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Potash Brook Phase II Documentation and QA/QC Notes
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Introduction:

The following is a documentation of the key geomorphic processes and adjustments occurring in the Potash Brook watershed at the reach scale. The intent of this documentation is twofold: 1) concisely summarize Potash Brook watershed zones and geomorphic processes; 2) highlight for those using the data the key steps containing important or extraordinary information. When used in conjunction with the Phase I and II data in the DMS, and the SGA Watershed Maps, this documentation also provides explanation for questions that may arise concerning discrepancies in the data. At the end of each reach summary is a discussion of potential projects that could protect, sustain, or restore fluvial geomorphic equilibrium conditions, through the implementation of either passive or active stream corridor management strategies. Following the discussion text is Appendix 1, which summarizes QA/QC notes and other relevant information for the Phase I and II databases. Reach summary statistics and maps are found respectively in Appendices 2 and 3.

Potash Brook Summary:

Like many of the urban-impacted streams assessed in Chittenden County in summer 2005, the Potash Brook watershed is greatly affected by both beaver activity in the low-gradient reaches and urban runoff in the higher-gradient reaches. These two stressors can have a confounding effect on the determination of predominant fluvial processes in many reaches in the watershed. However, in the high-gradient reaches the effect of urban runoff and floodplain encroachment is clearly observed. Care has been taken to document the difference between these two stressors when they can be clearly teased apart in the lower-gradient reaches. In addition to these current day stressors, historic impacts from floodplain encroachment around the urban centers makes assessment of the current stage of channel evolution difficult in some reaches of the watershed. Specific zones of the watershed and the dominant fluvial processes observed within each are discussed below.

Lower Watershed Zone (M01 through M06)

The lower zone of the Potash Brook watershed from the mouth at Shelburne Bay up through the western section the East Woods Natural Area is characterized by higher-gradient channels with coarse substrate. This zone includes reaches M01 through M06. Unlike many other small watersheds in Chittenden County which exhibit more of an oscillating pattern between high-gradient and low-gradient channels (with beaver ponding), this zone of Potash brook, with one small area of exception, represents a significant distance of continuous channel with above-average transport capacity (approximately 2.1 linear miles). The one exception to this trend is an area in reach M02-A below the Hannaford's store where the channel slope lessens and a small area of beaver activity is present. It is important to note the linear connectivity of these lower reaches for two reasons: 1) their higher channel slope allows greater transport of sediment through the channel network directly to Lake Champlain; and, 2) extensive urban impacts on the channel are concentrated in this zone of the watershed, thus compounding the problem of sediment transport capacity and alterations to the channel bed and form. Some of the reaches in this zone of the watershed have floodplain encroachments which may preclude significant channel restoration (M03/4 and M05), whereas some of the reaches still maintain some degree of floodplain connectivity (M01 & M02-B). Further discussion of channel and floodplain alterations specific to individual reaches in this zone of the watershed can be found in the "STD" and "project" sections towards the end of this document.

Middle Watershed Zone (M07 & M08)

From the East Woods Natural Area up to Dorset St., the riparian corridor of Potash Brook is largely well protected in forested conditions. This section of the watershed contains two low-gradient reaches (M07 & M08-A) with above-average floodplain connectivity and RGA scores higher than the average score for the watershed. However, beaver activity in these low-gradient reaches resulted in lower scores for habitat conditions (RHA). From Spear St. up to the Dorset St. crossing, the channel is a much higher-gradient transport reach (M08-B) and is impacted by two old stream crossings which are causing significant aggradation and planform changes above and below these structures. Further discussion of channel and floodplain alterations specific to individual reaches in this zone of the watershed can be found in the "STD" and "project" sections towards the end of this document.

Upper Watershed Zone (M09 through M15)

From Dorset St. up to Kennedy Dr., the channel is dominated by very low-gradient reaches with extensive beaver-activity. The presence of beaver ponding throughout this zone of the watershed makes assessment of urban impacts on the channel especially difficult, and the ponding appears to provide some mitigation of urban impacts by means of attenuation of sediment and peak streamflows. Some historic alterations to the channel, such as straightening (in M09), may be more significant than the current day stressors of surrounding urban land use. Further discussion of channel and floodplain alterations specific to individual reaches in this zone of the watershed can be found in the "STD" and "project" sections towards the end of this document.

