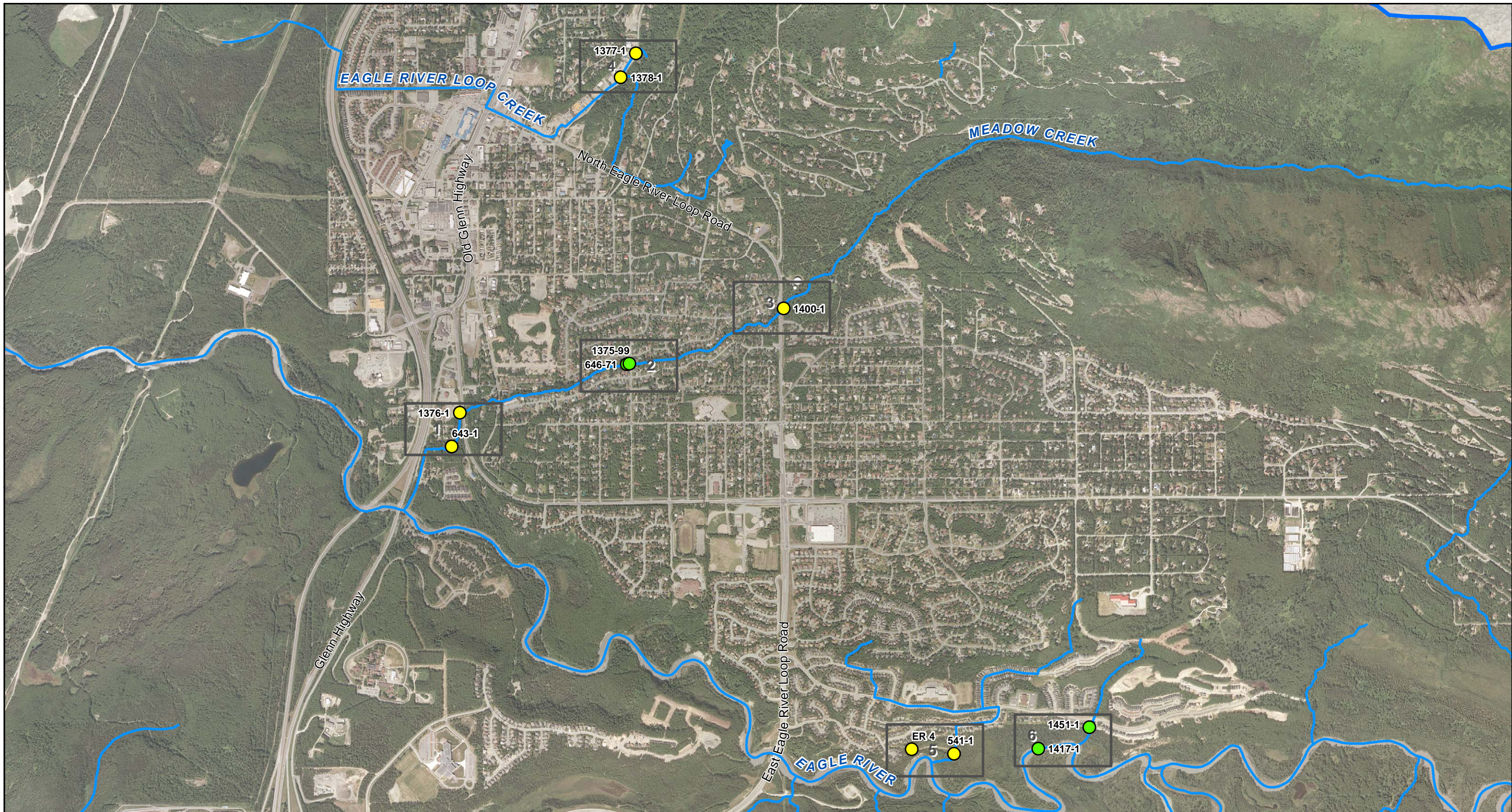
- Drainage Way Nodes**
-  Catch Basin
  -  Catchbasin Manhole
  -  Manhole
  -  OGS
  -  Outfall
  -  Outfall Major
  -  Outlet



Dry Weather Screening 2014  
**Campbell Creek**  
 Examined and Sampled Outfalls  
**Page 9**

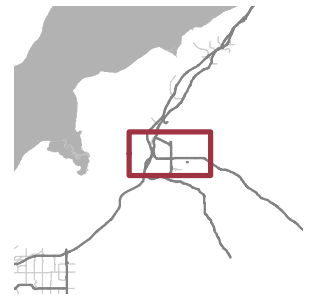
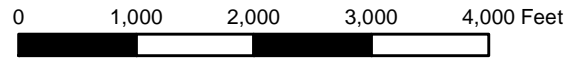
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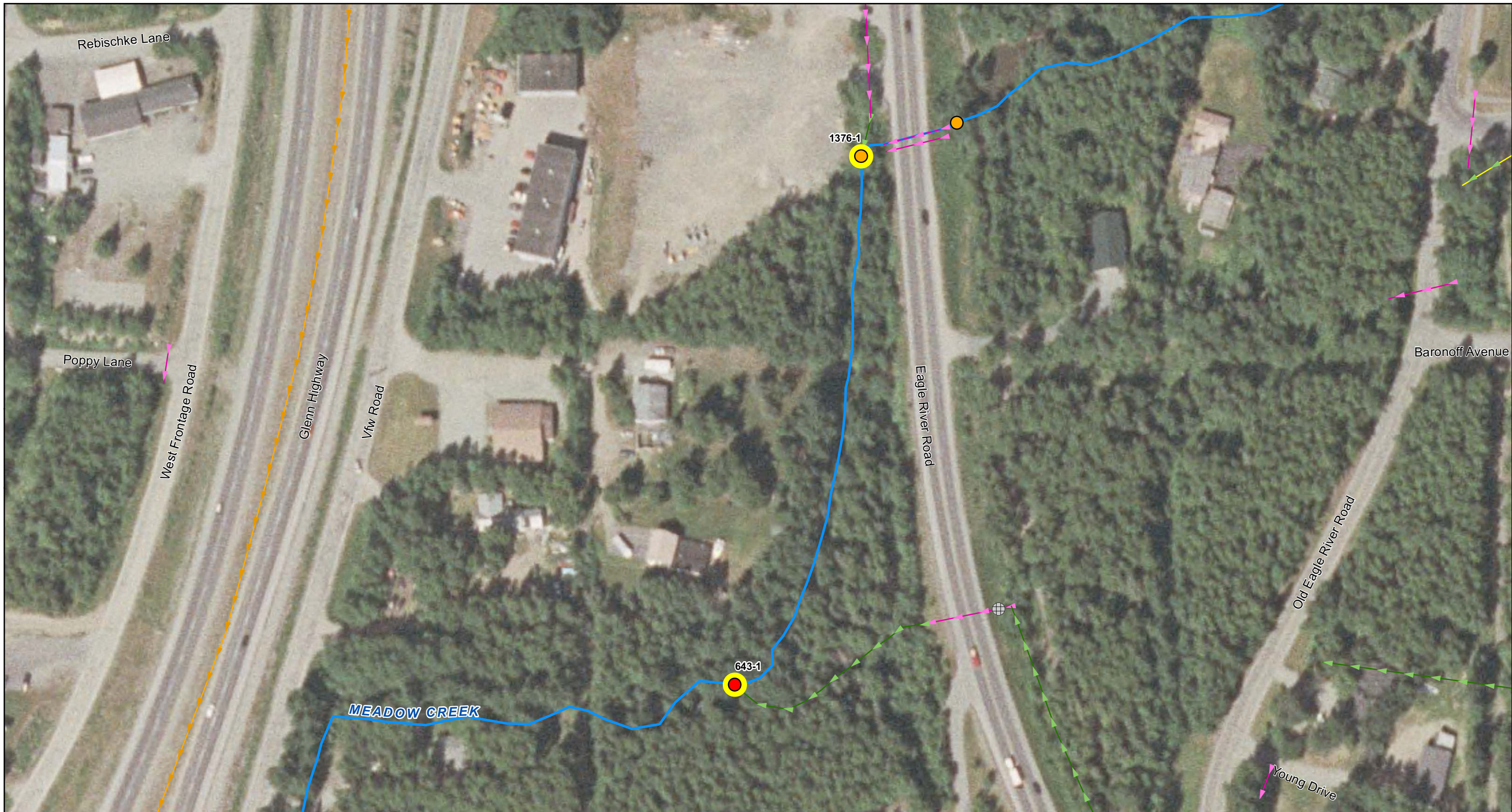
- 2014 Examined Outfall
- 2014 Sampled Outfall
- Stream
- Watershed Boundry
- Map Page Index





Dry Weather Screening 2014  
**Eagle River / Meadow Creek**  
 Examined and Sampled Outfalls  
**Map Index**





Source: MOA HGDB  
 Imagery: MOA Pictometry 2009  
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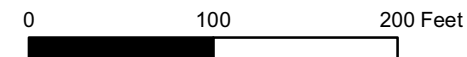


**LEGEND**

-  2014 Examined Outfall
-  Stream

- Drainage Ways**
-  Pipe
  -  Routing
  -  Open Channel
  -  Xing Culvert

- Drainage Way Nodes**
-  Catchbasin Manhole
  -  Manhole
  -  Outfall
  -  Outfall Major

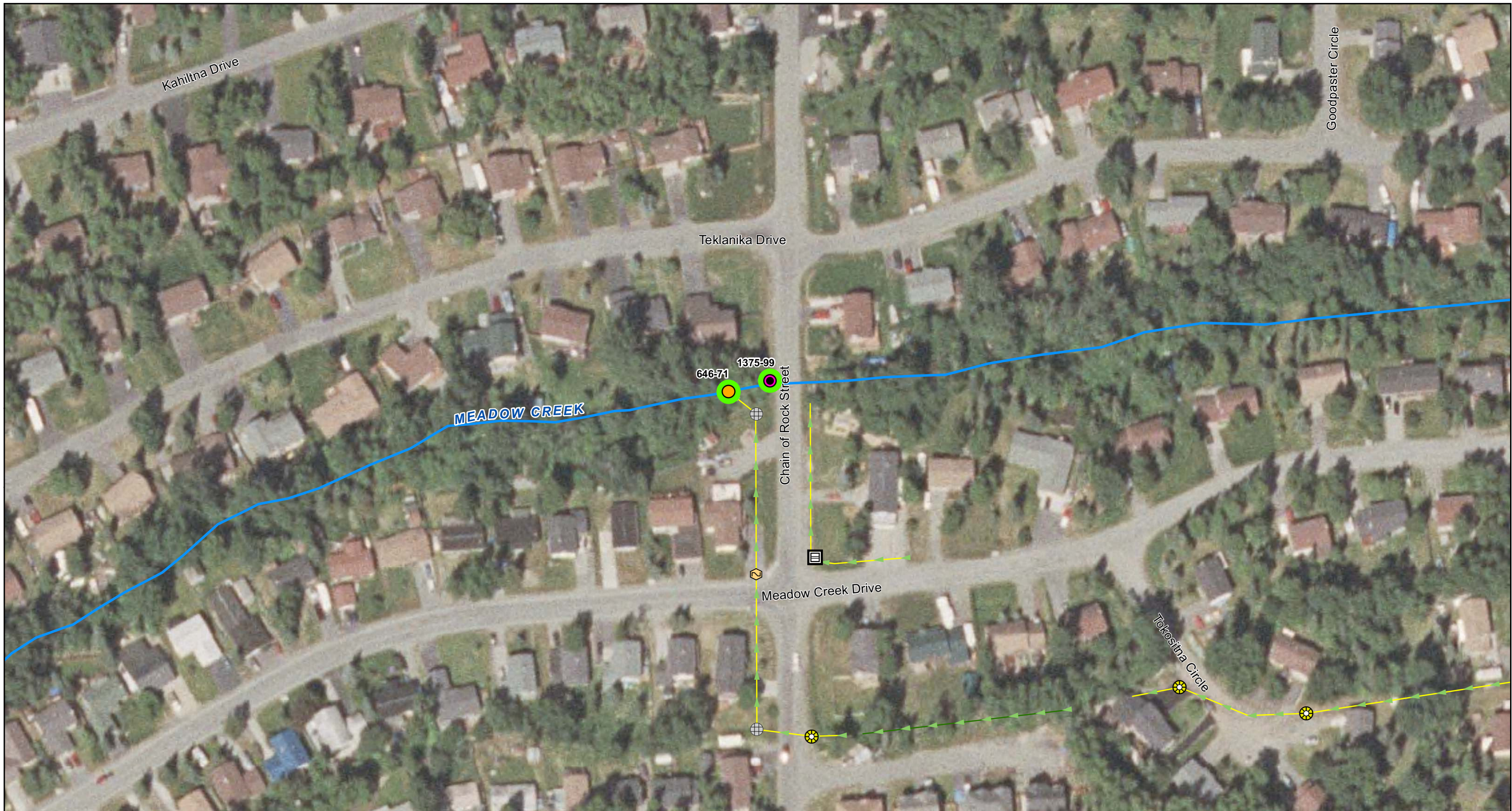


Dry Weather Screening 2014  
**Eagle River / Meadow Creek**  
 Examined and Sampled Outfalls  
**Page 1**




Source: MOA HGDB  
 Imagery: MOA Pictometry 2009  
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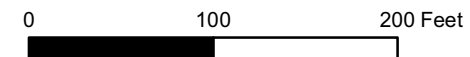


**LEGEND**

-  2014 Sampled Outfall
-  2014 New Node
-  Stream

- Drainage Ways**
-  Pipe
  -  Open Channel

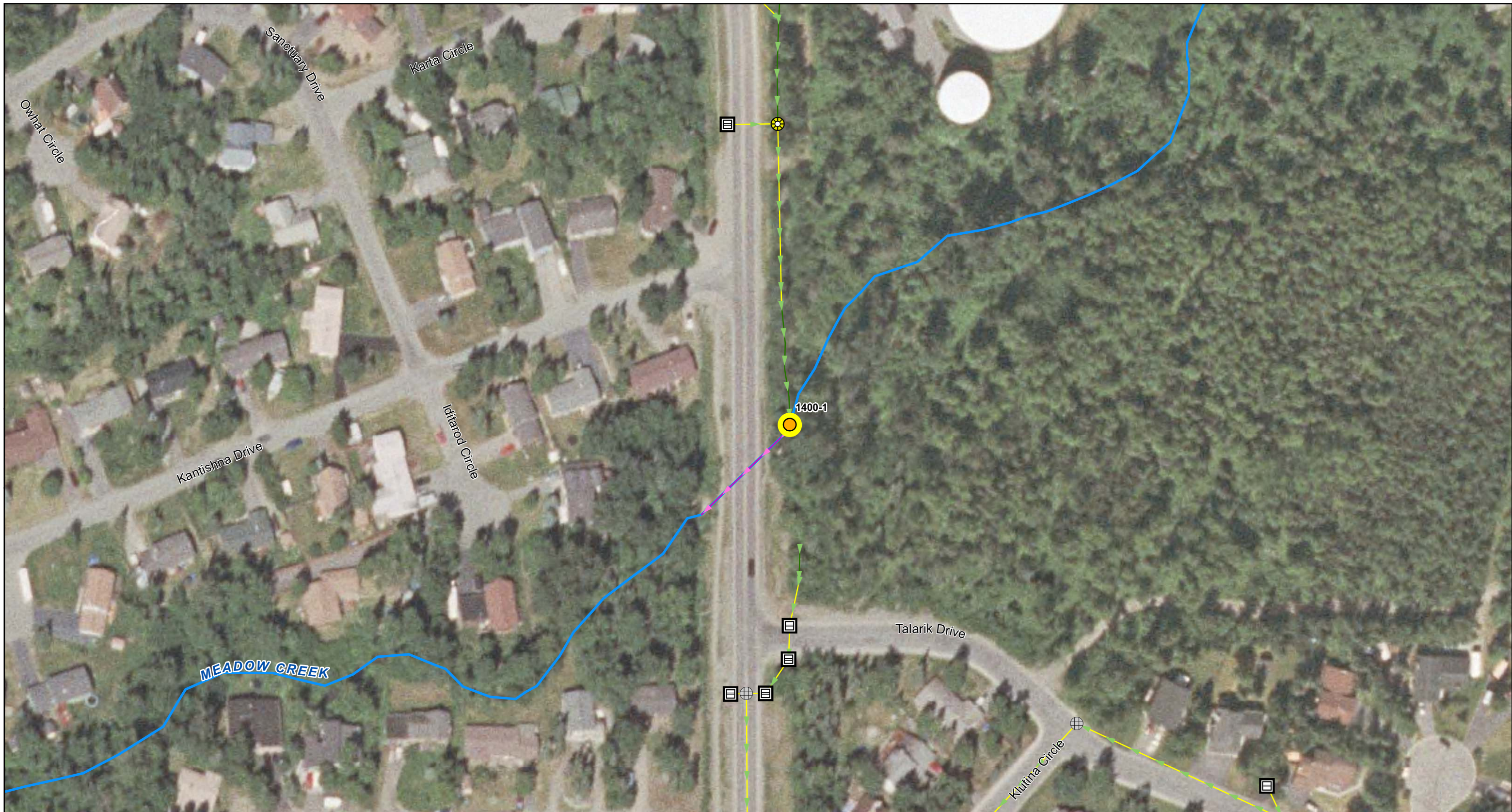
- Drainage Way Nodes**
-  Catch Basin
  -  Catchbasin Manhole
  -  Manhole
  -  OGS
  -  Outfall





Dry Weather Screening 2014  
**Eagle River / Meadow Creek**  
 Examined and Sampled Outfalls  
**Page 2**




Source: MOA HGDB  
 Imagery: MOA Pictometry 2009  
 HDR Alaska, Inc.  
 10/10/2014




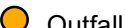


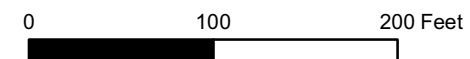


**LEGEND**

 2014 Examined Outfall  
 Stream

**Drainage Ways**  
 Pipe  
 Open Channel  
 Xing Culvert

**Drainage Way Nodes**  
 Catch Basin  
 Catchbasin Manhole  
 Manhole  
 Outfall





Dry Weather Screening 2014  
**Eagle River / Meadow Creek**  
 Examined and Sampled Outfalls  
**Page 3**




Source: MOA HGDB  
 Imagery: MOA Pictometry 2009  
 HDR Alaska, Inc.  
 10/10/2014







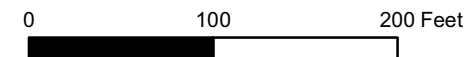


LEGEND

 2014 Examined Outfall  
 Stream

**Drainage Ways**  
 Pipe  
 Open Channel  
 Xing Culvert

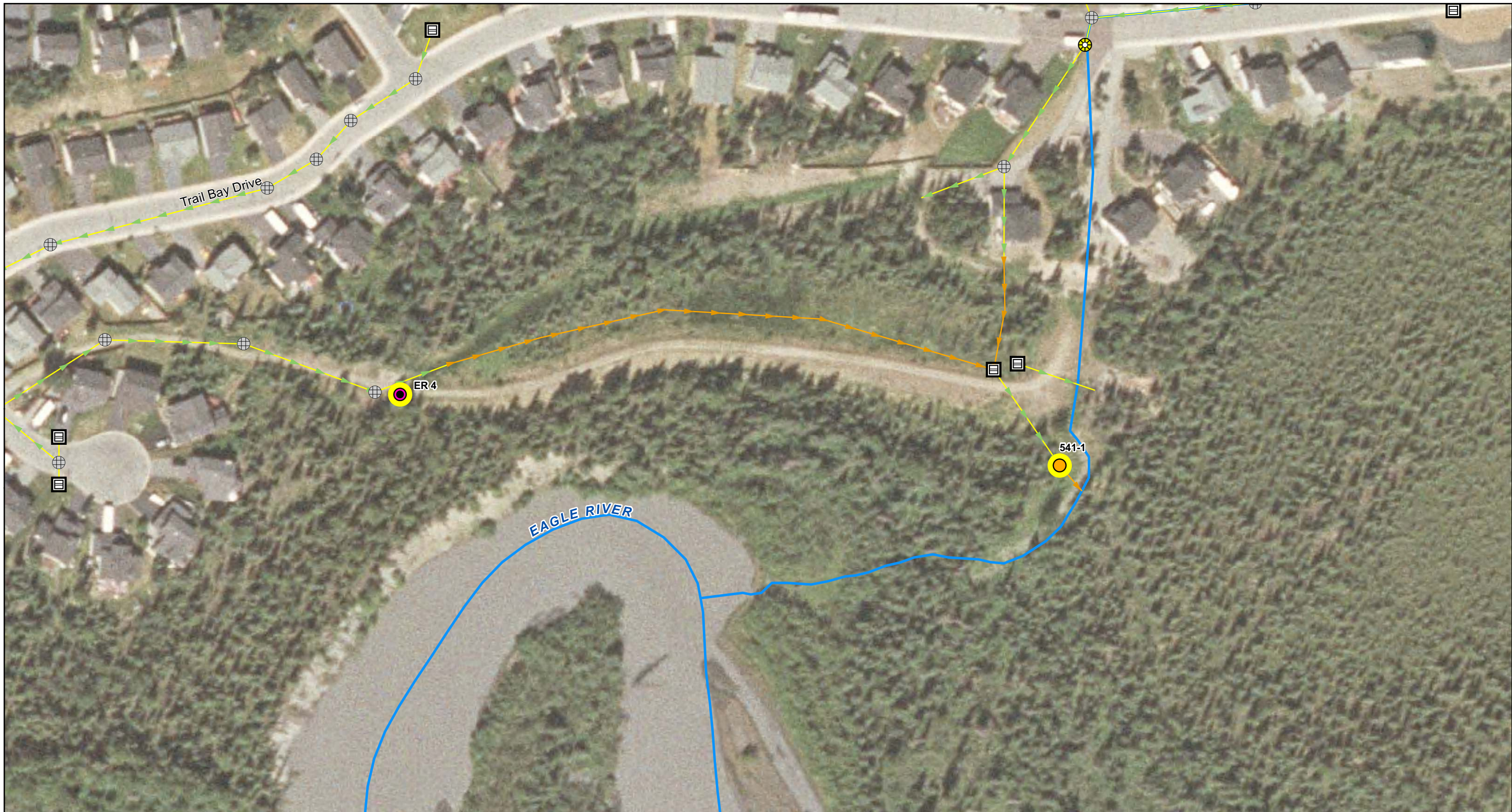
**Drainage Way Nodes**  
 Blind Connect  
 Catchbasin Manhole  
 Drywell  
 Outfall






Dry Weather Screening 2014  
**Eagle River / Meadow Creek**  
 Examined and Sampled Outfalls  
**Page 4**

Source: MOA HGDB  
 Imagery: MOA Pictometry 2009  
 HDR Alaska, Inc.  
 10/10/2014







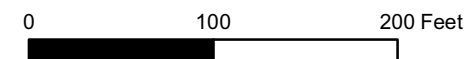


**LEGEND**

-  2014 Examined Outfall
-  2014 New Node
-  Stream

- Drainage Ways**
-  Pipe
  -  Routing

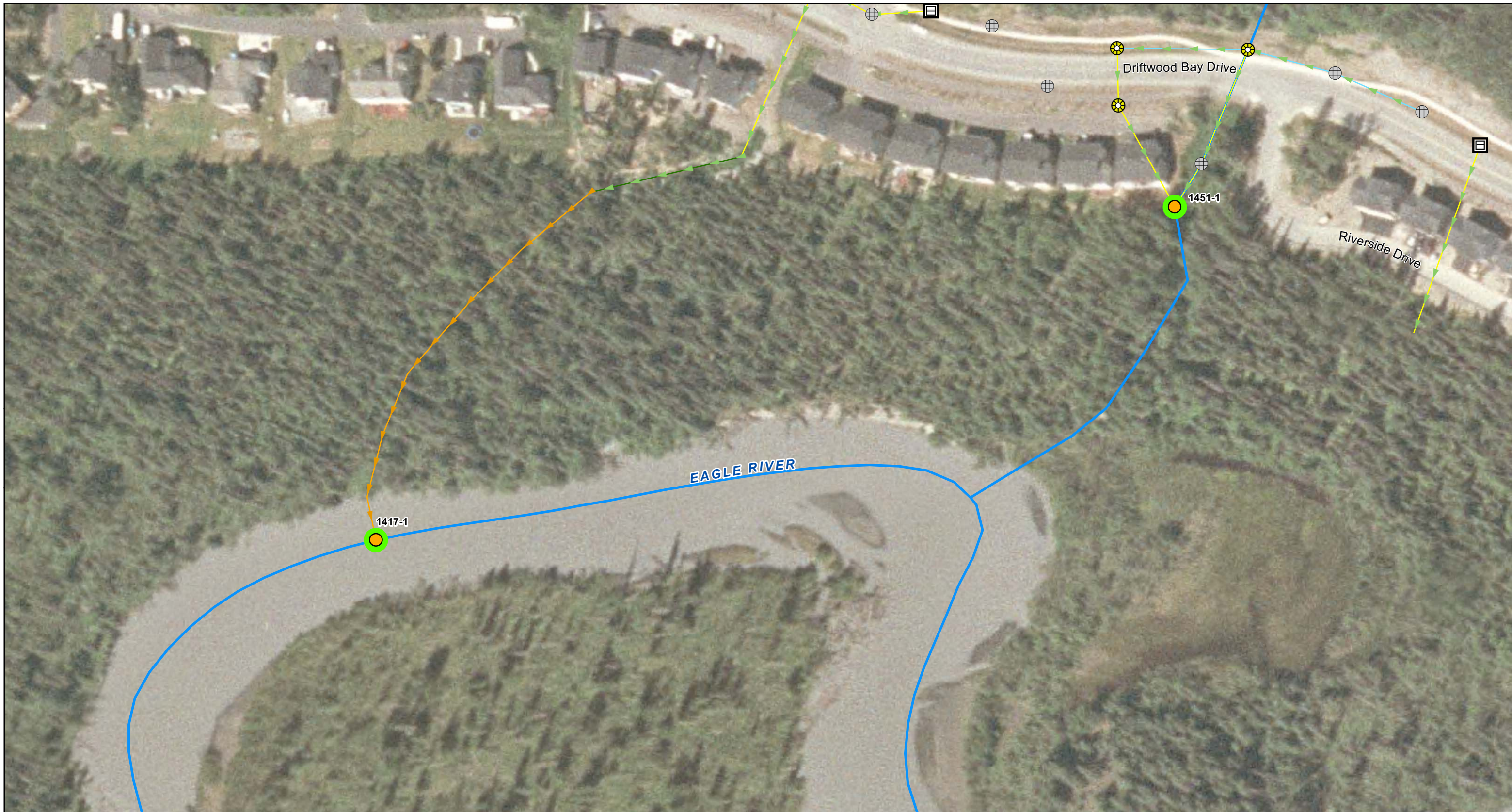
- Drainage Way Nodes**
-  Catch Basin
  -  Catchbasin Manhole
  -  Manhole
  -  Outfall





