PHASE ONE MAPS -12 MILE COULEE, COACH, CONFEDERATION, FOREST LAWN, RADIO TOWER, AND PINE CREEKS

RIPARIAN AREAS MAPPING PROJECT FOR THE CITY OF CALGARY

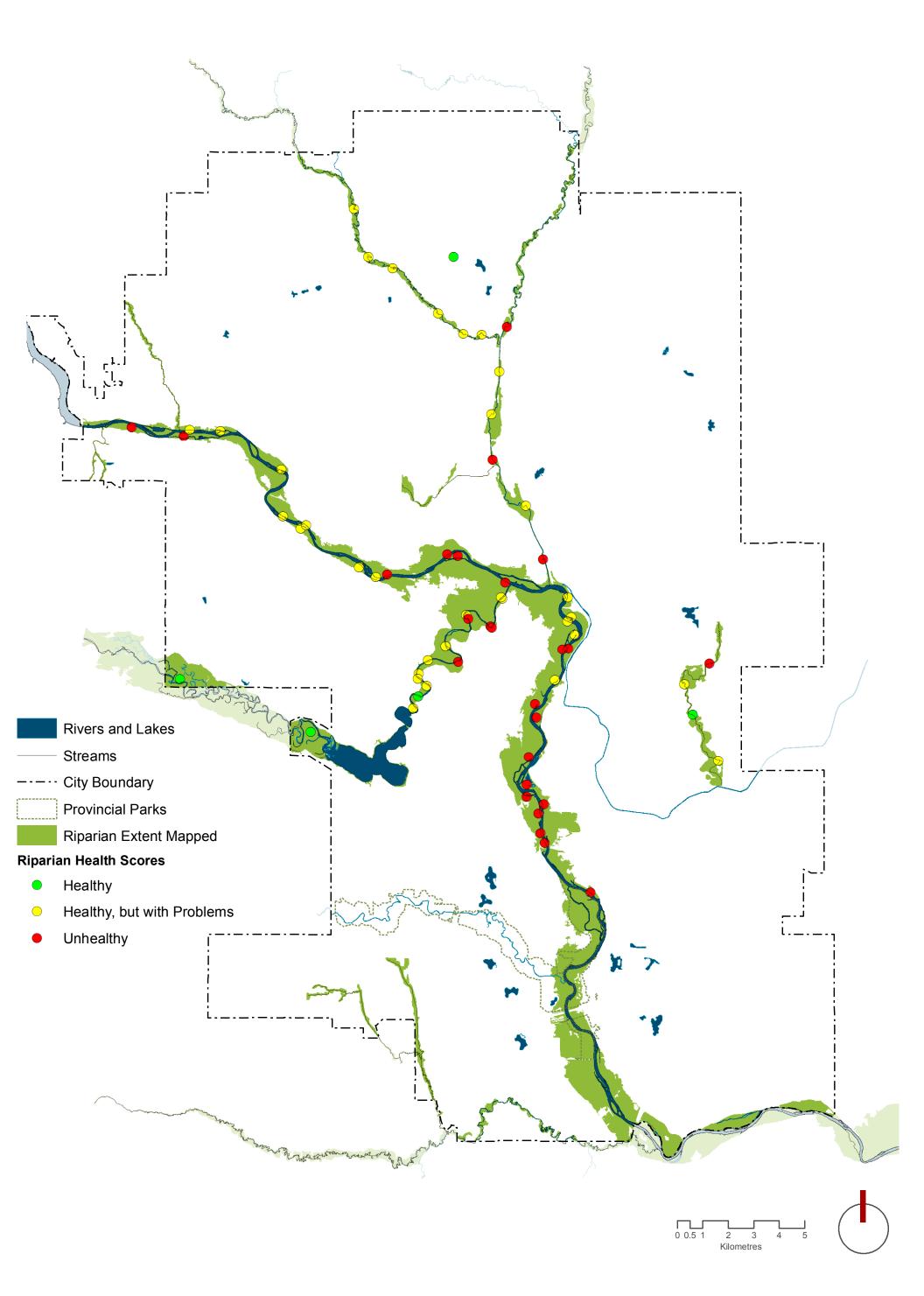
Prepared by: O2 Planning + Design Inc. with The Alberta Riparian Habitat Management Society (Cows and Fish)

Submitted to: The City of Calgary Water Resources

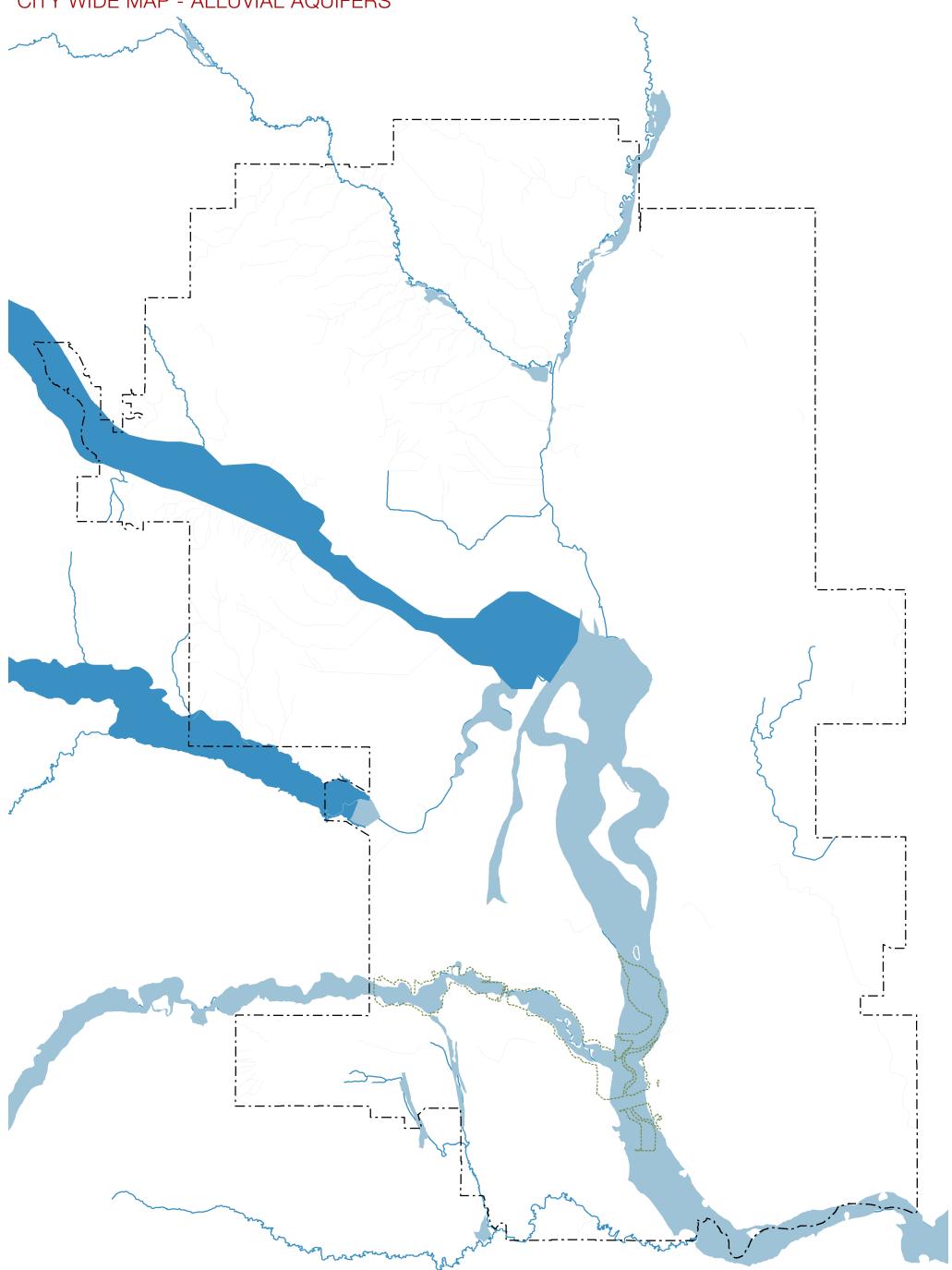
October 19 | 2012



CITY WIDE MAP - RIPARIAN LOCATION AND FUNCTION



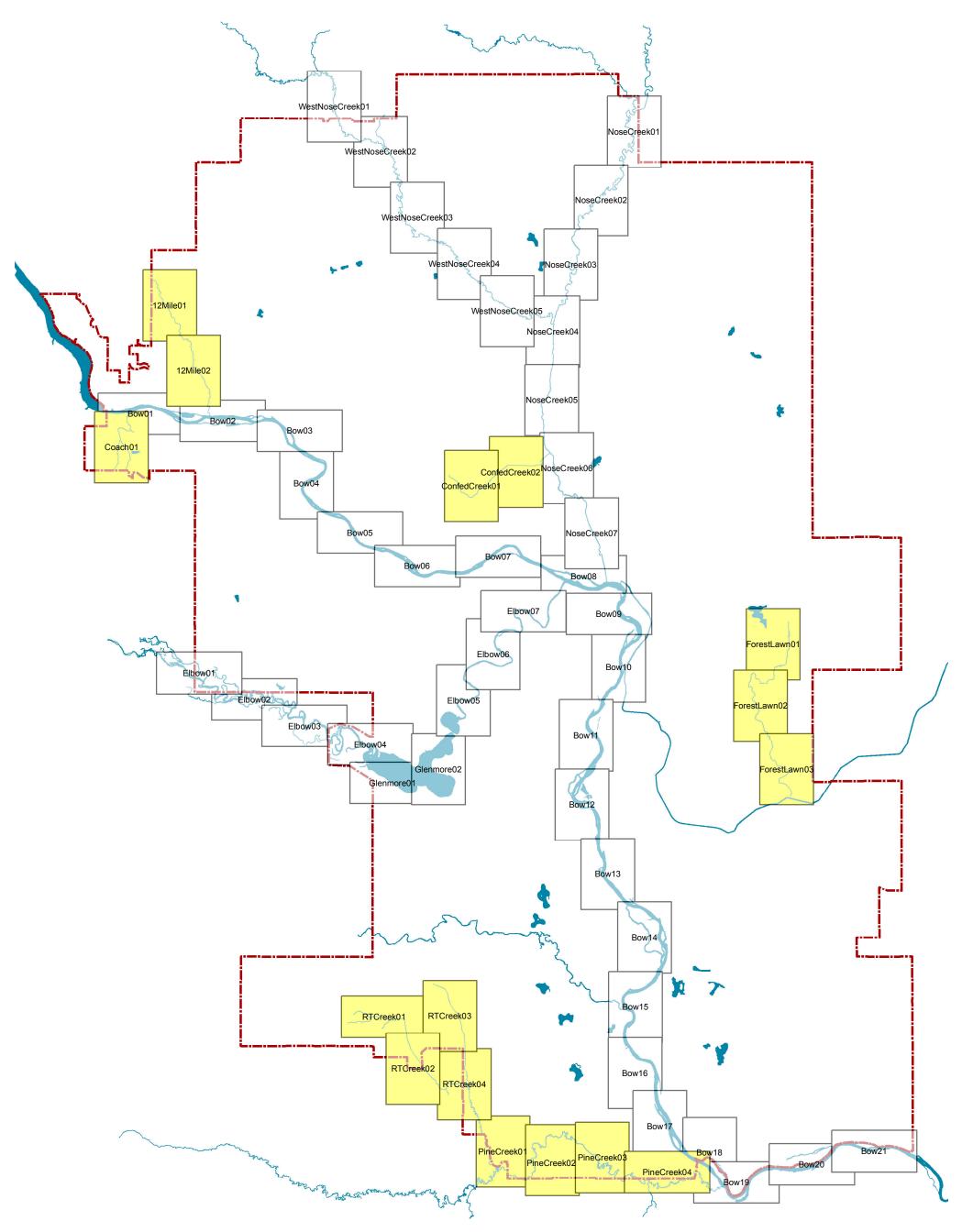
CITY WIDE MAP - ALLUVIAL AQUIFERS



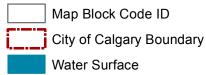
- _ City Boundary
- Fish Creek Provincial Park
- Mapped Alluvial Aquifer (ARC 2009)
- Potential Large Alluvial Aquifers in Coarse Sediments (Moran 1986)
- ____Streams / Rivers
- Lower Order Streams



CITY WIDE MAP - MAP BLOCK CODE



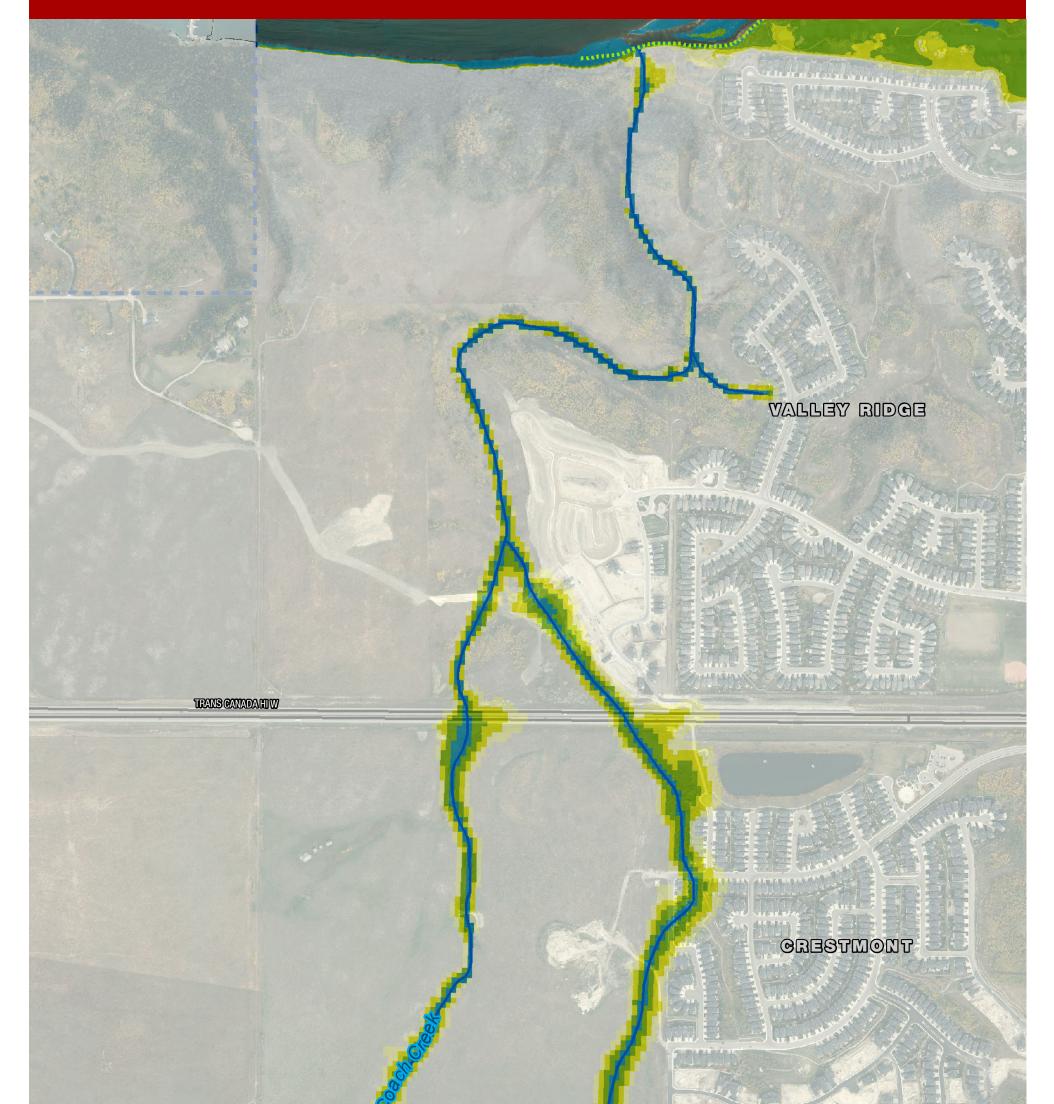
Legend





RIPARIAN AREA - LOCATION AND FUNCTION COACH CREEK 01

RIPARIAN AREAS MAP PROJECT





Riparian Zone*

- Inner Riparian Zone Middle Riparian Zone Outer Riparian Zone
 - Potential Outermost Riparian Zone

*Variable Width Riparian Model Outputs

 Riparian Health**

 Healthy

 Healthy, but with Problems

 Unhealthy

**Based on field studies of

sampled riparian polygons only

Bank Health*** Good

Moderate

***Based on field studies of major rivers / creeks, excluding private residential riverfront lots or steep valley slopes with limited riparian habitat

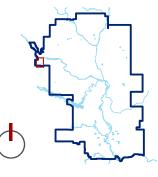




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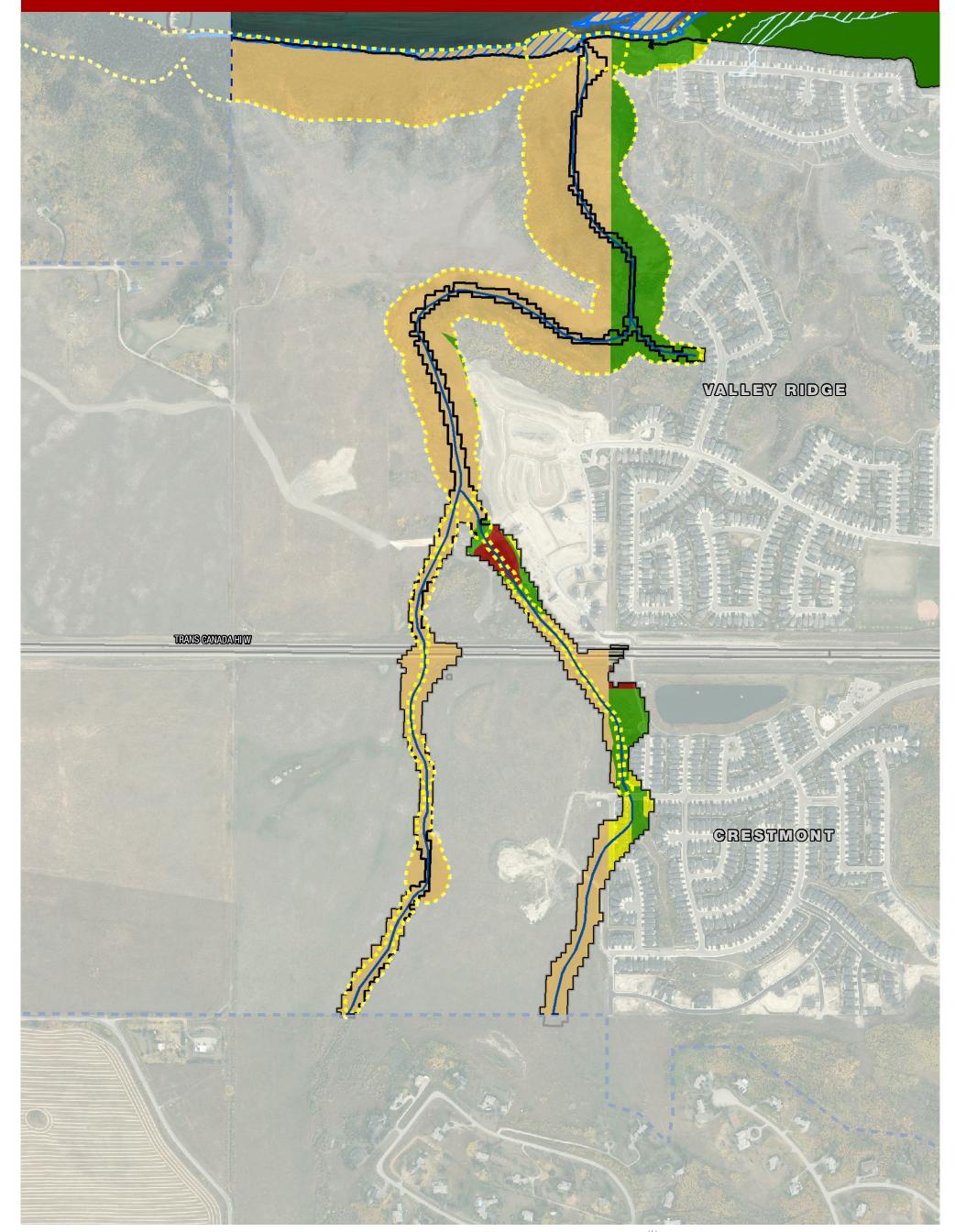
300