Above Kennedy Dr. the main stem of Potash Brook continues the trend of low-gradient, sand-bottomed channels up to the headwaters with one notable exception. Just above Kennedy Dr. there is short reach which is largely culverted through an area of extensive floodplain encroachment by adjacent commercial land. This reach (M13) has undergone significant alteration to channel and floodplain geometry and has been considered a departure from its reference stream type (see discussion in "STD" section). Above this highly altered reach, the channel maintains a very low gradient slope and winds through an area with extensive beaver activity below Community Drive. Above I-89, the headwaters channel becomes an ill-defined drainage through shallow-sloped wetlands and therefore was not assessed completely for geomorphic and habitat conditions.

Stream Type Departures (STD):

Stream Type Departure (STD) for **Rosgen Type** have been noted for the following reaches:

M03/4 – This reach has been highly modified and is now a G type channel due to a change in valley width from berming - reference was likely C riffle-pool. The entrenchment ratio (1.2) indicates degree of encroachment on floodplain due to berming. The incision ratio reported for this reach is somewhat inaccurate because there is no natural "low bank" where deposition is occurring. Dominant process degradation due to berming and increase in transport capacity. However, some aggradation was noted around channel constrictions, and fine sediment appears to fill the bed between larger substrate. Median particle size is currently cobble due to armoring present, but substrate sampled in downstream reaches suggests that median particle size was likely gravel before modification. Although an RGA score of "poor" usually suggests major adjustment, this reach has been characterized as Stage V of channel evolution, and is largely stable due to the armoring present.

M13 – Like M03/4, this reach has been extremely modified and an STD has been noted from C-type to G-type due to berming along the reach and the resulting entrenchment ratio (and high incision ratio). A significant portion of the reach is armored, which is also causing degradation and bedform changes due to increase in transport capacity. Plane bedform dominates reach, while reference was likely riffle-pool.

Stream Type Departure (STD) have been noted for the following reaches for **bedform only**:

M02-B – This segment is experiencing major increases in transport capacity due to upslope urban runoff and channelization of the reach just upstream. The segment is dominated by plane-bed runs, yet sections of riffle-pool bedform still remains intact. Stream type departure has been noted for dominant bedform change. Moderately-high levels of incision and bank erosion is occurring throughout upper sections of reach where concentrated flows from M03/4 and Queen City Rd. culvert carry high stream power and erosive energy. Some historic armoring in middle section of reach (at Hannaford's pond outlet) has also increased transport capacity of stream.

M05 – This short reach from Farrell St. down to the culvert under I-89 has been straightened alongside the correctional facility and bermed below the Farrell St.culvert. Armoring appears to be holding much of bank stable within the reach, although there was much scour noted at top of reach at the culvert outfall. Significant entrenchment and incision noted in channel geometry measurements will likely maintain transport regime (with degraded bed features) in perpetuity. Bed features altered as a result of straightening and increased transport capacity (both historic and current) have been noted as bedform departure from riffle-pool to plane bed.

M06 – The channel throughout this reach appears to have been historically straightened - possibly due to historic logging activity in East Woods Natural Area. Straightening, and increased streamflows from stormwater has caused riffle-pool system to be largely replaced by plane bed system. Many bars and changes in planform suggest this reach is going through adjustments from historic/current degradation and some current aggradation. In addition, there is one old stream crossing (possibly part of an old dam) in the mid-upper section of reach before the channel bends back to the south near I-89. Although the 2005 survey (done by Danica Lefevre and Lauren Moore) did not specifically note any structures, the details of this sketch indicate there to be a significant amount of adjustment (bar features and braiding) occurring in this same area. Additional reconnaissance work (perhaps in summer 2006) should be done to assess the effect this crossing is having on channel adjustments.

M08-B – Like in M06, there are old stream crossings (2) within this segment which are significantly affecting the planform and bedform of the channel. Likely channel bedform was riffle-pool, and historic and current impacts have resulted in a plane bed system. Significant channel aggradation above these structures, and degradation below has been noted in the database. Further discussion of the removal of these floodplain structures for habitat enhancement can be found below in the project identification section.

M09 – This reach has been historically altered due to the straightening which likely occurred when land was first settled for farming. Reference bedform has been noted as dune-ripple due to the low gradient valley slope, and has since been altered to a plane bedform due to the straightening and removal of sinuosity.