Dry Weather Screening 2014  
**Eagle River / Meadow Creek**  
 Examined and Sampled Outfalls  
**Page 5**





Source: MOA HGDB  
 Imagery: MOA Pictometry 2009  
 HDR Alaska, Inc.  
 10/10/2014







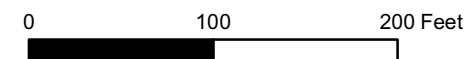


**LEGEND**

-  2014 Sampled Outfall
-  Stream

- Drainage Ways**
-  Pipe
  -  Inlet
  -  Routing
  -  Open Channel

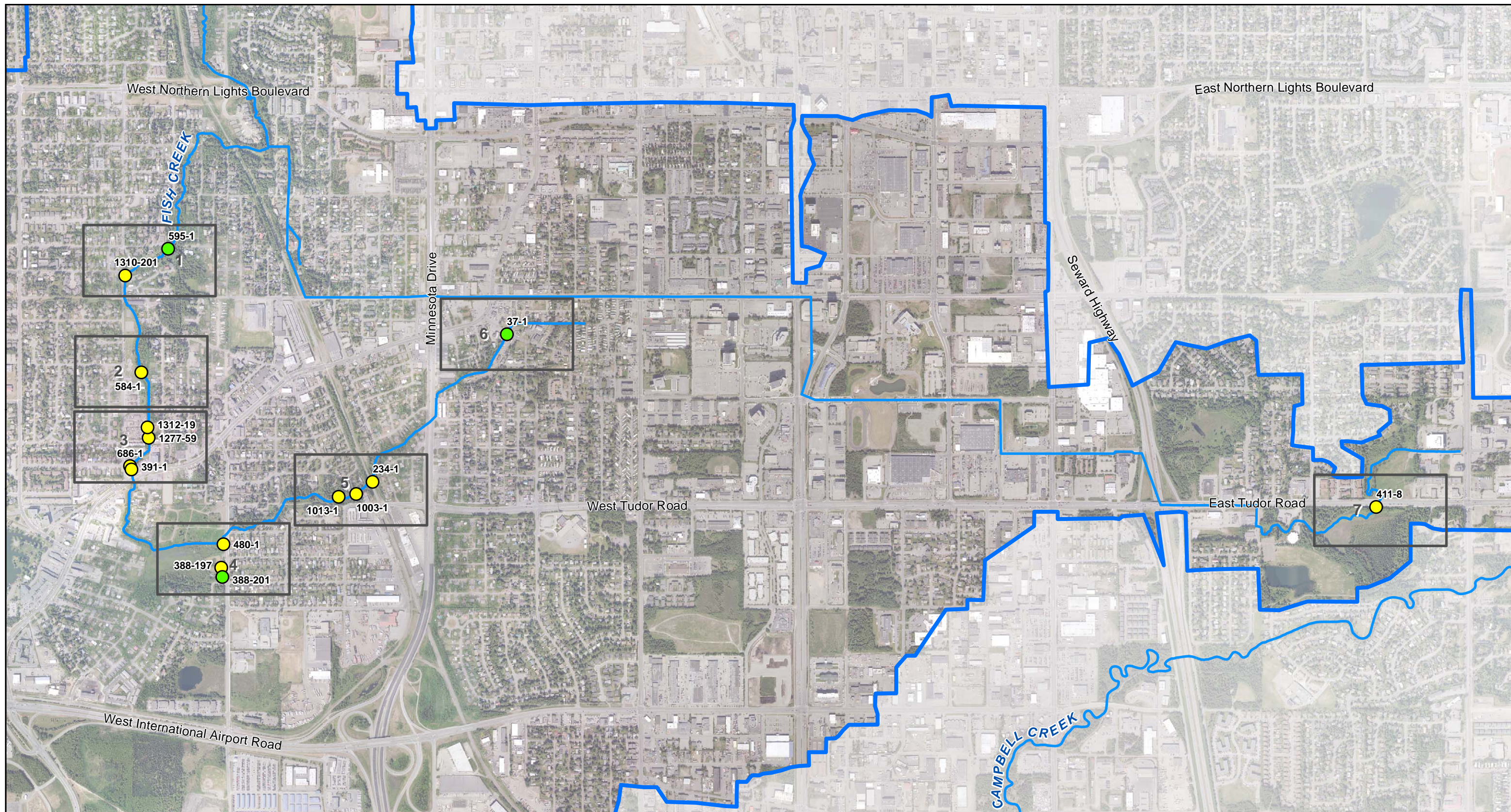
- Drainage Way Nodes**
-  Catch Basin
  -  Catchbasin Manhole
  -  Manhole
  -  Outfall



Dry Weather Screening 2014  
**Eagle River / Meadow Creek**  
 Examined and Sampled Outfalls  
**Page 6**

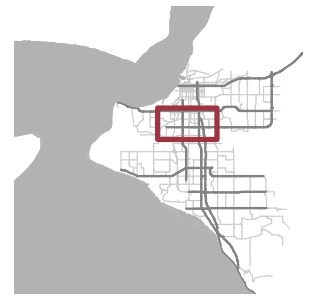
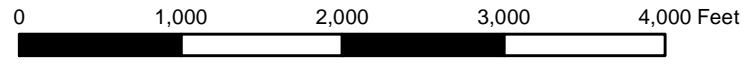
Source: MOA HGDB  
 Imagery: MOA Pictometry 2009  
 HDR Alaska, Inc.  
 10/10/2014





**LEGEND**

- 2014 Examined Outfall
- 2014 Sampled Outfall
- ~ Stream
- ▭ Watershed Boundry
- Map Page Index






Dry Weather Screening 2014  
**Fish Creek**  
 Examined and Sampled Outfalls  
**Map Index**





Source: MOA HGDB  
 Imagery: MOA Pictometry 2009  
 HDR Alaska, Inc.  
 10/10/2014

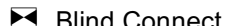
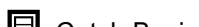
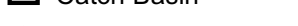





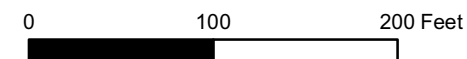


**LEGEND**

-  2014 Examined Outfall
-  2014 Sampled Outfall
-  Stream

- Drainage Ways**
-  Pipe
  -  Inlet
  -  Routing
  -  Xing Culvert

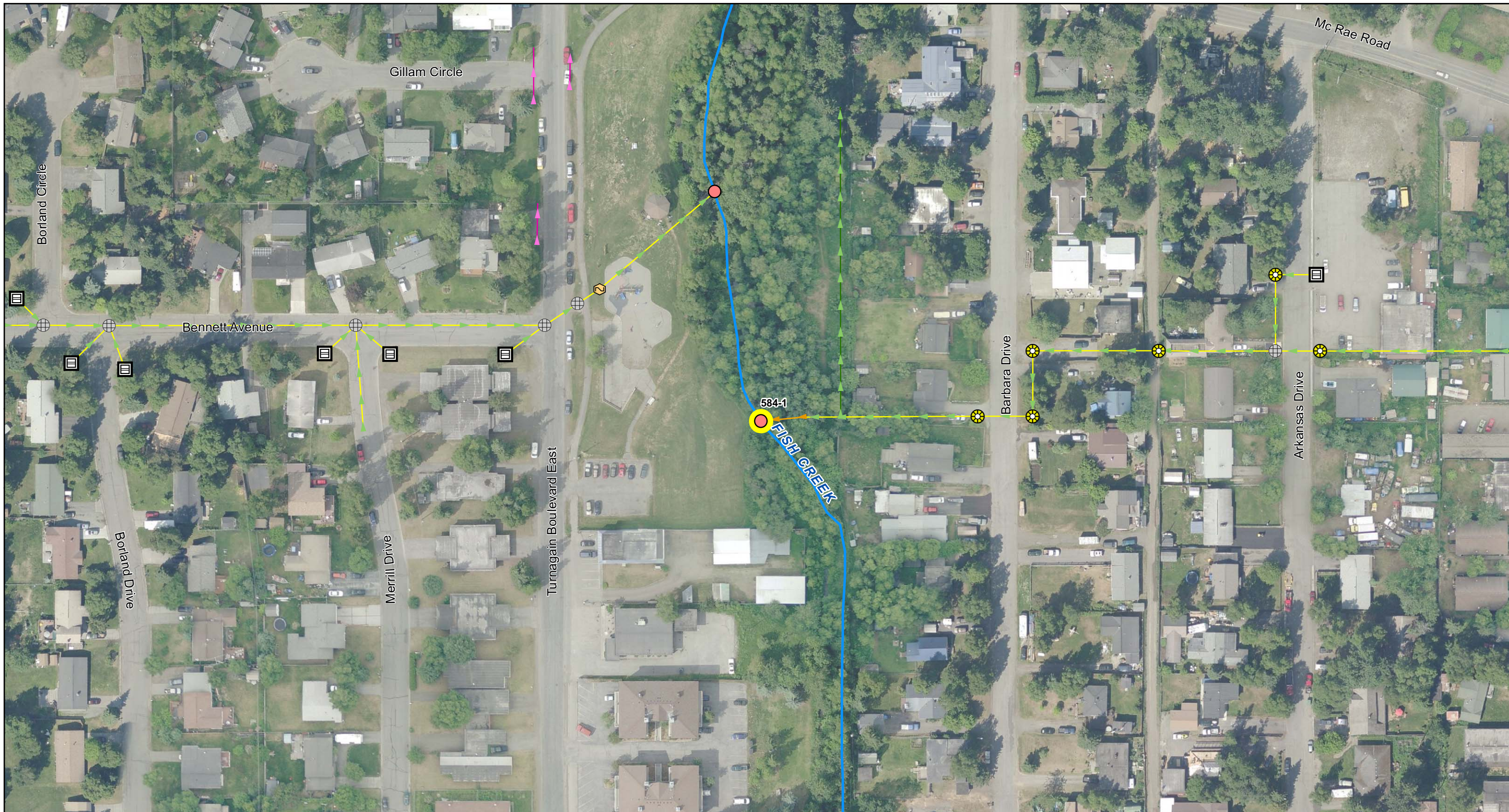
- Drainage Way Nodes**
-  Blind Connect
  -  Catch Basin
  -  Catchbasin Manhole
  -  Manhole
  -  Outfall
  -  Outfall Minor





Dry Weather Screening 2014  
**Fish Creek**  
 Examined and Sampled Outfalls  
**Page 1**





Source: MOA HGDB  
 Imagery: MOA Pictometry 2009  
 HDR Alaska, Inc.  
 10/10/2014








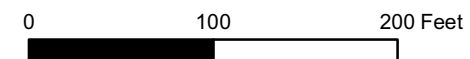


**LEGEND**

-  2014 Examined Outfall
-  Stream

- Drainage Ways**
-  Pipe
  -  Routing
  -  Open Channel
  -  Xing Culvert

- Drainage Way Nodes**
-  Catch Basin
  -  Catchbasin Manhole
  -  Manhole
  -  OGS
  -  Outfall Minor



Dry Weather Screening 2014  
**Fish Creek**  
 Examined and Sampled Outfalls  
**Page 2**



Source: MOA HGDB  
 Imagery: MOA Pictometry 2009  
 HDR Alaska, Inc.  
 10/10/2014
















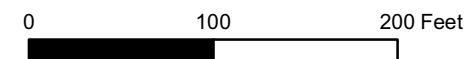


**LEGEND**

-  2014 Examined Outfall
-  Stream

- Drainage Ways**
-  Pipe
  -  Open Channel
  -  Xing Culvert

- Drainage Way Nodes**
-  Bypass Outlet
  -  Outfall
  -  Outfall Minor
  -  Catch Basin
  -  Catchbasin Manhole
  -  Manhole
  -  Weir
  -  OGS






Dry Weather Screening 2014  
**Fish Creek**  
 Examined and Sampled Outfalls  
**Page 3**





Source: MOA HGDB  
 Imagery: MOA Pictometry 2009  
 HDR Alaska, Inc.  
 10/10/2014










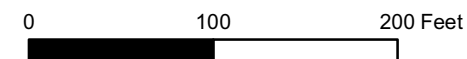


**LEGEND**

-  2014 Examined Outfall
-  2014 Sampled Outfall
-  Stream

- Drainage Ways**
-  Continuity
  -  Pipe
  -  Inlet
  -  Open Channel

- Drainage Way Nodes**
-  Catch Basin
  -  Catchbasin Manhole
  -  Control Outlet
  -  OGS
  -  Outfall
  -  Outfall Minor
  -  Outlet





Dry Weather Screening 2014  
**Fish Creek**  
 Examined and Sampled Outfalls  
**Page 4**





Source: MOA HGDB  
 Imagery: MOA Pictometry 2009  
 HDR Alaska, Inc.  
 10/10/2014









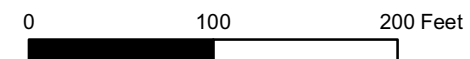


**LEGEND**

-  2014 Examined Outfall
-  Stream

- Drainage Ways**
-  Pipe
  -  Inlet
  -  Routing
  -  Xing Culvert

- Drainage Way Nodes**
-  Catch Basin
  -  Catchbasin Manhole
  -  Manhole
  -  Outfall
  -  Outfall Minor
  -  Outlet





Dry Weather Screening 2014  
**Fish Creek**  
 Examined and Sampled Outfalls  
**Page 5**




Source: MOA HGDB  
 Imagery: MOA Pictometry 2009  
 HDR Alaska, Inc.  
 10/10/2014









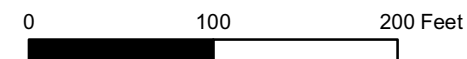


**LEGEND**

 2014 Sampled Outfall  
 Stream

**Drainage Ways**  
 Pipe  
 Routing  
 Xing Culvert

**Drainage Way Nodes**  
 Catch Basin  
 Catchbasin Manhole  
 Manhole  
 OGS  
 Outfall  
 Outfall Minor





Dry Weather Screening 2014  
**Fish Creek**  
 Examined and Sampled Outfalls  
**Page 6**

Source: MOA HGDB  
 Imagery: MOA Pictometry 2009  
 HDR Alaska, Inc.  
 10/10/2014








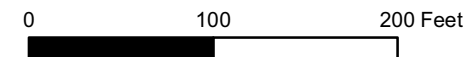


**LEGEND**

 2014 Examined Outfall  
 Stream

**Drainage Ways**  
 Pipe  
 Xing Culvert

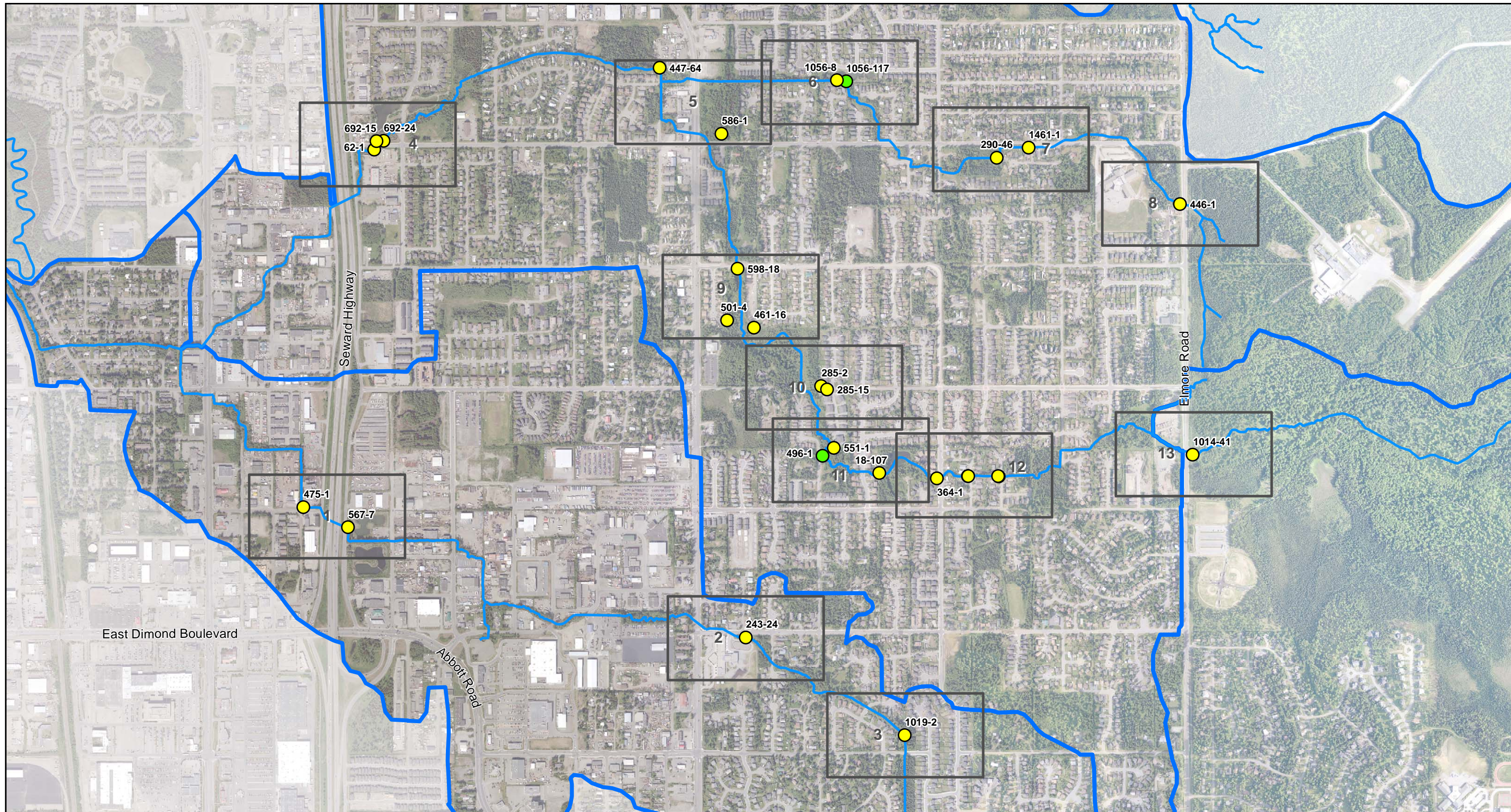
**Drainage Way Nodes**  
 Catch Basin  
 Catchbasin Manhole  
 Manhole  
 OGS  
 Outfall Major



Dry Weather Screening 2014  
**Fish Creek**  
 Examined and Sampled Outfalls  
**Page 7**

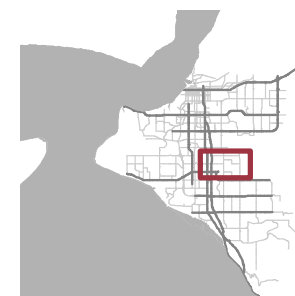
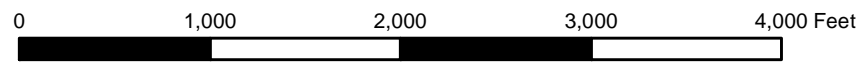
Source: MOA HGDB  
 Imagery: MOA Pictometry 2009  
 HDR Alaska, Inc.  
 10/10/2014





LEGEND

- 2014 Examined Outfall
- 2014 Sampled Outfall
- ~ Stream
- + Watershed Boundry
- Map Page Index





Dry Weather Screening 2014  
**Little Campbell Creek**  
 Examined and Sampled Outfalls  
**Map Index**






Source: MOA HGDB  
 Imagery: MOA Pictometry 2009  
 HDR Alaska, Inc.  
 10/10/2014










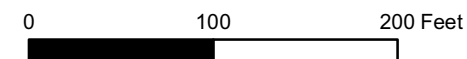


**LEGEND**

-  2014 Examined Outfall
-  Stream

- Drainage Ways**
-  Continuity
  -  Pipe
  -  Routing
  -  Open Channel
  -  Xing Culvert

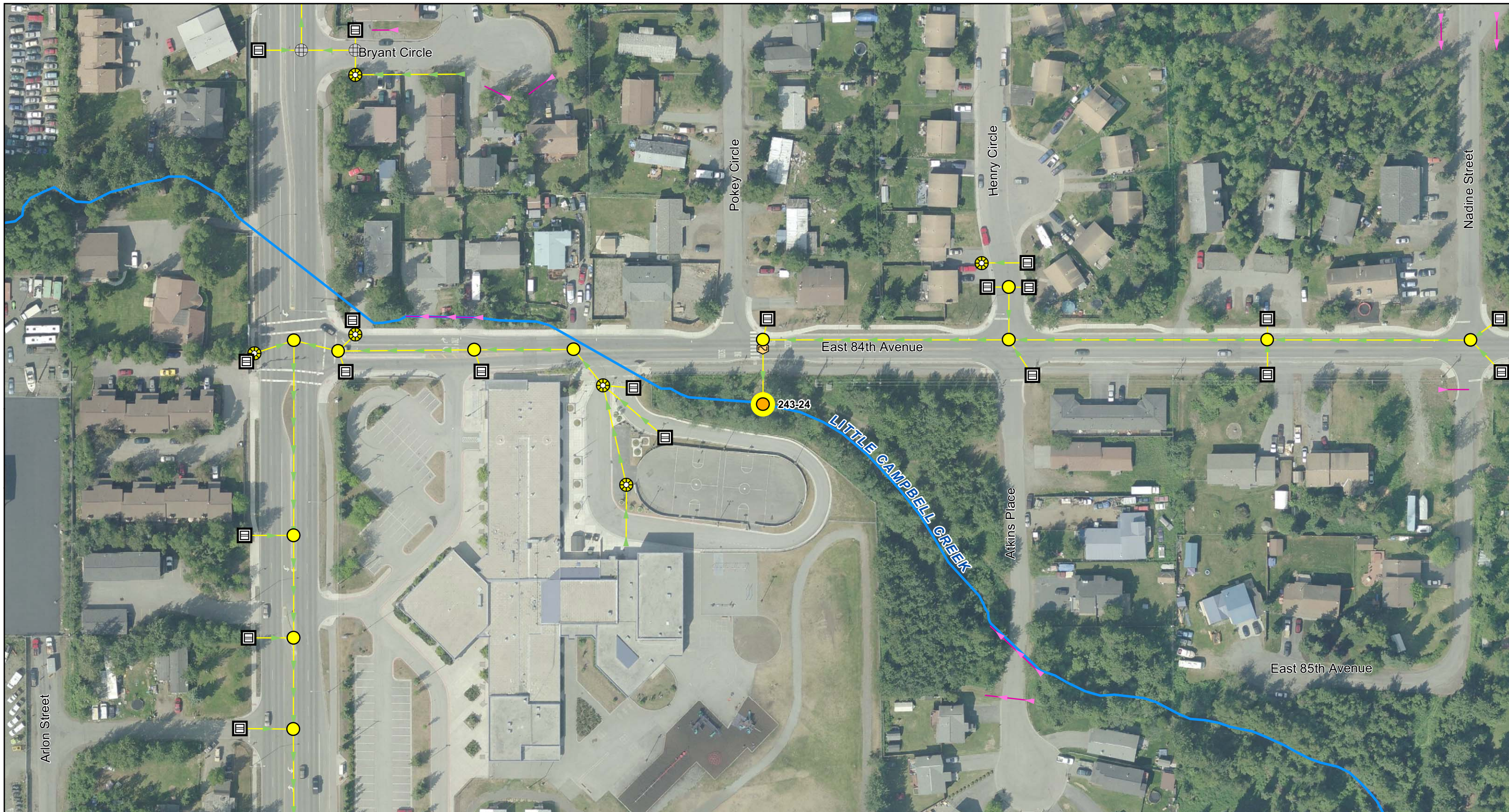
- Drainage Way Nodes**
-  Bypass Outlet
  -  Outfall
  -  Catch Basin
  -  Outlet
  -  Catchbasin Manhole
  -  Manhole
  -  OGS