400



200 Metres

LAND AND REGULATORY ISSUES COACH CREEK 01



Land Use Type Commercial

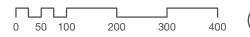
- Future Urban Development
- Industrial
- Institutional
- Major Infrastructure
- Mixed Use
- Residential
- Parks, Recreation and Public Education

- Golf Course
- City of Calgary ER Setback Policy* Nose Creek Watershed Partnership Setback** Floodway
 - Flood Fringe
 - Flood Extent 100 Year (Nose Creek/West Nose Creek)
 - Outer Riparian Zone Boundary
 - Streams
 - Major Roads
- HH Rail
- *Note that ER setbacks for lower order streams are not mapped as they were out of the project scope
 - **Recommended setback boundary of Nose Creek Watershed Partnership including floodplain, meander belt width and adjacent escarpments >15%

City Boundary

Fish Creek Provincial Park

CALGARY 2444





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EXISTING INFRASTRUCTURE AND POSSIBLE IMPROVEMENTS COACH CREEK 01





- Storm Outflow Location
- Stormwater Lift Station
- Storm Main (>900mm diameter)
- Sanitary Main (>600mm diameter)
- Water Main (>400mm diameter)
- Siphon
- Pipeline River Crossing Locations
- Water / Waste Water Treament Plants
- Existing Storm Retrofit Pond
- Possible Location of Storm Retrofit Pond
- Existing Storm Pond
- Existing Bank Infrastructure (e.g., Rip Rap, Retaining Walls, Weirs)
- Bank Erosion Hotspot

- Candidate Flood / Erosion Control Projects
- Paved Trails
- Gravel Trails
- ------ Bridge
- Buildings Parks (Maintained Turf Areas)
- City Boundary
 Major Roads
 HH Rail

- Streams
- Fish Creek Provincial Park

The non-masked area is based on the greater of:

(i) outer riparian zone of the variable width model,
(ii) City ER setback policy boundary,
(iii) Nose Creek Watershed Partnership recommended setback policy

(See Theme 2-Land and Regulatory Issues)



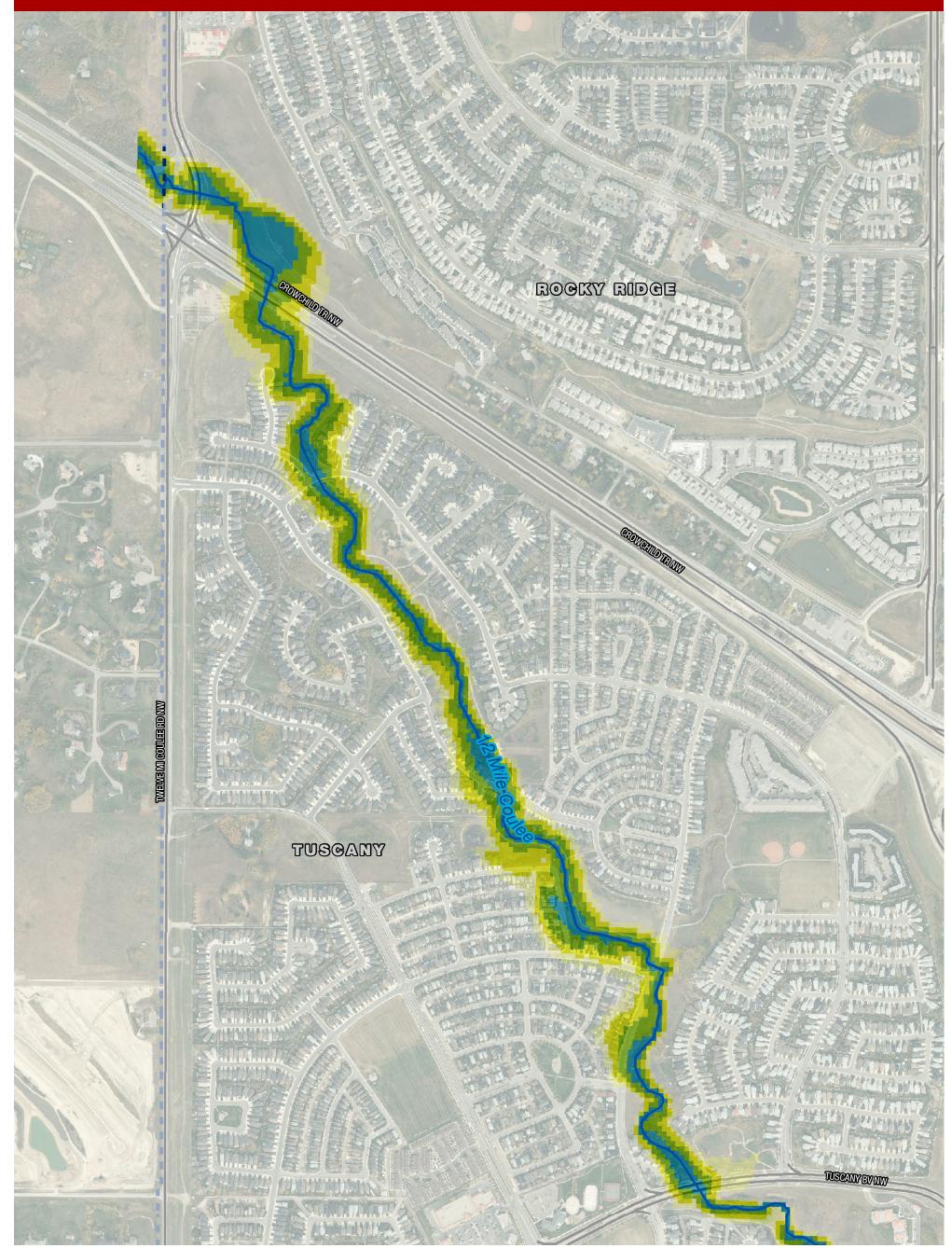
300

400



200 Metres

RIPARIAN AREA - LOCATION AND FUNCTION 12 MILE COULEE 01



Riparian Zone*

- Inner Riparian Zone Middle Riparian Zone Outer Riparian Zone
 - Potential Outermost Riparian Zone

*Variable Width Riparian Model Outputs

Riparian Health**
Healthy
Healthy, but with Problems

**Based on field studies of

sampled riparian polygons only

- Unhealthy
- Moderate

Good

Bank Health***

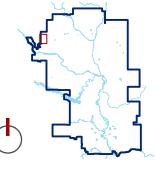
- ***Based on field studies of major rivers / creeks, excluding private residential riverfront lots or steep valley slopes with limited riparian habitat
- City Boundary
 Major Roads
 Rail
 Streams
 Fish Creek Provincial Park



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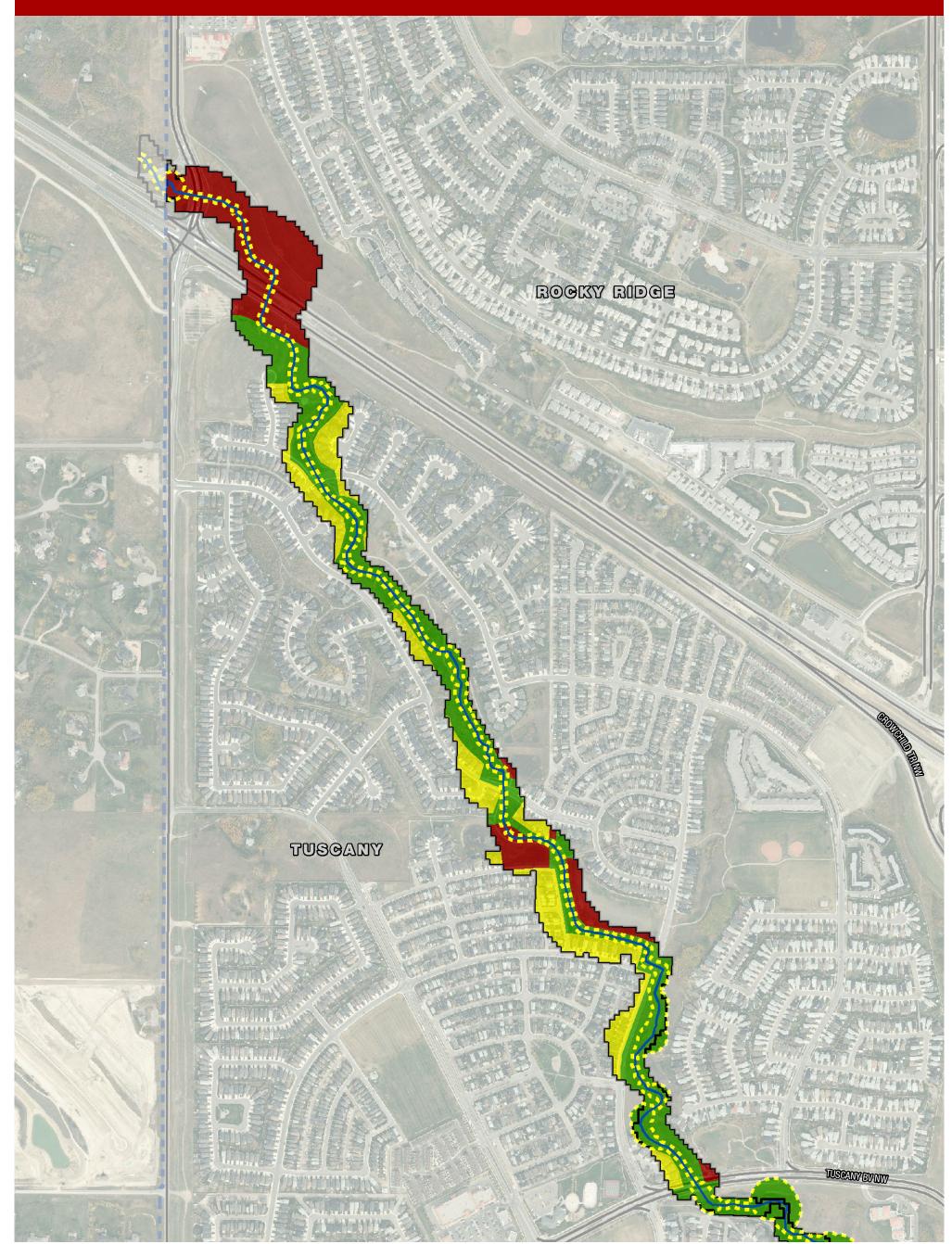
300

400



200 Metres

LAND AND REGULATORY ISSUES 12 MILE COULEE 01



Land Use Type

- Commercial Future Urban Development Industrial Institutional Major Infrastructure Mixed Use Residential
 - Parks, Recreation and Public Education
 - Golf Course
- City of Calgary ER Setback Policy* <mark>, . . .</mark> Nose Creek Watershed Partnership Setback**

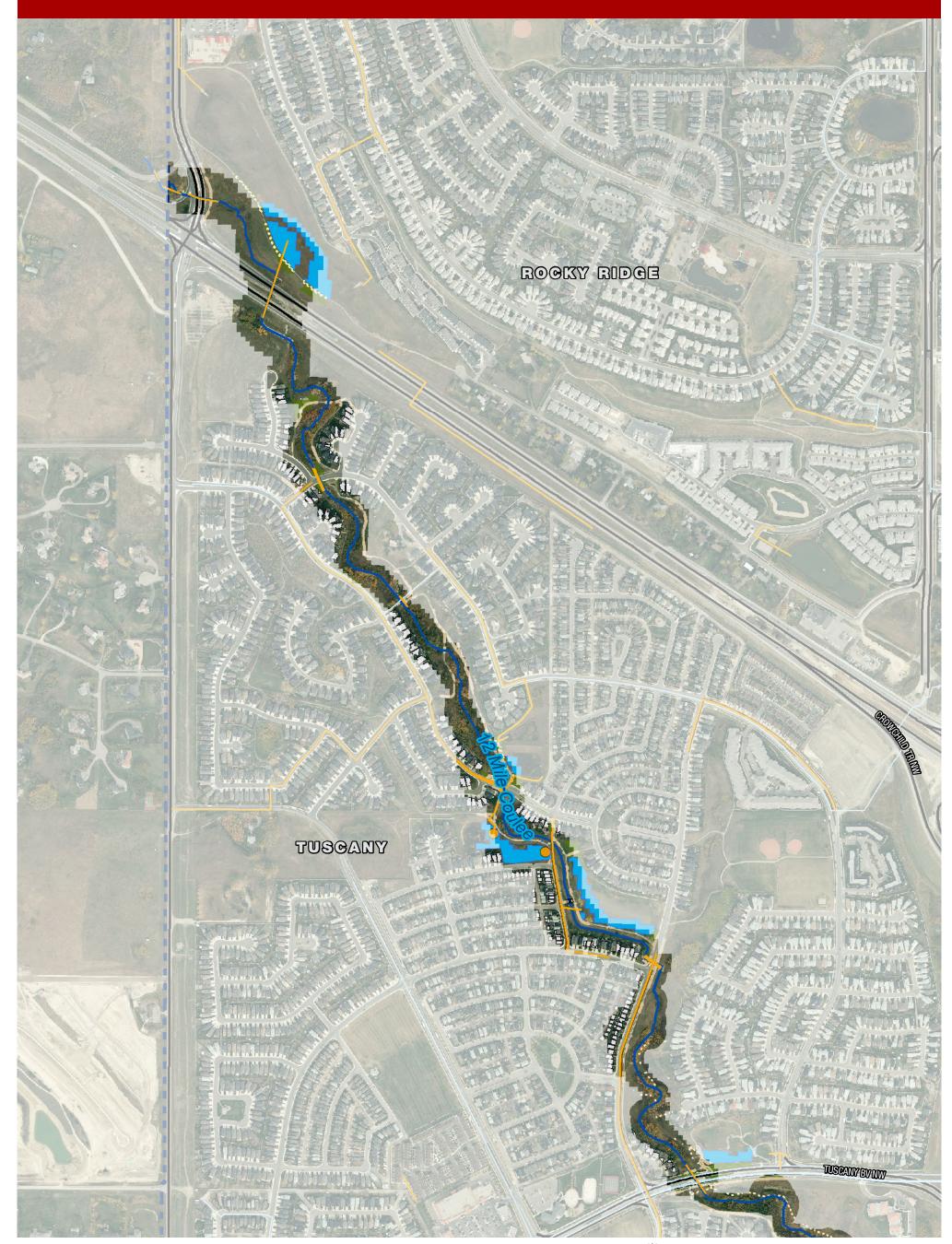
 - Flood Fringe
- Flood Extent 100 Year (Nose Creek/West Nose Creek)
- Outer Riparian Zone Boundary
 - Streams
- Major Roads
- HH Rail
- *Note that ER setbacks for lower order streams are not mapped as they were out of the project scope
 - **Recommended setback boundary of Nose Creek Watershed Partnership including floodplain, meander belt width and adjacent escarpments >15%

City Boundary

Fish Creek Provincial Park

CALGARY 119 0 50 100 200 300 400

EXISTING INFRASTRUCTURE AND POSSIBLE IMPROVEMENTS 12 MILE COULEE 01



- Storm Outflow Location
- Stormwater Lift Station
- Storm Main (>900mm diameter)
- Sanitary Main (>600mm diameter)
- Water Main (>400mm diameter)
- Siphon
- Pipeline River Crossing Locations
- Water / Waste Water Treament Plants
- Existing Storm Retrofit Pond
- Possible Location of Storm Retrofit Pond
- Existing Storm Pond
- Existing Bank Infrastructure (e.g., Rip Rap, Retaining Walls, Weirs)
- Bank Erosion Hotspot

- Candidate Flood / Erosion Control Projects
- Paved Trails
- Gravel Trails
- Bridge Buildings
- Parks (Maintained Turf Areas)
- City Boundary
 Major Roads
 HH Rail

- Streams
- Fish Creek Provincial Park

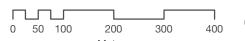
The non-masked area is based on the greater of:

(i) outer riparian zone of the variable width model,
(ii) City ER setback policy boundary,
(iii) Nose Creek Watershed Partnership recommended setback policy

(See Theme 2-Land and Regulatory Issues)











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RIPARIAN AREA - LOCATION AND FUNCTION 12 MILE COULEE 02



Riparian Zone*

- Inner Riparian Zone Middle Riparian Zone
 - Outer Riparian Zone
 - Potential Outermost Riparian Zone