Project Identification:

<u>Corridor Protection:</u>

The East Woods Natural Area provides excellent stream corridor protection to reaches M06 & M07. Other reaches outside of the natural area represent zones where historic and current encroachment threatens the floodplain and channel integrity. A discussion is included below for corridor protection by reach based on the Phase I and II data. Note that this discussion is a purely geomorphically-minded approach without any real context in zoning or other town/municipally-based constraints (beyond the scope of this summary).

For reaches **M01 & M02**, historic and current encroachment in upstream reach M03/4 has increased stream power and is resulting in incision in the upper section of these reaches. This incision begins just below the Queen City Park Rd. culvert where the channel is constricted by both the culvert itself and the berming associated with the road, and continues down to the railroad crossing at the segment break between M02-A and M02-B. Due to the connectivity of these reaches to the outlet at the lake and the increased sediment transport capacity associated with incision (average of 1.5 across both reaches), protection of these reaches against further floodplain encroachment by development is critical, as some floodplain connectivity still exists and may be providing some sediment storage capacity.

The corridor protected by the East Woods Natural area extends only so far as M07 and does not include reach **M08.** The corridor surrounding reach M08 may be considered part of an undevelopable area in between the east and westbound lanes of 1-89. In this case, making a case for protection of this corridor area may not be necessary. However, due to the adjustment processes observed in both segments of M08, and the fact that there is relatively even terrain in the vicinity of this reach (particularly in the upstream segment B) that could support additional urban development, this area is worth considering in the overall protection of the Potash Brook corridor. Additional commentary with respect to active restoration in segment M08-B is found below.

In the middle, low-gradient zone of the watershed which contains reaches **M09, M10, and M11/12**, there are significant natural barriers to encroachment on the floodplain (large adjacent beaver meadows which flood frequently) which will likely deter additional urban development. Nevertheless, reach **M09** is a reach which, out of the three mentioned above, would be more likely to have additional corridor encroachments. This is due to the fact that the channel was historically straightened and has maintained its straight planform due to the dominant degradation and incision processes in the reach. Although significant wetlands still remain intact in the historic floodplain of this reach, it is possible this straightening has reduced the amount of adjacent wetland and could open the door for further fill and encroachment in the floodplain.

Significant encroachment alongside the corridor of segment **M15-A** has occurred with the commercial buildings to the east. A total of 7 stormwater inputs were noted during the Phase II survey of this segment. This reach has a low-gradient response channel with good floodplain connectivity, but is currently experiencing incision as a result of the stormwater impacts. Land development in the even terrain adjacent to the corridor, if done without proper BMP selection, could lead the further incision and the conversion of this reach from a sediment attenuation reach to a transport reach.

<u>Disequilibrium Remediation:</u>

As discussed in the summary at the beginning of this document, reaches in the lower zone of the watershed which have experienced a combination of floodplain encroachment, berming, and urban runoff are significant transporters of sediment (fine and coarse) to the lower reaches and to the lake. This is especially true with reaches **M03/4** and **M05.** Although the berming associated with reach M03/4 may preclude any restoration of reference channel form for improving sediment regime and habitat conditions, **M05** might represent some opportunity in this regard. This short reach is located between Farrell St. and 1-89, and has been historically straightened and armored along much of its length. Although the reach channel evolution has been assessed at stage V (has developed a confined floodplain at a lower elevation), there is still significant degradation happening in the upper section of the reach just below the Farrell St. culvert. Debris jams and aggradation were noted above this culvert (12 ft. CMP), and significant scour was noted below, suggesting the culvert is undersized. This causes the upper section of the reach to be incising with deposition of sands and fine gravel occurring just above the 1-89 culvert in the lower part of the reach. Further detailed assessment of the appropriate sizing of this culvert in the context of improving sediment storage capacity and physical habitat conditions in this small reach may be worthwhile.

In segment **M08-B** above Spear St. there are two old stream crossings where bridge abutments are still present on both sides of the channel, constricting both the channel bankfull flow width and, of course the floodplain. Behind both of these structures, aggradation is occurring and leading to significant widening of the channel. This is especially true in the lowermost crossing found downstream of the bend in the channel that corresponds to the bend in 1-89. A review of the detailed sketch from the Phase II work indicates that these structures may be causing significant adjustments far upstream and downstream of where they're located. Overall bedform departure has been noted for this segment, and clearly these structures are having an effect on the bedform and thus physical habitat conditions for a significant portion of this segment. Management of this segment towards equilibrium conditions for increased sediment storage capacity and habitat should consider the removal of these structures. Further detailed (Phase III) study would be necessary to determine the practicality and feasibility of this active restoration strategy.