Dry Weather Screening 2014  
**Little Campbell Creek**  
 Examined and Sampled Outfalls  
**Page 1**




Source: MOA HGDB  
 Imagery: MOA Pictometry 2009  
 HDR Alaska, Inc.  
 10/10/2014









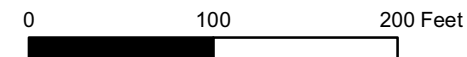


**LEGEND**

 2014 Examined Outfall  
 Stream

**Drainage Ways**  
 Pipe  
 Routing  
 Xing Culvert

**Drainage Way Nodes**  
 Catch Basin  
 Outlet  
 Catchbasin Manhole  
 Manhole  
 OGS  
 Outfall

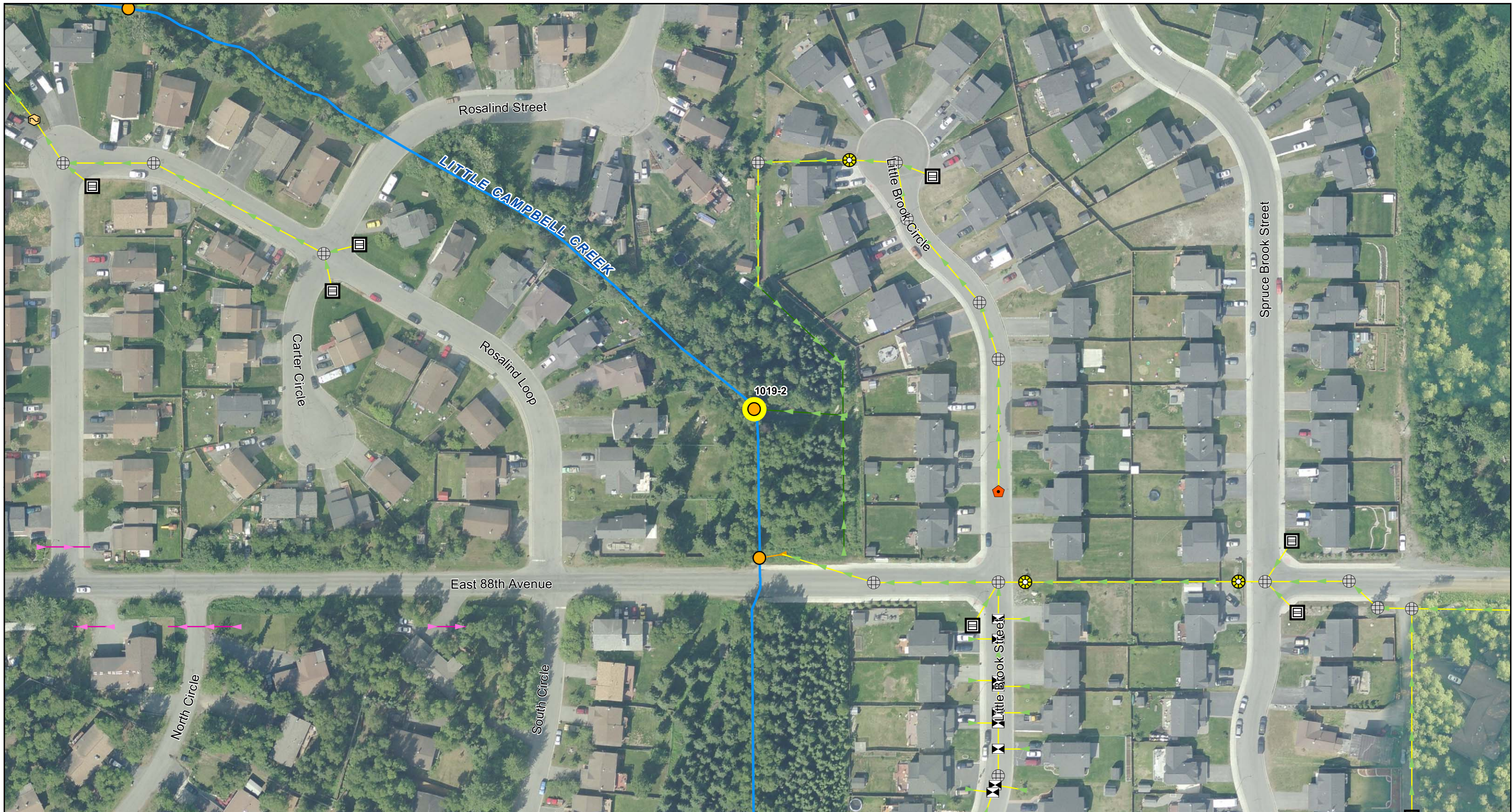


Dry Weather Screening 2014  
**Little Campbell Creek**  
 Examined and Sampled Outfalls  
**Page 2**



Source: MOA HGDB  
 Imagery: MOA Pictometry 2009  
 HDR Alaska, Inc.  
 10/10/2014







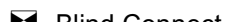


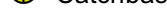
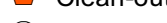




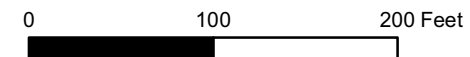


**LEGEND**

-  2014 Examined Outfall
-  Stream

- Drainage Ways**
-  Pipe
  -  Routing
  -  Open Channel
  -  Xing Culvert

- Drainage Way Nodes**
-  Blind Connect
  -  Catch Basin
  -  Catchbasin Manhole
  -  Clean-out
  -  Manhole
  -  OGS
  -  Outfall




Dry Weather Screening 2014  
**Little Campbell Creek**  
 Examined and Sampled Outfalls  
**Page 3**

Source: MOA HGDB  
 Imagery: MOA Pictometry 2009  
 HDR Alaska, Inc.  
 10/10/2014






**LEGEND**

 2014 Examined Outfall

 Stream

**Drainage Ways**

 Continuity


 Pipe

 Routing


 Open Channel

 Xing Culvert


**Drainage Way Nodes**

 Bypass Outlet

 Catch Basin

 Catchbasin Manhole

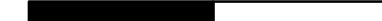
 Manhole

 OGS

 Outfall

 Weir

0 100 200 Feet





Dry Weather Screening 2014  
**Little Campbell Creek**  
 Examined and Sampled Outfalls  
**Page 4**





Source: MOA HGDB  
 Imagery: MOA Pictometry 2009  
 HDR Alaska, Inc.  
 10/10/2014









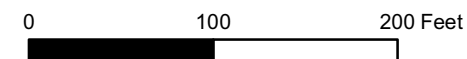


**LEGEND**

-  2014 Examined Outfall
-  Stream

- Drainage Ways**
-  Pipe
  -  Routing
  -  Open Channel
  -  Xing Culvert

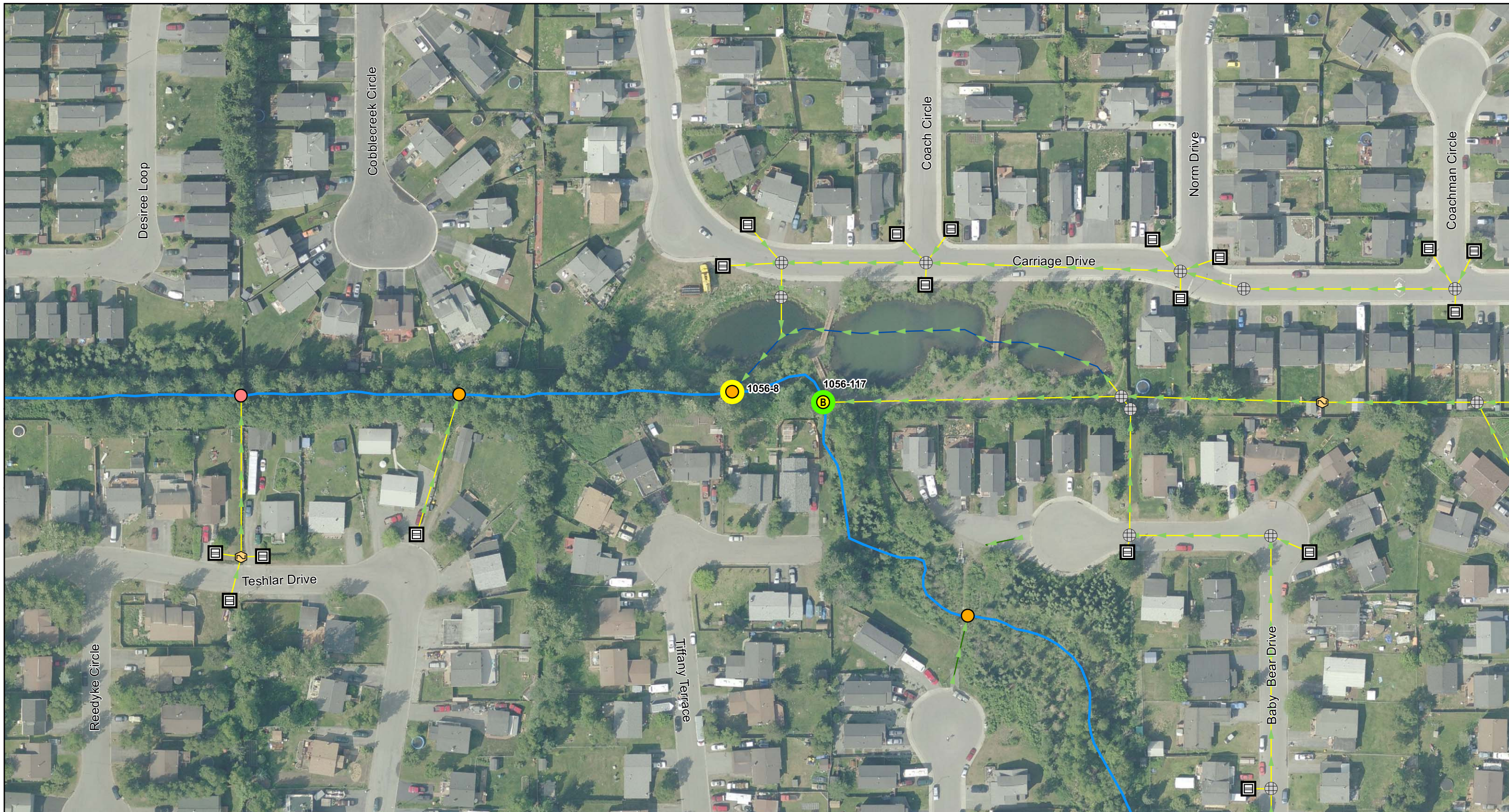
- Drainage Way Nodes**
-  Blind Connect
  -  Catch Basin
  -  Catchbasin Manhole
  -  Manhole
  -  OGS
  -  Outfall






Dry Weather Screening 2014  
**Little Campbell Creek**  
 Examined and Sampled Outfalls  
**Page 5**





Source: MOA HGDB  
 Imagery: MOA Pictometry 2009  
 HDR Alaska, Inc.  
 10/10/2014









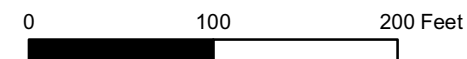


**LEGEND**

-  2014 Examined Outfall
-  2014 Sampled Outfall
-  Stream

- Drainage Ways**
-  Continuity
  -  Pipe
  -  Routing
  -  Open Channel

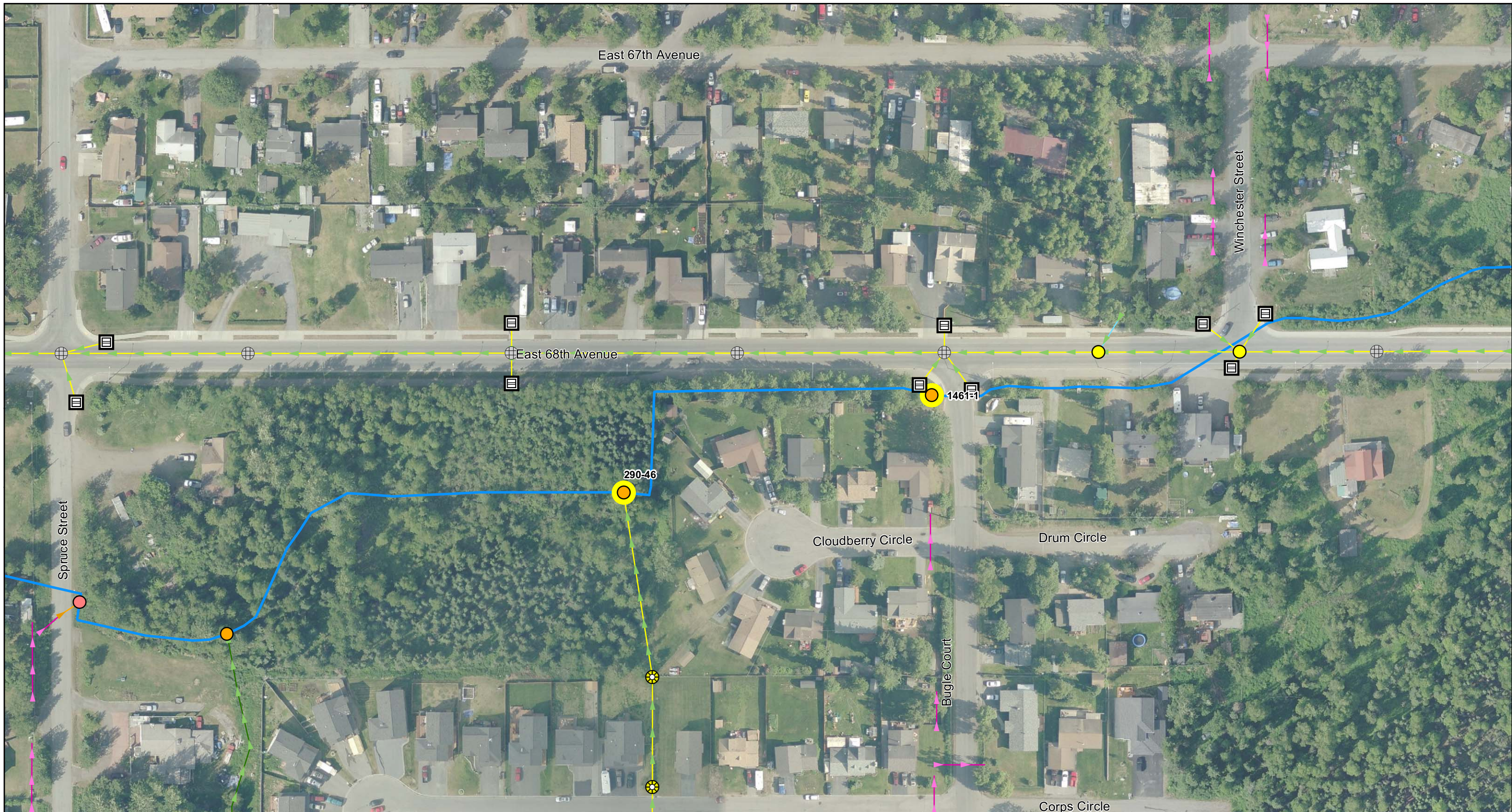
- Drainage Way Nodes**
-  Bypass Outlet
  -  Outfall Minor
  -  Catch Basin
  -  Manhole
  -  OGS
  -  Outfall



Dry Weather Screening 2014  
**Little Campbell Creek**  
 Examined and Sampled Outfalls  
**Page 6**

Source: MOA HGDB  
 Imagery: MOA Pictometry 2009  
 HDR Alaska, Inc.  
 10/10/2014



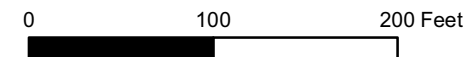


**LEGEND**

- 2014 Examined Outfall
- ~ Stream

- Drainage Ways**
- Pipe
  - Inlet
  - Routing
  - Open Channel
  - Xing Culvert

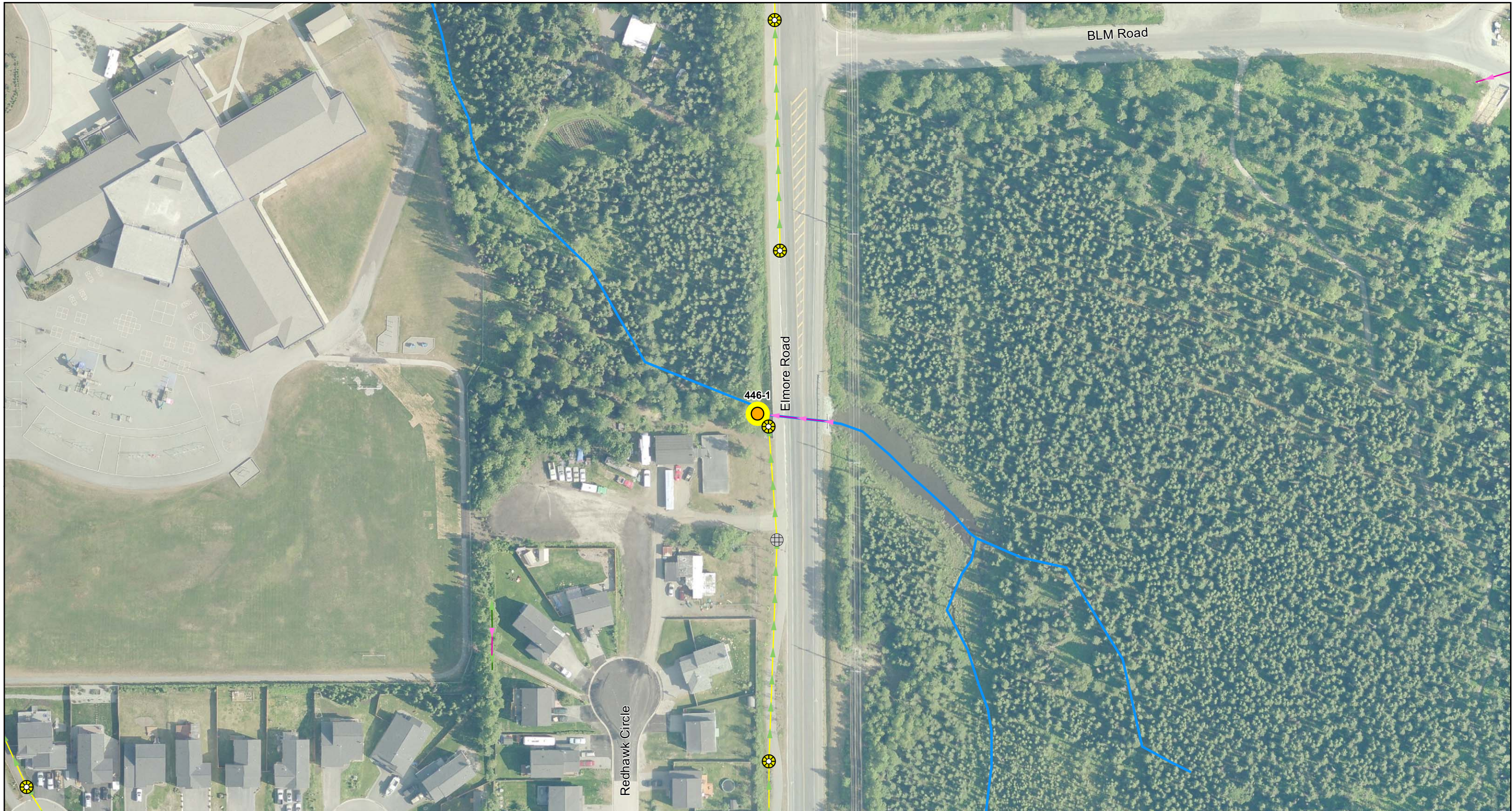
- Drainage Way Nodes**
- Catch Basin
  - Catchbasin Manhole
  - Manhole
  - Outfall
  - Outfall
  - Outfall Minor





Dry Weather Screening 2014  
**Little Campbell Creek**  
 Examined and Sampled Outfalls  
**Page 7**




Source: MOA HGDB  
 Imagery: MOA Pictometry 2009  
 HDR Alaska, Inc.  
 10/10/2014







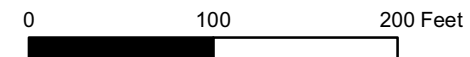


**LEGEND**

-  2014 Examined Outfall
-  Stream

- Drainage Ways**
-  Pipe
  -  Open Channel
  -  Xing Culvert

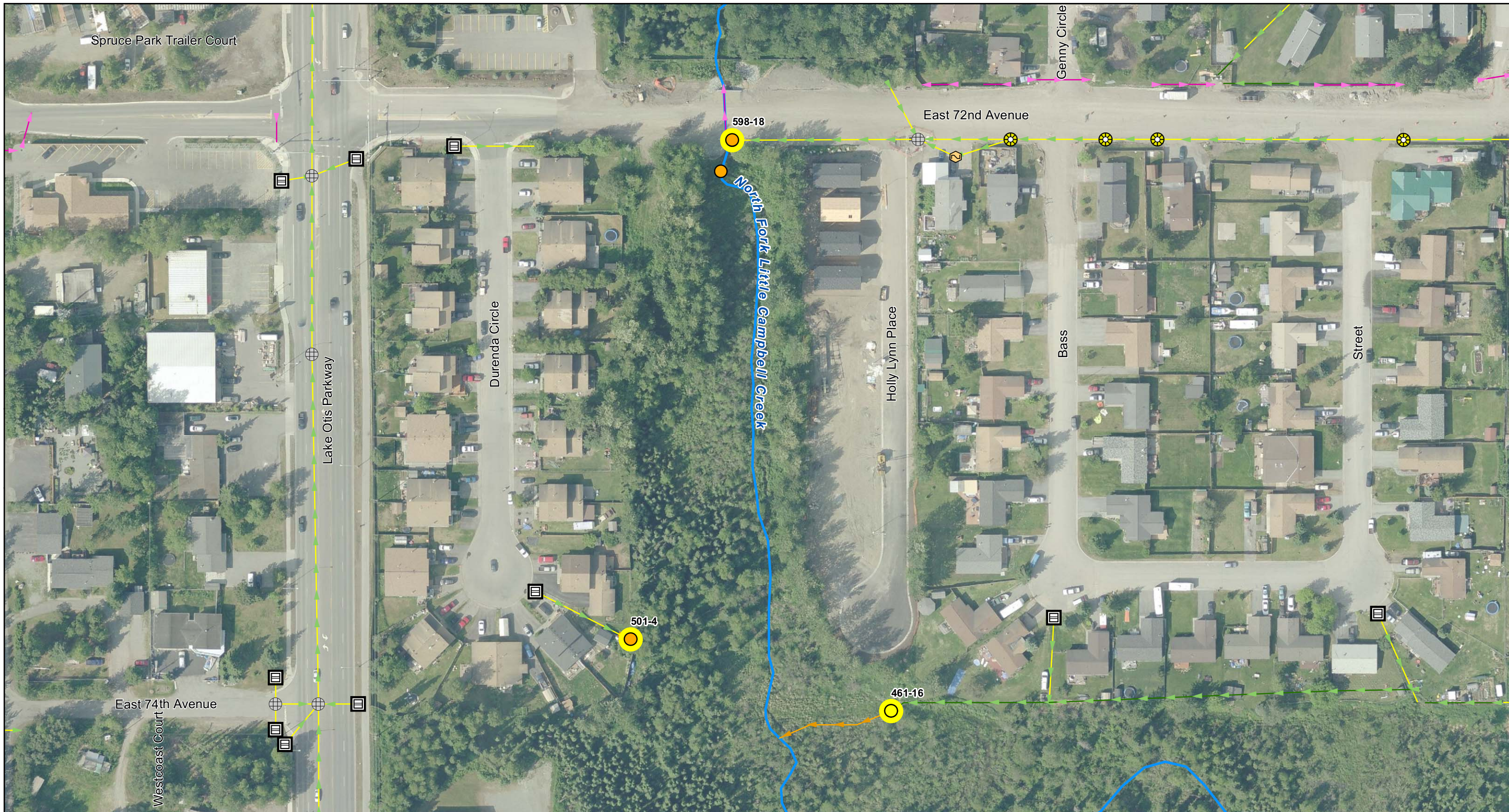
- Drainage Way Nodes**
-  Catchbasin Manhole
  -  Manhole
  -  OGS
  -  Outfall



Dry Weather Screening 2014  
**Little Campbell Creek**  
 Examined and Sampled Outfalls  
**Page 8**

Source: MOA HGDB  
 Imagery: MOA Pictometry 2009  
 HDR Alaska, Inc.  
 10/10/2014