*Variable Width Riparian Model Outputs

Riparian Health**

**Based on field studies of

sampled riparian polygons only

Healthy, but with Problems

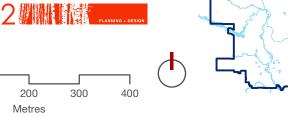
Bank Health*** Good Moderate

Poor

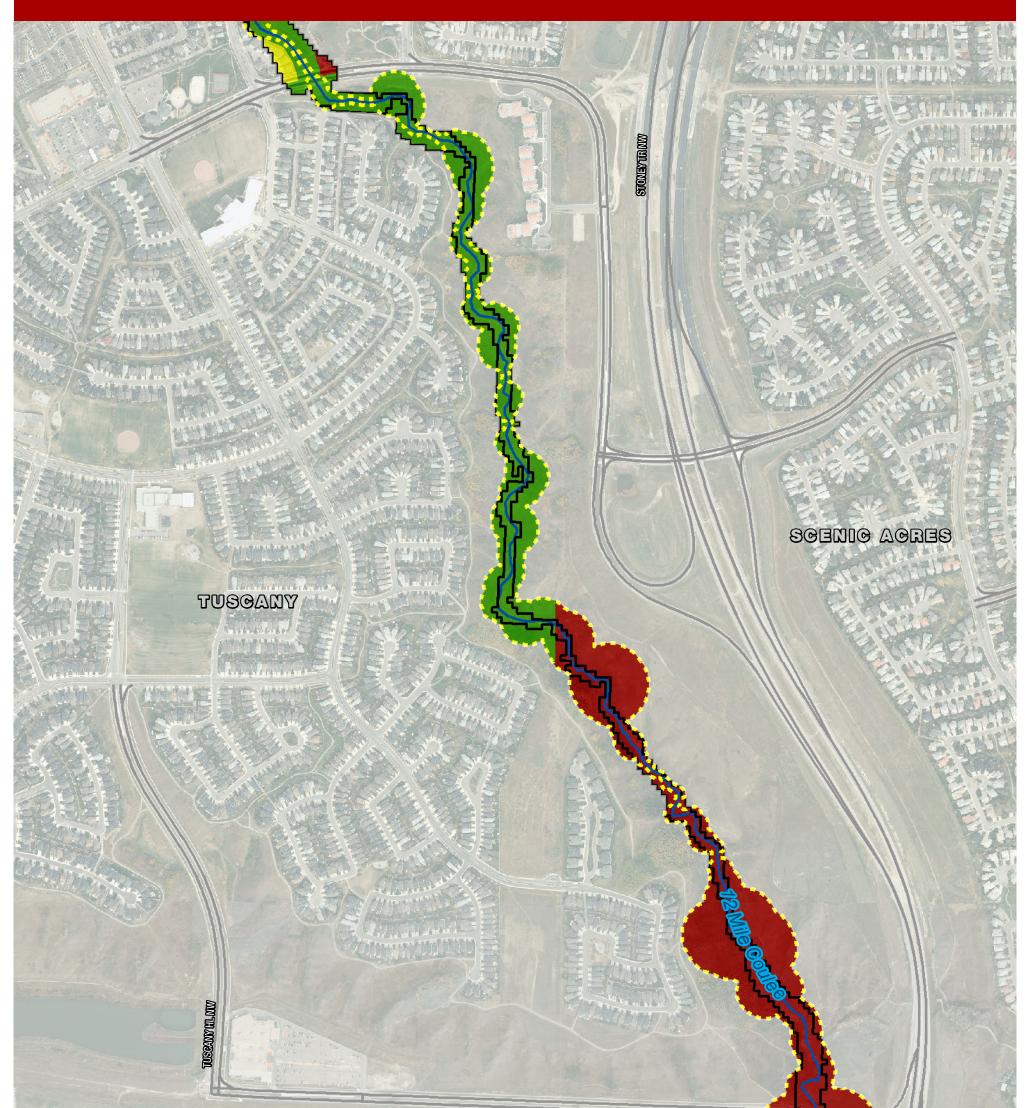
***Based on field studies of major rivers / creeks, excluding private residential riverfront lots or steep valley slopes with limited riparian habitat



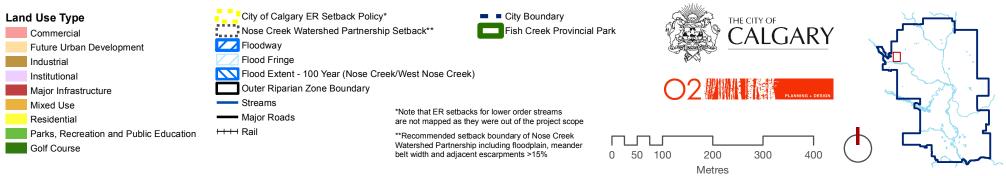




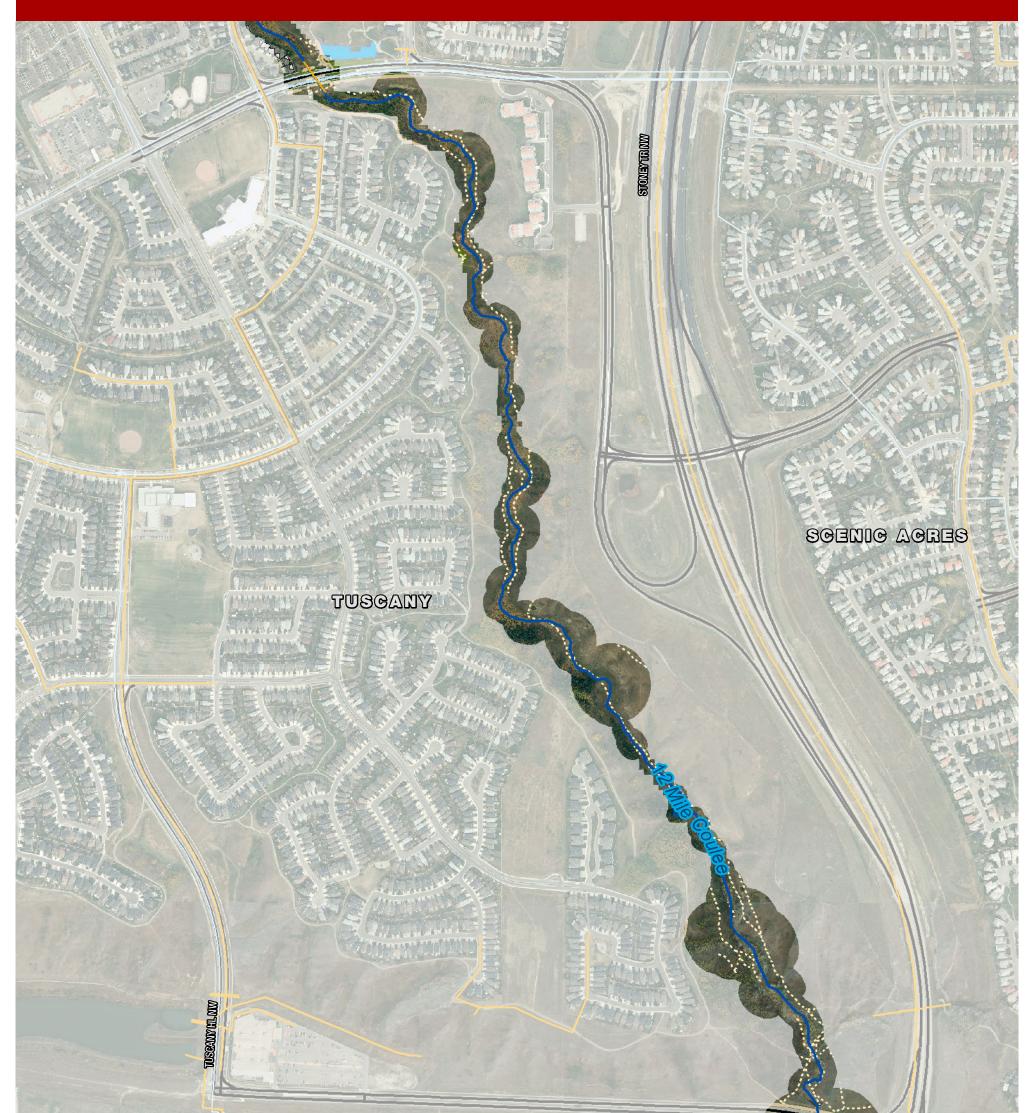
LAND AND REGULATORY ISSUES 12 MILE COULEE 02







EXISTING INFRASTRUCTURE AND POSSIBLE IMPROVEMENTS 12 MILE COULEE 02



Bearspaw Water Treatment Plant

11

- Storm Outflow Location
- Stormwater Lift Station
- Storm Main (>900mm diameter)
- Sanitary Main (>600mm diameter)
- Water Main (>400mm diameter)
- Siphon
- Pipeline River Crossing Locations
- Water / Waste Water Treament Plants
- Existing Storm Retrofit Pond
- Possible Location of Storm Retrofit Pond
- Existing Storm Pond
- Existing Bank Infrastructure (e.g., Rip Rap, Retaining Walls, Weirs)
- Bank Erosion Hotspot

- Candidate Flood / Erosion Control Projects
- Paved Trails
- Gravel Trails
- = Bridge
- Buildings
- Parks (Maintained Turf Areas)
- City Boundary
 Major Roads
 HH Rail

- Streams
- Fish Creek Provincial Park

The non-masked area is based on the greater of:

(i) outer riparian zone of the variable width model, (ii) City ER setback policy boundary, (iii) Nose Creek Watershed Partnership recommended setback policy

(See Theme 2-Land and Regulatory Issues)



300



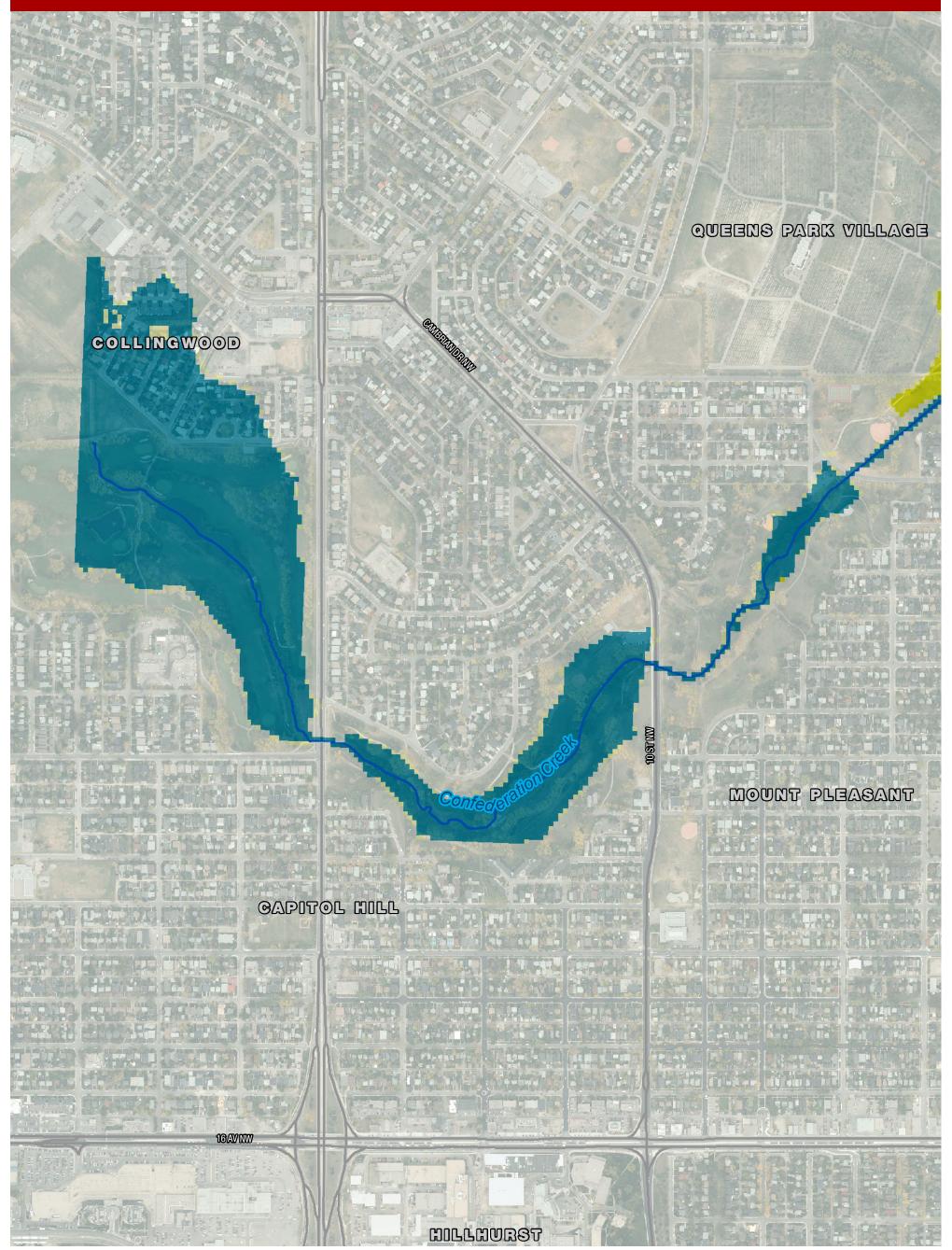
T

400

NOSSIDUL DRINN

200 Metres

RIPARIAN AREA - LOCATION AND FUNCTION CONFEDERATION CREEK 01



Riparian Zone*

Inner Riparian Zone Middle Riparian Zone

Outer Riparian Zone

Potential Outermost Riparian Zone

*Variable Width Riparian Model Outputs

Riparian Health** Healthy Healthy, but with Problems Unhealthy

**Based on field studies of

sampled riparian polygons only

Bank Health*** Good Moderate

Poor

***Based on field studies of major rivers / creeks, excluding private residential riverfront lots or steep valley slopes with limited riparian habitat





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k Provincial Park		Ζ

0 50 100



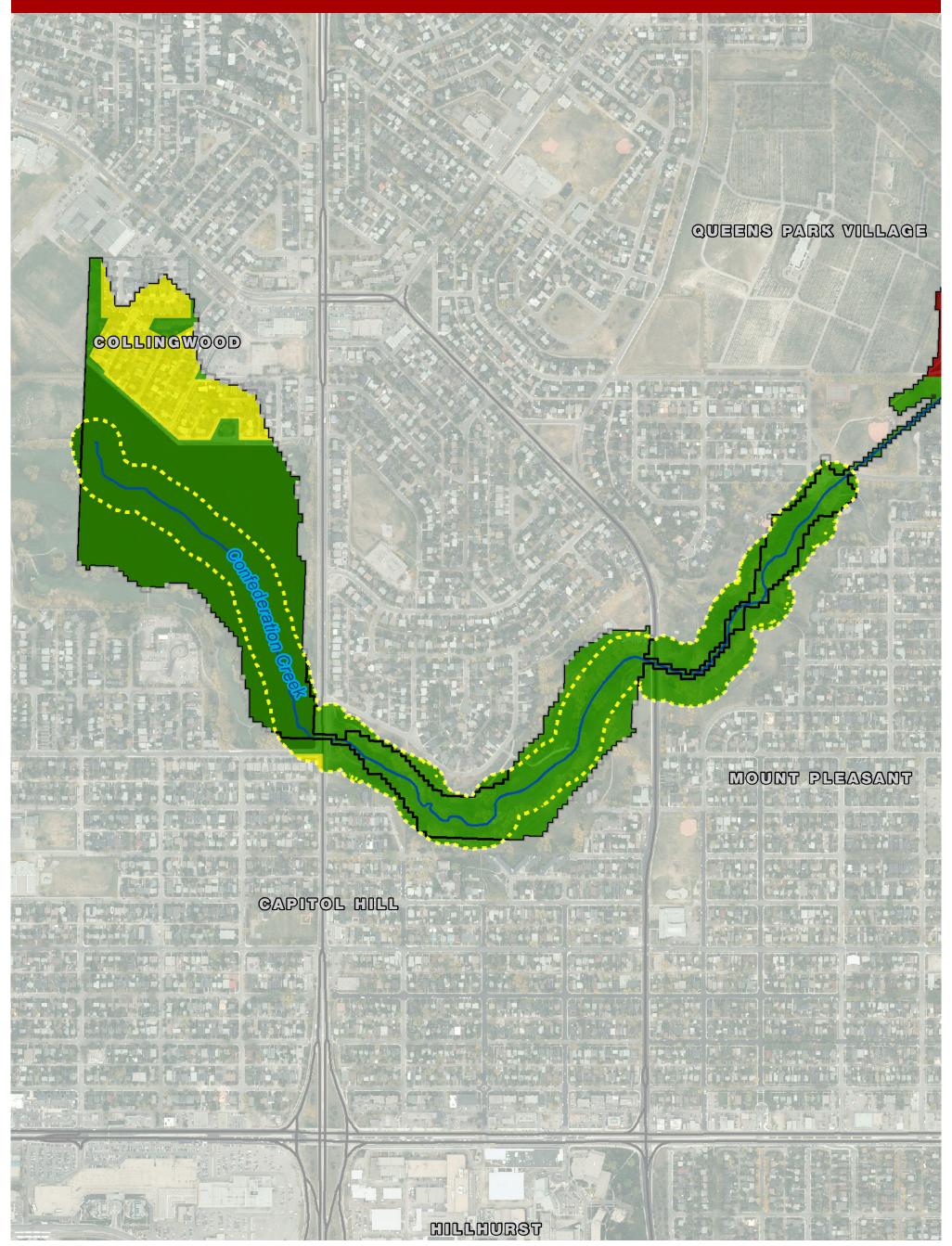
300



T

400

LAND AND REGULATORY ISSUES CONFEDERATION CREEK 01

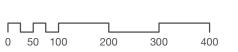


Land Use Type

- Commercial Future Urban Development Industrial Institutional Major Infrastructure
 - Mixed Use
 - Residential
 - Parks, Recreation and Public Education
 - Golf Course
- City of Calgary ER Setback Policy* Nose Creek Watershed Partnership Setback**
 - Flood Fringe
 - Flood Extent 100 Year (Nose Creek/West Nose Creek)
- Outer Riparian Zone Boundary
 - Streams
- Major Roads
- n HHH Rail
- *Note that ER setbacks for lower order streams are not mapped as they were out of the project scope
 - **Recommended setback boundary of Nose Creek Watershed Partnership including floodplain, meander belt width and adjacent escarpments >15%

City Boundary

Fish Creek Provincial Park





EXISTING INFRASTRUCTURE AND POSSIBLE IMPROVEMENTS **CONFEDERATION CREEK 01**



- Storm Outflow Location
- Stormwater Lift Station
- Storm Main (>900mm diameter)
- Sanitary Main (>600mm diameter)
- Water Main (>400mm diameter)
- Siphon
- Pipeline River Crossing Locations
- Water / Waste Water Treament Plants
- Existing Storm Retrofit Pond
- Possible Location of Storm Retrofit Pond
- Existing Storm Pond
- Existing Bank Infrastructure (e.g., Rip Rap, Retaining Walls, Weirs)
- Bank Erosion Hotspot

- Candidate Flood / Erosion Control Projects
- Paved Trails
- Gravel Trails
- = Bridge
- Buildings
- Parks (Maintained Turf Areas)
- City Boundary
 Major Roads
 HH Rail

- Streams
- Fish Creek Provincial Park

The non-masked area is based on the greater of:

(i) outer riparian zone of the variable width model, (ii) City ER setback policy boundary, (iii) Nose Creek Watershed Partnership recommended setback policy

(See Theme 2-Land and Regulatory Issues)