Significant encroachment on reach **M13** has led to a stream type departure as noted previously. In addition to the encroachment, extensive stormwater inputs from impervious surfaces in this subcatchment have caused incision and have increased the transport capacity of this reach. Like in the case of M03/4, the current floodplain encroachment by surrounding commercial land may preclude the restoration of channel form for this short reach. Nevertheless, the evolution of this channel through more severe stages of incision will likely result in the export of a large amount of sediment from a very short reach (1300 ft). Therefore, management options in the subcatchment draining to this reach should include mitigation of the hydrologic regime (as will be addressed in TMDL approach for peak streamflows) as a priority, with active restoration of the channel form being left as a possibility for the future if the reach constitutes a significant fluvial erosion hazard. Further field work will be conducted in summer 2006 (by Evan Fitzgerald) to re-assess the channel evolution stage of this reach in the context of the potential for restoration or rehabilitation.

APPENDIX 1

Phase II Notes and Updates to Phase I Data:
General updates are reviewed below for each DMS Phase II step to which noteworthy revisions were made, after the initial QA from DEC staff. Common parameter themes across reaches are summarized with **reach names in bold text**. References to Phase I data are summarized and discussed in red text.

- *Step 1 - Valley and Floodplain Corridor:*
  - Adjacent Terrace or Hillside (1.4)
    - Phase II side-slopes have been reviewed but have **NOT** been updated in the Phase I database. Therefore, database user should refer to Phase II for correct valley side-slope data.
  - Valley Features (1.5)
    - Where better estimated or measured values were taken for valley width in Phase II surveys, Phase I data has been updated. Otherwise, Phase I valley width has been used and entered in Phase II database.
    - All human caused changes in valley width reflect significantly altered valleys due to berming, adjacent roadways, etc. Structures that are in the floodplain that might significantly alter the floodplain hydraulics are also considered as human caused changes. Reaches with human-caused changes to valley width include: **M03/4, M05, M08-B, & M12/13**
  - Grade Controls (1.6)
    - Phase II grade controls have been reviewed but have **NOT** been updated in the Phase I database. Therefore, database user should refer to Phase II for correct grade control data.
    - Despite the abundance of beaver dams in many reaches and their ability to control stream grade on a short-term basis, these features have been removed as grade controls in the database.
- *Step 2 - Stream Channel:*
  - Stream Channel (2.1 – 2.9)
    - Efforts were made to get a minimum of 2 cross-sections per reach, especially for the longer reaches. Sometimes representative cross-sections selected for DMS data entry disagrees with stream type or adjustment type, or suggests a higher/lower degradation adjustment than that observed.
      1. Reaches with more than one cross-section that have average incision ratios **lower** than the one reported incision ratio include: **M02-B, M06, & M14**
      2. Reaches with more than one cross-section that have average incision ratios **higher** than the one reported incision ratio include: **M11**
  - Riffle Data (2.10 – 2.11)
    - Riffle data has not been collected for "dune-ripple" bedforms. All observed riffle/pool spacings have been included for "riffle-pool" and "step-pool" bedforms.
  - Substrate Data (2.12 – 2.13)
    - Percent Detritus has been estimated and tends to be higher on lower gradient reaches (E-types). Note that this data is more qualitative than quantitative.
    - For "Dune-Ripple" bedforms, average largest particles on both the bed and bar are sand, which often appear as "0" values in the DMS.
  - Stream Type (2.14)
    - In heterogeneous reaches, dominant bedform has been selected even though reach may contain multiple bedforms throughout (e.g., B3 step-pool may also

have significant portions of plane bedform). Those reaches with altered bedform from reference conditions are listed below:

1. Plane bed reaches that were likely riffle-pool include: **M02-B, M03/4**, **M05, M08-B & M13**
2. Plane bed reaches that were likely dune-ripple include: **M09**

- Determination of stream type may be based on data from more than one cross-section measurement. Please refer to all cross section data to confirm chosen stream type.
- Reference condition stream types have been updated in the Phase I database where a type different from Phase I estimate was observed in the field. This included many reaches that were thought to be C riffle-pool streams during Phase I assessment but were observed as E dune-ripple during Phase II assessments.