**LEGEND**

2014 Examined Outfall

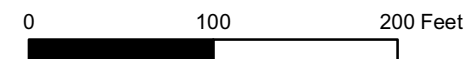
Stream

**Drainage Ways**

- Pipe
- Routing
- Open Channel
- Xing Culvert

**Drainage Way Nodes**

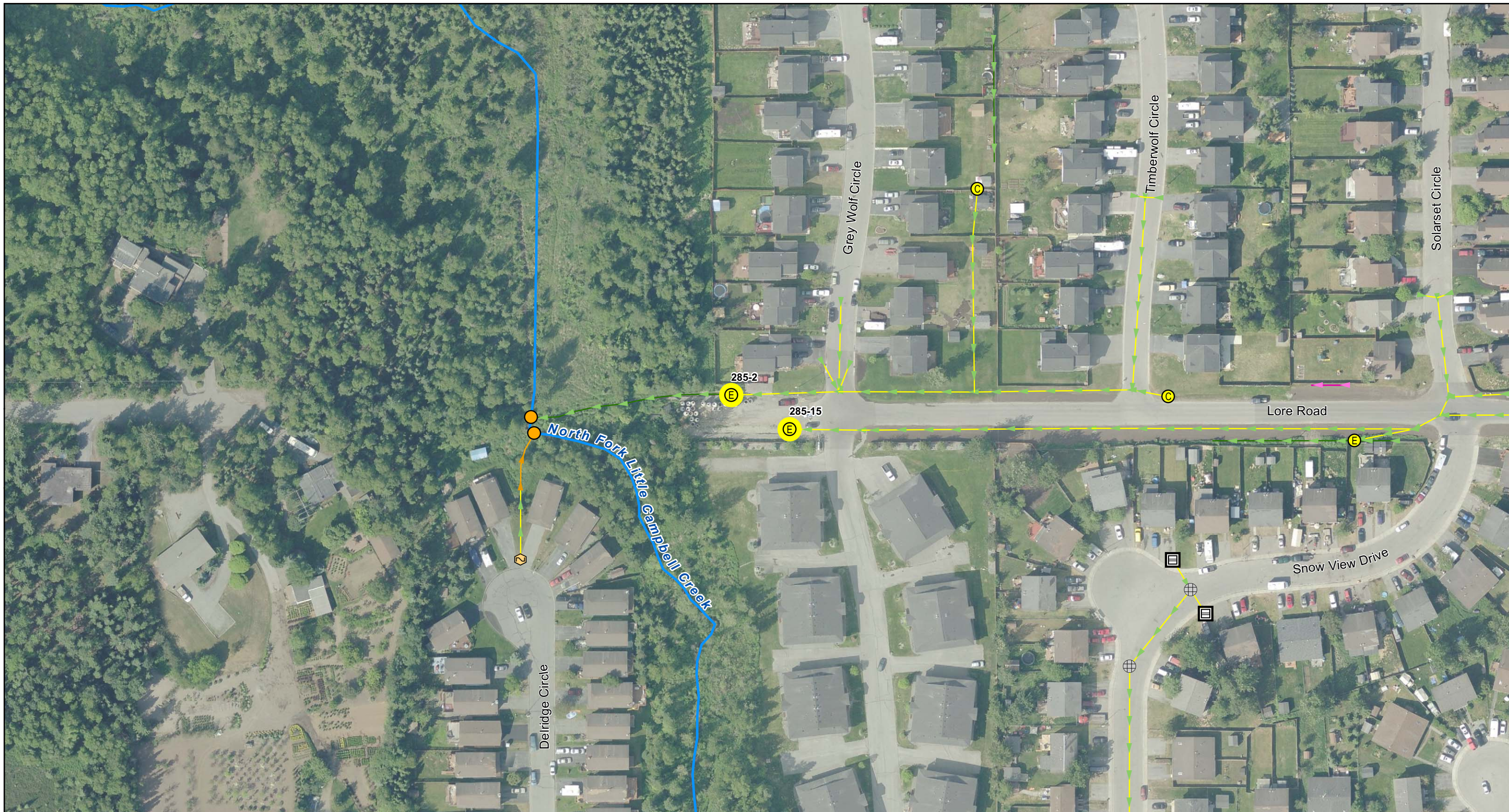
- Catch Basin
- Outlet
- Catchbasin Manhole
- Manhole
- OGS
- Outfall





Dry Weather Screening 2014  
**Little Campbell Creek**  
 Examined and Sampled Outfalls  
**Page 9**





Source: MOA HGDB  
 Imagery: MOA Pictometry 2009  
 HDR Alaska, Inc.  
 10/10/2014


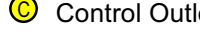
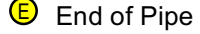
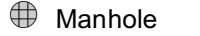




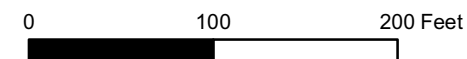


LEGEND

-  2014 Examined Outfall
-  Stream

- Drainage Ways**
-  Pipe
  -  Routing
  -  Open Channel
  -  Xing Culvert

- Drainage Way Nodes**
-  Catch Basin
  -  Control Outlet
  -  End of Pipe (EOP)
  -  Manhole
  -  OGS
  -  Outfall

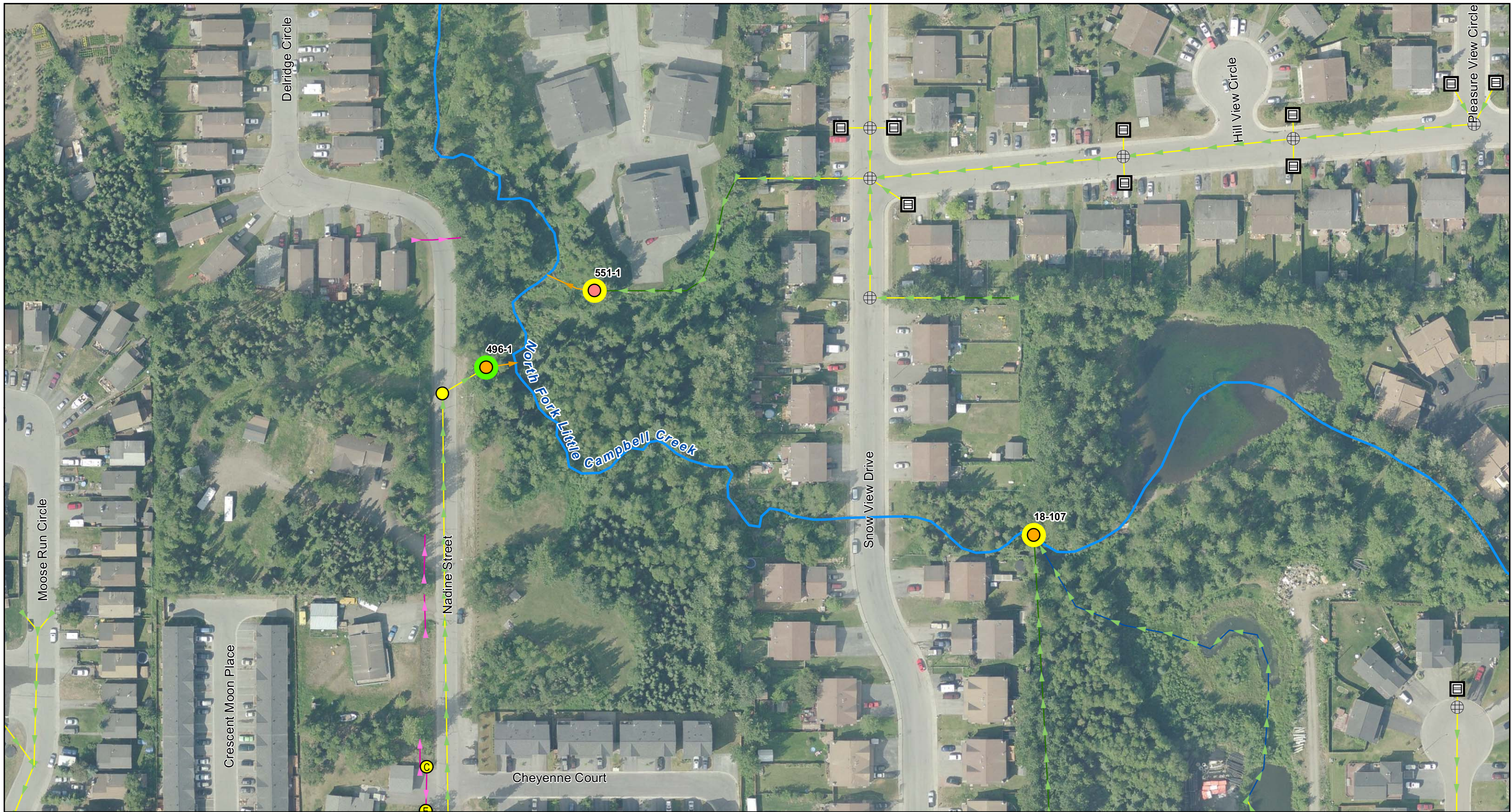


Dry Weather Screening 2014  
**Little Campbell Creek**  
 Examined and Sampled Outfalls  
**Page 10**




Source: MOA HGDB  
 Imagery: MOA Pictometry 2009  
 HDR Alaska, Inc.  
 10/10/2014

















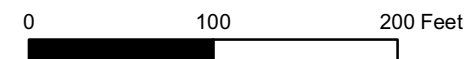


**LEGEND**

-  2014 Examined Outfall
-  2014 Sampled Outfall
-  Stream

- Drainage Ways**
-  Continuity
  -  Pipe
  -  Routing
  -  Open Channel
  -  Xing Culvert

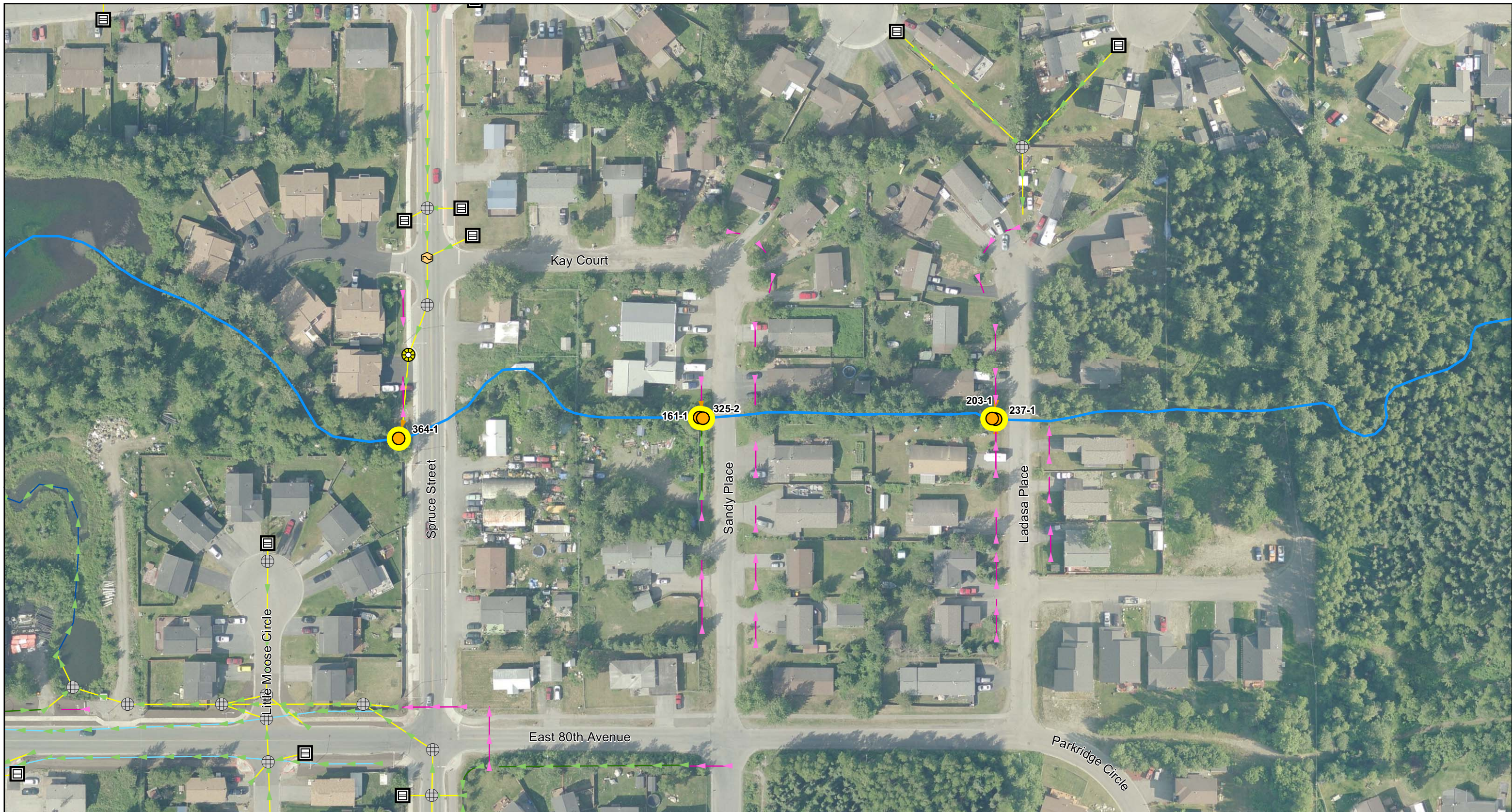
- Drainage Way Nodes**
-  Catch Basin
  -  Control Outlet
  -  End of Pipe (EOP)
  -  Manhole
  -  Outfall
  -  Outfall Minor
  -  Outlet





Dry Weather Screening 2014  
**Little Campbell Creek**  
 Examined and Sampled Outfalls  
**Page 11**







Source: MOA HGDB  
 Imagery: MOA Pictometry 2009  
 HDR Alaska, Inc.  
 10/10/2014








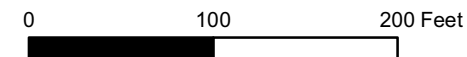


**LEGEND**

-  2014 Examined Outfall
-  Stream

- Drainage Ways**
-  Continuity
  -  Pipe
  -  Inlet
  -  Routing
  -  Open Channel
  -  Xing Culvert

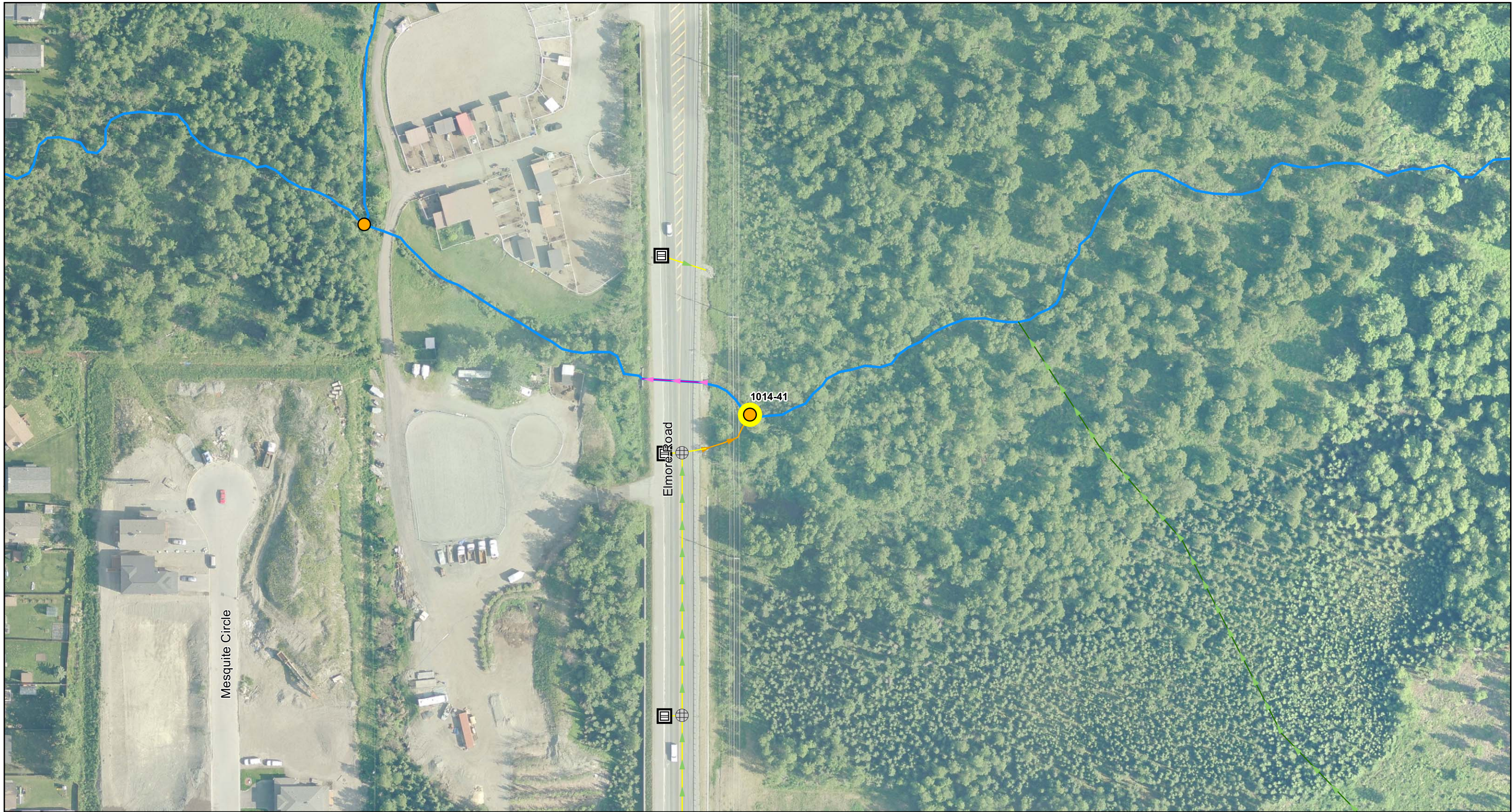
- Drainage Way Nodes**
-  Catch Basin
  -  Catchbasin Manhole
  -  Manhole
  -  OGS
  -  Outfall





Dry Weather Screening 2014  
**Little Campbell Creek**  
 Examined and Sampled Outfalls  
**Page 12**





Source: MOA HGDB  
 Imagery: MOA Pictometry 2009  
 HDR Alaska, Inc.  
 10/10/2014






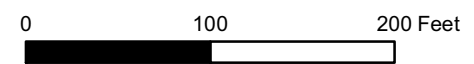


**LEGEND**

 2014 Examined Outfall  
 Stream

**Drainage Ways**  
 Pipe  
 Routing  
 Open Channel  
 Xing Culvert

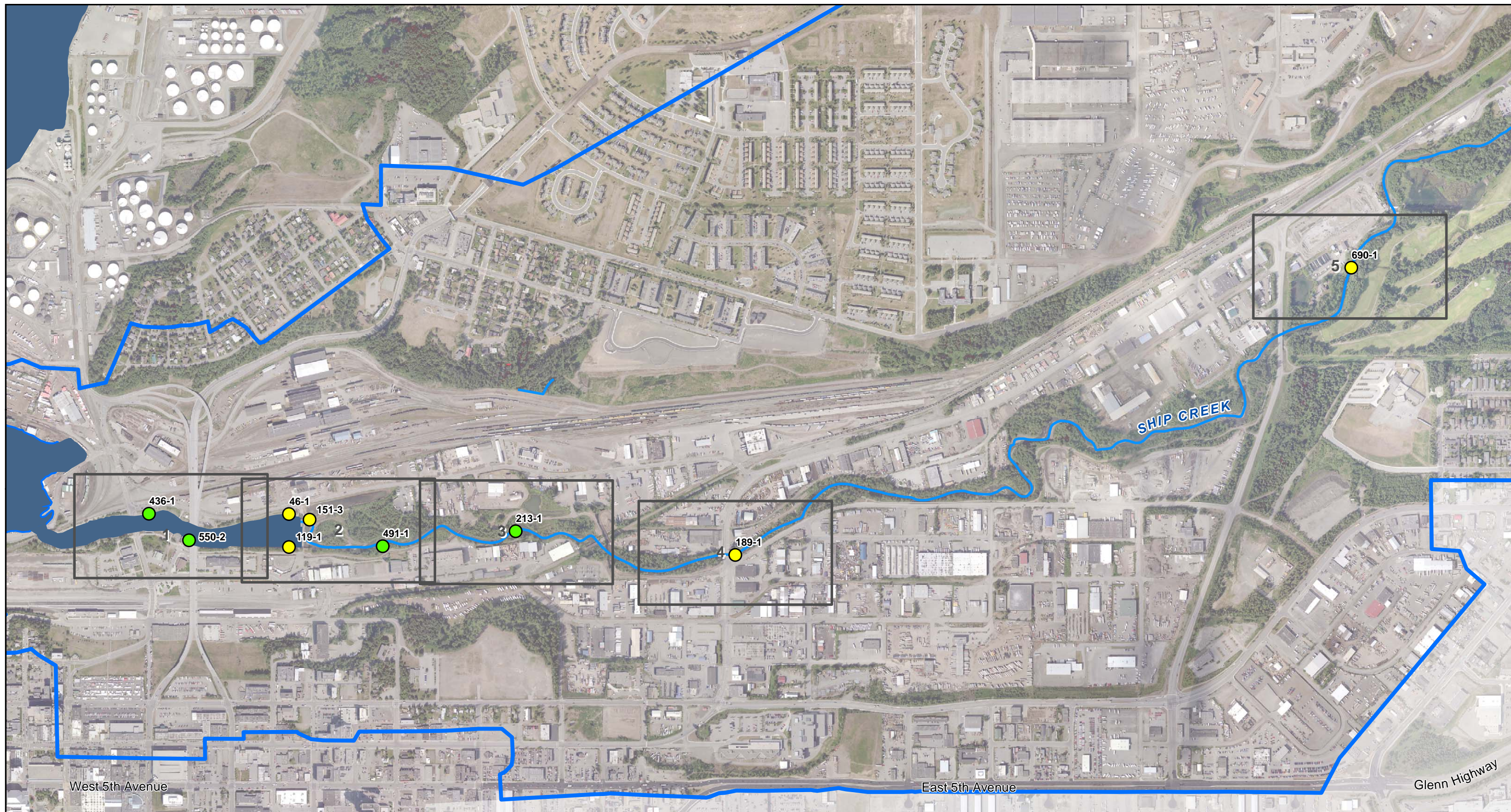
**Drainage Way Nodes**  
 Catch Basin  
 Manhole  
 Outfall



Dry Weather Screening 2014  
**Little Campbell Creek**  
 Examined and Sampled Outfalls  
**Page 13**

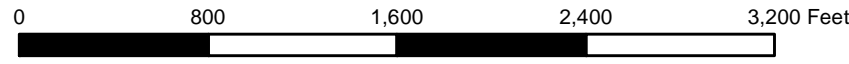
Source: MOA HGDB  
 Imagery: MOA Pictometry 2009  
 HDR Alaska, Inc.  
 10/10/2014





LEGEND

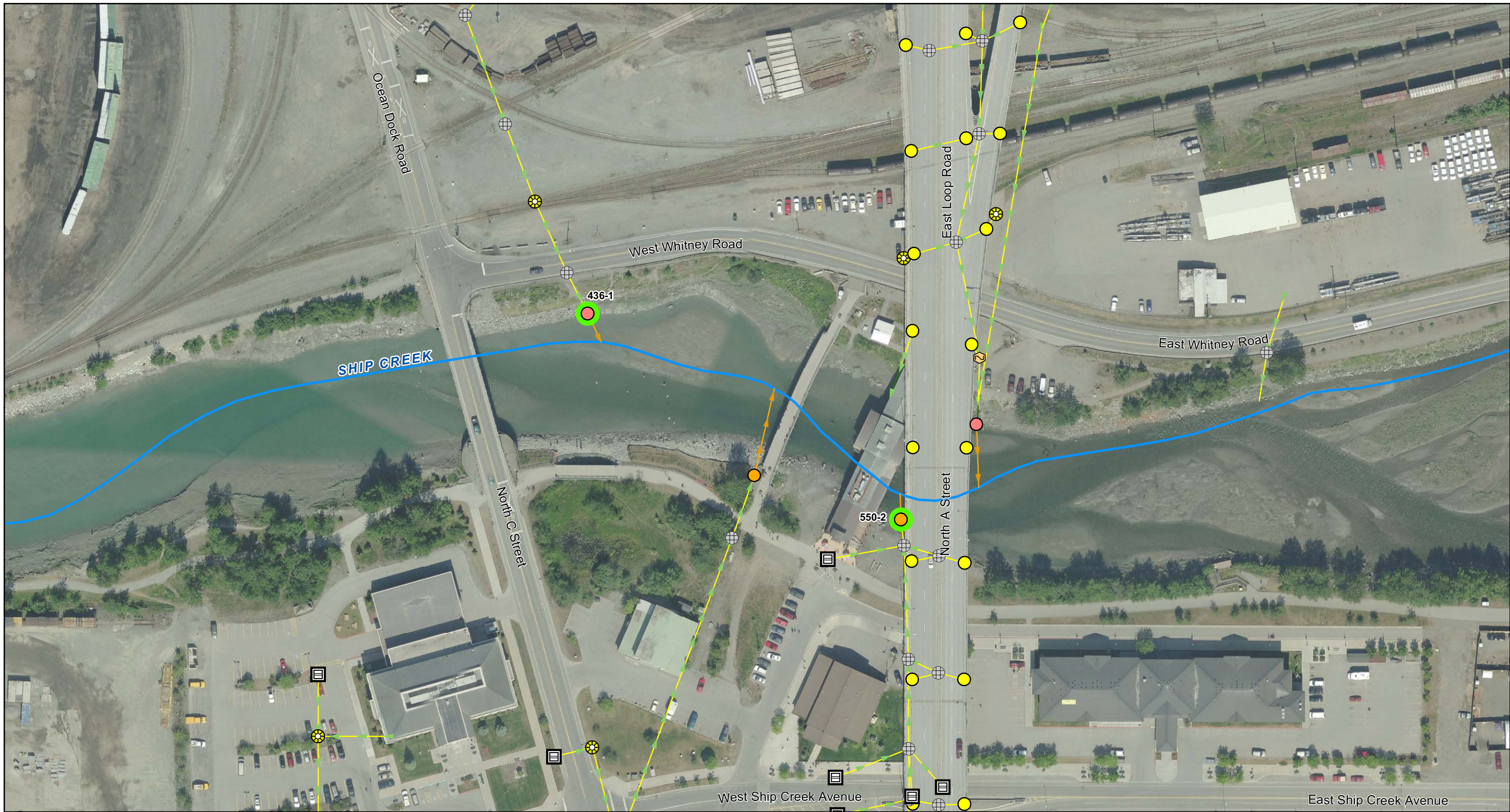
- 2014 Examined Outfall
- 2014 Sampled Outfall
- ~ Stream
- ▭ Watershed Boundry
- Map Page Index