300

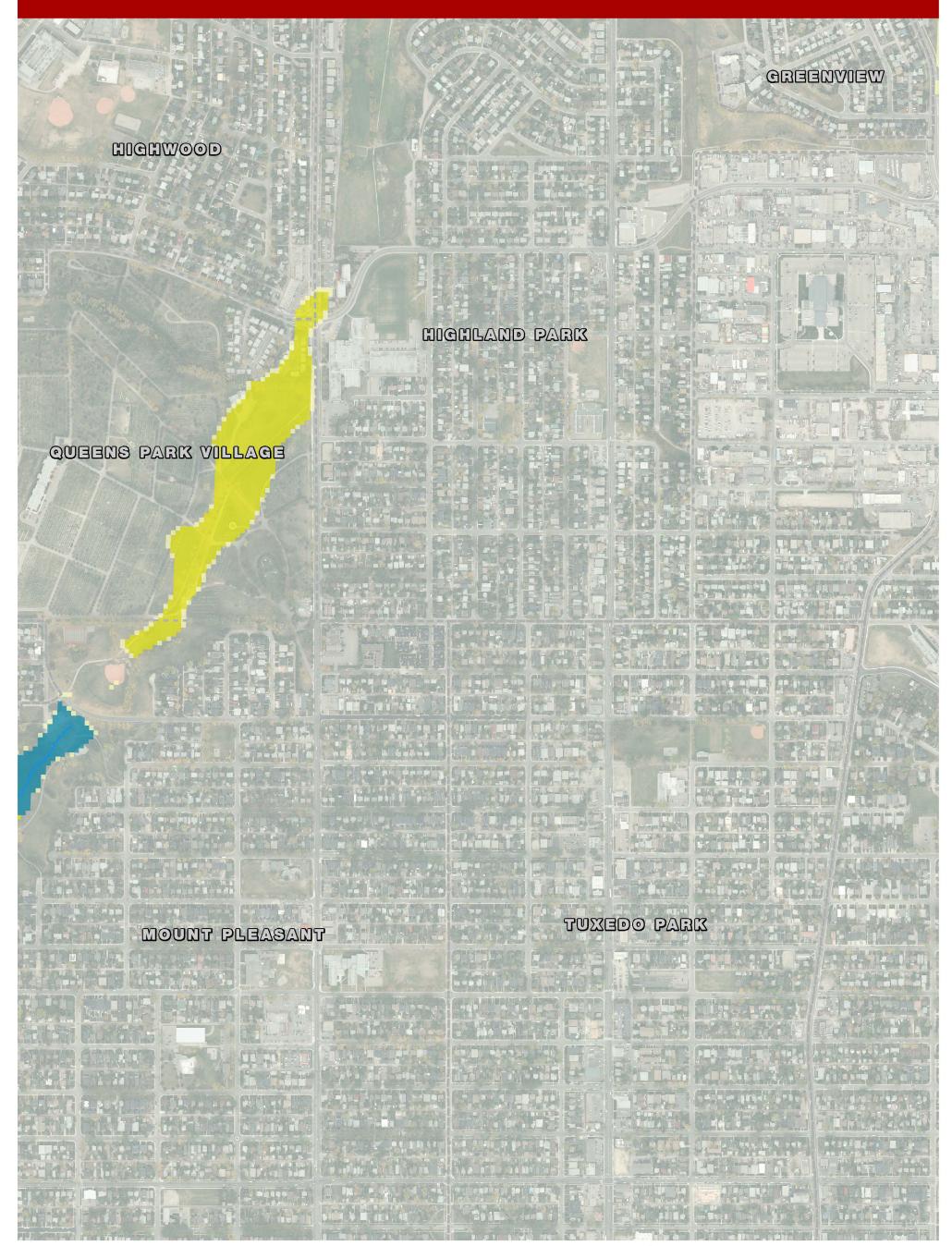


Т

400

200 Metres

RIPARIAN AREA - LOCATION AND FUNCTION CONFEDERATION CREEK 02



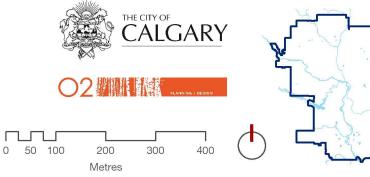
Riparian Zone

- Inner Riparian Zone
- Middle Riparian Zone Outer Riparian Zone

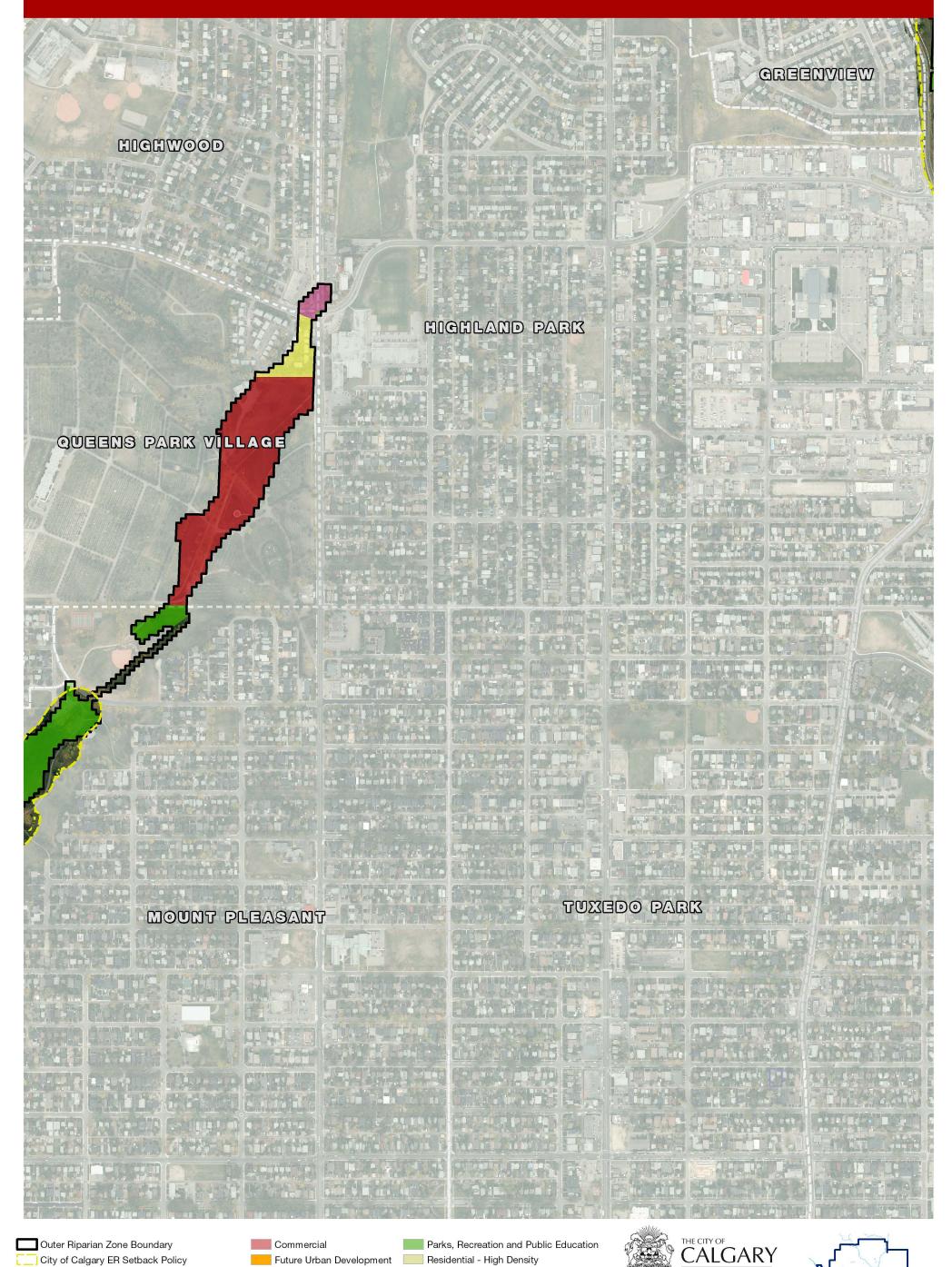
Dominant Fish Habitat

- Brown Trout
- Mountain Whitefish
- Longnose Sucker
- Northern Pike
- Rainbow Trout
- A Bank Observations (ASRD Golder Fish Habitat Study)
- Bank Stability Hotspot (AMEC)
- ••• Other Erosion Hotspots
- Potential Outermost Riparian Zone Inant Fish Habitat Riparian Health Scores Healthy Riparian Health Scores Healthy, but with Problems
 - K Riparian Health Scores Unhealthy
 - —— Majo —— Rail Major Roads

 - City Boundary
 - Community Boundaries
 - Provincial Parks

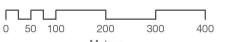


LAND AND REGULATORY ISSUES **CONFEDERATION CREEK 02**



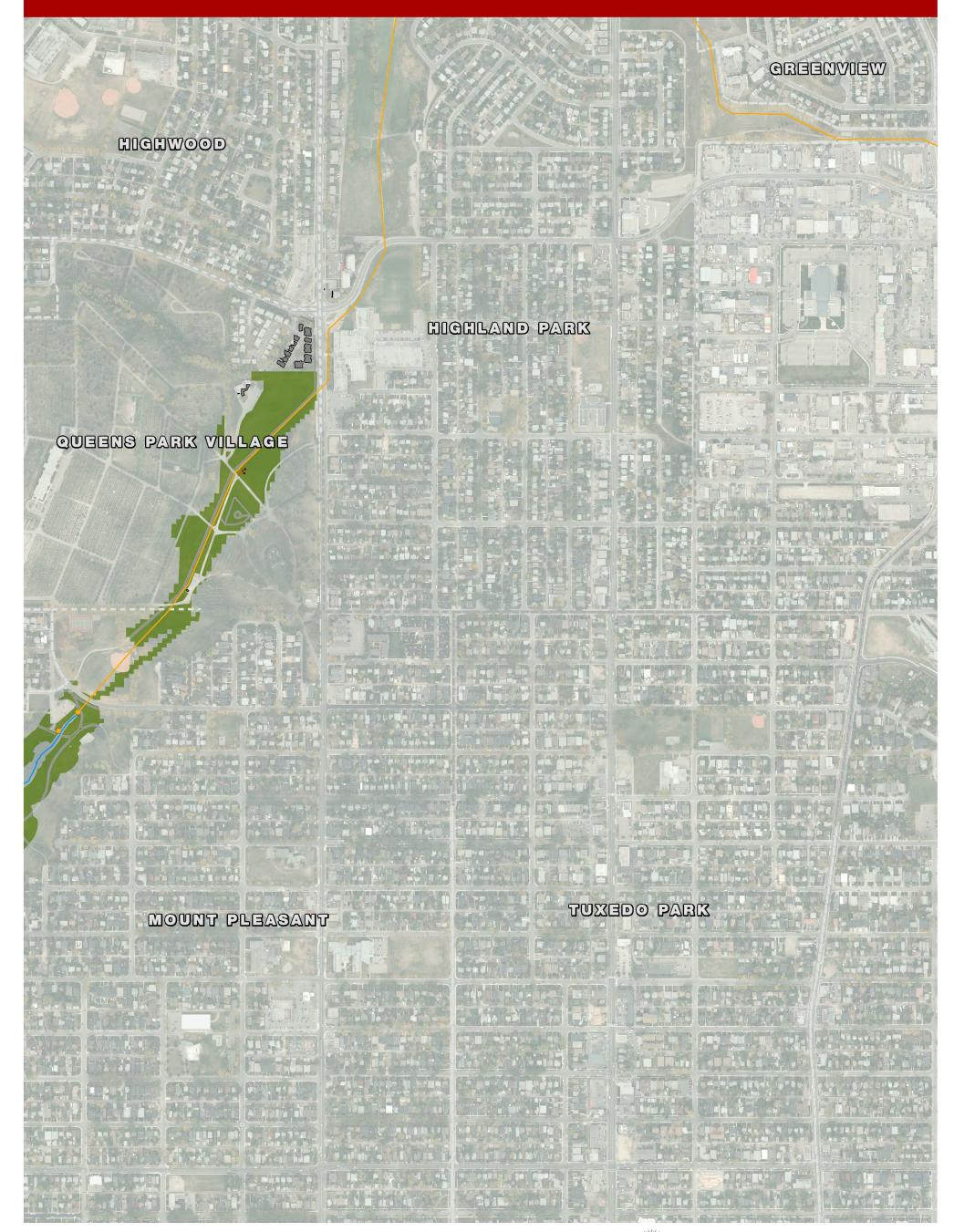
- Outer Riparian Zone Boundary City of Calgary ER Setback Policy Nose Creek Watershed Partnership Setback Floodway Z Flood Fringe
- Major Roads
- 🕂 Rail
- City Boundary
- Community Boundaries
- Commercial

- - Major Infrastructure
 - Mixed Use
- Future Urban Development
- Industrial
 - **Institutional**
- Residential High Density ſ
- Parks, Recreation and Public Education
 - Residential Medium Density
 - Residential Low Density



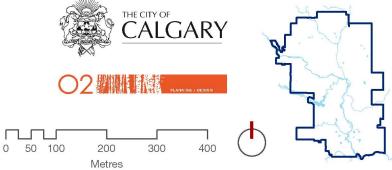


EXISTING INFRASTRUCTURE AND POSSIBLE IMPROVEMENTS CONFEDERATION CREEK 02

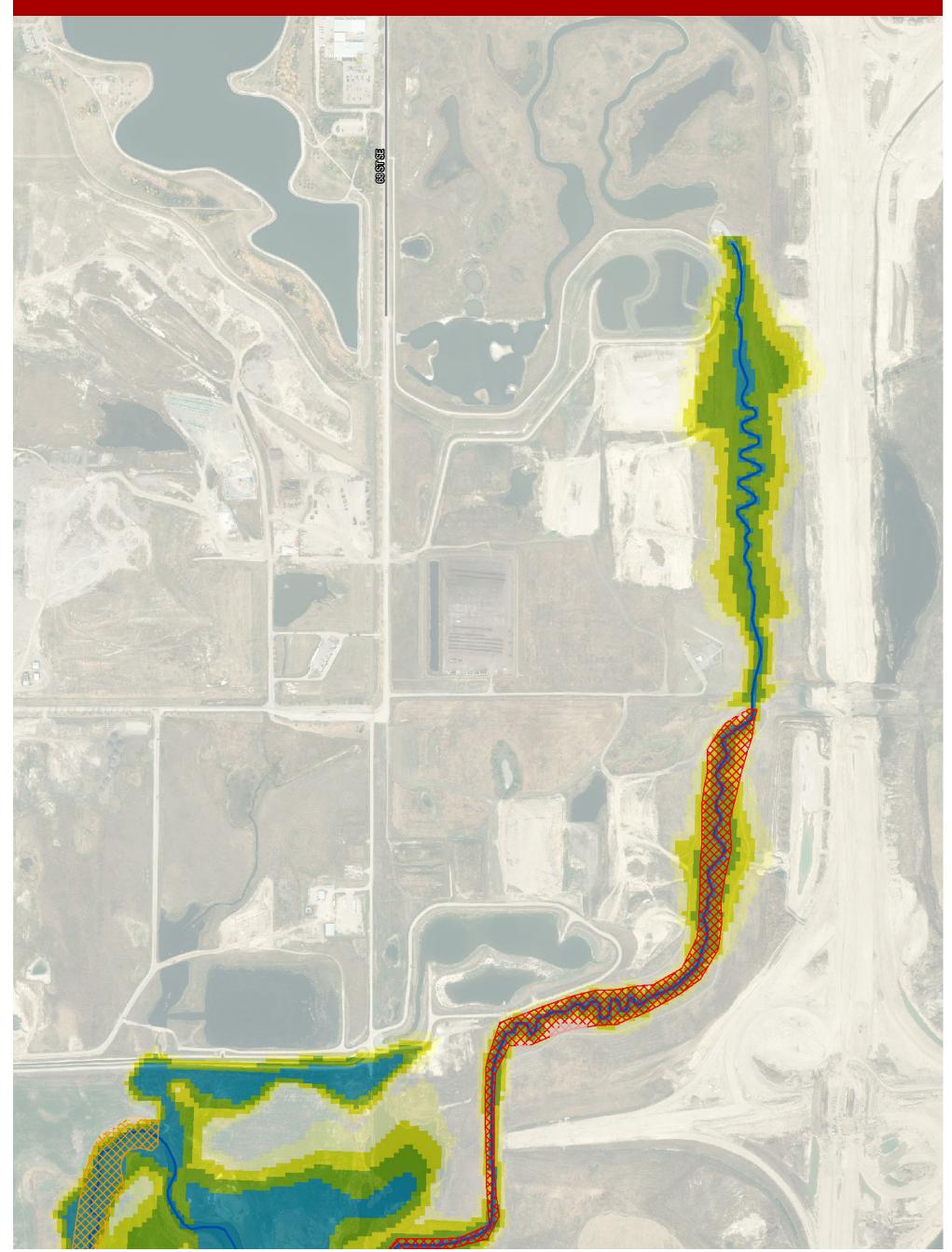




- Pavel Trails — Gravel Trails
- Major Roads
- +— Rail
- City Boundary
 Community Boundaries



RIPARIAN AREA - LOCATION AND FUNCTION FOREST LAWN CREEK 01



Riparian Zone*

Inner Riparian Zone Middle Riparian Zone Outer Riparian Zone

Potential Outermost Riparian Zone

*Variable Width Riparian Model Outputs

Riparian Health** Healthy Healthy, but with Problems Unhealthy

**Based on field studies of

sampled riparian polygons only

***Based on field studies of major rivers / creeks, excluding private residential riverfront lots or steep valley slopes with limited riparian habitat

Bank Health***

Moderate

Good

Poor



THE CITY OF

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300

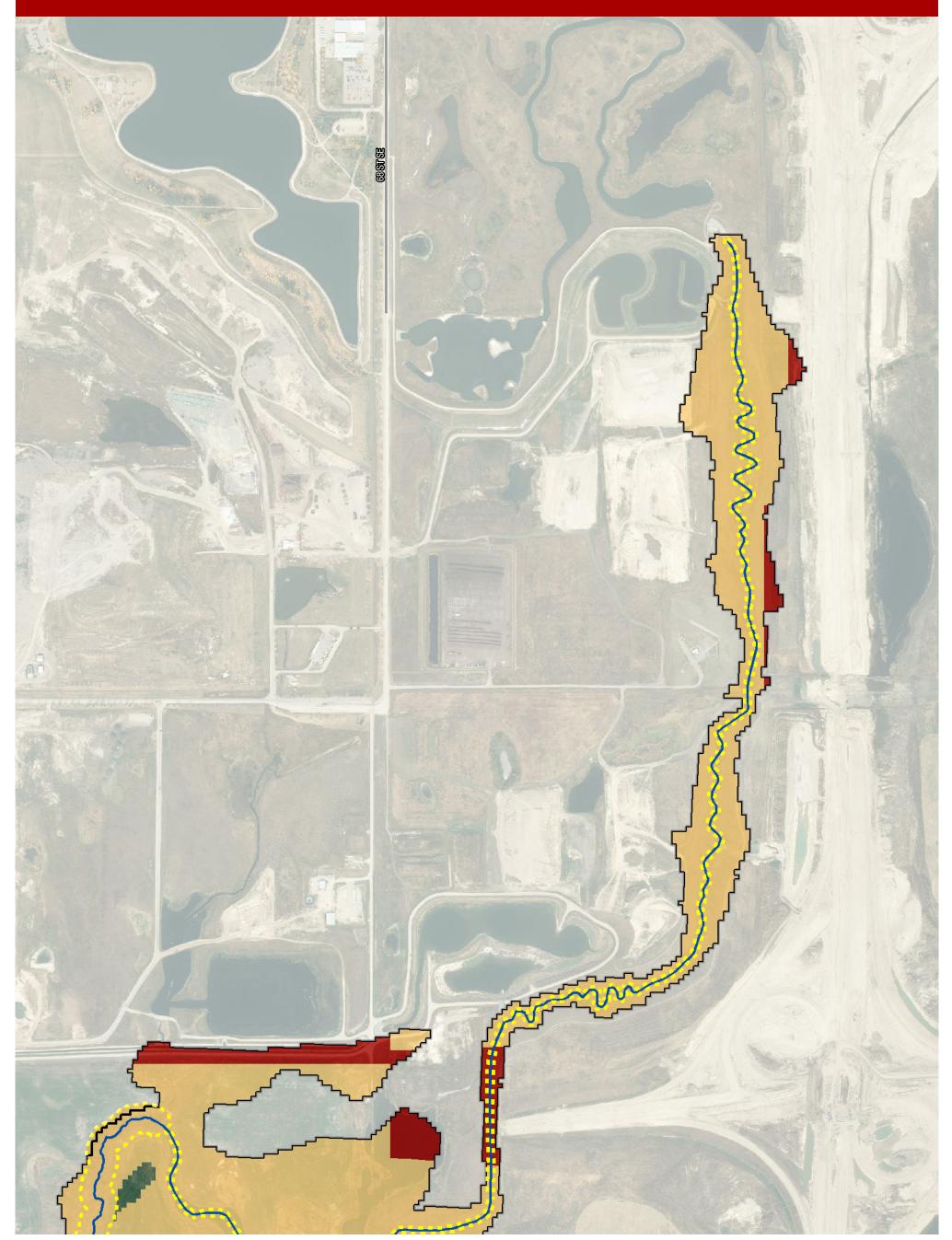


T

400

200 Metres

LAND AND REGULATORY ISSUES FOREST LAWN CREEK 01



Land Use Type

- Commercial Future Urban Development Industrial
 - Institutional
- Major Infrastructure
- Mixed Use