- *Step 3 - Riparian Banks, Buffers, and Corridors:*
  - Stream Banks (3.1)
    - Bank textures observations during Phase II assessments focused more on material type more than cohesiveness. Therefore, "cohesive" versus "non-cohesive" values have been updated during the QA process and have been made accurate.
    - Observed bank erosion values in many cases represent best possible estimations of length for each bank. For reaches with higher percentages in particular, estimated values are likely more qualitative than quantitative.
    - Phase II bank erosion data have **NOT** been updated in the Phase I database. Therefore, database user should refer to Phase II for correct data.
  - Stream Buffer (3.2)
    - Phase II buffer width and vegetation data have been reviewed but have **NOT** been updated in the Phase I database. Therefore, database user should refer to Phase II for correct data.
  - Stream Corridor (3.3)
    - Phase II corridor land use data have been reviewed but have **NOT** been updated in the Phase I database. Therefore, database user should refer to Phase II for correct data.
- *Step 4 – Flow and Flow Modifiers:*
  - Springs, Seeps, & Tributaries (4.1)
    - In addition to seeps and springs, tributaries of any size were considered to provide water storage capacity at the reach scale during the Phase II assessments. GIS mapping using orthophotography and VHD layers were also used to determine the abundance of tributaries for each reach.
  - Adjacent Wetlands/GW Inputs; Impoundments/Flow Regs; Constrictions (4.2, 4.5, 4.7, 4.8)
    - Phase II inputs for above-described data have been reviewed but have **NOT** been updated in the Phase I database. Therefore, database user should refer to Phase II for correct data.
  - Flow Regulating Impoundments (4.5 & 4.7)
    - There are no flow regulating impoundments on the main stem of Potash Brook.
  - Stormwater Inputs (4.6)
    - Stormwater inputs include those outfalls discharging directly to the channel, as well as those ditches and other features conveying concentrated runoff directly to channel. Man-made drainage mapping was used in field during Phase II assessments to locate potential stormwater inputs not found directly on the channel.

        - User of data should also consult with Pioneer's mapping and documentation of stormwater inputs directly to the channel for confirmation of this dataset.
    - Beaver Dams (4.9)
        - Active beaver dams causing significant ponding and were documented. The length of the channel affected by the ponding was measured using mapping in the field and/or GIS.
- *Step 5 – Channel Bed and Planform Changes:*
    - Bar Types (5.1)
        - Phase II bar type and abundance data have been reviewed but have **NOT** been updated in the Phase I database. Therefore, database user should refer to Phase II for correct data.
    - Planform Changes (5.2 – 5.3)
        - Alterations to the hydrologic and sediment regimes in the Potash Bk. watershed are caused primarily by: 1) urban runoff, and 2) beaver modifications to channel and floodplain. It is often difficult to tease apart the relative impacts of each of these factors during Phase II assessments when both are present in a reach or segment. Noteworthy planform changes relative to each impact are listed below:
            1. Reaches where significant alterations to planform can be associated with **beaver activity** include the following reaches: **M02-A, M08-A, M10, M11/12**
            2. Reaches where significant alterations to planform are resulting from **urban runoff** and/or **floodplain encroachment** include the following reaches: **M01, M02-A, M02-B, M05, M06,**
& M08-B
            3. Reaches where extreme alterations to planform have clearly resulted from **urban runoff** and/or **floodplain encroachment** include: **M03/4 & M13**
    - Channel Alterations (5.5)
        - Phase II channel alteration data have been reviewed but have **NOT** been updated in the Phase I database. Therefore, database user should refer to Phase II for correct data. Channel alterations are described in further detail in the commentary section at the end of step 5.
- *Step 6 – RHA:*
    - Bank Stability (6.8)
        - Bank stability measurements reflect estimated bank erosion values entered in step 3.1. In some cases RHA scores for bank stability may appear slightly higher or lower than the expected ranges/values entered in step 3.1. Best judgment was used in these cases when evaluating bank stability from a habitat perspective.
    - Overall Rating (6.11)
        - Confidence in integrity of overall RHA scores is high for Potash Brook.
        - Overall habitat assessment in E-type channels is difficult due to general lack of quality habitat associated with these sand-bottomed reaches. Another confounding variable which makes assessment of habitat in low-gradient E-type channels difficult is the influence of beaver activity. Reaches with lower RHA scores due to beaver influence included: **M02-A, M08-A, M10, M11/12, & M14**
- *Step 7 – RGA:*
    - Channel Degradation (7.1)
        - Degradation is the predominant adjustment process occurring in many reaches in Potash Brook. This can be explained by the alterations to the hydrologic