Dry Weather Screening 2014  
**Ship Creek**  
 Examined and Sampled Outfalls  
**Map Index**




Source: MOA HGDB  
 Imagery: MOA Pictometry 2009  
 HDR Alaska, Inc.  
 10/10/2014


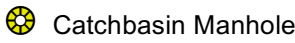




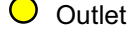


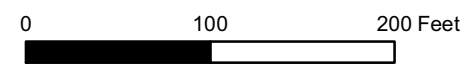


**LEGEND**

 2014 Sampled Outfall  
 Stream

**Drainage Ways**  
 Pipe  
 Routing  
 Open Channel

**Drainage Way Nodes**  
 Catch Basin  
 Catchbasin Manhole  
 Manhole  
 OGS  
 Outfall  
 Outfall Minor  
 Outlet



Dry Weather Screening 2014  
**Ship Creek**  
 Examined and Sampled Outfalls  
**Page 1**

Source: MOA HGDB  
 Imagery: MOA Pictometry 2009  
 HDR Alaska, Inc.  
 10/10/2014



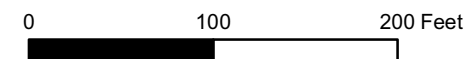


**LEGEND**

- 2014 Examined Outfall
- 2014 Sampled Outfall
- ~ Stream

- Drainage Ways**
- Continuity
  - Pipe
  - Routing
  - Open Channel
  - Xing Culvert

- Drainage Way Nodes**
- Catch Basin
  - Catchbasin Manhole
  - Manhole
  - OGS
  - Outfall
  - Outfall Major
  - Outfall Minor





Dry Weather Screening 2014  
**Ship Creek**  
 Examined and Sampled Outfalls  
**Page 2**







Source: MOA HGDB  
 Imagery: MOA Pictometry 2009  
 HDR Alaska, Inc.  
 10/10/2014









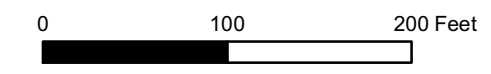


**LEGEND**

-  2014 Sampled Outfall
-  Stream

- Drainage Ways**
-  Continuity
  -  Pipe
  -  Inlet
  -  Routing
  -  Open Channel
  -  Xing Culvert

- Drainage Way Nodes**
-  Catch Basin
  -  Catchbasin Manhole
  -  Manhole
  -  OGS
  -  Outfall
  -  Outfall Major





Dry Weather Screening 2014  
**Ship Creek**  
 Examined and Sampled Outfalls  
**Page 3**





Source: MOA HGDB  
 Imagery: MOA Pictometry 2009  
 HDR Alaska, Inc.  
 10/10/2014







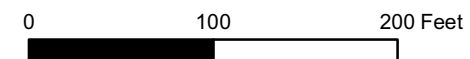


LEGEND

-  2014 Examined Outfall
-  Stream

- Drainage Ways**
-  Pipe
  -  Routing
  -  Open Channel
  -  Xing Culvert

- Drainage Way Nodes**
-  Catch Basin
  -  Catchbasin Manhole
  -  Manhole
  -  Outfall



Dry Weather Screening 2014  
**Ship Creek**  
 Examined and Sampled Outfalls  
**Page 4**



Source: MOA HGDB  
 Imagery: MOA Pictometry 2009  
 HDR Alaska, Inc.  
 10/10/2014





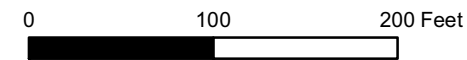


LEGEND

 2014 Examined Outfall  
 Stream

**Drainage Ways**  
 Routing  
 Xing Culvert

**Drainage Way Nodes**  
 Outfall Major



Dry Weather Screening 2014  
**Ship Creek**  
 Examined and Sampled Outfalls  
**Page 5**

Source: MOA HGDB  
 Imagery: MOA Pictometry 2009  
 HDR Alaska, Inc.  
 10/10/2014



## Appendix B

### Field Notebook

2 6/12 SHIP CREEK  
C MEYN ISAAC WATKINS DNS RECON

(436-1): good but flowing at slow trickle; 2 ft culvert  
Park at Ulu Factory

(550-2): good, sample at lowest tide possible  
2 ft culvert  
Park at Ulu Factory

119-1: poor condition. Jacked up significantly,  
rust holes 6 ft in from end of pipe.  
Water flowing from holes in pipe

46-1: Completely submerged; 3-4 ft concrete  
out fall; just upstream of sportfishing  
wire line

151-3: Outlet of pond into creek = NOT  
a pipe

(491-1): pipe at bike path edge NOT at creek  
edge. Access before bench.  
Good.

(213-1): good, flowing  
Access behind Allied building  
Walk between Allied; Emerald AK building  
turn left & walk in front of fence to

SHIP CREEK

hole in fence.

189-1: Completely submerged, pipe cut  
4 ft up. End of pipe crushed with hole.  
Noticeable milky plume flowing out

477-1: Could not locate; possible culvert  
designated as outfall

728-1: Drain open channel through golf  
course. Tributary?

690-1: Water pipe over creek?

FOR BOTH ABOVE: Parking at hatchery;  
outfalls on opposite side of creek

## FISH CREEK

241 and 1303-1: Could not locate. Found manhole in marsh

595-1: Good. Walk along bike path to orange/yellow striped guy lines to left of trail. Follow fence out to creek. 1 ft wide pipe. End of pipe has red marking post sticking up 8".

1310-201: Under construction (entire area). Outfall & network needs to be updated

584-1: End of pipe completely covered with logs & debris; water was flowing but unable to access end of pipe.

6/16/14

594-1: Cleared off debris. Pipe crushed & twisted. Water in outfall channel not coming from outfall pipe. Open end of pipe clogged with dirt.

1277-59: Dry; <sup>partially</sup> clogged with sediment

1312-19: Trickling water. Alternate Pink flagging in tree directly above outfall. Be careful of footing as horse tails obstruct view of ground.

Unlabeled by pass outlet - lined out notes good

391-1: Standing water, no flow out of pipe. 3 ft wide pipe;  $\frac{1}{5}$  th submerged

6806-1: 2 ft pipe. Completely submerged

NOTE: 391-1 & 6806-1 are 10 ft apart

391-1: Standing water. Overground pipe 2 ft to the right coming from parking lot. End of pipe damaged

1276-2: Could not locate

388-201: Flowing; 3 ft pipe

388-197: Standing water

see below  
 480-1: ~~Could not locate~~ ~~outfall~~. Potentially  
 relocated during construction

137-1: Completely submerged. Standing  
 water. Pipe coming out of concrete  
 facing. Orange carsonite marker on  
 top.

480-1: Alternate. Drains at elbow  
 of creek. Looks like standing water

1003-1: Dripping. Use as alternate. End of  
 pipe at edge of parking lot.  
 Plastic pipe

1013-1: Dry

234-1: Could not locate. Possibly buried  
 under railroad gravel and/or dead  
 vegetation.

37-1: ~~No flow, standing water~~ Flowing  
 1 ft pipe. Culvert is undersized & upstream  
 of culvert is backed up & stagnant

Unnamed:

trickle of water. Tudor Rd west of  
 Lake Otis on south side of road,  
 next to culvert crossing. Alternate

## C MEYN A GERLER DNS RECON

5417

ER 4' Flowing, 6 in. water in pipe. 1 ft PVC

Photo 2164 Pipe

2165 Downstream

Blue marker

ER 4' Backed up with standing water; slight  
water flow. Alternate?

2166: Outlett

2167: Downstream

Left hand side of trail when coming from  
Mt Point CircleBOTH ABOVE: Access from utility corridor/trail on  
Mountain Point Circle1417-1: Flowing. 1 ft PVC pipe. 4 in. water in pipe  
Access ~~between~~ Eagle Place | houses  
to the side of

Addresses 19920 &amp; 19962

1451-1 Flowing. 2 ft PVC pipe. 1 in. water in  
pipe

2170 outfall

2171 downstream

Access from Riverside Drive, corner of  
guardrail1377-1: Open channel drainage to creek;  
not pipe outfall1378-1: Stream routed through culvert;  
not outfall646-7 Flowing. 2 ft <sup>plastic</sup> pipe

2172 outfall

2173 outfall into creek

Unnamed outfall: flowing into creek from  
North side. 1 ft metal pipe

2174, 2175

1400-1: Dry. 2 ft metal pipe

2176, 2177

643-1: Open channel drainage; not pipe  
outfall1376-1: Open channel drainage; not pipe  
outfall

CAM 605-1: Slightly wet, possibly not enough to sample. Access on E side of creek

2178 - End of pipe

2179 - Downstream

642-1: Standing water. Pipe almost entirely submerged. Just in front of storm manhole

2180 - EOP

2180 - Standing water downstream

556-2-1: Trickle of water

500-1-1: Could not locate

297-1: Slightly flowing, almost standing water, Orange marker

(581-1): Flowing, ~25 in water in pipe.

2 ft PVC pipe

2184 - outfall

2185 - flow out

pg 5-6

(488-1): Flowing. 5 ft metal <sup>PIPE</sup> pipe. 1 ft water in pipe. Lots of trash.

2186 outfall

2187 downstream

Park in Las Margaritas lot, access via gravel road past gate.

1477-1: Un-accessible

(546-1): Flowing. 3 ft metal pipe. 6 inches water in pipe

2189 outfall

2190 downstream

Park at Taku Campbell Park on 76<sup>th</sup> off of Kings

503-1: Could not locate

(111-1): Flowing. 2 ft plastic pipe. Inch water in pipe

2191 - outlet

2192 down

Access from Huntsmen Circle

100-1: Flowing. 4 ft metal pipe. 3 inches  
water in pipe.

Second outfall trickling. 2 ft plastic  
pipe closer to houses.

2193- Big outfall

2194 smaller

as Bar

96 Downstream

305-1: In accessible

468-1: Trickling. 2 ft plastic pipe. Access from  
Pearl Drive  
trail

2197 outlet

2198 downstream

1457-2:

~~474-4~~: Flowing. 4 ft metal pipe.

2199 outfall

2200 downstream

474-1: No flow. Pipe rusted on bottom

509-1: Inaccessible

280-1:

271-1: Backed up with creek water, not  
flowing

271-1: Flowing. 2 ft metal pipe. 2 inches  
water in pipe.

Park in Arctic Roadrunner lot & walk  
down drive to yellow posts

2201-outfall

2202-downstream

### N.E.K Little Campbell

**496-1** good flow - across street  
from active construction right  
at the end of const. area.  
10' off the road. Can park  
right next to ~~to~~ outfall. **pg 23**

18-107 - multiple ends-of-pipe

18-107A One @ manhole near Snow View Dr

18-107B One directly across from Madeline Cr.

**18-107C** One emptying into small pond through  
OGS which is marked as manhole  
on MAP - Flowing - Good to test  
can pull off @ OGS. *Rite in the Rain*



325-2, 161-1, 203-1 & 237-1 All are ends of open drainage ditches.

364-1 - very low flow - standing H<sub>2</sub>O w/ thick algae in outlet channel could sample as alternate

285-15 standing H<sub>2</sub>O - no flow  
piles of grass cuttings in ditch

285-2 standing H<sub>2</sub>O - no flow  
thick algae = mosquito breeding area

551-1 EOP @ end yellow line on map  
Strong flow, but EOP completely submerged. Stick in center of photo coming out of EOP  
- good alternate b/c all water is from pipe

598-18 = Dry

461-16 @ EOP Filled w/dirt and dead grass

501-4 = Dry

475-1: Slightly flowing, could be used as alternate.

567-7: Bypass outlet. Standing water

567-1: Outlet of sed basin. Cannot access inlet so will not sample

1-1: X-ing where - EOP is bypass outlet, cannot access inlet so will not sample

243-24 = Dry

1019-2: Access through private property. EOP not streamside. Light flowing water in channel. Use as alternate. Access off of E 88th

383-1: Cannot locate. EOP possibly filled

65-2: Cannot access; loose dogs

500-1: Cannot access

320-5: Cannot access. Private property

149-2: Could not find outfall potentially labeled culvert. Culvert perched 2 ft.

692-15: Outlet of 3 separate EOPs that drain into sed basins

692-24: Flowing slowly

62-1: Standing water

692-15 (B): Slightly flowing. Marked by orange marker

(A): Flowing. This pipe drains largest portion of network

(C): Two outfalls. Metal pipe overgrown with vegetation. Plastic pipe flowing

447-64: Flowing well but EOP broken? bent over; unable to access

317-1: Connects to stream under road

586-1: EOP heavily clogged. Recent rain event blew out debris. Standing water in pipe. Directly in line w/ 2 grates

manhole cover in road (1/2 way down slope of road)

155-3: Could not access, private property

104-4: Dry

424-3: No access. Short pipe network

612-13 427-2: No access. Short network

1056-117: Flowing. Access difficult due to closed foot bridges. Access via trail by red house on E side of sed basins Pg 25

1056-8 (A): Flowing. By backyard of big red house

(B): Partially submerged. Not flowing

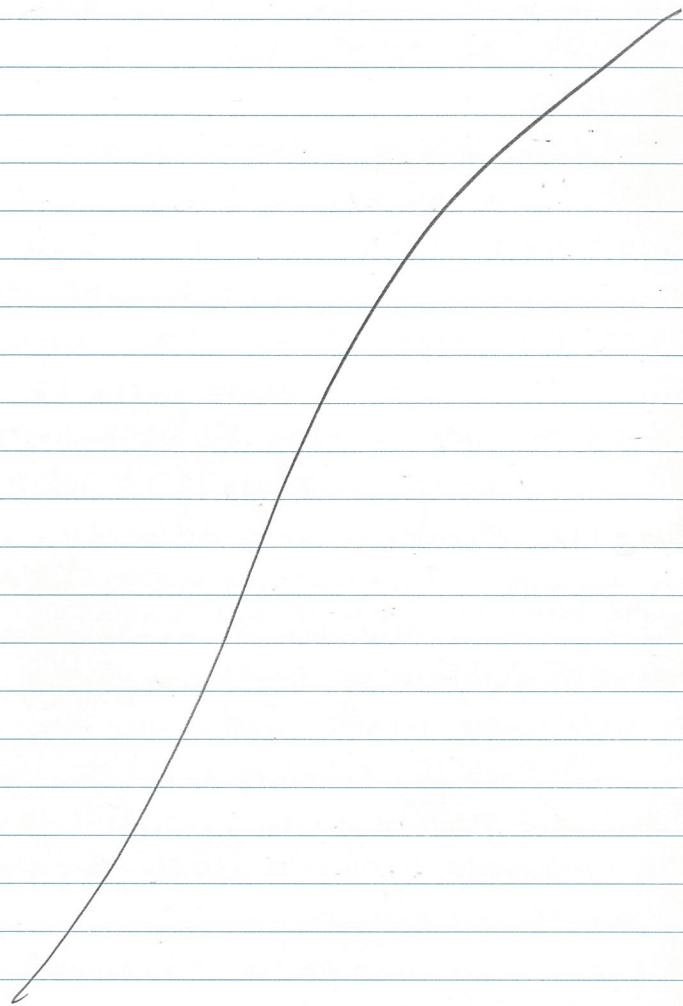
NOTE: Access to 1056-117; 1056-8 - Park at corner of Carriage

1461-1: Not flowing

290-46: 3 wood latch marking EOP

446-1: Slightly flowing. Alternate

*Rate in the Rain*



## Dry Weather Screening Sampling

7-16-14

Ship Cr.  
12:30

436-1

Very slow steady stream of water. Pipe outfall above ordinary high tide.

550-2 12:50

steady flow - likely discharging tide water from recent high tide. Pipe outfall well below ordinary high tide mark. Recon notes indicate good flow even during lowest point in tide.

213-1 1440

good flow A LOT of Beaver Activity <sup>prior</sup>  
All large trees cut down = A lot of dead fall remaining

491-1 1455

good flow, outfall channel w/ heavy sedimentation = backs up flow into end of pipe.

*Return in the Rain.*

16 July 2014  
 Meter #2  
 Standards Set #2

empty meter 0.05 NTU  
 DI Water 0.21 NTU 0.18 NTU  
 after silicon oil

| Range  | Standard | Reading |
|--------|----------|---------|
| 0-10   | 5.05     | 4.96    |
| 0-100  | 57.2     | 57.8    |
| 0-1000 | 523      | 527     |

76W  
 7-16-14

7-17-14 Fish Cr.

595-1 - 1420 steady trickle  
 easier to find as Horse tail is  
 dying back.

Turb. cal.

Empty = 0.05  
 P.I. H<sub>2</sub>O = 0.07

|        | Standard | Reading |
|--------|----------|---------|
| 0-10   | 5.05     | 4.99    |
| 0-100  | 57.2     | 57.2    |
| 0-1000 | 523      | 523     |

388-201 Drains into sed. Basin.

sed Basin overrun w/ iron  
 flocculation. Outfall w/ debris, surface scum,  
 oily sheen, iron floc

37-1 very low flow near headwater  
 of a branch of Fish creek. Very clogged  
 w/ veg, dirt etc. Tires in channel  
 just 1st. Creek culvert clogged 3 creek  
 backed up 1st. of crossing = standing  
 H<sub>2</sub>O. Samples run @ same time as 388-201  
 Note in the Rain.

7/18 DWS Screening  
EAGLE RIVER

541-1: Dry

ER 4: Standing water

1417-1: Sampled

1451-1: Sampled

646-71: Sampled

Turbidimeter Calibration: Meter # 2

Empty Meter = 0.06 NTUs

DI Water Reading = 0.06 NTUs

|        | Standard | Reading |
|--------|----------|---------|
| 0-10   | 5.05     | 5.09    |
| 0-100  | 57.2     | 56.5    |
| 0-1000 | 523      | 524     |

7/21 DWS Screening Campbell Creek

581-1: Sampled. Sussy

1488-1: Sampled.

496-1: Sampled

1056-117: Sampled

## Appendix C

### Field Data Sheets



# DRY WEATHER SCREENING FIELD DATA FORM



Outfall Number: 436-1

## Part 1. General Information

- Date 16 July 2014 Time 12:30
- Field Crew I. WALKINS, A. GERUK Water quality analyses conducted by: I.W., A.G.
- How long since last rainfall?  raining now  less than 3 days  3 or more days  unknown
- Size of last rain event: \_\_\_\_\_ inches (Attach data from Anchorage International Airport or Girdwood. Websites provided on back of form.)
- End-of-pipe diameter: 2 feet 6 inches
- Depth of water in end-of-pipe: - feet <1 inches

## Part 2. Visual Observations

- Photograph Log: Camera # and frame number (s) camera # 085 102-2262, 102-2263
- Water flowing from end-of-pipe?  No  Yes  
If NO, take and log photograph of outfall, record any pertinent information in comments, and go to next outfall. If YES, continue.
- Odors:  No  Yes If yes, describe in comment section.
- Floatables in water flowing from end-of-pipe:  None  Moving oily sheen  Surface scum  Soapy suds  Debris  Other
- Vegetation: some algae in bottom of pipe 12. Structural Condition: good
- Biology: -

## Part 3. Field Analyses

- Flow: \_\_\_\_\_ gal/min; OR 0.5L/9min
- Low: Not intense, water moving very slowly  Medium: Water moving at a moderate rate  High: Intense water moving very quickly
- Appearance of water flowing from end-of-pipe:  Clear  Cloudy/Muddy
- Color of water flowing from end-of-pipe:  Clear  Colored \_\_\_\_\_
- Water Quality Analyses:

| Quality Control Samples |   |   |
|-------------------------|---|---|
| Parameter               | Equipment Blank<br>[1 each before sampling event] | Duplicate Sample<br>[1 each sampling event] |
| pH                      | N/A   | pH units                                    |
| Total chlorine          | <u>&lt;0.5</u> ppm                                | ppm   |
| Detergents              | <u>&lt;0.05</u> ppm                               | ppm   |
| Total copper            | <u>&lt;0.05</u> ppm                               | ppm   |
| Total phenols           | <u>&lt;0.1</u> ppm                                | ppm   |
| *Turbidity (outfall)    | <u>0.18</u>                                       |   |
| *Turbidity (upstream)   | N/A   |   |
| Fecal Coliform          |   |   |

| Water Quality Samples |                      |
|-----------------------|----------------------|
| Parameter             | Primary Sample       |
| pH                    | <u>7.32</u> pH units |
| Total chlorine        | <u>&lt;0.5</u> ppm   |
| Detergents            | <u>&lt;0.05</u> ppm  |
| Total copper          | <u>&lt;0.05</u> ppm  |
| Total phenols         | <u>&lt;0.1</u> ppm   |
| *Turbidity (outfall)  | <u>1.50</u> NTU      |
| *Turbidity (upstream) | <u>N/A</u>           |
| Fecal Coliform        |                      |

## Part 4. Comments:

sample bottle #1  
very low flow

iron oxidation stains on rock below outfall



# DRY WEATHER SCREENING FIELD DATA FORM



Outfall Number: 550-2

## Part 1. General Information

- Date 16 July 2014 Time 12:50
- Field Crew I. Watkins, A. Gerlek Water quality analyses conducted by: I.W., A.G.
- How long since last rainfall?  raining now  less than 3 days  3 or more days  unknown
- Size of last rain event. \_\_\_\_\_ inches (Attach data from Anchorage International Airport or Girdwood. Websites provided on back of form.)
- End-of-pipe diameter: 2 feet \_\_\_\_\_ inches
- Depth of water in end-of-pipe: \_\_\_\_\_ feet 3 inches

## Part 2. Visual Observations

- Photograph Log: Camera # and frame number (s) camera #035 102-2264, 102-2265
- Water flowing from end-of-pipe?  No  Yes  
*If NO, take and log photograph of outfall, record any pertinent information in comments, and go to next outfall. If YES, continue.*
- Odors:  No  Yes *If yes, describe in comment section.*
- Floatables in water flowing from end-of-pipe:  None  Moving oily sheen  Surface scum  Soapy suds  Debris  Other
- Vegetation: \_\_\_\_\_
- Structural Condition: good
- Biology \_\_\_\_\_

## Part 3. Field Analyses

- Flow: \_\_\_\_\_ gal/min; OR
- Low: Not intense, water moving very slowly  Medium: Water moving at a moderate rate  High: Intense water moving very quickly
- Appearance of water flowing from end-of-pipe:  Clear  Cloudy/Muddy
- Color of water flowing from end-of-pipe:  Clear  Colored \_\_\_\_\_
- Water Quality Analyses:

| Quality Control Samples |   |   |
|-------------------------|---|---|
| Parameter               | Equipment Blank<br>[1 each before sampling event] | Duplicate Sample<br>[1 each sampling event] |
| pH                      | N/A   | 7.26 pH units                               |
| Total chlorine          | <del>0.5</del> ppm                                | 0.5 ppm                                     |
| Detergents              |   | 0.05 ppm                                    |
| Total copper            | <del>0.05</del> ppm                               | 0.05 ppm                                    |
| Total phenols           |   | 0.1 ppm                                     |
| *Turbidity (outfall)    |   |   |
| *Turbidity (upstream)   | N/A   |   |
| Fecal Coliform          |   |   |

| Water Quality Samples |                |
|-----------------------|----------------|
| Parameter             | Primary Sample |
| pH                    | 7.30 pH units  |
| Total chlorine        | 0.5 ppm        |
| Detergents            | 0.05 ppm       |
| Total copper          | 0.05 ppm       |
| Total phenols         | 0.1 ppm        |
| *Turbidity (outfall)  | 20.1 NTU       |
| *Turbidity (upstream) | N/A            |
| Fecal Coliform        |                |

## Part 4. Comments:

tide too high to measure flow  
sample bottle #2





# DRY WEATHER SCREENING FIELD DATA FORM



Outfall Number: 213-1

## Part 1. General Information

- Date 16 July 2014 Time 14:40
- Field Crew I. Watkins, A. Gerlek Water quality analyses conducted by: I.W., A.G.
- How long since last rainfall?  raining now  less than 3 days  3 or more days  unknown
- Size of last rain event. \_\_\_\_\_ inches (Attach data from Anchorage International Airport or Girdwood. Websites provided on back of form.)
- End-of-pipe diameter: 2 feet \_\_\_\_\_ inches
- Depth of water in end-of-pipe: \_\_\_\_\_ feet 3 inches

## Part 2. Visual Observations

- Photograph Log: Camera # and frame number (s) Camera #035, 102-2266, 102-2268
- Water flowing from end-of-pipe?  No  Yes  
*If NO, take and log photograph of outfall, record any pertinent information in comments, and go to next outfall. If YES, continue.*
- Odors:  No  Yes *If yes, describe in comment section.*
- Floatables in water flowing from end-of-pipe:  None  Moving oily sheen  Surface scum  Soapy suds  Debris  Other
- Vegetation: algae
- Structural Condition: good, covered w/woody debris
- Biology: baby fish in outfall channel (beaver dam)