Golf Course

- Residential
- Parks, Recreation and Public Education
- City of Calgary ER Setback Policy* Nose Creek Watershed Partnership Setback**

 - Flood Fringe
- Flood Extent 100 Year (Nose Creek/West Nose Creek)
- Outer Riparian Zone Boundary
 - Streams
- Major Roads

- City Boundary
- Fish Creek Provincial Park

- HH Rail
- *Note that ER setbacks for lower order streams are not mapped as they were out of the project scope
- **Recommended setback boundary of Nose Creek Watershed Partnership including floodplain, meander belt width and adjacent escarpments >15%
- THE CITY OF 0 50 100 200 300 400

EXISTING INFRASTRUCTURE AND POSSIBLE IMPROVEMENTS FOREST LAWN CREEK 01



- Storm Outflow Location
- Stormwater Lift Station
- Storm Main (>900mm diameter)
- Sanitary Main (>600mm diameter)
- Water Main (>400mm diameter)
- Siphon
- Pipeline River Crossing Locations
- Water / Waste Water Treament Plants
- Existing Storm Retrofit Pond
- Possible Location of Storm Retrofit Pond
- Existing Storm Pond
- Existing Bank Infrastructure (e.g., Rip Rap, Retaining Walls, Weirs)
- Bank Erosion Hotspot

- Candidate Flood / Erosion Control Projects
- Paved Trails
- Gravel Trails
- = Bridge
- Buildings
- Parks (Maintained Turf Areas)
- City Boundary
 Major Roads
 Hit Rail

- Streams
- Fish Creek Provincial Park

The non-masked area is based on the greater of:

(i) outer riparian zone of the variable width model,
(ii) City ER setback policy boundary,
(iii) Nose Creek Watershed Partnership recommended setback policy

(See Theme 2-Land and Regulatory Issues)



300

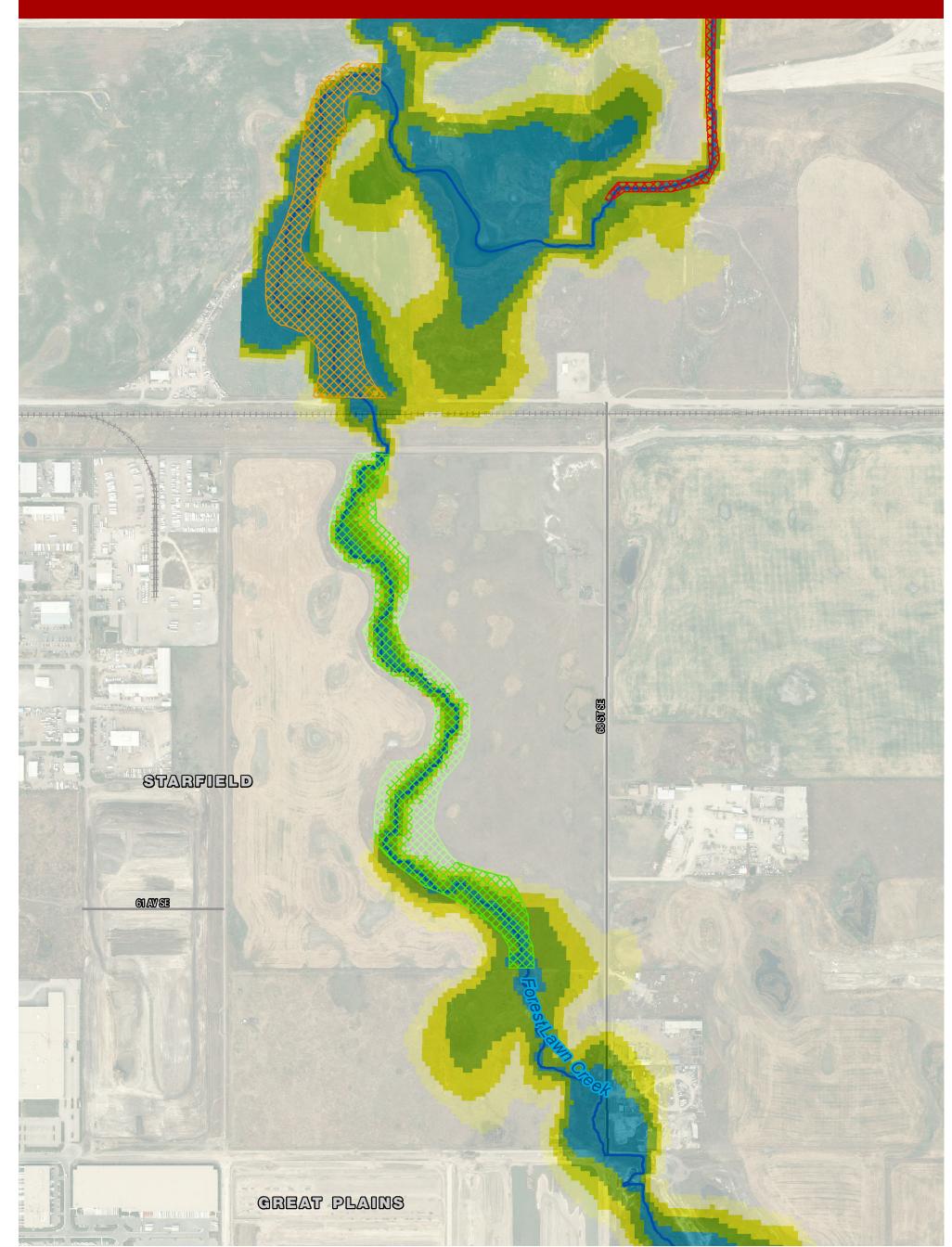


T

400

200 Metres

RIPARIAN AREA - LOCATION AND FUNCTION FOREST LAWN CREEK 02



Riparian Zone*

- Inner Riparian Zone Middle Riparian Zone Outer Riparian Zone
 - Potential Outermost Riparian Zone

*Variable Width Riparian Model Outputs

Riparian Health** Healthy Healthy, but with Problems Unhealthy

**Based on field studies of

sampled riparian polygons only

Bank Health*** Good Moderate

Poor

***Based on field studies of major rivers / creeks, excluding private residential riverfront lots or steep valley slopes with limited riparian habitat







0 50 100



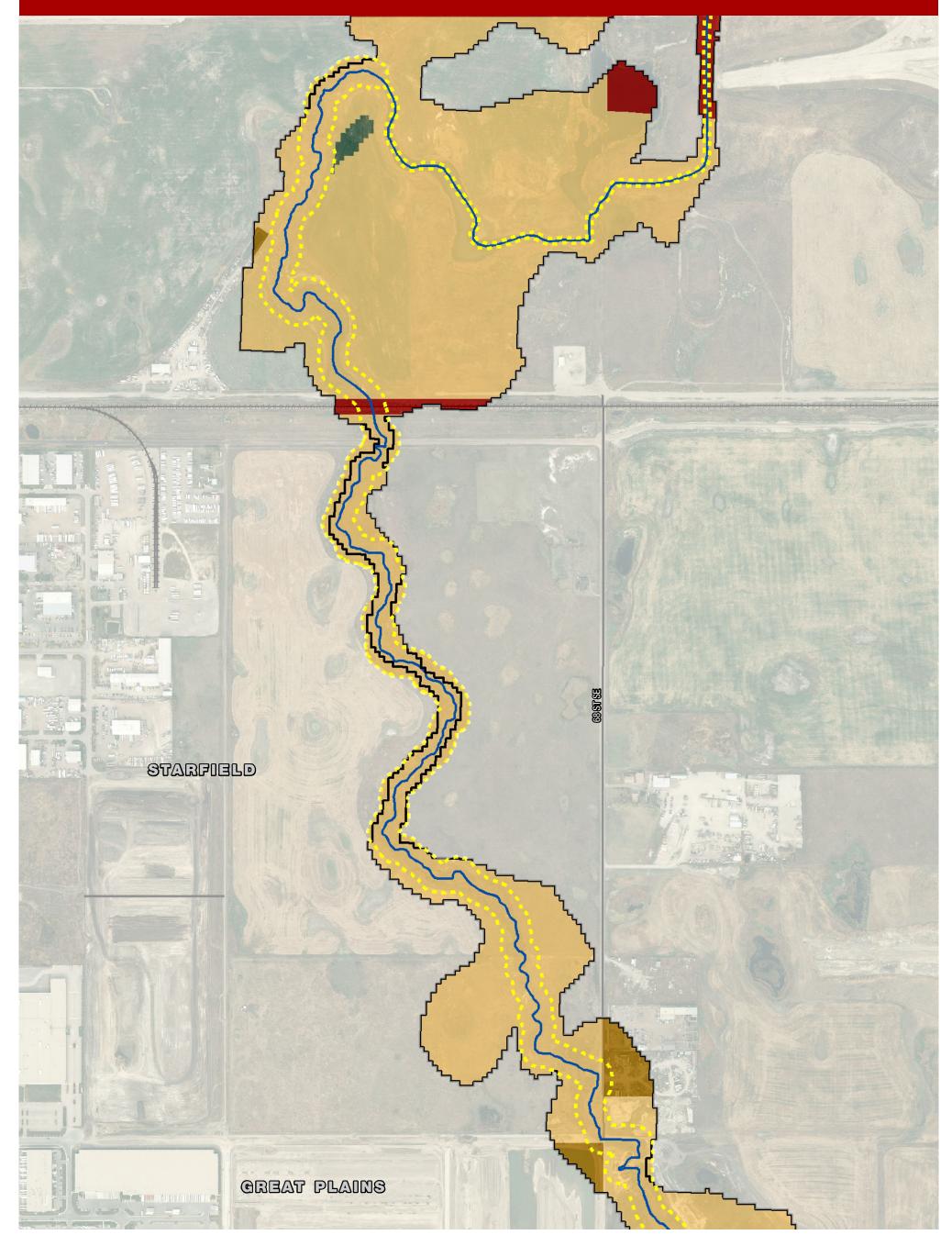
400

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300



LAND AND REGULATORY ISSUES FOREST LAWN CREEK 02



Land Use Type

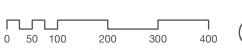
- Commercial Future Urban Development Industrial Institutional
- Major Infrastructure
- Mixed Use
- Residential
- Parks, Recreation and Public Education
- Golf Course
- City of Calgary ER Setback Policy* Nose Creek Watershed Partnership Setback**

 - Flood Fringe
- Flood Extent 100 Year (Nose Creek/West Nose Creek)
- Outer Riparian Zone Boundary
 - Streams
- Major Roads
- HH Rail
- *Note that ER setbacks for lower order streams are not mapped as they were out of the project scope
 - **Recommended setback boundary of Nose Creek Watershed Partnership including floodplain, meander belt width and adjacent escarpments >15%

City Boundary

Fish Creek Provincial Park

CALGARY





EXISTING INFRASTRUCTURE AND POSSIBLE IMPROVEMENTS FOREST LAWN CREEK 02



GREAT PLAINS

- Storm Outflow Location
- Stormwater Lift Station
- Storm Main (>900mm diameter)
- Sanitary Main (>600mm diameter)
- Water Main (>400mm diameter)
- Siphon
- Pipeline River Crossing Locations
- Water / Waste Water Treament Plants
- Existing Storm Retrofit Pond
- Possible Location of Storm Retrofit Pond
- Existing Storm Pond
- Existing Bank Infrastructure (e.g., Rip Rap, Retaining Walls, Weirs)

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Bank Erosion Hotspot

- Candidate Flood / Erosion Control Projects
- Paved Trails
- Gravel Trails
- = Bridge
- Buildings
- Parks (Maintained Turf Areas)
- City Boundary
 Major Roads
 HH Rail

- Streams
- Fish Creek Provincial Park

The non-masked area is based on the greater of:

(i) outer riparian zone of the variable width model,
(ii) City ER setback policy boundary,
(iii) Nose Creek Watershed Partnership recommended setback policy

(See Theme 2-Land and Regulatory Issues)

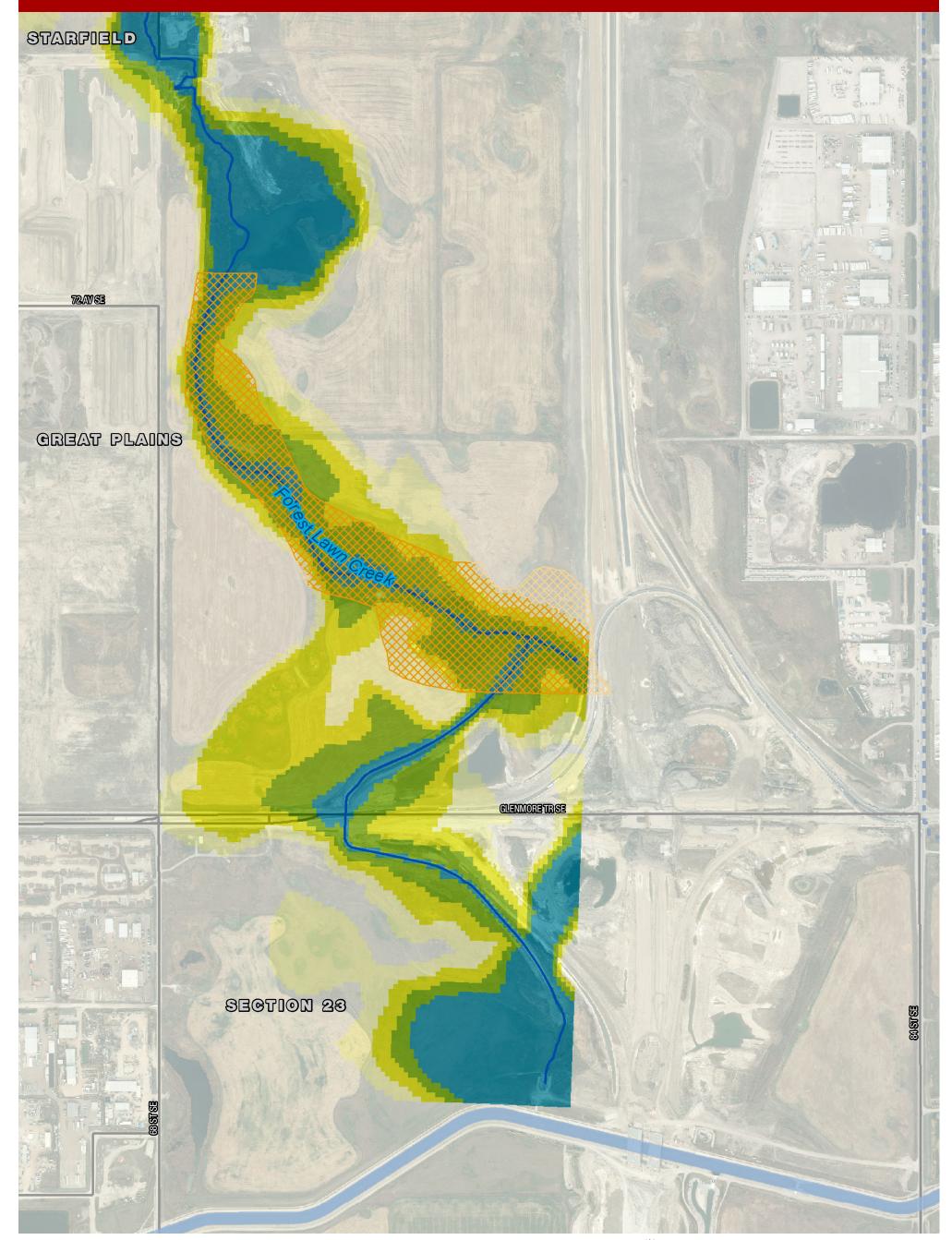


O^2	PLANNING + DESIGN
	PLANNING + DESIGN





RIPARIAN AREA - LOCATION AND FUNCTION FOREST LAWN CREEK 03



Riparian Zone*

- Inner Riparian Zone Middle Riparian Zone Outer Riparian Zone
 - Potential Outermost Riparian Zone

*Variable Width Riparian Model Outputs

Riparian Health** Healthy Healthy, but with Problems

**Based on field studies of

sampled riparian polygons only

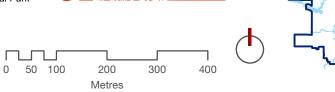
Bank Health*** Good Moderate

Poor

***Based on field studies of major rivers / creeks, excluding private residential riverfront lots or steep valley slopes with limited riparian habitat