regime that result in higher stream power. Incision values and entrenchment ratios were reviewed for ALL reach cross-section measurements in order to determine scores in 7.1 (row 2) and 7.3 (row 3). Certain reaches may appear to have RGA scores for these rows which do not agree with reported DMS cross section geometry, in which case database user should refer to additional cross-sections.

- Channel Widening (7.3)
  - As the channel evolution stage that follows incision, channel widening is also an adjustment process occurring in some of the impacted high-gradient (B & C type channels) reaches in Potash Brook. In the future, channel widths will be compared with hydraulic geometry curves developed for Chittenden County in order to make adjustments to scores in 7.3 (row 1). For this parameter, width to depth ratio is not always adequate at capturing the degree of widening. Also, certain reaches may appear to have RGA scores for these rows which do not agree with reported DMS cross section geometry, in which case the database user should refer to additional cross sections.
- Overall Rating (7.6)
  - Confidence in integrity of overall RGA scores is high for Potash Brook.
  - As discussed above in the RHA section, overall geomorphic stability is often difficult to assess in low-gradient, E-type channels affected by beaver activity. Historic beaver activity in many cases has led to aggradation of fine sediments behind the historic dam in many low gradient reaches. These reaches, when observed in current-day conditions in the absence of ponding, often appear to be actively incising back down through this aggraded material. Reaches where this phenomenon has been observed include: **M02-A, M08-A, M10, M12, & M14**

APPENDIX 2

REACH SUMMARY STATISTICS

Potash Brook Stream Summary Table
Evan P. Fitzgerald
04/11/06

Reach	Segment	Stream Type	Dominant Bed Material	Bedform	STD*	Reference Stream Type†	Reference Bed Material†	Reference Bedform†	RHA Score	RHA Condition	RGA Score	RGA Condition	Reach Sensitivity
M01		C	Gravel	Riffle-Pool	No				0.64	Fair	0.59	Fair	Very High
M02	A	C	Gravel	Riffle-Pool	No				0.53	Fair	0.40	Fair	Very High
M02	B	C	Gravel	Plane Bed	Yes	C	Gravel	Riffle-Pool	0.54	Fair	0.45	Fair	Very High
M03/04		G	Cobble	Plane Bed	Yes	C	Gravel	Riffle-Pool	0.33	Poor	0.34	Poor	High
M05		C	Cobble	Plane Bed	Yes	C	Gravel	Riffle-Pool	0.39	Fair	0.48	Fair	High
M06		C	Cobble	Plane Bed	Yes	C	Cobble	Riffle-Pool	0.45	Fair	0.38	Fair	Very High
M07		E	Sand	Dune-Ripple	No				0.66	Good	0.59	Fair	Very High
M08	A	E	Sand	Dune-Ripple	No				0.53	Fair	0.40	Fair	Very High
M08	B	C	Cobble	Plane Bed	Yes	C	Cobble	Riffle-Pool	0.50	Fair	0.45	Fair	High
M09		E	Sand	Plane Bed	Yes	E	Sand	Dune-Ripple	0.35	Poor	0.41	Fair	Very High
M10		E	Gravel	Dune-Ripple	No				0.77	Good	0.61	Fair	Very High
M11/12		E	Sand	Dune-Ripple	No				0.69	Good	0.54	Fair	High
M13		G	Gravel	Plane Bed	Yes	C	Gravel	Riffle-Pool	0.34	Poor	0.40	Fair	Very High
M14		E	Sand	Dune-Ripple	No				0.50	Fair	0.53	Fair	Very High
M15	A	E	Sand	Dune-Ripple	No				0.66	Good	0.51	Fair	Very High
M15	B	E	Sand	Dune-Ripple	No				NE	NE	NE	NE	NE