## Part 3. Field Analyses

- Flow: \_\_\_\_\_ gal/min; OR  
 Low: Not intense, water moving very slowly  Medium: Water moving at a moderate rate  High: Intense water moving very quickly
- Appearance of water flowing from end-of-pipe:  Clear  Cloudy/Muddy
- Color of water flowing from end-of-pipe:  Clear  Colored \_\_\_\_\_
- Water Quality Analyses:

| Quality Control Samples |   |   |
|-------------------------|---|---|
| Parameter               | Equipment Blank<br>(1 each before sampling event) | Duplicate Sample<br>(1 each sampling event) |
| pH                      | N/A   | pH units                                    |
| Total chlorine          | ppm   | ppm   |
| Detergents              | ppm   | ppm   |
| Total copper            | ppm   | ppm   |
| Total phenols           | ppm   | ppm   |
| *Turbidity (outfall)    |   |   |
| *Turbidity (upstream)   | N/A   |   |
| Fecal Coliform          |   |   |

| Water Quality Samples |                |
|-----------------------|----------------|
| Parameter             | Primary Sample |
| pH                    | 6.88 pH units  |
| Total chlorine        | <0.5 ppm       |
| Detergents            | <0.05 ppm      |
| Total copper          | <0.05 ppm      |
| Total phenols         | <0.1 ppm       |
| *Turbidity (outfall)  | 1.36 NTU       |
| *Turbidity (upstream) | N/A            |
| Fecal Coliform        | ✓              |

## Part 4. Comments:

lots of dead fallen cottonwoods from beaver activity  
no standing tall trees in area  
oxidation in outfall channel.

sample bottle #1



# DRY WEATHER SCREENING FIELD DATA FORM



Outfall Number: 491-1

## Part 1. General Information

- Date 10 July 2014 Time 14:55
- Field Crew T. Watkins, A. Gerlek Water quality analyses conducted by: \_\_\_\_\_
- How long since last rainfall?  raining now  less than 3 days  3 or more days  unknown
- Size of last rain event: \_\_\_\_\_ inches (Attach data from Anchorage International Airport or Girdwood. Websites provided on back of form.)
- End-of-pipe diameter: 2 feet - inches
- Depth of water in end-of-pipe: - feet 6 inches

## Part 2. Visual Observations

- Photograph Log: Camera # and frame number (s) camera # 035, 102-7269, 107-2270
- Water flowing from end-of-pipe?  No  Yes  
*If NO, take and log photograph of outfall, record any pertinent information in comments, and go to next outfall. If YES, continue.*
- Odors:  No  Yes *If yes, describe in comment section.*
- Floatables in water flowing from end-of-pipe:  None  Moving oily sheen  Surface scum  Soapy suds  Debris  Other
- Vegetation: debris in outfall channel
- Structural Condition: good
- Biology: firm in outfall channel

## Part 3. Field Analyses

- Flow: \_\_\_\_\_ gal/min; OR  
 Low: Not intense, water moving very slowly  Medium: Water moving at a moderate rate  High; Intense water moving very quickly
- Appearance of water flowing from end-of-pipe:  Clear  Cloudy/Muddy
- Color of water flowing from end-of-pipe:  Clear  Colored \_\_\_\_\_
- Water Quality Analyses:

| Quality Control Samples |   |   |
|-------------------------|---|---|
| Parameter               | Equipment Blank<br>(1 each before sampling event) | Duplicate Sample<br>(1 each sampling event) |
| pH                      | N/A   | pH units                                    |
| Total chlorine          | ppm   | ppm   |
| Detergents              | ppm   | ppm   |
| Total copper            | ppm   | ppm   |
| Total phenols           | ppm   | ppm   |
| *Turbidity (outfall)    |   |   |
| *Turbidity (upstream)   | N/A   |   |
| Fecal Coliform          |   | ✓   |

| Water Quality Samples |                      |
|-----------------------|----------------------|
| Parameter             | Primary Sample       |
| pH                    | <u>6.83</u> pH units |
| Total chlorine        | <u>&lt;0.5</u> ppm   |
| Detergents            | <u>&lt;0.05</u> ppm  |
| Total copper          | <u>&lt;0.05</u> ppm  |
| Total phenols         | <u>&lt;0.1</u> ppm   |
| *Turbidity (outfall)  | <u>3.57 NTU</u>      |
| *Turbidity (upstream) | <u>N/A</u>           |
| Fecal Coliform        | ✓                    |

## Part 4. Comments:

debris + siltation in outfall channel are backing up flow - channel could be cleared  
sample bottle #2



# DRY WEATHER SCREENING FIELD DATA FORM



Outfall Number: 595-1

## Part 1. General Information

- Date 7-17-14 Time 1420
- Field Crew I. Watkins Water quality analyses conducted by: I. Watkins
- How long since last rainfall?  raining now  less than 3 days  3 or more days  unknown
- Size of last rain event. < 1 inches (Attach data from Anchorage International Airport or Girdwood. Websites provided on back of form.)
- End-of-pipe diameter: 21 feet 0 inches
- Depth of water in end-of-pipe: 0 feet < 1 inches

## Part 2. Visual Observations

- Photograph Log: Camera # and frame number (s) \_\_\_\_\_
- Water flowing from end-of-pipe?  No  Yes  
If NO, take and log photograph of outfall, record any pertinent information in comments, and go to next outfall. If YES, continue.
- Odors:  No  Yes If yes, describe in comment section.
- Floatables in water flowing from end-of-pipe:  None  Moving oily sheen  Surface scum  Soapy suds  Debris  Other
- Vegetation: Horse tail 12. Structural Condition: good
- Biology none

## Part 3. Field Analyses

- Flow: \_\_\_\_\_ gal/min; OR 1 liter/minute
- Low: Not intense, water moving very slowly  Medium: Water moving at a moderate rate  High: Intense water moving very quickly
- Appearance of water flowing from end-of-pipe:  Clear  Cloudy/Muddy
- Color of water flowing from end-of-pipe:  Clear  Colored light tan
- Water Quality Analyses:

| Quality Control Samples |   |   |
|-------------------------|---|---|
| Parameter               | Equipment Blank<br>(1 each before sampling event) | Duplicate Sample<br>(1 each sampling event) |
| pH                      | N/A   | <u>6.90</u> pH units                        |
| Total chlorine          | <u>20.5</u> ppm                                   | <u>20.5</u> ppm                             |
| Detergents              | <u>20.05</u> ppm                                  | <u>20.05</u> ppm                            |
| Total copper            | <u>20.05</u> ppm                                  | <u>20.05</u> ppm                            |
| Total phenols           | <u>20.1</u> ppm                                   | <u>20.1</u> ppm                             |
| *Turbidity (outfall)    | <u>0.07</u>                                       | <u>5.37</u>                                 |
| *Turbidity (upstream)   | N/A   | <u>N/A</u>                                  |
| Fecal Coliform          | <u>N/A</u>  | <u>Y</u>                                    |

| Water Quality Samples |                      |
|-----------------------|----------------------|
| Parameter             | Primary Sample       |
| pH                    | <u>6.93</u> pH units |
| Total chlorine        | <u>20.5</u> ppm      |
| Detergents            | <u>20.05</u> ppm     |
| Total copper          | <u>20.05</u> ppm     |
| Total phenols         | <u>20.1</u> ppm      |
| *Turbidity (outfall)  | <u>5.46</u>          |
| *Turbidity (upstream) | <u>NA</u>            |
| Fecal Coliform        | <u>Y</u>             |

Part 4. Comments:



# DRY WEATHER SCREENING FIELD DATA FORM



Outfall Number: 388-201

## Part 1. General Information

- Date 7-17-14 Time 1515
- Field Crew I. Watkins Water quality analyses conducted by: I. Watkins
- How long since last rainfall?  raining now  less than 3 days  3 or more days  unknown
- Size of last rain event. <1 inches (Attach data from Anchorage International Airport or Girdwood. Websites provided on back of form.)
- End-of-pipe diameter: 3 feet 0 inches
- Depth of water in end-of-pipe: 1 feet 0 inches

## Part 2. Visual Observations

- Photograph Log: Camera # and frame number (s) \_\_\_\_\_
- Water flowing from end-of-pipe?  No  Yes  
If NO, take and log photograph of outfall, record any pertinent information in comments, and go to next outfall. If YES, continue.
- Odors:  No  Yes If yes, describe in comment section.
- Floatables in water flowing from end-of-pipe:  None  Moving oily sheen  Surface scum  Soapy suds  Debris  Other
- Vegetation: none algae
- Structural Condition: good
- Biology: none

## Part 3. Field Analyses

- Flow: \_\_\_\_\_ gal/min; OR  
 Low: Not intense, water moving very slowly  Medium: Water moving at a moderate rate  High: Intense water moving very quickly
- Appearance of water flowing from end-of-pipe:  Clear  Cloudy/Muddy
- Color of water flowing from end-of-pipe:  Clear  Colored light tan
- Water Quality Analyses:

| Quality Control Samples |   |   |
|-------------------------|---|---|
| Parameter               | Equipment Blank<br>[1 each before sampling event] | Duplicate Sample<br>[1 each sampling event] |
| pH                      | N/A   | pH units                                    |
| Total chlorine          | ppm   | ppm   |
| Detergents              | ppm   | ppm   |
| Total copper            | ppm   | ppm   |
| Total phenols           | ppm   | ppm   |
| *Turbidity (outfall)    |   | <u>17.4</u>                                 |
| *Turbidity (upstream)   | N/A   |   |
| Fecal Coliform          |   |   |

| Water Quality Samples |                      |
|-----------------------|----------------------|
| Parameter             | Primary Sample       |
| pH                    | <u>6.39</u> pH units |
| Total chlorine        | <u>&lt;1.5</u> ppm   |
| Detergents            | <u>&lt;105</u> ppm   |
| Total copper          | <u>&lt;105</u> ppm   |
| Total phenols         | <u>&lt;1</u> ppm     |
| *Turbidity (outfall)  | <u>15.2</u>          |
| *Turbidity (upstream) | <u>N/A</u>           |
| Fecal Coliform        | <u>4</u>             |

## Part 4. Comments:

other floatables = iron floc. A LOT of debris @ outfall. Oily sheen in multiple places. Whole sea basin covered in iron floculation.



# DRY WEATHER SCREENING FIELD DATA FORM



Outfall Number: 137-1

## Part 1. General Information

1. Date 7-17-14 Time 1545
2. Field Crew I. Watkins Water quality analyses conducted by: I. Watkins
3. How long since last rainfall?  raining now  less than 3 days  3 or more days  unknown
4. Size of last rain event. 2.1 inches (Attach data from Anchorage International Airport or Girdwood. Websites provided on back of form.)
5. End-of-pipe diameter: 1 feet 0 inches
6. Depth of water in end-of-pipe: 0 feet 8 inches

## Part 2. Visual Observations

7. Photograph Log: Camera # and frame number (s) \_\_\_\_\_
8. Water flowing from end-of-pipe?  No  Yes  
If NO, take and log photograph of outfall, record any pertinent information in comments, and go to next outfall. If YES, continue.
9. Odors:  No  Yes If yes, describe in comment section.
10. Floatables in water flowing from end-of-pipe:  None  Moving oily sheen  Surface scum  Soapy suds  Debris  Other
11. Vegetation: horse tail, grass 12. Structural Condition: Almost filled over w/dirt & veg.
13. Biology none

## Part 3. Field Analyses

14. Flow: \_\_\_\_\_ gal/min; OR < 0.25 L/min
- Low: Not intense, water moving very slowly  Medium: Water moving at a moderate rate  High; Intense water moving very quickly
15. Appearance of water flowing from end-of-pipe:  Clear  Cloudy/Muddy
16. Color of water flowing from end-of-pipe:  Clear  Colored medium tan
17. Water Quality Analyses:

| Quality Control Samples |   |   |
|-------------------------|---|---|
| Parameter               | Equipment Blank<br>[1 each before sampling event] | Duplicate Sample<br>[1 each sampling event] |
| pH                      | N/A   | pH units                                    |
| Total chlorine          | ppm   | ppm   |
| Detergents              | ppm   | ppm   |
| Total copper            | ppm   | ppm   |
| Total phenols           | ppm   | ppm   |
| *Turbidity (outfall)    |   | <u>148</u>                                  |
| *Turbidity (upstream)   | N/A   |   |
| Fecal Coliform          | <u>N/A</u>  | <u>N/A</u>                                  |

| Water Quality Samples |                      |
|-----------------------|----------------------|
| Parameter             | Primary Sample       |
| pH                    | <u>6.76</u> pH units |
| Total chlorine        | <u>&lt; 1.5</u> ppm  |
| Detergents            | <u>&lt; 1.05</u> ppm |
| Total copper          | <u>&lt; 1.05</u> ppm |
| Total phenols         | <u>&lt; 1.1</u> ppm  |
| *Turbidity (outfall)  | <u>154</u>           |
| *Turbidity (upstream) |                      |
| Fecal Coliform        | <u>Y</u>             |

## Part 4. Comments:

A lot of suspended sediment



# DRY WEATHER SCREENING FIELD DATA FORM



Outfall Number: 541-1

## Part 1. General Information

- Date 7/18 Time 10:41 AM
- Field Crew C MEYN, J WATKINS Water quality analyses conducted by: \_\_\_\_\_
- How long since last rainfall?  raining now  less than 3 days  3 or more days  unknown
- Size of last rain event. <1 inches (Attach data from Anchorage International Airport or Girdwood. Websites provided on back of form.)
- End-of-pipe diameter: 1 feet \_\_\_\_\_ inches
- Depth of water in end-of-pipe: 0 feet \_\_\_\_\_ inches

## Part 2. Visual Observations

- Photograph Log: Camera # and frame number (s) 102-2280
- Water flowing from end-of-pipe?  No  Yes  
*If NO, take and log photograph of outfall, record any pertinent information in comments, and go to next outfall. If YES, continue.*
- Odors:  No  Yes *If yes, describe in comment section.*
- Floatables in water flowing from end-of-pipe:  None  Moving oily sheen  Surface scum  Soapy suds  Debris  Other
- Vegetation: \_\_\_\_\_
- Structural Condition: \_\_\_\_\_
- Biology \_\_\_\_\_

## Part 3. Field Analyses

- Flow: \_\_\_\_\_ gal/min; OR  
 Low: Not intense, water moving very slowly  Medium: Water moving at a moderate rate  High; Intense water moving very quickly
- Appearance of water flowing from end-of-pipe:  Clear  Cloudy/Muddy
- Color of water flowing from end-of-pipe:  Clear  Colored \_\_\_\_\_
- Water Quality Analyses:

| Quality Control Samples |   |   |
|-------------------------|---|---|
| Parameter               | Equipment Blank<br>[1 each before sampling event] | Duplicate Sample<br>[1 each sampling event] |
| pH                      | N/A   | pH units                                    |
| Total chlorine          | ppm   | ppm   |
| Detergents              | ppm   | ppm   |
| Total copper            | ppm   | ppm   |
| Total phenols           | ppm   | ppm   |
| *Turbidity (outfall)    |   |   |
| *Turbidity (upstream)   | N/A   |   |
| Fecal Coliform          |   |   |

| Water Quality Samples |                |
|-----------------------|----------------|
| Parameter             | Primary Sample |
| pH                    | pH units       |
| Total chlorine        | ppm            |
| Detergents            | ppm            |
| Total copper          | ppm            |
| Total phenols         | ppm            |
| *Turbidity (outfall)  |                |
| *Turbidity (upstream) |                |
| Fecal Coliform        |                |

## Part 4. Comments:



# DRY WEATHER SCREENING FIELD DATA FORM



Outfall Number: 1417-1

## Part 1. General Information

- Date 7/18/14 Time 10:59 AM
- Field Crew C MEYER, I WATKINS Water quality analyses conducted by: \_\_\_\_\_
- How long since last rainfall?  raining now  less than 3 days  3 or more days  unknown
- Size of last rain event. <1 inches (Attach data from Anchorage International Airport or Girdwood. Websites provided on back of form.)
- End-of-pipe diameter: 1 feet 0 inches
- Depth of water in end-of-pipe: 0 feet 2 inches

## Part 2. Visual Observations

- Photograph Log: Camera # and frame number (s) 10 2 2292
- Water flowing from end-of-pipe?  No  Yes  
If NO, take and log photograph of outfall, record any pertinent information in comments, and go to next outfall. If YES, continue.
- Odors:  No  Yes If yes, describe in comment section.
- Floatables in water flowing from end-of-pipe:  None  Moving oily sheen  Surface scum  Soapy suds  Debris  Other
- Vegetation: some algae, partially overgrown with grasses 12. Structural Condition: good
- Biology none

## Part 3. Field Analyses

- Flow: \_\_\_\_\_ gal/min; OR  
 Low: Not intense, water moving very slowly  Medium: Water moving at a moderate rate  High: Intense water moving very quickly
- Appearance of water flowing from end-of-pipe:  Clear  Cloudy/Muddy
- Color of water flowing from end-of-pipe:  Clear  Colored \_\_\_\_\_
- Water Quality Analyses:

Sample Bottle 1

| Quality Control Samples |   |   |
|-------------------------|---|---|
| Parameter               | Equipment Blank<br>[1 each before sampling event] | Duplicate Sample<br>[1 each sampling event] |
| pH                      | N/A   | pH units                                    |
| Total chlorine          | <u>&lt;0.5</u> ppm                                | ppm   |
| Detergents              | <u>&lt;0.15</u> ppm                               | ppm   |
| Total copper            | <u>&lt;0.05</u> ppm                               | ppm   |
| Total phenols           | <u>&lt;0.1</u> ppm                                | ppm   |
| *Turbidity (outfall)    | <u>0-06</u>                                       |   |
| *Turbidity (upstream)   | N/A   |   |
| Fecal Coliform          | —   |   |

| Water Quality Samples |                      |
|-----------------------|----------------------|
| Parameter             | Primary Sample       |
| pH                    | <u>6.80</u> pH units |
| Total chlorine        | <u>&lt;0.5</u> ppm   |
| Detergents            | <u>&lt;0.15</u> ppm  |
| Total copper          | <u>&lt;0.05</u> ppm  |
| Total phenols         | <u>&lt;0.1</u> ppm   |
| *Turbidity (outfall)  | <u>2.25</u>          |
| *Turbidity (upstream) | <u>N/A</u>           |
| Fecal Coliform        | <u>✓</u>             |

## Part 4. Comments:



# DRY WEATHER SCREENING FIELD DATA FORM



Outfall Number: 1451-1

## Part 1. General Information

- Date 7/10 Time 11:06 AM
- Field Crew CMEYN, IWATKINS Water quality analyses conducted by: \_\_\_\_\_
- How long since last rainfall?  raining now  less than 3 days  3 or more days  unknown
- Size of last rain event. <1 inches (Attach data from Anchorage International Airport or Girdwood. Websites provided on back of form.)
- End-of-pipe diameter: 2 feet 0 inches
- Depth of water in end-of-pipe: 0 feet 0.5 inches

## Part 2. Visual Observations

- Photograph Log: Camera # and frame number (s) \_\_\_\_\_
- Water flowing from end-of-pipe?  No  Yes  
*If NO, take and log photograph of outfall, record any pertinent information in comments, and go to next outfall. If YES, continue.*
- Odors:  No  Yes *If yes, describe in comment section.*
- Floatables in water flowing from end-of-pipe:  None  Moving oily sheen  Surface scum  Soapy suds  Debris  Other
- Vegetation: none
- Structural Condition: good
- Biology none

## Part 3. Field Analyses

- Flow: 1 gal/min; OR  
 Low: Not intense, water moving very slowly  Medium: Water moving at a moderate rate  High; Intense water moving very quickly
- Appearance of water flowing from end-of-pipe:  Clear  Cloudy/Muddy
- Color of water flowing from end-of-pipe:  Clear  Colored \_\_\_\_\_
- Water Quality Analyses:

| Quality Control Samples |   |   |
|-------------------------|---|---|
| Parameter               | Equipment Blank<br>[1 each before sampling event] | Duplicate Sample<br>[1 each sampling event] |
| pH                      | N/A   | 6.51 pH units                               |
| Total chlorine          | ppm   | <0.5 ppm                                    |
| Detergents              | ppm   | <0.05 ppm                                   |
| Total copper            | ppm   | <0.05 ppm                                   |
| Total phenols           | ppm   | <0.1 ppm                                    |
| *Turbidity (outfall)    |   | 0.62  |
| *Turbidity (upstream)   | N/A   | N/A   |
| Fecal Coliform          |   | Y   |

| Water Quality Samples |                |
|-----------------------|----------------|
| Parameter             | Primary Sample |
| pH                    | 6.55 pH units  |
| Total chlorine        | <0.5 ppm       |
| Detergents            | <0.05 ppm      |
| Total copper          | <0.05 ppm      |
| Total phenols         | <0.1 ppm       |
| *Turbidity (outfall)  | 0.67           |
| *Turbidity (upstream) | N/A            |
| Fecal Coliform        | Y              |

## Part 4. Comments:

Sample Bottle 2





# DRY WEATHER SCREENING FIELD DATA FORM



Outfall Number: 646-71

## Part 1. General Information

- Date 7/18/14 Time 14:04
- Field Crew CMEYN, I WATKINS Water quality analyses conducted by: \_\_\_\_\_
- How long since last rainfall?  raining now  less than 3 days  3 or more days  unknown
- Size of last rain event. <1 inches (Attach data from Anchorage International Airport or Girdwood. Websites provided on back of form.)
- End-of-pipe diameter: 2 feet 0 inches
- Depth of water in end-of-pipe: 0 feet 2 inches

## Part 2. Visual Observations

- Photograph Log: Camera # and frame number (s) 102-2285
- Water flowing from end-of-pipe?  No  Yes  
*If NO, take and log photograph of outfall, record any pertinent information in comments, and go to next outfall. If YES, continue.*
- Odors:  No  Yes *If yes, describe in comment section.*
- Floatables in water flowing from end-of-pipe:  None  Moving oily sheen  Surface scum  Soapy suds  Debris  Other
- Vegetation: Moss in pipe
- Structural Condition: good
- Biology none

## Part 3. Field Analyses

- Flow: \_\_\_\_\_ gal/min; OR  
 Low: Not intense, water moving very slowly  Medium: Water moving at a moderate rate  High; Intense water moving very quickly
- Appearance of water flowing from end-of-pipe:  Clear  Cloudy/Muddy
- Color of water flowing from end-of-pipe:  Clear  Colored \_\_\_\_\_
- Water Quality Analyses:

| Quality Control Samples |   |   |
|-------------------------|---|---|
| Parameter               | Equipment Blank<br>[1 each before sampling event] | Duplicate Sample<br>[1 each sampling event] |
| pH                      | N/A   | pH units                                    |
| Total chlorine          | <   | ppm   |
| Detergents              |   | ppm   |
| Total copper            |   | ppm   |
| Total phenols           |   | ppm   |
| *Turbidity (outfall)    |   |   |
| *Turbidity (upstream)   | N/A   |   |
| Fecal Coliform          |   |   |

| Water Quality Samples |                |
|-----------------------|----------------|
| Parameter             | Primary Sample |
| pH                    | 7.18 pH units  |
| Total chlorine        | 40.8 ppm       |
| Detergents            | <0.05 ppm      |
| Total copper          | 40.05 ppm      |
| Total phenols         | <0.1 ppm       |
| *Turbidity (outfall)  | 0.73           |
| *Turbidity (upstream) | N/A            |
| Fecal Coliform        | Y              |

## Part 4. Comments:

Sample Bottle  
1



# DRY WEATHER SCREENING FIELD DATA FORM



Outfall Number: ER UN COR

## Part 1. General Information

- Date 7/18/14 Time 14:14
- Field Crew C MEYN, I WATKINS Water quality analyses conducted by: \_\_\_\_\_
- How long since last rainfall?  raining now  less than 3 days  3 or more days  unknown
- Size of last rain event. 1 inches (Attach data from Anchorage International Airport or Girdwood. Websites provided on back of form.)
- End-of-pipe diameter: 1 feet 0 inches
- Depth of water in end-of-pipe: 0 feet 1 inches

## Part 2. Visual Observations

- Photograph Log: Camera # and frame number (s) 102-2204
- Water flowing from end-of-pipe?  No  Yes  
If NO, take and log photograph of outfall, record any pertinent information in comments, and go to next outfall. If YES, continue.
- Odors:  No  Yes If yes, describe in comment section.
- Floatables in water flowing from end-of-pipe:  None  Moving oily sheen  Surface scum  Soapy suds  Debris  Other
- Vegetation: none
- Structural Condition: good
- Biology none

## Part 3. Field Analyses

- Flow: \_\_\_\_\_ gal/min; OR  
 Low: Not intense, water moving very slowly  Medium: Water moving at a moderate rate  High; Intense water moving very quickly
- Appearance of water flowing from end-of-pipe:  Clear  Cloudy/Muddy
- Color of water flowing from end-of-pipe:  Clear  Colored \_\_\_\_\_
- Water Quality Analyses:

| Quality Control Samples |   |   |
|-------------------------|---|---|
| Parameter               | Equipment Blank<br>[1 each before sampling event] | Duplicate Sample<br>[1 each sampling event] |
| pH                      | N/A   | pH units                                    |
| Total chlorine          |   | ppm   |
| Detergents              |   | ppm   |
| Total copper            |   | ppm   |
| Total phenols           |   | ppm   |
| *Turbidity (outfall)    |   |   |
| *Turbidity (upstream)   | N/A   |   |
| Fecal Coliform          |   |   |

| Water Quality Samples |                |
|-----------------------|----------------|
| Parameter             | Primary Sample |
| pH                    | 6.77 pH units  |
| Total chlorine        | 20.5 ppm       |
| Detergents            | 20.05 ppm      |
| Total copper          | 20.05 ppm      |
| Total phenols         | 20.1 ppm       |
| *Turbidity (outfall)  | 0.31           |
| *Turbidity (upstream) | NA             |
| Fecal Coliform        | Y              |