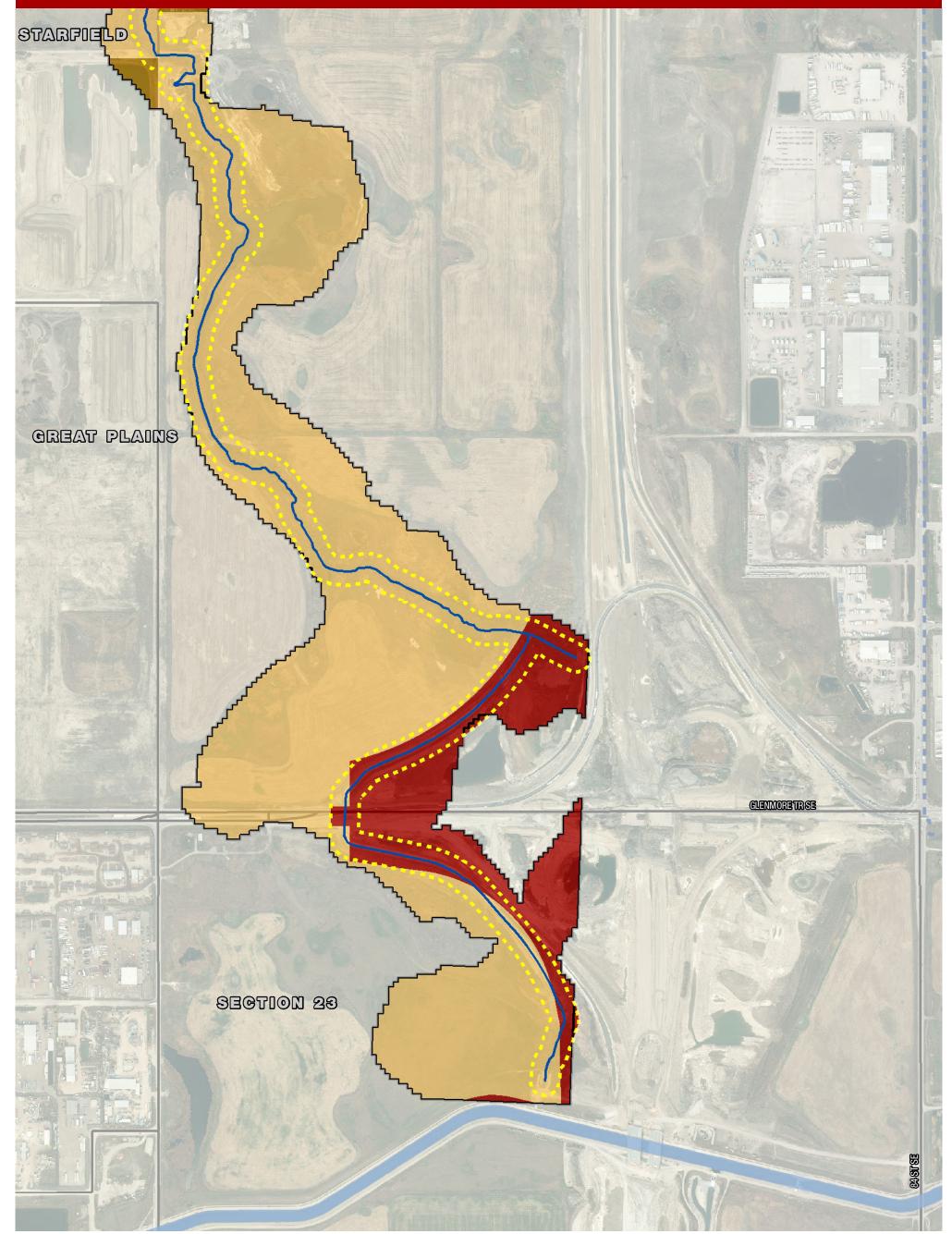


THE CITY OF



Unhealthy

LAND AND REGULATORY ISSUES FOREST LAWN CREEK 03



Land Use Type

- Commercial Future Urban Development Industrial Institutional Major Infrastructure Mixed Use
 - Residential
 - Parks, Recreation and Public Education
 - Golf Course
- City of Calgary ER Setback Policy* City of Calgary ER Setback Policy* Nose Creek Watershed Partnership Setback** Z Floodway

 - Flood Fringe
 - Flood Extent 100 Year (Nose Creek/West Nose Creek)
- Outer Riparian Zone Boundary
 - Streams
- Major Roads
- HH Rail
- - *Note that ER setbacks for lower order streams are not mapped as they were out of the project scope

City Boundary

Fish Creek Provincial Park

- **Recommended setback boundary of Nose Creek Watershed Partnership including floodplain, meander belt width and adjacent escarpments >15%
- THE CITY OF

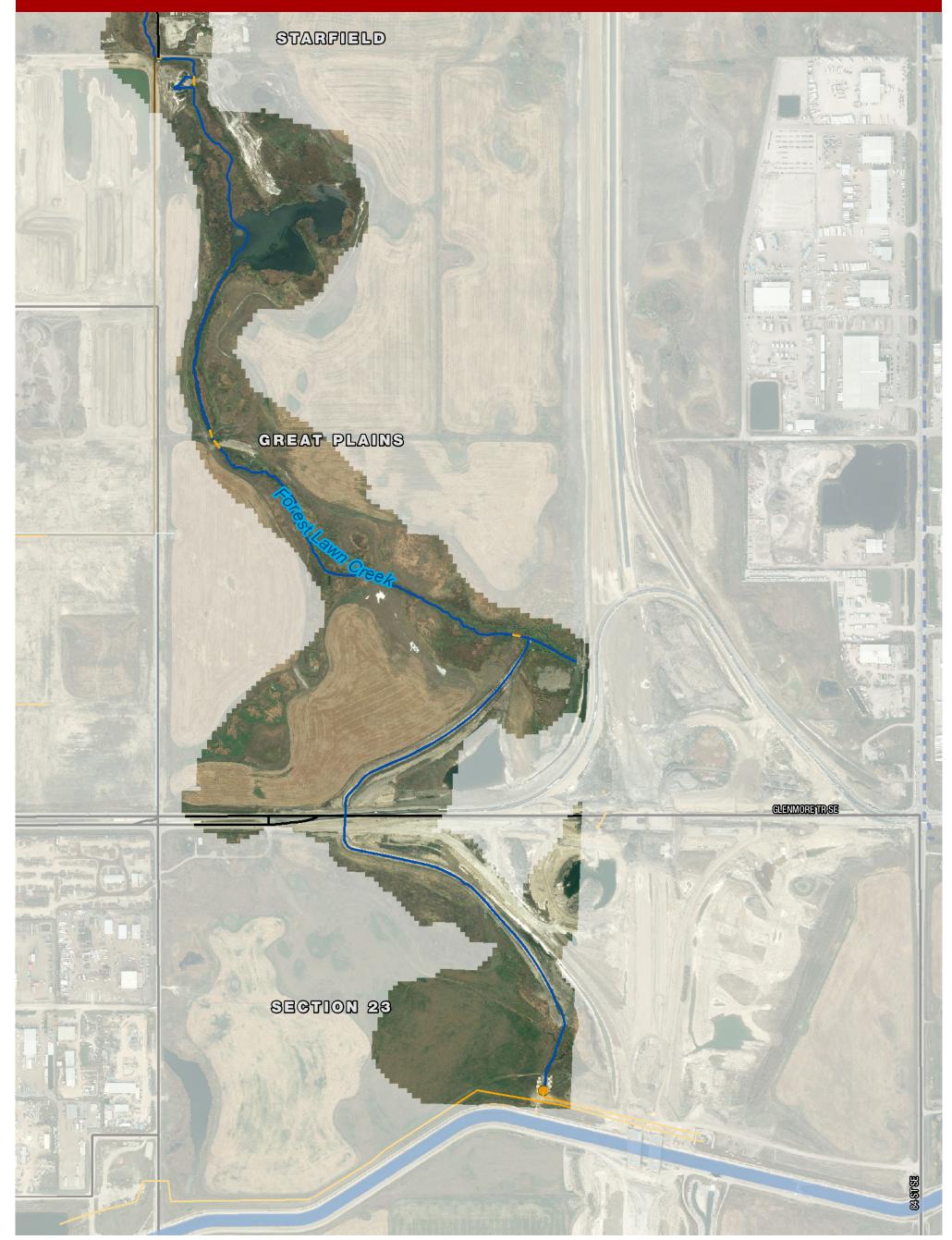
300

400



200 Metres

EXISTING INFRASTRUCTURE AND POSSIBLE IMPROVEMENTS FOREST LAWN CREEK 03



- Storm Outflow Location
- Stormwater Lift Station
- Storm Main (>900mm diameter)
- Sanitary Main (>600mm diameter)
- Water Main (>400mm diameter)
- Siphon
- Pipeline River Crossing Locations
- Water / Waste Water Treament Plants
- Existing Storm Retrofit Pond
- Possible Location of Storm Retrofit Pond
- Existing Storm Pond
- Existing Bank Infrastructure (e.g., Rip Rap, Retaining Walls, Weirs)
- Bank Erosion Hotspot

- Candidate Flood / Erosion Control Projects
- Paved Trails
- Gravel Trails
- = Bridge
- Buildings
- Parks (Maintained Turf Areas)
- City Boundary
 Major Roads
 HH Rail

- Streams
- Fish Creek Provincial Park

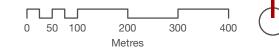
The non-masked area is based on the greater of:

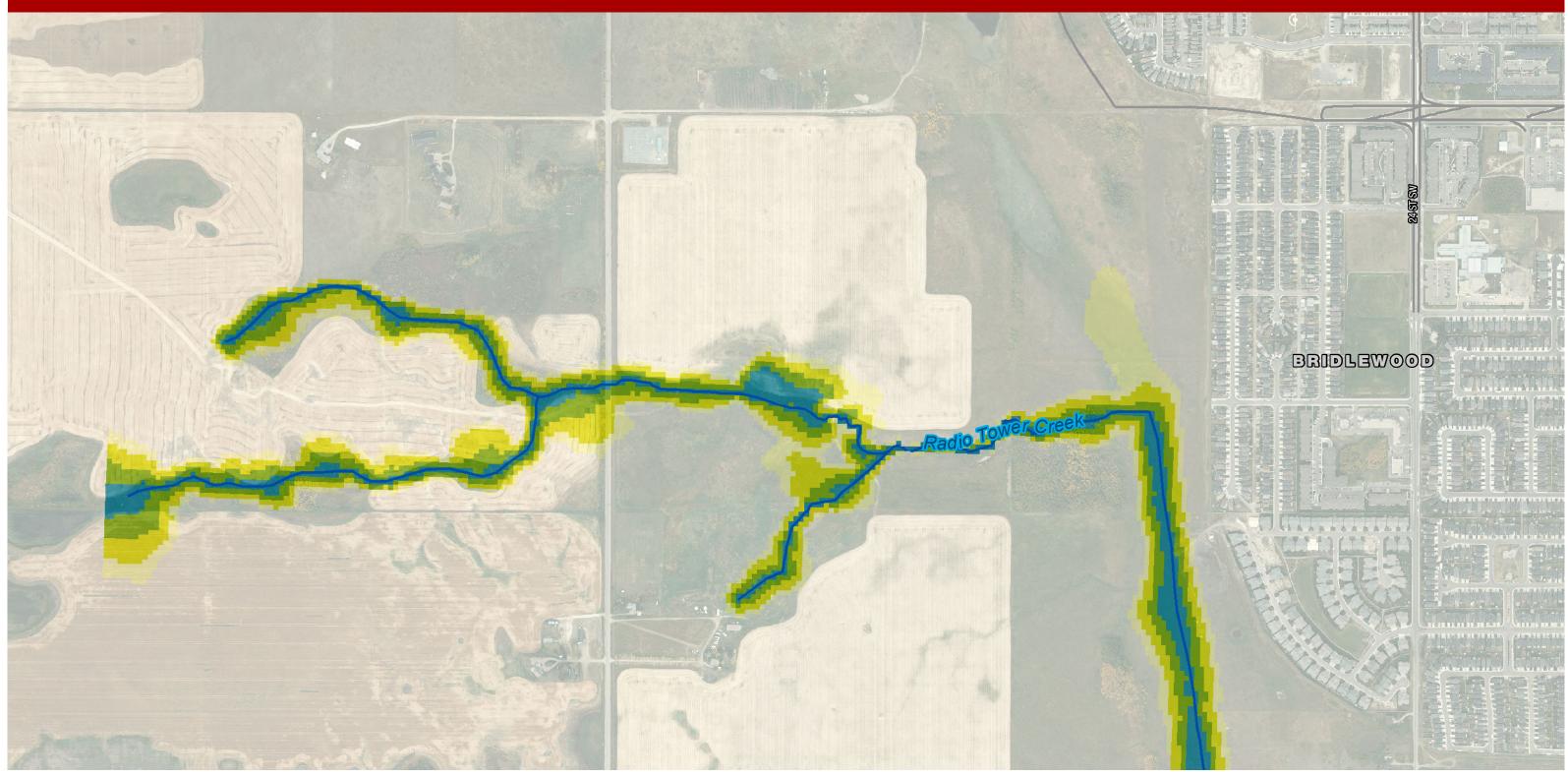
(i) outer riparian zone of the variable width model,
(ii) City ER setback policy boundary,
(iii) Nose Creek Watershed Partnership recommended setback policy

(See Theme 2-Land and Regulatory Issues)









Riparian Zone*



Riparian Health**

Healthy Healthy, but with Problems Unhealthy

Bank Health*** Good

Moderate

Poor

⊢++++ Rail Streams

Fish Creek Provincial Park

City Boundary

— Major Roads

THE CITY OF

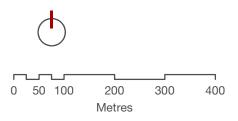


*Variable Width Riparian Model Outputs

**Based on field studies of sampled riparian polygons only

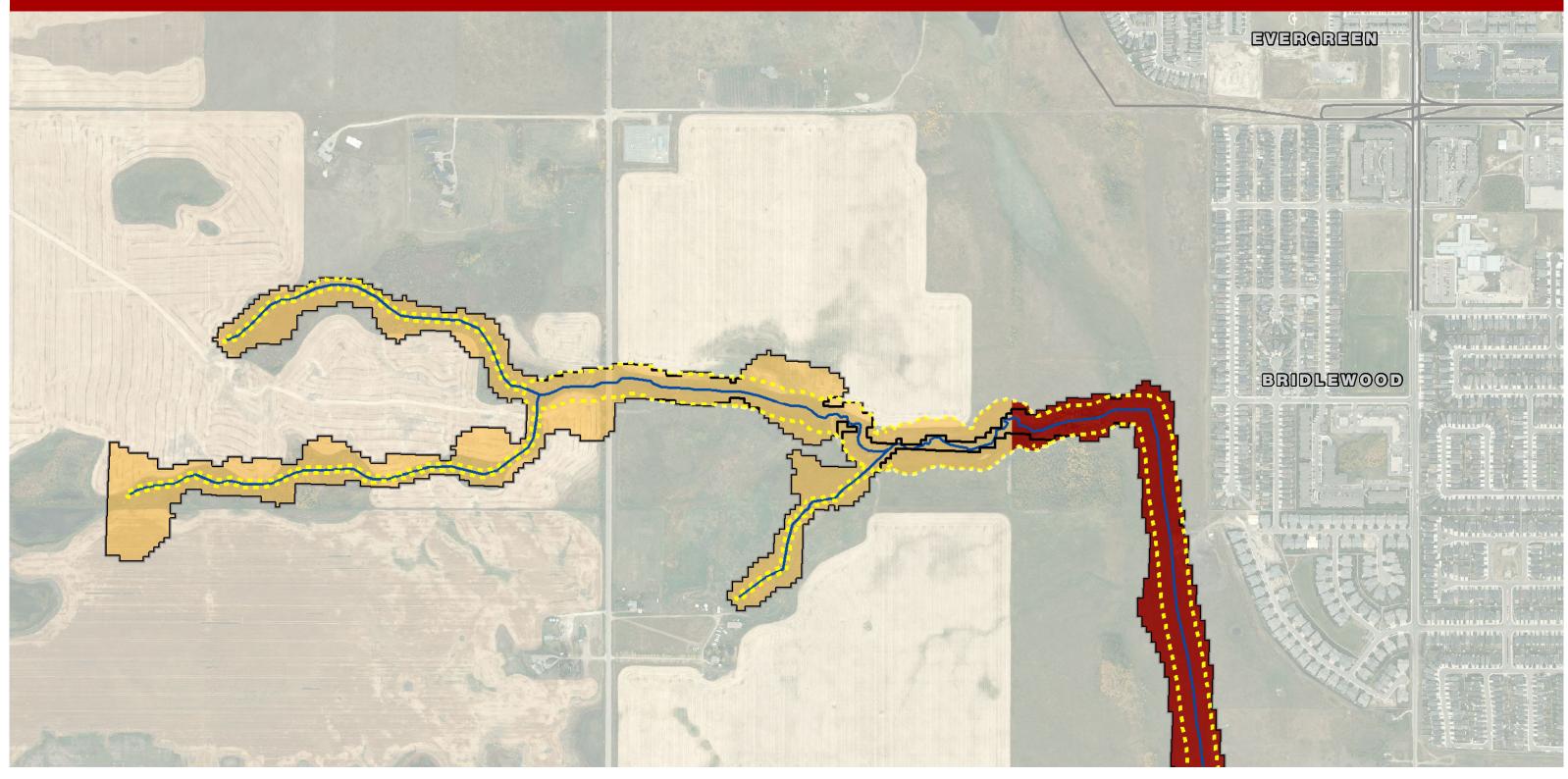
***Based on field studies of major rivers / creeks, excluding private residential riverfront lots or steep valley slopes with limited riparian habitat

RIPARIAN AREA - LOCATION AND FUNCTION RADIO TOWER CREEK 01











Major Infrastructure
Mixed Use
Residential
Parks, Recreation and Public Education

Golf Course



Nose Creek Water Management Plan Setback **



Flood Extent - 100 Year (Nose Creek/West Nose Creek)

Outer Riparian Zone Boundary

Streams Major Roads

⊢++++ Rail

City Boundary

Fish Creek Provincial Park

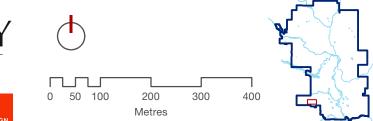




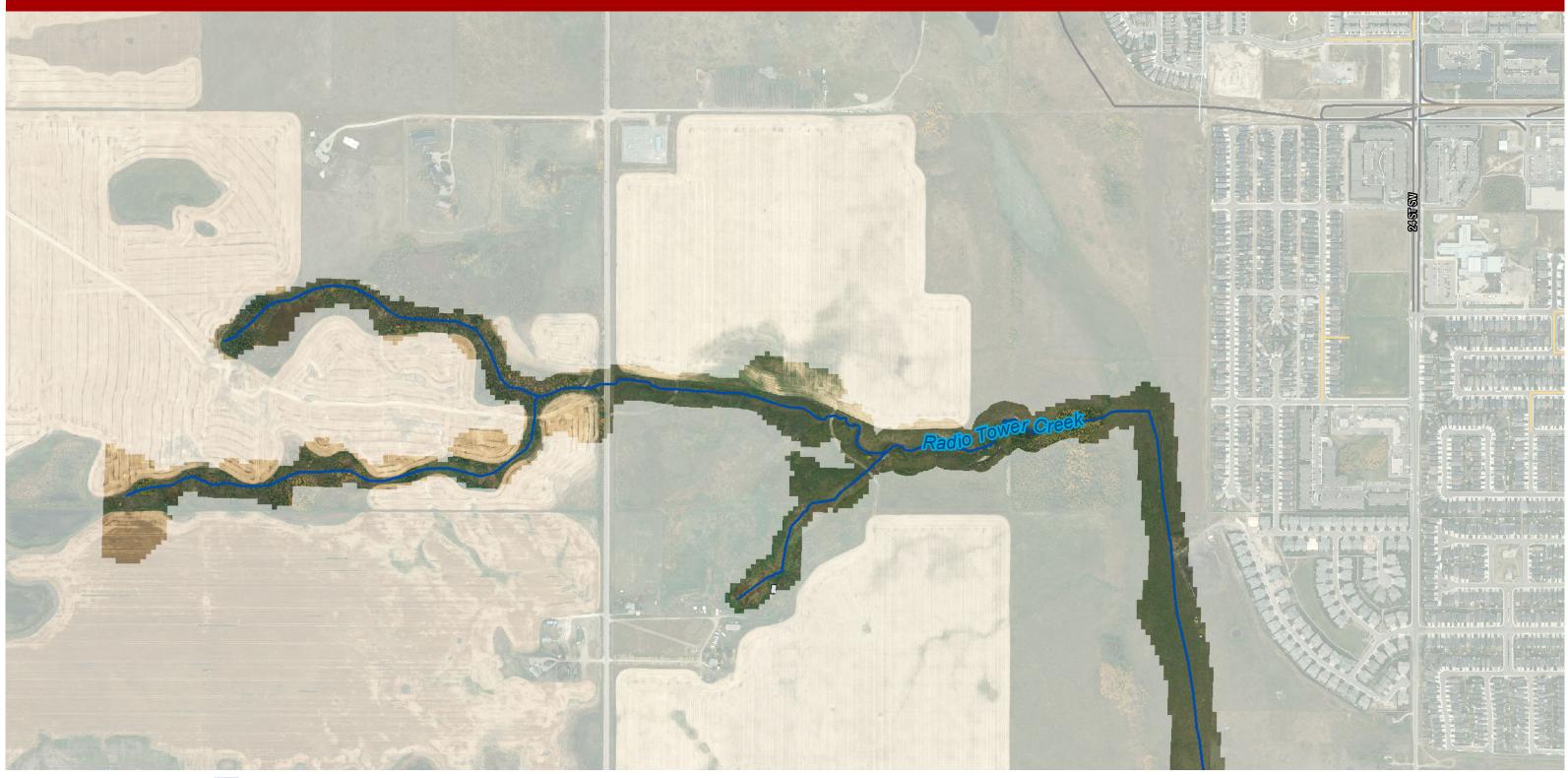
*Note that ER setbacks for lower order streams are not mapped as they were out of the project scope