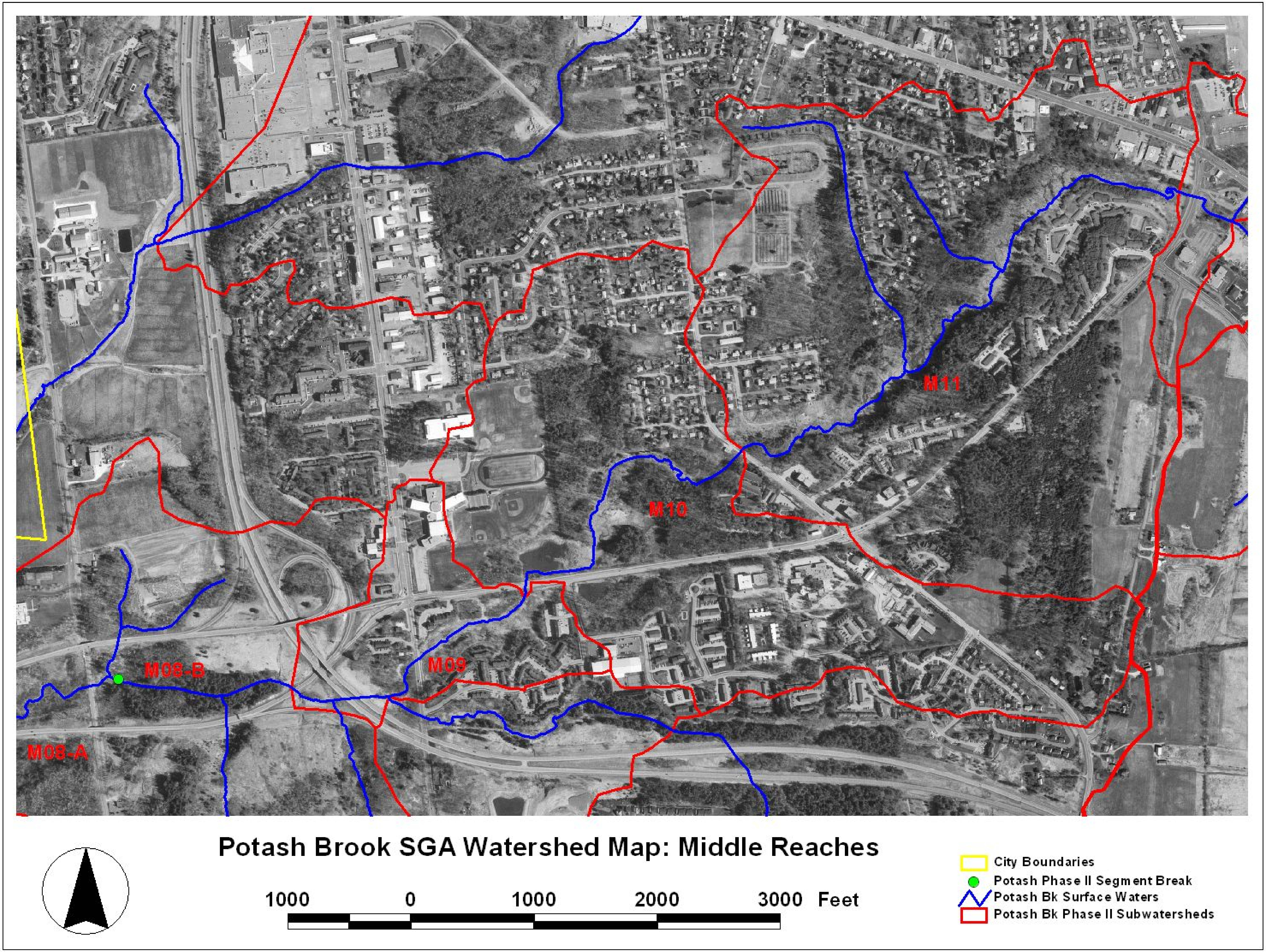
	RHA Score	RGA Score
Mean:	0.52	0.47
Max:	0.77	0.61
Min:	0.33	0.34