Part 4. Comments:

Sample Bottle  
2



# DRY WEATHER SCREENING FIELD DATA FORM



Outfall Number: 591-1

## Part 1. General Information

- Date 7/21/14 Time 14:00
- Field Crew C MEYER I WATKINS Water quality analyses conducted by: I.W., C.M.
- How long since last rainfall?  raining now  less than 3 days  3 or more days  unknown
- Size of last rain event. < 1 inches (Attach data from Anchorage International Airport or Girdwood. Websites provided on back of form.)
- End-of-pipe diameter: 2 feet 0 inches
- Depth of water in end-of-pipe: 0 feet .5 inches

## Part 2. Visual Observations

- Photograph Log: Camera # and frame number (s) 102-2289
- Water flowing from end-of-pipe?  No  Yes  
If NO, take and log photograph of outfall, record any pertinent information in comments, and go to next outfall. If YES, continue.
- Odors:  No  Yes If yes, describe in comment section.
- Floatables in water flowing from end-of-pipe:  None  Moving oily sheen  Surface scum  Soapy suds  Debris  Other
- Vegetation: drainage way filled in w/ tall grass
- Structural Condition: good
- Biology none

## Part 3. Field Analyses

- Flow: 6 <sup>L</sup>-gal/min; OR
- Low: Not intense, water moving very slowly  Medium: Water moving at a moderate rate  High: Intense water moving very quickly
- Appearance of water flowing from end-of-pipe:  Clear  Cloudy/Muddy
- Color of water flowing from end-of-pipe:  Clear  Colored
- Water Quality Analyses:

| Quality Control Samples |   |   |
|-------------------------|---|---|
| Parameter               | Equipment Blank<br>[1 each before sampling event] | Duplicate Sample<br>[1 each sampling event] |
| pH                      | N/A   | <u>7.20</u> pH units                        |
| Total chlorine          | <u>&lt; 0.5</u> ppm                               | <u>&lt; 0.5</u> ppm                         |
| Detergents              | <u>&lt; 0.05</u> ppm                              | <u>0.55</u> ppm                             |
| Total copper            | <u>&lt; 0.05</u> ppm                              | <u>&lt; 0.05</u> ppm                        |
| Total phenols           | <u>&lt; 0.1</u> ppm                               | <u>&lt; 0.1</u> ppm                         |
| *Turbidity (outfall)    | <u>0.17</u>                                       | <u>1</u>                                    |
| *Turbidity (upstream)   | N/A   | <u>1</u>                                    |
| Fecal Coliform          | <u>—</u>  | <u>4</u>                                    |

| Water Quality Samples |                      |
|-----------------------|----------------------|
| Parameter             | Primary Sample       |
| pH                    | <u>7.19</u> pH units |
| Total chlorine        | <u>&lt; 0.5</u> ppm  |
| Detergents            | <u>0.45</u> ppm      |
| Total copper          | <u>&lt; 0.05</u> ppm |
| Total phenols         | <u>&lt; 0.1</u> ppm  |
| *Turbidity (outfall)  | <u>2.22</u>          |
| *Turbidity (upstream) | <u>N/A</u>           |
| Fecal Coliform        | <u>4</u>             |

## Part 4. Comments:

Sample Bottle  
1



# DRY WEATHER SCREENING FIELD DATA FORM



Outfall Number: 1488-1

## Part 1. General Information

- Date 7/21/14 Time 14:15
- Field Crew C MEYN I WATKINS Water quality analyses conducted by: I.W., G.M.
- How long since last rainfall?  raining now  less than 3 days  3 or more days  unknown
- Size of last rain event. <1 inches (Attach data from Anchorage International Airport or Girdwood. Websites provided on back of form.)
- End-of-pipe diameter: 6 feet 0 inches
- Depth of water in end-of-pipe: 1 feet 0 inches

## Part 2. Visual Observations

- Photograph Log: Camera # and frame number (s) 102-2211
- Water flowing from end-of-pipe?  No  Yes  
If NO, take and log photograph of outfall, record any pertinent information in comments, and go to next outfall. If YES, continue.
- Odors:  No  Yes If yes, describe in comment section.
- Floatables in water flowing from end-of-pipe:  None  Moving oily sheen  Surface scum  Soapy suds  Debris  Other
- Vegetation: none 12. Structural Condition: good
- Biology none

## Part 3. Field Analyses

- Flow: 5 gal/min; OR relative to size of outfall  
 Low: Not intense, water moving very slowly  Medium: Water moving at a moderate rate  High; Intense water moving very quickly
- Appearance of water flowing from end-of-pipe:  Clear  Cloudy/Muddy
- Color of water flowing from end-of-pipe:  Clear  Colored light tan
- Water Quality Analyses:

| Quality Control Samples |   |   |
|-------------------------|---|---|
| Parameter               | Equipment Blank<br>(1 each before sampling event) | Duplicate Sample<br>(1 each sampling event) |
| pH                      | N/A   | pH units                                    |
| Total chlorine          |   | ppm   |
| Detergents              |   | ppm   |
| Total copper            |   | ppm   |
| Total phenols           |   | ppm   |
| *Turbidity (outfall)    |   | <u>21.7</u>                                 |
| *Turbidity (upstream)   | N/A   | <u>N/A</u>                                  |
| Fecal Coliform          |   |   |

| Water Quality Samples |                      |
|-----------------------|----------------------|
| Parameter             | Primary Sample       |
| pH                    | <u>6.88</u> pH units |
| Total chlorine        | <u>&lt;0.5</u> ppm   |
| Detergents            | <u>0.10</u> ppm      |
| Total copper          | <u>&lt;0.05</u> ppm  |
| Total phenols         | <u>&lt;0.1</u> ppm   |
| *Turbidity (outfall)  | <u>21.8</u>          |
| *Turbidity (upstream) | <u>N/A</u>           |
| Fecal Coliform        | <u>Y</u>             |

## Part 4. Comments:

Debris = trash caught in outfall grate

Sample Bottle 2



# DRY WEATHER SCREENING FIELD DATA FORM



Outfall Number: 196-1

## Part 1. General Information

- Date 7/21/14 Time 14:30
- Field Crew C MEYN I WATKINS Water quality analyses conducted by: I.W., C.M.
- How long since last rainfall?  raining now  less than 3 days  3 or more days  unknown
- Size of last rain event. <1 inches (Attach data from Anchorage International Airport or Girdwood. Websites provided on back of form.)
- End-of-pipe diameter: 2 feet 0 inches
- Depth of water in end-of-pipe: 0 feet 1 inches

## Part 2. Visual Observations

- Photograph Log: Camera # and frame number (s) 102-2293
- Water flowing from end-of-pipe?  No  Yes  
If NO, take and log photograph of outfall, record any pertinent information in comments, and go to next outfall. If YES, continue.
- Odors:  No  Yes If yes, describe in comment section.
- Floatables in water flowing from end-of-pipe:  None  Moving oily sheen  Surface scum  Soapy suds  Debris  Other
- Vegetation: some algae
- Structural Condition: good
- Biology none

## Part 3. Field Analyses

- Flow: 710 <sup>L</sup> gal/min; OR  
 Low: Not intense, water moving very slowly  Medium: Water moving at a moderate rate  High: Intense water moving very quickly
- Appearance of water flowing from end-of-pipe:  Clear  Cloudy/Muddy
- Color of water flowing from end-of-pipe:  Clear  Colored \_\_\_\_\_
- Water Quality Analyses:

| Quality Control Samples |   |   |
|-------------------------|---|---|
| Parameter               | Equipment Blank<br>[1 each before sampling event] | Duplicate Sample<br>[1 each sampling event] |
| pH                      | N/A   | pH units                                    |
| Total chlorine          |   | ppm   |
| Detergents              |   | ppm   |
| Total copper            |   | ppm   |
| Total phenols           |   | ppm   |
| *Turbidity (outfall)    |   |   |
| *Turbidity (upstream)   | N/A   |   |
| Fecal Coliform          |   |   |

| Water Quality Samples |                      |
|-----------------------|----------------------|
| Parameter             | Primary Sample       |
| pH                    | <u>7.14</u> pH units |
| Total chlorine        | <u>&lt;0.5</u> ppm   |
| Detergents            | <u>0-15</u> ppm      |
| Total copper          | <u>&lt;0.05</u> ppm  |
| Total phenols         | <u>&lt;0.1</u> ppm   |
| *Turbidity (outfall)  | <u>40.1</u>          |
| *Turbidity (upstream) | <u>N/A</u>           |
| Fecal Coliform        | <u>Y</u>             |

## Part 4. Comments:

outfall channel splits 3 ft down from EOP

Sample Bottle  
3



# DRY WEATHER SCREENING FIELD DATA FORM



Outfall Number: 1056-117

## Part 1. General Information

- Date 7/21/14 Time 14:45
- Field Crew C MEYER I WATKINS Water quality analyses conducted by: I.W., C.M.
- How long since last rainfall?  raining now  less than 3 days  3 or more days  unknown
- Size of last rain event. <1 inches (Attach data from Anchorage International Airport or Girdwood. Websites provided on back of form.)
- End-of-pipe diameter: 2 feet 0 inches
- Depth of water in end-of-pipe: 0 feet 1 inches

## Part 2. Visual Observations

- Photograph Log: Camera # and frame number (s) 102-2295
- Water flowing from end-of-pipe?  No  Yes  
If NO, take and log photograph of outfall, record any pertinent information in comments, and go to next outfall. If YES, continue.
- Odors:  No  Yes If yes, describe in comment section.
- Floatables in water flowing from end-of-pipe:  None  Moving oily sheen  Surface scum  Soapy suds  Debris  Other  
*Some veg debris caught in*
- Vegetation: outfall grass 12. Structural Condition: good
- Biology none

## Part 3. Field Analyses

- Flow: 6 <sup>L</sup> gal/min; OR  
 Low: Not intense, water moving very slowly  Medium: Water moving at a moderate rate  High: Intense water moving very quickly
- Appearance of water flowing from end-of-pipe:  Clear  Cloudy/Muddy
- Color of water flowing from end-of-pipe:  Clear  Colored
- Water Quality Analyses:

| Quality Control Samples |   |   |
|-------------------------|---|---|
| Parameter               | Equipment Blank<br>[1 each before sampling event] | Duplicate Sample<br>[1 each sampling event] |
| pH                      | N/A   | pH units                                    |
| Total chlorine          | ppm   | ppm   |
| Detergents              | ppm   | ppm   |
| Total copper            | ppm   | ppm   |
| Total phenols           | ppm   | ppm   |
| *Turbidity (outfall)    |   |   |
| *Turbidity (upstream)   | N/A   |   |
| Fecal Coliform          |   |   |

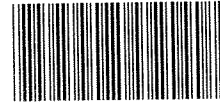
| Water Quality Samples |                      |
|-----------------------|----------------------|
| Parameter             | Primary Sample       |
| pH                    | <u>6.44</u> pH units |
| Total chlorine        | <u>40.5</u> ppm      |
| Detergents            | <u>&lt;0.05</u> ppm  |
| Total copper          | <u>&lt;0.05</u> ppm  |
| Total phenols         | <u>&lt;0.1</u> ppm   |
| *Turbidity (outfall)  | <u>7.14</u>          |
| *Turbidity (upstream) | <u>N/A</u>           |
| Fecal Coliform        | <u>Y</u>             |

## Part 4. Comments:

*Sample Bottle 4*  
 Bypass outlet around sed basin  
 Odor: sulfur  
 Orange iron floc in outfall channel extending into creek

## Appendix D

### Chains of Custody



CLIENT: **HDR** Instructions: Sections 1 - 5 must be filled out.  
Omissions may delay the onset of analysis.

CONTACT: **ISAAC Watkins** PHONE NO: **644-2088**  
PROJECT NAME: **Dry Weather Screening** PROJECT/PWSID/PERMIT#: \_\_\_\_\_  
REPORTS TO: **I. Watkins** E-MAIL: **ISAAC.WATKINS@HDRINC.COM**  
INVOICE TO: **HDR** QUOTE #: **99503** P.O. #: **M43E DWS**  
**2525 C ST STE 305**

Section 3 Preservative

| RESERVED for lab use | SAMPLE IDENTIFICATION | DATE mm/dd/yy | TIME HH:MM | MATRIX/MATRIX CODE | C<br>O<br>N<br>T<br>A<br>I<br>N<br>E<br>R<br>S | Type<br>C = COMP<br>G = GRAB<br>MI = Multi Incremental Soils |                |  |  |  |  |  |  |  |  |  | REMARKS/LOC ID |  |  |  |
|----------------------|-----------------------|---------------|------------|--------------------|--|--|----------------|--|--|--|--|--|--|--|--|--|----------------|--|--|--|
| ① A                  | 491-1                 | 07/16/14      | 1455       | H <sub>2</sub> O   | 1  | G  | Fecal Coliform |  |  |  |  |  |  |  |  |  |                |  |  |  |
| ② A                  | 491-1D                | ↓             | 1455       | "                  | 1  | G  |                |  |  |  |  |  |  |  |  |  |                |  |  |  |
| ③ A                  | 213-1                 |               | 1440       | "                  | 1  | G  |                |  |  |  |  |  |  |  |  |  |                |  |  |  |
| ④ A                  | 436-1                 |               | 1230       | "                  | 1  | G  |                |  |  |  |  |  |  |  |  |  |                |  |  |  |
| ⑤ A                  | 550-2                 |               | 1250       | "                  | 1  | G  |                |  |  |  |  |  |  |  |  |  |                |  |  |  |

Relinquished By: (1) **[Signature]** Date **7-16-14** Time **1632** Received By: \_\_\_\_\_  
Relinquished By: (2) \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_ Received By: \_\_\_\_\_  
Relinquished By: (3) \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_ Received By: \_\_\_\_\_  
Relinquished By: (4) **[Signature]** Date **7/16/14** Time **16:32** Received For Laboratory By: **Leri Drager**

Section 4 DOD Project? Yes No Data Deliverable Requirements: \_\_\_\_\_  
Cooler ID: \_\_\_\_\_  
Requested Turnaround Time and/or Special Instructions: \_\_\_\_\_  
Temp Blank °C: **9.9°C #205** Chain of Custody Seal: (Circle)  
or Ambient [ ] INTACT BROKEN **ABSENT**  
(See attached Sample Receipt Form) (See attached Sample Receipt Form)





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1143189

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**CLIENT:** HDR Inc.

**CONTACT:** ISAAC WATKINS **PHONE NO:** 907-644-2088

**PROJECT NAME:** Dry Weather Screening **PROJECT PWSID/ PERMIT#:**

**REPORTS TO:** HDR Inc 2525 C St. St 307 99503 **E-MAIL:** ISAAC.WATKINS@HDRINC.COM

**INVOICE TO:** same **QUOTE #:** **P.O. #:**

**Instructions: Sections 1 - 5 must be filled out. Omissions may delay the onset of analysis.**

Section 1

Section 3

Section 2

| RESERVED for lab use | SAMPLE IDENTIFICATION | DATE mm/dd/yy | TIME HH:MM | MATRIX/ MATRIX CODE | # | Type | PRESERVATIVE |  |  |  |  |  |  |  |  |  | REMARKS/ LOC ID |  |  |  |  |
|----------------------|-----------------------|---------------|------------|---------------------|---|------|--------------|--|--|--|--|--|--|--|--|--|-----------------|--|--|--|--|
| ① A                  | 37-1                  | 7-17-14       | 1545       | H <sub>2</sub> O    | 1 | G    | X            |  |  |  |  |  |  |  |  |  |                 |  |  |  |  |
| ② A                  | 388-201               | }             | 1515       | }                   | 1 | G    | X            |  |  |  |  |  |  |  |  |  |                 |  |  |  |  |
| ③ A                  | 595-10                |               | 1420       |                     | 1 | G    | X            |  |  |  |  |  |  |  |  |  |                 |  |  |  |  |
| ④ A                  | 595-1                 | ↓             | 1420       | ↓                   | 1 | G    | X            |  |  |  |  |  |  |  |  |  |                 |  |  |  |  |

Section 4

Section 5

Relinquished By: (1) *[Signature]* Date: 7-17-14 Time: 1558 Received By: *[Signature]*

Relinquished By: (2) Date: Time: Received By:

Relinquished By: (3) Date: Time: Received By:

Relinquished By: (4) Date: 7/17/14 Time: 15:59 Received For Laboratory By: *[Signature]*

Section 4 DOD Project? Yes No Data Deliverable Requirements:

Cooler ID: Requested Turnaround Time and/or Special Instructions:

Temp Blank °C: 4.9°C #200 Chain of Custody Seal: (Circle) INTACT BROKEN ABSENT

(See attached Sample Receipt Form) (See attached Sample Receipt Form)



Instructions: Sections 1 - 5 must be filled out.  
Omissions may delay the onset of analysis.

Section 1

CLIENT: HDR Inc

CONTACT: Isaac Watkins PHONE NO: 907-644-2054

PROJECT NAME: PMIE Dry Weather Screening

REPORTS TO: HDR 2525 CST. Ste 305 99507

INVOICE TO: SAmp

E-MAIL: Isaac.Watkins@HDRInc.com

QUOTE #: Dry Weather Screening

P.O. #:

Section 3

| # | CONTAINER | Type<br>C = COMP<br>G = GRAB<br>MI = Multi Incremental<br>Soils | Preservative |  |  |  |  |  |  |  |  |  | REMARKS/<br>LOC ID |  |  |
|---|-----------|---|--------------|--|--|--|--|--|--|--|--|--|--------------------|--|--|
|   |           |   |              |  |  |  |  |  |  |  |  |  |                    |  |  |
| ① | A         | G   | ✓            |  |  |  |  |  |  |  |  |  |                    |  |  |
| ② | A         | G   | ✓            |  |  |  |  |  |  |  |  |  |                    |  |  |
| ③ | A         | G   | ✓            |  |  |  |  |  |  |  |  |  |                    |  |  |
| ④ | A         | G   | ✓            |  |  |  |  |  |  |  |  |  |                    |  |  |
| ⑤ | A         | G   | ✓            |  |  |  |  |  |  |  |  |  |                    |  |  |

Freeze / Cool. Return

Section 2

| RESERVED for lab use | SAMPLE IDENTIFICATION | DATE mm/dd/yy | TIME HH:MM | MATRIX/ MATRIX CODE |   |   |   |  |  |  |  |  |  |  |  |
|----------------------|-----------------------|---------------|------------|---------------------|---|---|---|--|--|--|--|--|--|--|--|
| ①                    | A 646-71              | 07-18-14      | 1404       | H <sub>2</sub> O    | 1 | G | ✓ |  |  |  |  |  |  |  |  |
| ②                    | A ER UN COR           | 07-18-14      | 1414       | H <sub>2</sub> O    | 1 | G | ✓ |  |  |  |  |  |  |  |  |
| ③                    | A 1451-1              | 07-18-14      | 1106       | H <sub>2</sub> O    | 1 | G | ✓ |  |  |  |  |  |  |  |  |
| ④                    | A 1451-10             | ↓             | 1106       | H <sub>2</sub> O    | 1 | G | ✓ |  |  |  |  |  |  |  |  |
| ⑤                    | A 1417-1              | ↓             | 1059       | H <sub>2</sub> O    | 1 | G | ✓ |  |  |  |  |  |  |  |  |

Section 4

Relinquished By: (1) [Signature] Date: 7-18-14 Time: [ ] Received By: [Signature]

Relinquished By: (2) Date: [ ] Time: [ ] Received By: [Signature]

Relinquished By: (3) Date: [ ] Time: [ ] Received By: [Signature]

Relinquished By: (4) Date: 7/18/14 Time: 15:45 Received For Laboratory By: [Signature]

Section 4

DOD Project? Yes No

Data Deliverable Requirements:

Cooler ID: [ ]

Requested Turnaround Time and/or Special Instructions:

Temp Blank °C: [ ] or Ambient [ ]

Chain of Custody Seal: (Circle) INTACT BROKEN ABSENT

(See attached Sample Receipt Form)



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|----------------------|--|----------|---------|-----------------------|--|--------------------|---|---|---------------------------------|------------------------------------|--|--|--------------------|------------|
| CLIENT: HDR Inc      |  |          |         |                       | <b>Instructions: Sections 1 - 5 must be filled out.<br/>Omissions may delay the onset of analysis.</b> |                    |   |   |                                 | Page <u>1</u> of <u>1</u>          |  |  |                    |            |
| Section 1            | CONTACT: Isaac Watkins                         |          |         |                       | PHONE NO: 644-2089   |                    | Section 3   |   | Preservative                    |                                    |  |  |                    |            |
|                      | PROJECT NAME: Dry Weather Screening            |          |         |                       | PROJECT/ PWSID/ PERMIT#:   |                    | #<br><br>C<br>O<br>N<br>T<br>A<br>I<br>N<br>E<br>R<br>S | Type<br>C =<br>COMP<br>G =<br>GRAB<br>MI =<br>Multi<br>Incremental<br>Soils |                                 |                                    |  |  | REMARKS/<br>LOC ID |            |
|                      | REPORTS TO: HDR<br>2525 C St. Ste 305<br>99507 |          |         |                       | E-MAIL: Isaac.Watkins@HDRINC.com   |                    |   |   |                                 |                                    |  |  |                    |            |
|                      | INVOICE TO: Same                               |          |         |                       | QUOTE #: PMIE DWS  |                    |   |   |                                 |                                    |  |  |                    | P.O. #:    |
| RESERVED for lab use |  |          |         | SAMPLE IDENTIFICATION |  | DATE mm/dd/yy      |   |   |                                 |                                    |  |  |                    | TIME HH:MM |
| Section 2            | 1A   | 1056-117 | 6/21/14 | 1445                  | H <sub>2</sub> O   | 1                  | G   | X   |                                 |                                    |  |  |                    |            |
|                      | 2A   | 496-1    | }       | 1430                  | }  | 1                  | }   | X   |                                 |                                    |  |  |                    |            |
|                      | 3A   | 1488-1   | }       | 1415                  | }  | 1                  | }   | X   |                                 |                                    |  |  |                    |            |
|                      | 4A   | 581-1    | }       | 1400                  | }  | 1                  | }   | X   |                                 |                                    |  |  |                    |            |
|                      | 5A   | 581-1D   | ↓       | 1400                  | ↓  | 1                  | ↓   | X   |                                 |                                    |  |  |                    |            |
| Section 5            | Relinquished By: (1)                           |          |         | Date                  | Time   | Received By:       |   |   | Section 4 DOD Project? Yes No   |                                    | Data Deliverable Requirements:                         |  |                    |            |
|                      | <i>[Signature]</i>                             |          |         | 7-21-14               | 1530   | <i>[Signature]</i> |   |   | Cooler ID:                      |                                    | Requested Turnaround Time and/or Special Instructions: |  |                    |            |
|                      | Relinquished By: (2)                           |          |         | Date                  | Time   | Received By:       |   |   | Temp Blank °C: <u>9.0 / 241</u> |                                    | Chain of Custody Seal: (Circle)                        |  |                    |            |
|                      | Relinquished By: (3)                           |          |         | Date                  | Time   | Received By:       |   |   |                                 |                                    | INTACT BROKEN <u>ABSENT</u>                            |  |                    |            |
| Relinquished By: (4) |  |          | Date    | Time                  | Received For Laboratory By:  |                    |   | (See attached Sample Receipt Form)  |                                 | (See attached Sample Receipt Form) |  |  |                    |            |
| <i>[Signature]</i>   |  |          | 7/21/14 | 15:30                 | <i>[Signature]</i>   |                    |   |   |                                 |                                    |  |  |                    |            |

Appendix E  
Data Package



## Laboratory Report of Analysis

To: HDR Alaska, Inc.  
2525 C Street #305  
Anchorage, AK 99503  
(907)644-2000

Report Number: **1143155**

Client Project: **Dry Weather Screening**

Dear Isaac Watkins,

Enclosed are the results of the analytical services performed under the referenced project for the received samples and associated QC as applicable. The samples are certified to meet the requirements of the National Environmental Laboratory Accreditation Conference Standards. Copies of this report and supporting data will be retained in our files for a period of five years in the event they are required for future reference. All results are intended to be used in their entirety and SGS is not responsible for use of less than the complete report. Any samples submitted to our laboratory will be retained for a maximum of fourteen (14) days from the date of this report unless other archiving requirements were included in the quote.

If there are any questions about the report or services performed during this project, please call Justin at (907) 562-2343. We will be happy to answer any questions or concerns which you may have.

Thank you for using SGS North America Inc. for your analytical services. We look forward to working with you again on any additional analytical needs.

Sincerely,  
SGS North America Inc.

---

Justin Nelson  
Project Manager  
Justin.Nelson@sgs.com

Date

Print Date: 07/22/2014 4:35:24PM

SGS North America Inc. | 200 West Potter Drive, Anchorage, AK 99518  
t 907.562.2343 f 907.561.5301 www.us.sgs.com

Member of SGS Group

## Laboratory Qualifiers

Enclosed are the analytical results associated with the above work order. All results are intended to be used in their entirety and SGS is not responsible for use of less than the complete report. If you have any questions regarding this report, or if we can be of any other assistance, please contact your SGS Project Manager at 907-562-2343. All work is provided under SGS general terms and conditions (<[http://www.sgs.com/terms\\_and\\_conditions.htm](http://www.sgs.com/terms_and_conditions.htm)>), unless other written agreements have been accepted by both parties.