**Recommended setback boundary of Nose Creek Watershed Partnership including floodplain, meander belt width and adjacent escarpments >15%

LAND AND REGULATORY ISSUES RADIO TOWER CREEK 01



EXISTING INFRASTRUCTURE AND POSSIBLE IMPROVEMENTS RADIO TOWER CREEK 01



- Storm Outflow Location
 Stormwater Lift Station
 Storm Main (> 900mm diameter)
 Sanitary Main (>600mm diameter)
 Water Main (>400mm diameter)
 Siphon
 Pipeline River Crossing Locations
 Water / Waste Water Treatment Plants
- Water / Waste Water Treatment Plan
 Existing Storm Retrofit Pond
- Possible Location of Storm Retrofit Pond

- Existing Storm Pond
- Existing Bank Infrastructure (e.g., Rip Rap, Retaining Walls, Weirs)
- Bank Erosion Hotspot
- Candidate Flood / Erosion Control Projects
- Paved Trails
- Bridge Buildings
- Parks (Maintained Turf Areas)

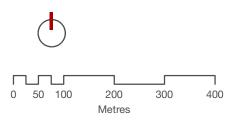
- City BoundaryMajor Roads
- +++++ Rail
 Streams
- Fish Creek Provincial Park

The non-masked area is based on the greater of:

(i) outer riparian zone of the variable width model,
(ii) City ER setback policy boundary,
(iii) Nose Creek Watershed Partnership recommended setback policy
(See Theme 2-Land and Regulatory Issues)

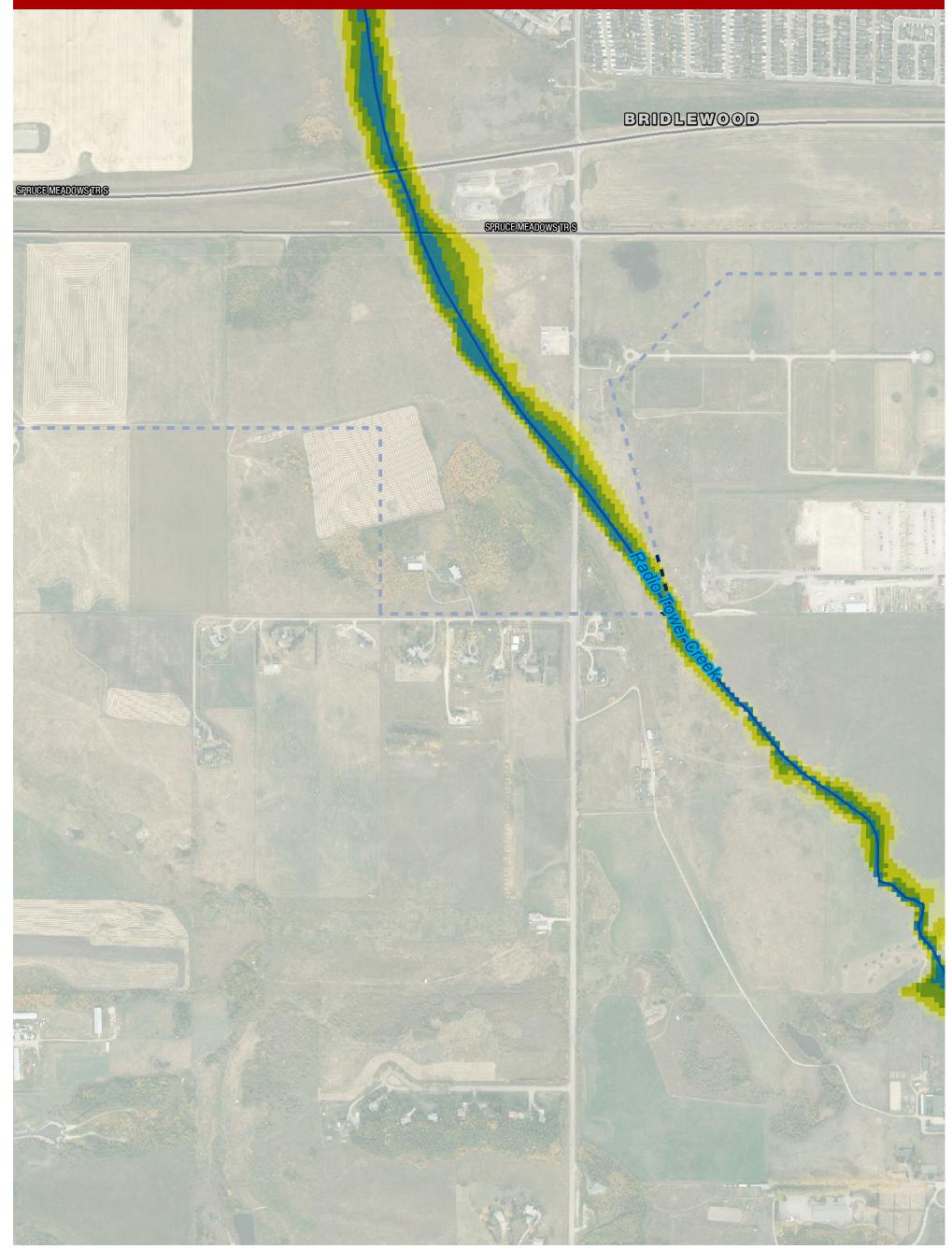








RIPARIAN AREA - LOCATION AND FUNCTION RADIO TOWER CREEK 02



Riparian Zone*

Inner Riparian Zone Middle Riparian Zone Outer Riparian Zone

Potential Outermost Riparian Zone

*Variable Width Riparian Model Outputs

 Riparian Health**

 Healthy

 Healthy, but with Problems

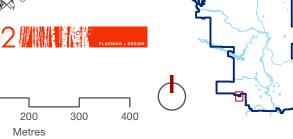
 Unhealthy

Bank Health*** Good Moderate

Poor

***Based on field studies of major rivers / creeks, excluding private residential riverfront lots or steep valley slopes with limited riparian habitat

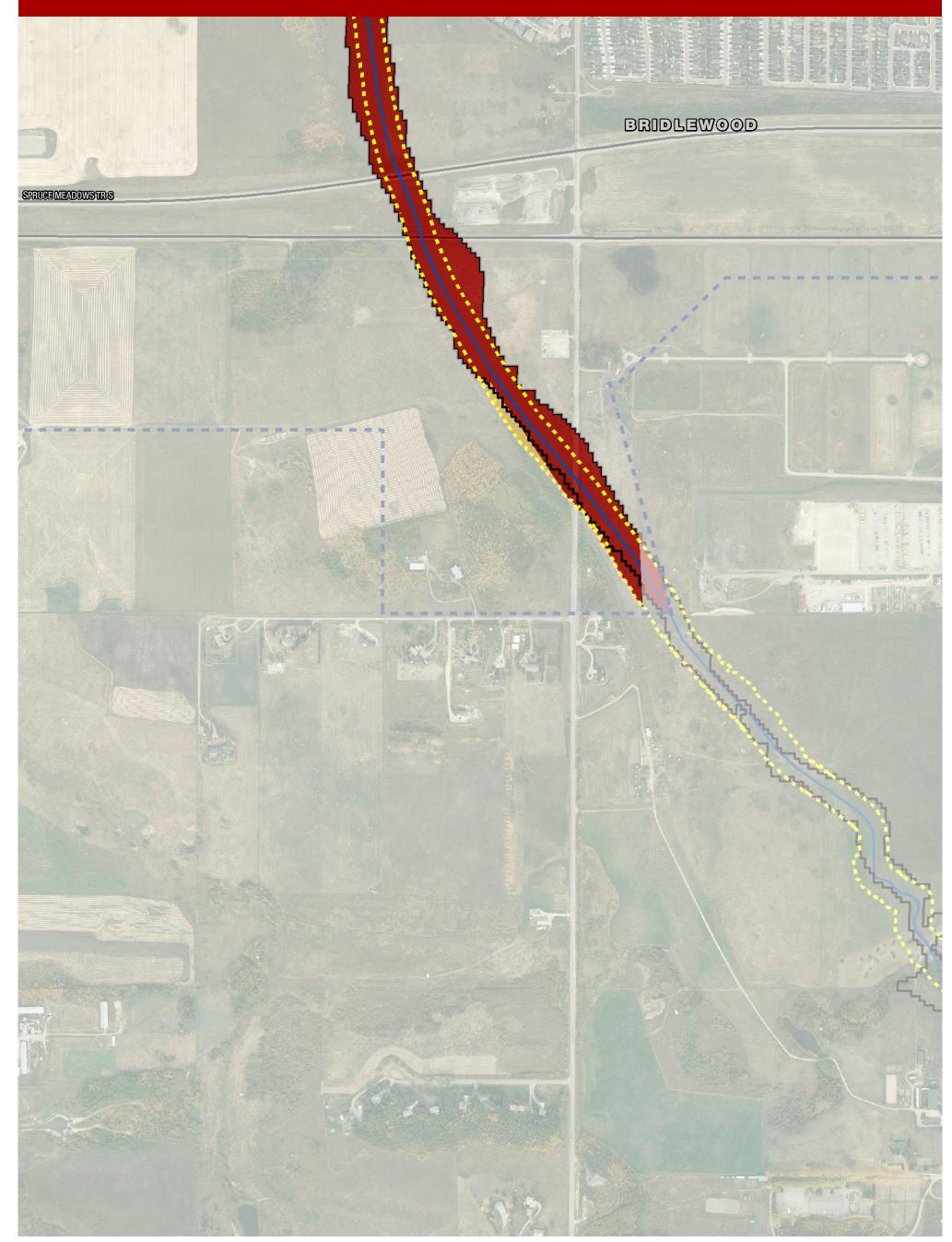




**Based on field studies of sampled riparian polygons only

Met

LAND AND REGULATORY ISSUES RADIO TOWER CREEK 02



Land Use Type		
	Commercial	
	Future Urban Development	
	Industrial	
	Institutional	

- Major Infrastructure
- Mixed Use
- Residential
- Parks, Recreation and Public Education
- Golf Course
- City of Calgary ER Setback Policy* <mark>,</mark> . . . Nose Creek Watershed Partnership Setback**

 - Flood Fringe
 - Flood Extent 100 Year (Nose Creek/West Nose Creek)
 - Outer Riparian Zone Boundary
 - Streams
 - Major Roads
- HH Rail
- *Note that ER setbacks for lower order streams are not mapped as they were out of the project scope
 - **Recommended setback boundary of Nose Creek Watershed Partnership including floodplain, meander belt width and adjacent escarpments >15%

City Boundary

Fish Creek Provincial Park

CALGARY

300

400



200 Metres

EXISTING INFRASTRUCTURE AND POSSIBLE IMPROVEMENTS RADIO TOWER CREEK 02



- Storm Outflow Location
- Stormwater Lift Station
- Storm Main (>900mm diameter)
- Sanitary Main (>600mm diameter)
- Water Main (>400mm diameter)
- Siphon
- Pipeline River Crossing Locations
- Water / Waste Water Treament Plants
- Existing Storm Retrofit Pond
- Possible Location of Storm Retrofit Pond
- Existing Storm Pond
- Existing Bank Infrastructure (e.g., Rip Rap, Retaining Walls, Weirs)
- Bank Erosion Hotspot

- Candidate Flood / Erosion Control Projects
- Paved Trails
- Gravel Trails
- = Bridge
- Buildings
- Parks (Maintained Turf Areas)
- City Boundary
 Major Roads
- ⊢++ Rail
- Streams
- Fish Creek Provincial Park

The non-masked area is based on the greater of:

(i) outer riparian zone of the variable width model, (ii) City ER setback policy boundary,
 (iii) Nose Creek Watershed Partnership recommended setback policy

(See Theme 2-Land and Regulatory Issues)



300

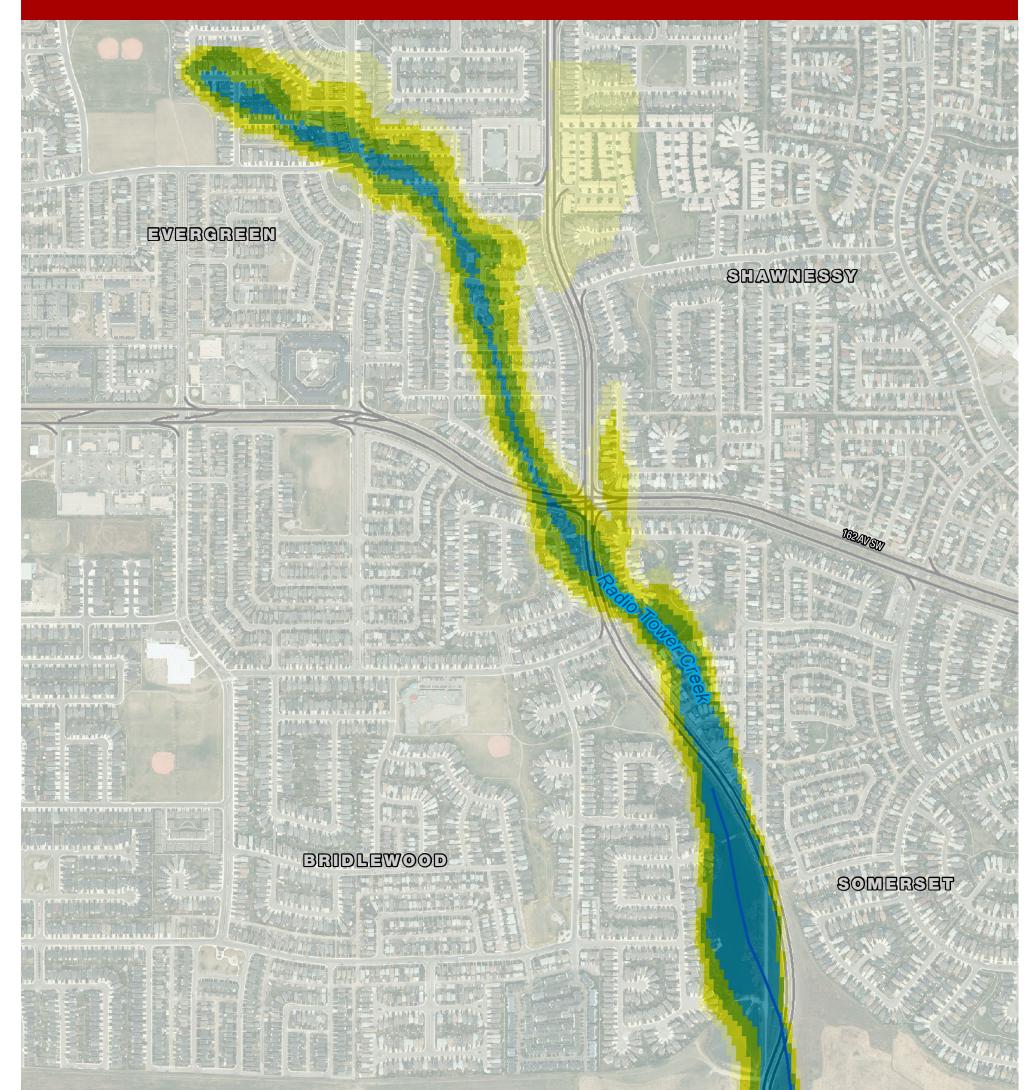


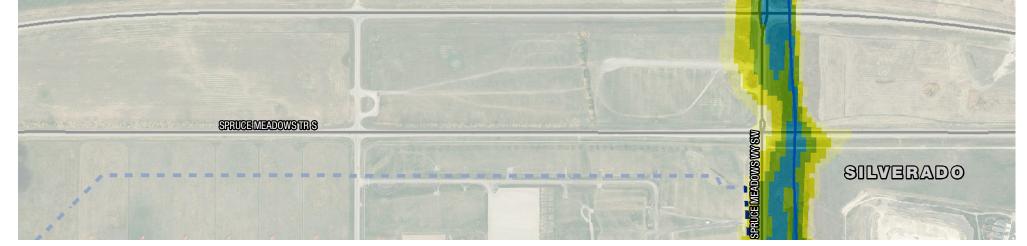
T

400

200 Metres

RIPARIAN AREA - LOCATION AND FUNCTION RADIO TOWER CREEK 03





Riparian Zone*

Inner Riparian Zone Middle Riparian Zone Outer Riparian Zone

Potential Outermost Riparian Zone

*Variable Width Riparian Model Outputs

Riparian Health** Healthy Healthy, but with Problems Unhealthy

**Based on field studies of

sampled riparian polygons only

Bank Health*** Good Moderate

Poor

***Based on field studies of major rivers / creeks, excluding private residential riverfront lots or steep valley slopes with limited riparian habitat