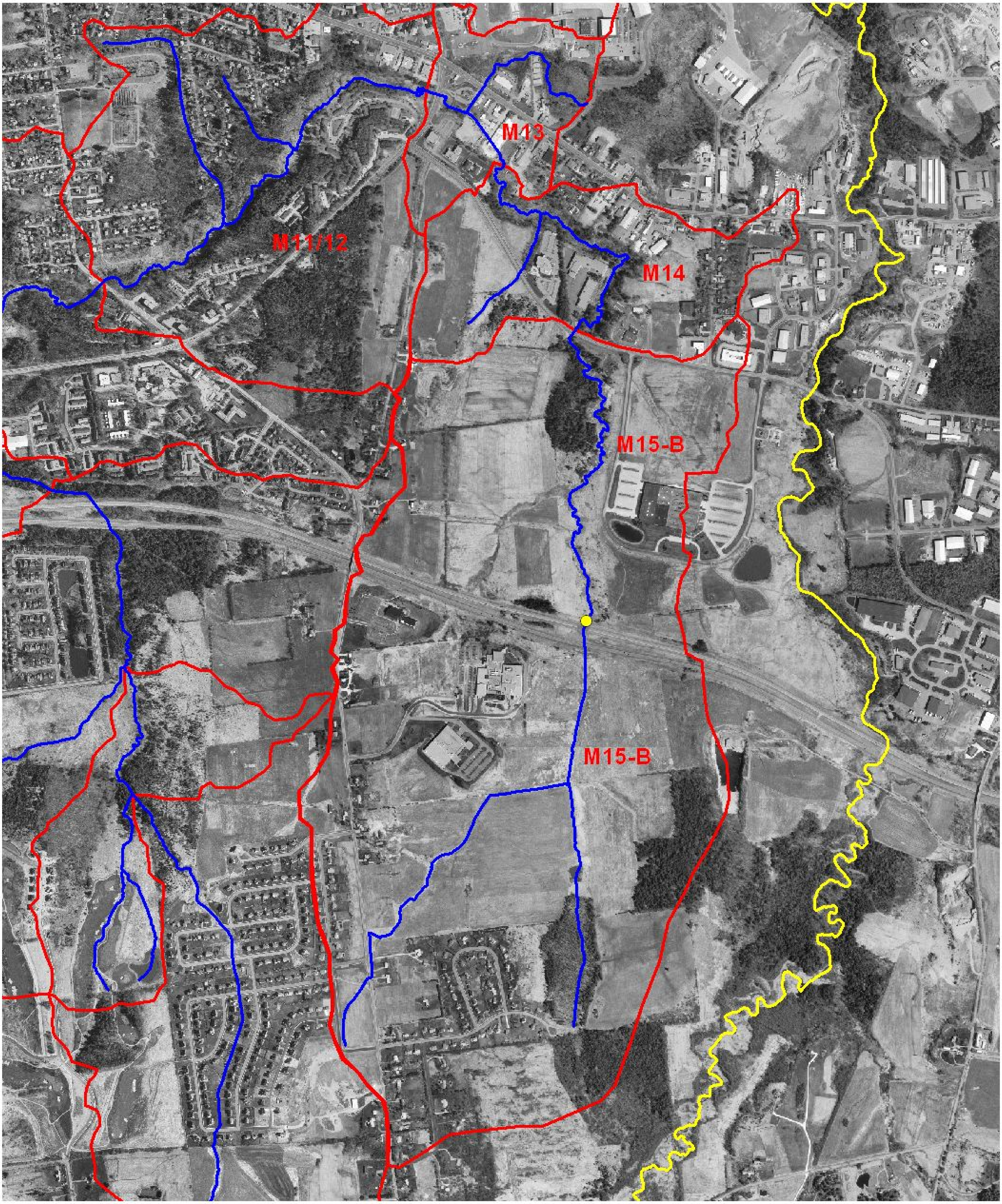
* STD = Stream Type Departure
† = Assessed Reference Condition Prior to Stream Type Departure
NE = Not Evaluated

APPENDIX 3

SUBWATERSHED MAPPING

Potash Brook SGA Watershed Map: Lower Reaches


M11
M10
M09
M08-B
M08-A
Potash Brook SGA Watershed Map: Middle Reaches
1000
0
1000
2000
3000 Feet
City Boundaries
Potash Phase II Segment Break
Potash Bk Surface Waters
Potash Bk Phase II Subwatersheds



Potash Bk SGA Watershed Map: Upper Reaches

2000 0 2000 Feet

City Boundaries
Potash Phase II Segment Break
Potash Bk Surface Waters
Potash Bk Phase II Subwatersheds