SGS maintains a formal Quality Assurance/Quality Control (QA/QC) program. A copy of our Quality Assurance Plan (QAP), which outlines this program, is available at your request. The laboratory certification numbers are AK00971 (DW Chemistry & Microbiology) & UST-005 (CS) for ADEC and 2944.01 for DOD ELAP/ISO17025 (RCRA methods: 1020A, 1311, 3010A, 3050B, 3520C, 3550C, 5030B, 5035B, 6020, 7470A, 7471B, 8021B, 8082A, 8260B, 8270D, 8270D-SIM, 9040B, 9045C, 9056A, 9060A, AK101 and AK102/103). Except as specifically noted, all statements and data in this report are in conformance to the provisions set forth by the SGS QAP and, when applicable, other regulatory authorities.

The following descriptors or qualifiers may be found in your report:

|        |  |
|--------|--|
| *      | The analyte has exceeded allowable regulatory or control limits.                 |
| !      | Surrogate out of control limits.   |
| B      | Indicates the analyte is found in a blank associated with the sample.            |
| CCV    | Continuing Calibration Verification  |
| CL     | Control Limit  |
| D      | The analyte concentration is the result of a dilution.                           |
| DF     | Dilution Factor  |
| DL     | Detection Limit (i.e., maximum method detection limit)                           |
| E      | The analyte result is above the calibrated range.                                |
| F      | Indicates value that is greater than or equal to the DL                          |
| GT     | Greater Than   |
| IB     | Instrument Blank   |
| ICV    | Initial Calibration Verification   |
| J      | The quantitation is an estimation.   |
| JL     | The analyte was positively identified, but the quantitation is a low estimation. |
| LCS(D) | Laboratory Control Spike (Duplicate)   |
| LOD    | Limit of Detection (i.e., 1/2 of the LOQ)  |
| LOQ    | Limit of Quantitation (i.e., reporting or practical quantitation limit)          |
| LT     | Less Than  |
| M      | A matrix effect was present.   |
| MB     | Method Blank   |
| MS(D)  | Matrix Spike (Duplicate)   |
| ND     | Indicates the analyte is not detected.   |
| Q      | QC parameter out of acceptance range.  |
| R      | Rejected   |
| RPD    | Relative Percent Difference  |
| U      | Indicates the analyte was analyzed for but not detected.                         |

Note: Sample summaries which include a result for "Total Solids" have already been adjusted for moisture content. All DRO/RRO analyses are integrated per SOP.

## Results of 491-1

Client Sample ID: **491-1**  
 Client Project ID: **Dry Weather Screening**  
 Lab Sample ID: 1143155001  
 Lab Project ID: 1143155

Collection Date: 07/16/14 14:55  
 Received Date: 07/16/14 16:32  
 Matrix: Water (Surface, Eff., Ground)  
 Solids (%):  
 Location:

## Results by Microbiology Laboratory

| Parameter      | Result | Qual | LOQ/CL | DL   | Units     | DF | Allowable Limits | Date Analyzed  |
|----------------|--------|------|--------|------|-----------|----|------------------|----------------|
| Fecal Coliform | 300    |      | 10.0   | 10.0 | col/100mL | 1  |                  | 07/16/14 18:09 |

## Batch Information

Analytical Batch: BTF13628  
 Analytical Method: SM21 9222D  
 Analyst: MEV  
 Analytical Date/Time: 07/16/14 18:09  
 Container ID: 1143155001-A

Print Date: 07/22/2014 4:35:35PM



Results of **491-1D**

Client Sample ID: **491-1D**  
Client Project ID: **Dry Weather Screening**  
Lab Sample ID: 1143155002  
Lab Project ID: 1143155

Collection Date: 07/16/14 14:55  
Received Date: 07/16/14 16:32  
Matrix: Water (Surface, Eff., Ground)  
Solids (%):  
Location:

Results by **Microbiology Laboratory**

| <u>Parameter</u> | <u>Result</u> | <u>Qual</u> | <u>LOQ/CL</u> | <u>DL</u> | <u>Units</u> | <u>DF</u> | <u>Allowable</u><br><u>Limits</u> | <u>Date Analyzed</u> |
|------------------|---------------|-------------|---------------|-----------|--------------|-----------|-----------------------------------|----------------------|
| Fecal Coliform   | 230           |             | 10.0          | 10.0      | col/100mL    | 1         |                                   | 07/16/14 18:09       |

**Batch Information**

Analytical Batch: BTF13628  
Analytical Method: SM21 9222D  
Analyst: MEV  
Analytical Date/Time: 07/16/14 18:09  
Container ID: 1143155002-A

Print Date: 07/22/2014 4:35:35PM



## Results of 213-1

Client Sample ID: **213-1**  
 Client Project ID: **Dry Weather Screening**  
 Lab Sample ID: 1143155003  
 Lab Project ID: 1143155

Collection Date: 07/16/14 14:40  
 Received Date: 07/16/14 16:32  
 Matrix: Water (Surface, Eff., Ground)  
 Solids (%):  
 Location:

## Results by Microbiology Laboratory

| Parameter      | Result Qual | LOQ/CL | DL   | Units     | DF | Allowable Limits | Date Analyzed  |
|----------------|-------------|--------|------|-----------|----|------------------|----------------|
| Fecal Coliform | 1.64 U      | 1.64   | 1.64 | col/100mL | 1  |                  | 07/16/14 18:09 |

## Batch Information

Analytical Batch: BTF13628  
 Analytical Method: SM21 9222D  
 Analyst: MEV  
 Analytical Date/Time: 07/16/14 18:09  
 Container ID: 1143155003-A

Print Date: 07/22/2014 4:35:35PM

## Results of 436-1

Client Sample ID: **436-1**  
 Client Project ID: **Dry Weather Screening**  
 Lab Sample ID: 1143155004  
 Lab Project ID: 1143155

Collection Date: 07/16/14 12:30  
 Received Date: 07/16/14 16:32  
 Matrix: Water (Surface, Eff., Ground)  
 Solids (%):  
 Location:

## Results by Microbiology Laboratory

| Parameter      | Result Qual | LOQ/CL | DL   | Units     | DF | Allowable Limits | Date Analyzed  |
|----------------|-------------|--------|------|-----------|----|------------------|----------------|
| Fecal Coliform | 1.64 U      | 1.64   | 1.64 | col/100mL | 1  |                  | 07/16/14 18:09 |

## Batch Information

Analytical Batch: BTF13628  
 Analytical Method: SM21 9222D  
 Analyst: MEV  
 Analytical Date/Time: 07/16/14 18:09  
 Container ID: 1143155004-A

Print Date: 07/22/2014 4:35:35PM

## Results of 550-2

Client Sample ID: **550-2**  
 Client Project ID: **Dry Weather Screening**  
 Lab Sample ID: 1143155005  
 Lab Project ID: 1143155

Collection Date: 07/16/14 12:50  
 Received Date: 07/16/14 16:32  
 Matrix: Water (Surface, Eff., Ground)  
 Solids (%):  
 Location:

## Results by Microbiology Laboratory

| Parameter      | Result | Qual | LOQ/CL | DL   | Units     | DF | Allowable Limits | Date Analyzed  |
|----------------|--------|------|--------|------|-----------|----|------------------|----------------|
| Fecal Coliform | 118    |      | 2.00   | 2.00 | col/100mL | 1  |                  | 07/16/14 18:09 |

## Batch Information

Analytical Batch: BTF13628  
 Analytical Method: SM21 9222D  
 Analyst: MEV  
 Analytical Date/Time: 07/16/14 18:09  
 Container ID: 1143155005-A

Print Date: 07/22/2014 4:35:35PM



**Results of 37-1**

Client Sample ID: **37-1**  
Client Project ID: **Dry Weather Screening**  
Lab Sample ID: 1143189001  
Lab Project ID: 1143189

Collection Date: 07/17/14 15:45  
Received Date: 07/17/14 15:59  
Matrix: Water (Surface, Eff., Ground)  
Solids (%):  
Location:

**Results by Microbiology Laboratory**

| <u>Parameter</u> | <u>Result</u> | <u>Qual</u> | <u>LOQ/CL</u> | <u>DL</u> | <u>Units</u> | <u>DF</u> | <u>Allowable</u><br><u>Limits</u> | <u>Date Analyzed</u> |
|------------------|---------------|-------------|---------------|-----------|--------------|-----------|-----------------------------------|----------------------|
| Fecal Coliform   | 16            |             | 1.64          | 1.64      | col/100mL    | 1         |                                   | 07/17/14 17:15       |

**Batch Information**

Analytical Batch: BTF13630  
Analytical Method: SM21 9222D  
Analyst: MEV  
Analytical Date/Time: 07/17/14 17:15  
Container ID: 1143189001-A

Print Date: 07/22/2014 4:55:29PM

## Results of 388-201

Client Sample ID: **388-201**  
 Client Project ID: **Dry Weather Screening**  
 Lab Sample ID: 1143189002  
 Lab Project ID: 1143189

Collection Date: 07/17/14 15:15  
 Received Date: 07/17/14 15:59  
 Matrix: Water (Surface, Eff., Ground)  
 Solids (%):  
 Location:

## Results by Microbiology Laboratory

| Parameter      | Result | Qual | LOQ/CL | DL   | Units     | DF | Allowable Limits | Date Analyzed  |
|----------------|--------|------|--------|------|-----------|----|------------------|----------------|
| Fecal Coliform | 2.0    |      | 2.00   | 2.00 | col/100mL | 1  |                  | 07/17/14 17:15 |

## Batch Information

Analytical Batch: BTF13630  
 Analytical Method: SM21 9222D  
 Analyst: MEV  
 Analytical Date/Time: 07/17/14 17:15  
 Container ID: 1143189002-A

Print Date: 07/22/2014 4:55:29PM



**Results of 595-1D**

Client Sample ID: **595-1D**  
Client Project ID: **Dry Weather Screening**  
Lab Sample ID: 1143189003  
Lab Project ID: 1143189

Collection Date: 07/17/14 14:20  
Received Date: 07/17/14 15:59  
Matrix: Water (Surface, Eff., Ground)  
Solids (%):  
Location:

**Results by Microbiology Laboratory**

| <u>Parameter</u> | <u>Result Qual</u> | <u>LOQ/CL</u> | <u>DL</u> | <u>Units</u> | <u>DF</u> | <u>Allowable Limits</u> | <u>Date Analyzed</u> |
|------------------|--------------------|---------------|-----------|--------------|-----------|-------------------------|----------------------|
| Fecal Coliform   | 1.64 U             | 1.64          | 1.64      | col/100mL    | 1         |                         | 07/17/14 17:15       |

**Batch Information**

Analytical Batch: BTF13630  
Analytical Method: SM21 9222D  
Analyst: MEV  
Analytical Date/Time: 07/17/14 17:15  
Container ID: 1143189003-A

Print Date: 07/22/2014 4:55:29PM

**Results of 595-1**

Client Sample ID: **595-1**  
 Client Project ID: **Dry Weather Screening**  
 Lab Sample ID: 1143189004  
 Lab Project ID: 1143189

Collection Date: 07/17/14 14:20  
 Received Date: 07/17/14 15:59  
 Matrix: Water (Surface, Eff., Ground)  
 Solids (%):  
 Location:

**Results by Microbiology Laboratory**

| <u>Parameter</u> | <u>Result Qual</u> | <u>LOQ/CL</u> | <u>DL</u> | <u>Units</u> | <u>DF</u> | <u>Allowable Limits</u> | <u>Date Analyzed</u> |
|------------------|--------------------|---------------|-----------|--------------|-----------|-------------------------|----------------------|
| Fecal Coliform   | 1.64 U             | 1.64          | 1.64      | col/100mL    | 1         |                         | 07/17/14 17:15       |

**Batch Information**

Analytical Batch: BTF13630  
 Analytical Method: SM21 9222D  
 Analyst: MEV  
 Analytical Date/Time: 07/17/14 17:15  
 Container ID: 1143189004-A

Print Date: 07/22/2014 4:55:29PM

## Results of 646-71

Client Sample ID: **646-71**  
 Client Project ID: **PM&E Dry Weather Screening**  
 Lab Sample ID: 1143208001  
 Lab Project ID: 1143208

Collection Date: 07/18/14 14:04  
 Received Date: 07/18/14 15:45  
 Matrix: Water (Surface, Eff., Ground)  
 Solids (%):  
 Location:

## Results by Microbiology Laboratory

| <u>Parameter</u> | <u>Result Qual</u> | <u>LOQ/CL</u> | <u>DL</u> | <u>Units</u> | <u>DF</u> | <u>Allowable Limits</u> | <u>Date Analyzed</u> |
|------------------|--------------------|---------------|-----------|--------------|-----------|-------------------------|----------------------|
| Fecal Coliform   | 48                 | 2.00          | 2.00      | col/100mL    | 1         |                         | 07/18/14 17:04       |

## Batch Information

Analytical Batch: BTF13633  
 Analytical Method: SM21 9222D  
 Analyst: MEV  
 Analytical Date/Time: 07/18/14 17:04  
 Container ID: 1143208001-A

Print Date: 07/23/2014 8:44:18AM





**Results of ER UN COR**

Client Sample ID: **ER UN COR**  
Client Project ID: **PM&E Dry Weather Screening**  
Lab Sample ID: 1143208002  
Lab Project ID: 1143208

Collection Date: 07/18/14 14:14  
Received Date: 07/18/14 15:45  
Matrix: Water (Surface, Eff., Ground)  
Solids (%):  
Location:

**Results by Microbiology Laboratory**

| <u>Parameter</u> | <u>Result Qual</u> | <u>LOQ/CL</u> | <u>DL</u> | <u>Units</u> | <u>DF</u> | <u>Allowable Limits</u> | <u>Date Analyzed</u> |
|------------------|--------------------|---------------|-----------|--------------|-----------|-------------------------|----------------------|
| Fecal Coliform   | 1.64 U             | 1.64          | 1.64      | col/100mL    | 1         |                         | 07/18/14 17:04       |

**Batch Information**

Analytical Batch: BTF13633  
Analytical Method: SM21 9222D  
Analyst: MEV  
Analytical Date/Time: 07/18/14 17:04  
Container ID: 1143208002-A

Print Date: 07/23/2014 8:44:18AM

## Results of 1451-1

Client Sample ID: **1451-1**  
Client Project ID: **PM&E Dry Weather Screening**  
Lab Sample ID: 1143208003  
Lab Project ID: 1143208

Collection Date: 07/18/14 11:06  
Received Date: 07/18/14 15:45  
Matrix: Water (Surface, Eff., Ground)  
Solids (%):  
Location:

## Results by Microbiology Laboratory

| <u>Parameter</u> | <u>Result Qual</u> | <u>LOQ/CL</u> | <u>DL</u> | <u>Units</u> | <u>DF</u> | <u>Allowable Limits</u> | <u>Date Analyzed</u> |
|------------------|--------------------|---------------|-----------|--------------|-----------|-------------------------|----------------------|
| Fecal Coliform   | 2.0                | 2.00          | 2.00      | col/100mL    | 1         |                         | 07/18/14 17:04       |

## Batch Information

Analytical Batch: BTF13633  
Analytical Method: SM21 9222D  
Analyst: MEV  
Analytical Date/Time: 07/18/14 17:04  
Container ID: 1143208003-A

Print Date: 07/23/2014 8:44:18AM

## Results of 1451-1D

Client Sample ID: **1451-1D**  
 Client Project ID: **PM&E Dry Weather Screening**  
 Lab Sample ID: 1143208004  
 Lab Project ID: 1143208

Collection Date: 07/18/14 11:06  
 Received Date: 07/18/14 15:45  
 Matrix: Water (Surface, Eff., Ground)  
 Solids (%):  
 Location:

## Results by Microbiology Laboratory

| <u>Parameter</u> | <u>Result Qual</u> | <u>LOQ/CL</u> | <u>DL</u> | <u>Units</u> | <u>DF</u> | <u>Allowable Limits</u> | <u>Date Analyzed</u> |
|------------------|--------------------|---------------|-----------|--------------|-----------|-------------------------|----------------------|
| Fecal Coliform   | 1.64 U             | 1.64          | 1.64      | col/100mL    | 1         |                         | 07/18/14 17:04       |

## Batch Information

Analytical Batch: BTF13633  
 Analytical Method: SM21 9222D  
 Analyst: MEV  
 Analytical Date/Time: 07/18/14 17:04  
 Container ID: 1143208004-A

Print Date: 07/23/2014 8:44:18AM



**Results of 1417-1**

Client Sample ID: **1417-1**  
Client Project ID: **PM&E Dry Weather Screening**  
Lab Sample ID: 1143208005  
Lab Project ID: 1143208

Collection Date: 07/18/14 10:59  
Received Date: 07/18/14 15:45  
Matrix: Water (Surface, Eff., Ground)  
Solids (%):  
Location:

**Results by Microbiology Laboratory**

| <u>Parameter</u> | <u>Result Qual</u> | <u>LOQ/CL</u> | <u>DL</u> | <u>Units</u> | <u>DF</u> | <u>Allowable Limits</u> | <u>Date Analyzed</u> |
|------------------|--------------------|---------------|-----------|--------------|-----------|-------------------------|----------------------|
| Fecal Coliform   | 4.0                | 2.00          | 2.00      | col/100mL    | 1         |                         | 07/18/14 17:04       |

**Batch Information**

Analytical Batch: BTF13633  
Analytical Method: SM21 9222D  
Analyst: MEV  
Analytical Date/Time: 07/18/14 17:04  
Container ID: 1143208005-A

Print Date: 07/23/2014 8:44:18AM



**Results of 1056-117**

Client Sample ID: **1056-117**  
Client Project ID: **Dry Weather Screening**  
Lab Sample ID: 1143235001  
Lab Project ID: 1143235

Collection Date: 07/21/14 14:45  
Received Date: 07/21/14 15:32  
Matrix: Water (Surface, Eff., Ground)  
Solids (%):  
Location:

**Results by Microbiology Laboratory**

| <u>Parameter</u> | <u>Result</u> | <u>Qual</u> | <u>LOQ/CL</u> | <u>DL</u> | <u>Units</u> | <u>DF</u> | <u>Allowable</u><br><u>Limits</u> | <u>Date Analyzed</u> |
|------------------|---------------|-------------|---------------|-----------|--------------|-----------|-----------------------------------|----------------------|
| Fecal Coliform   | 12            |             | 1.67          | 1.67      | col/100mL    | 1         |                                   | 07/21/12 16:57       |

**Batch Information**

Analytical Batch: BTF13635  
Analytical Method: SM21 9222D  
Analyst: MEV  
Analytical Date/Time: 07/21/12 16:57  
Container ID: 1143235001-A

Print Date: 07/29/2014 11:24:07AM

## Results of 496-1

Client Sample ID: **496-1**  
 Client Project ID: **Dry Weather Screening**  
 Lab Sample ID: 1143235002  
 Lab Project ID: 1143235

Collection Date: 07/21/14 14:30  
 Received Date: 07/21/14 15:32  
 Matrix: Water (Surface, Eff., Ground)  
 Solids (%):  
 Location:

## Results by Microbiology Laboratory

| Parameter      | Result | Qual | LOQ/CL | DL   | Units     | DF | Allowable Limits | Date Analyzed  |
|----------------|--------|------|--------|------|-----------|----|------------------|----------------|
| Fecal Coliform | 30     |      | 2.00   | 2.00 | col/100mL | 1  |                  | 07/21/12 16:57 |

## Batch Information

Analytical Batch: BTF13635  
 Analytical Method: SM21 9222D  
 Analyst: MEV  
 Analytical Date/Time: 07/21/12 16:57  
 Container ID: 1143235002-A

Print Date: 07/29/2014 11:24:07AM



**Results of 1488-1**

Client Sample ID: **1488-1**  
Client Project ID: **Dry Weather Screening**  
Lab Sample ID: 1143235003  
Lab Project ID: 1143235

Collection Date: 07/21/14 14:15  
Received Date: 07/21/14 15:32  
Matrix: Water (Surface, Eff., Ground)  
Solids (%):  
Location:

**Results by Microbiology Laboratory**

| <u>Parameter</u> | <u>Result</u> | <u>Qual</u> | <u>LOQ/CL</u> | <u>DL</u> | <u>Units</u> | <u>DF</u> | <u>Allowable</u><br><u>Limits</u> | <u>Date Analyzed</u> |
|------------------|---------------|-------------|---------------|-----------|--------------|-----------|-----------------------------------|----------------------|
| Fecal Coliform   | 12            |             | 1.67          | 1.67      | col/100mL    | 1         |                                   | 07/21/12 16:57       |

**Batch Information**

Analytical Batch: BTF13635  
Analytical Method: SM21 9222D  
Analyst: MEV  
Analytical Date/Time: 07/21/12 16:57  
Container ID: 1143235003-A

Print Date: 07/29/2014 11:24:07AM



Results of **581-1**

Client Sample ID: **581-1**  
Client Project ID: **Dry Weather Screening**  
Lab Sample ID: 1143235004  
Lab Project ID: 1143235

Collection Date: 07/21/14 14:00  
Received Date: 07/21/14 15:32  
Matrix: Water (Surface, Eff., Ground)  
Solids (%):  
Location:

Results by **Microbiology Laboratory**

| <u>Parameter</u> | <u>Result</u> | <u>Qual</u> | <u>LOQ/CL</u> | <u>DL</u> | <u>Units</u> | <u>DF</u> | <u>Allowable</u><br><u>Limits</u> | <u>Date Analyzed</u> |
|------------------|---------------|-------------|---------------|-----------|--------------|-----------|-----------------------------------|----------------------|
| Fecal Coliform   | 17            |             | 1.67          | 1.67      | col/100mL    | 1         |                                   | 07/21/12 16:57       |

**Batch Information**

Analytical Batch: BTF13635  
Analytical Method: SM21 9222D  
Analyst: MEV  
Analytical Date/Time: 07/21/12 16:57  
Container ID: 1143235004-A

Print Date: 07/29/2014 11:24:07AM





**Results of 581-1 D**

Client Sample ID: **581-1 D**  
Client Project ID: **Dry Weather Screening**  
Lab Sample ID: 1143235005  
Lab Project ID: 1143235

Collection Date: 07/21/14 14:00  
Received Date: 07/21/14 15:32  
Matrix: Water (Surface, Eff., Ground)  
Solids (%):  
Location:

**Results by Microbiology Laboratory**

| <u>Parameter</u> | <u>Result</u> | <u>Qual</u> | <u>LOQ/CL</u> | <u>DL</u> | <u>Units</u> | <u>DF</u> | <u>Allowable</u><br><u>Limits</u> | <u>Date Analyzed</u> |
|------------------|---------------|-------------|---------------|-----------|--------------|-----------|-----------------------------------|----------------------|
| Fecal Coliform   | 31            |             | 1.64          | 1.64      | col/100mL    | 1         |                                   | 07/21/12 16:57       |

**Batch Information**

Analytical Batch: BTF13635  
Analytical Method: SM21 9222D  
Analyst: MEV  
Analytical Date/Time: 07/21/12 16:57  
Container ID: 1143235005-A

Print Date: 07/29/2014 11:24:07AM

Appendix F  
Outfall Sampling Site Photographs



Ship Creek **436-1**: North bank of Ship Creek, east of C St bridge.



Ship Creek **550-2**: South bank of Ship Creek just east of the Bridge Restaurant.



Ship Creek **213-1**: North of Allied building.



Ship Creek **491-1**: On Ship Creek trail near Alaska Flo-Wall Distributors.



Fish Creek **595-1**: Between W 34<sup>th</sup> Avenue and Kona Lane.



Fish Creek **388-201**: Corner of Northwood Drive and Haru Lane.



Fish Creek **37-1**: Chugach Way near Spenard Road.



Eagle River **541-1**: East of Mountain Point Circle. Outfall was dry at time of sampling.



Eagle River **1417-1**: South of Eagle Place addresses 19920 and 19862 Driftwood Bay Drive.



Eagle River **1451-1**: Near west corner of Riverside Drive.



Eagle River **646-71**: South bank; Chain of Rock Street and Teklanika Drive.



Eagle River **1375-99**: North bank; Chain of Rock Street and Teklanika Drive





Campbell Creek **581-1**: Near bike path at Arctic Blvd



Campbell Creek **1488-1**: Behind Las Margaritas property on Dimond Blvd and C St.



Campbell Creek **496-1**: Adjacent to Nadine Street.



Campbell Creek **1056-117**: Southwest corner of Carriage Drive.

## Damaged, Clogged or Submerged Outfalls



Ship Creek **119-1**: Jacked up and rusted out.



Ship Creek **189-1**: Submerged outfall



Fish Creek **1310-201**: New construction and new outfalls



Fish Creek **584-1**: Before clearing



Fish Creek **584-1**: After clearing debris



Fish Creek **1277-59**: Clogged with sediment



Fish Creek **686-1**: Completely submerged



Fish Creek **391-1**: End of pipe damaged and submerged



Fish Creek **480-1**: Outfall potentially moved during construction without HGDB update



Campbell Creek **642-1**: Almost completely submerged



Campbell Creek **551-1**: Completely submerged



Campbell Creek **447-64**: Broken and bent. Note Creek to right, outfall flowing, but is inaccessible