0 50 100



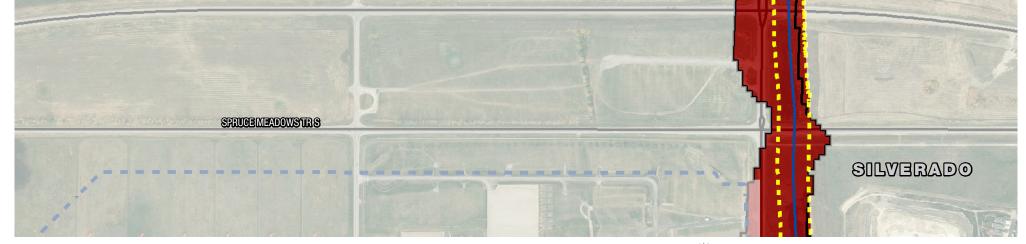
300

400



LAND AND REGULATORY ISSUES RADIO TOWER CREEK 03





City Boundary

Fish Creek Provincial Park

Land Use Type

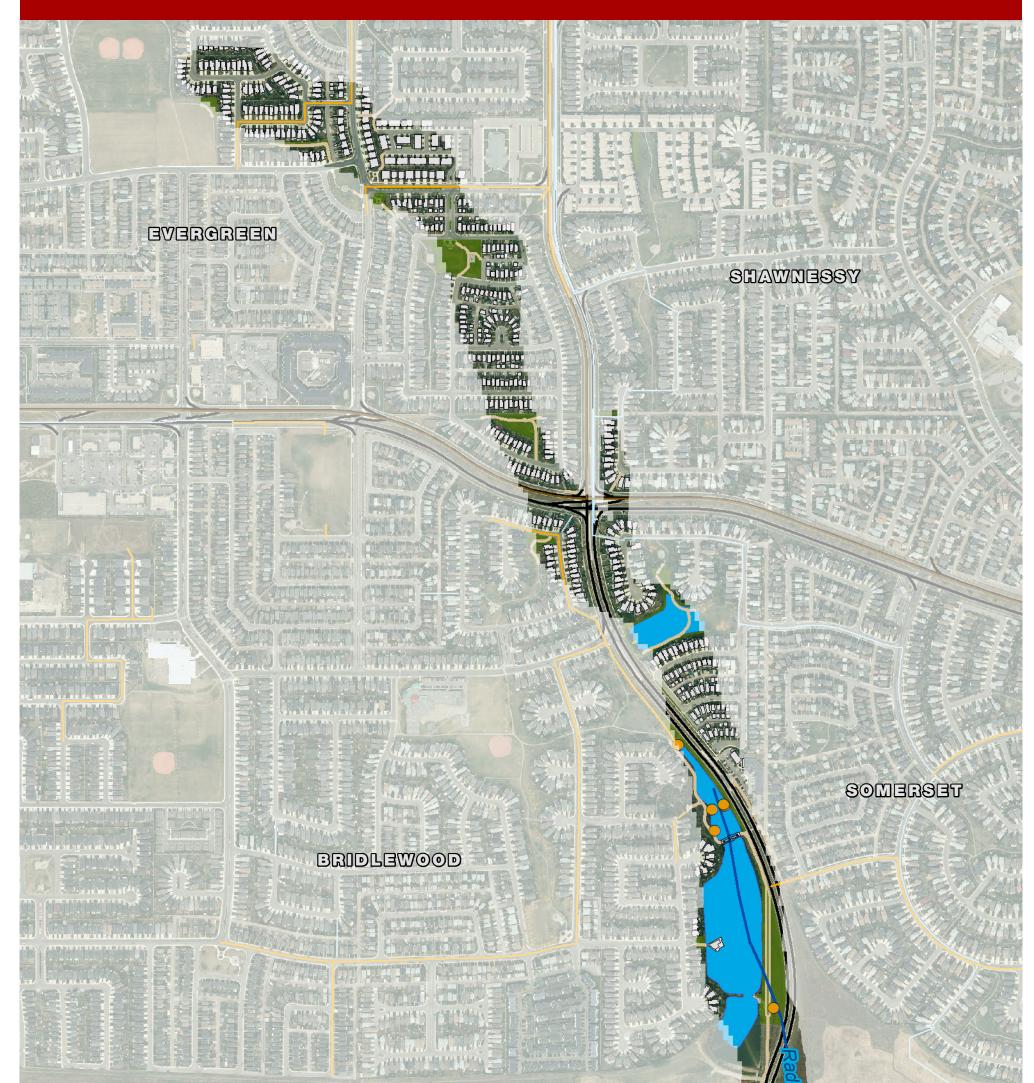
- Commercial Future Urban Development Industrial Institutional Major Infrastructure
 - Mixed Use
 - Residential
 - Parks, Recreation and Public Education
 - Golf Course
- City of Calgary ER Setback Policy* Nose Creek Watershed Partnership Setback** ZZ Floodway
 - 📝 Flood Fringe
 - Flood Extent 100 Year (Nose Creek/West Nose Creek)
 - Outer Riparian Zone Boundary
 - Streams
 - Major Roads
- n ++++ Rail
- *Note that ER setbacks for lower order streams are not mapped as they were out of the project scope
 - **Recommended setback boundary of Nose Creek Watershed Partnership including floodplain, meander belt width and adjacent escarpments >15%

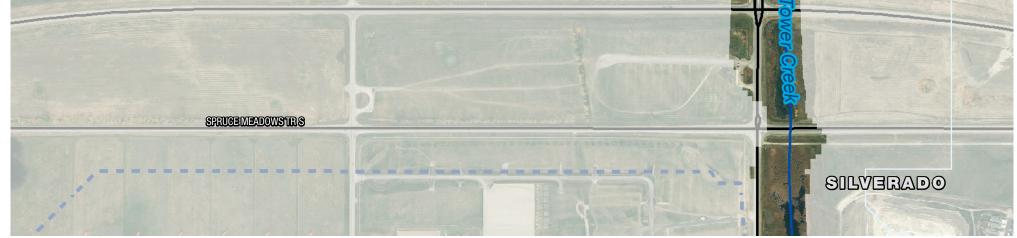






EXISTING INFRASTRUCTURE AND POSSIBLE IMPROVEMENTS RADIO TOWER CREEK 03





- Storm Outflow Location
- Stormwater Lift Station
- Storm Main (>900mm diameter)
- Sanitary Main (>600mm diameter)
- Water Main (>400mm diameter)
- Siphon
- Pipeline River Crossing Locations
- Water / Waste Water Treament Plants
- Existing Storm Retrofit Pond
- Possible Location of Storm Retrofit Pond
- Existing Storm Pond
- Existing Bank Infrastructure (e.g., Rip Rap, Retaining Walls, Weirs)
- Bank Erosion Hotspot

- Candidate Flood / Erosion Control Projects
- Paved Trails
- --- Gravel Trails
- ------ Bridge
- Buildings
- Parks (Maintained Turf Areas)
- City Boundary
- Major Roads
- ⊢++ Rail
- Streams
- Fish Creek Provincial Park

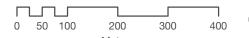
The non-masked area is based on the greater of:

 (i) outer riparian zone of the variable width model,
 (ii) City ER setback policy boundary,
 (iii) Nose Creek Watershed Partnership recommended setback policy

(See Theme 2-Land and Regulatory Issues)

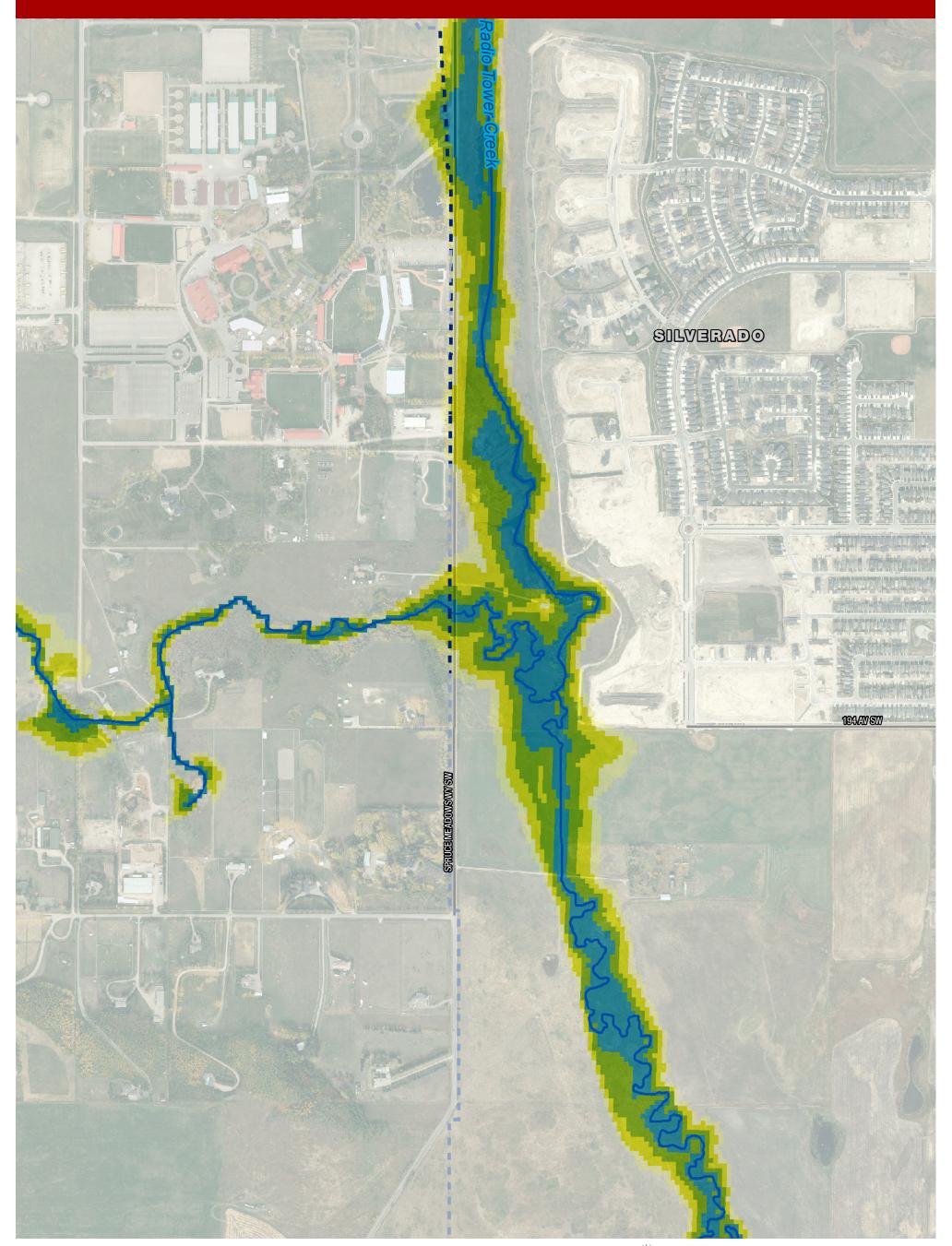








RIPARIAN AREA - LOCATION AND FUNCTION RADIO TOWER CREEK 04



Riparian Zone*

Inner Riparian Zone Middle Riparian Zone Outer Riparian Zone

Potential Outermost Riparian Zone

*Variable Width Riparian Model Outputs

Riparian Health** Healthy Healthy, but with Problems Unhealthy

**Based on field studies of

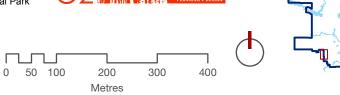
sampled riparian polygons only

Bank Health*** Good Moderate

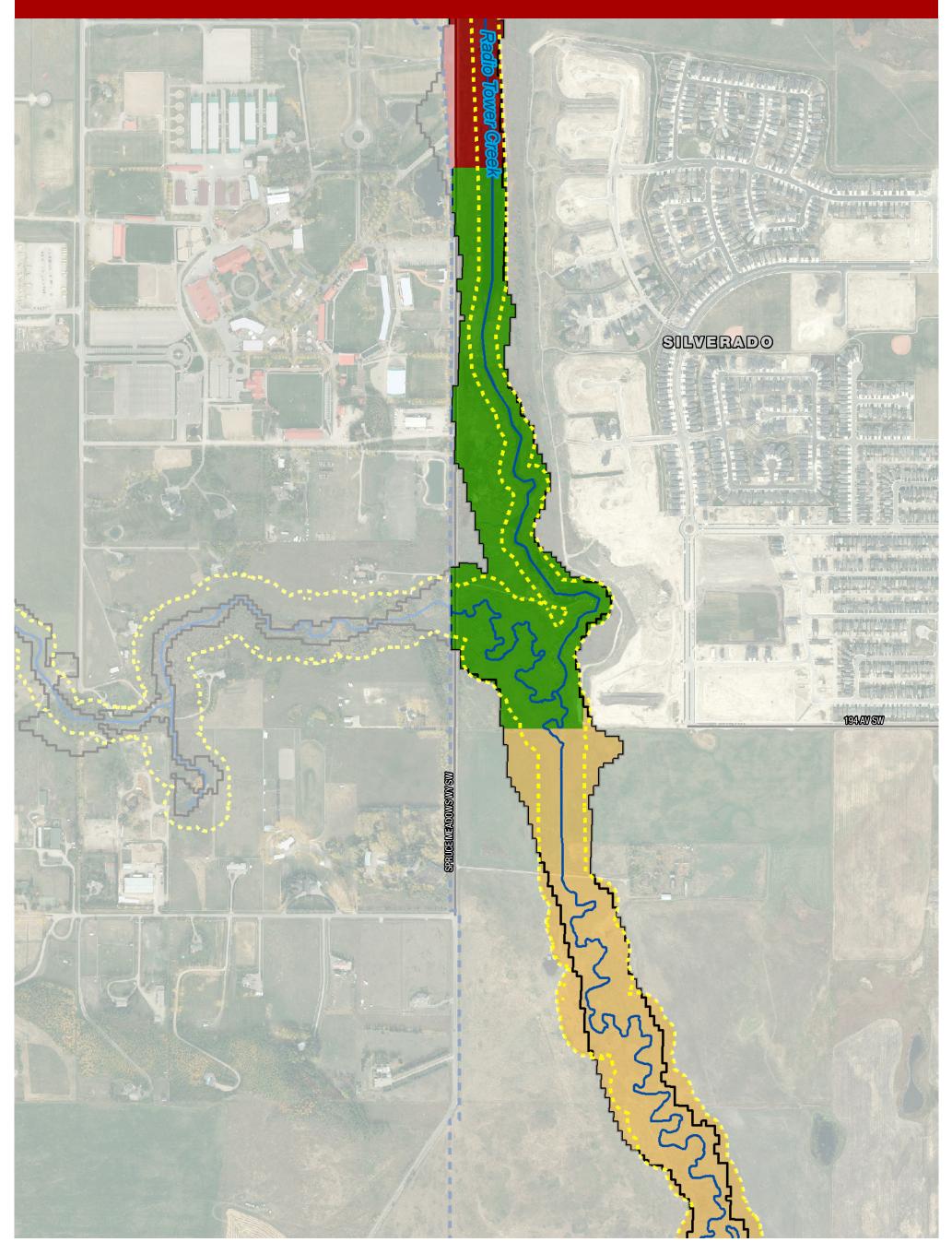
Poor

***Based on field studies of major rivers / creeks, excluding private residential riverfront lots or steep valley slopes with limited riparian habitat





LAND AND REGULATORY ISSUES RADIO TOWER CREEK 04



Land Use Type Commercial

- Future Urban Development
- Industrial
- Institutional
- Major Infrastructure
- Mixed Use
- Residential

Golf Course

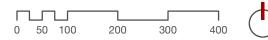
- Parks, Recreation and Public Education
- City of Calgary ER Setback Policy* City of Calgary ER Setback Policy* Nose Creek Watershed Partnership Setback** Z Floodway

 - Flood Fringe
 - Flood Extent 100 Year (Nose Creek/West Nose Creek)
 - Outer Riparian Zone Boundary
 - Streams
 - Major Roads
- HH Rail

City Boundary

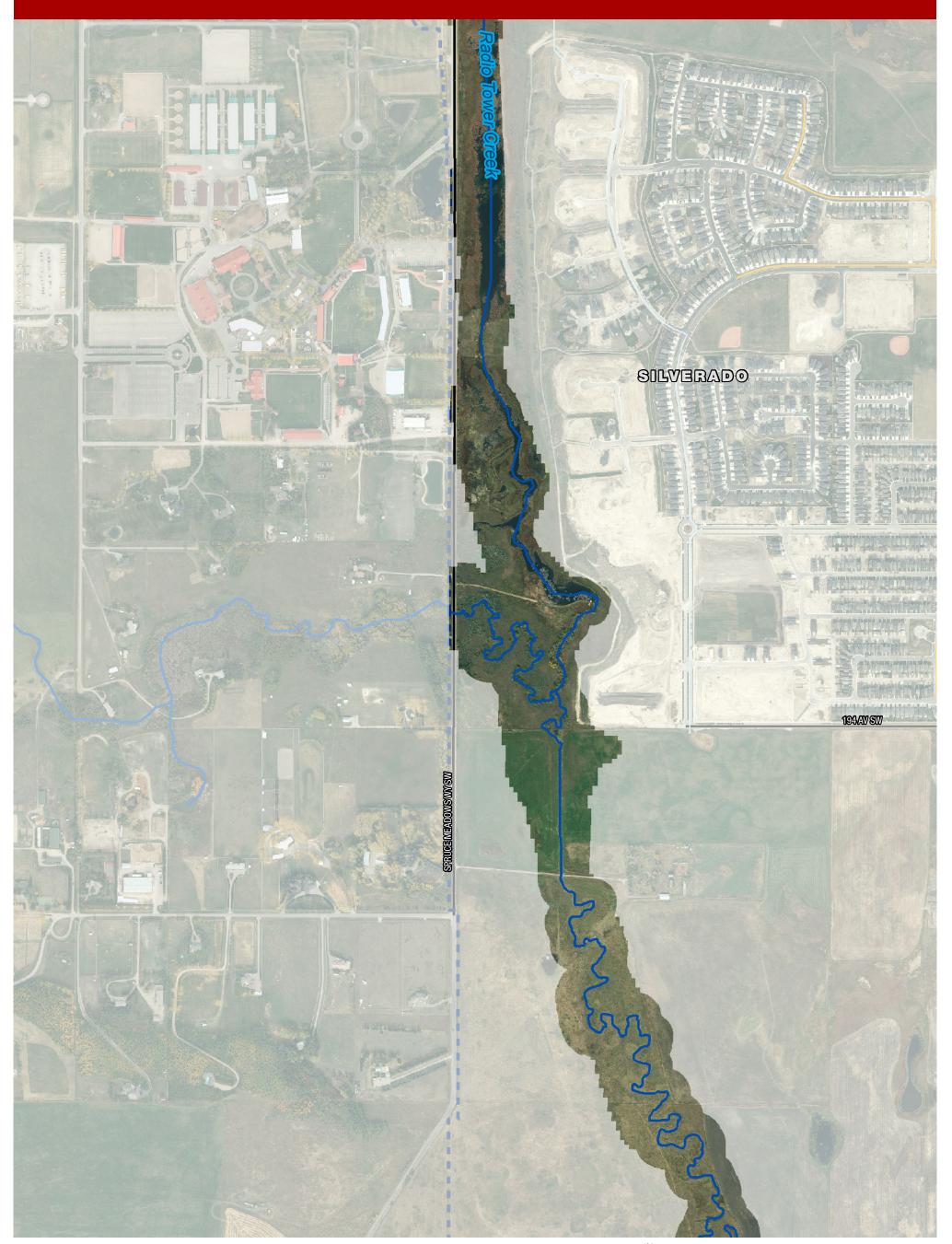
Fish Creek Provincial Park

- *Note that ER setbacks for lower order streams are not mapped as they were out of the project scope
- **Recommended setback boundary of Nose Creek Watershed Partnership including floodplain, meander belt width and adjacent escarpments >15%
- THE CITY OF





EXISTING INFRASTRUCTURE AND POSSIBLE IMPROVEMENTS RADIO TOWER CREEK 04



- Storm Outflow Location
- Stormwater Lift Station
- Storm Main (>900mm diameter)
- Sanitary Main (>600mm diameter)
- Water Main (>400mm diameter)
- Siphon
- Pipeline River Crossing Locations
- Water / Waste Water Treament Plants
- Existing Storm Retrofit Pond
- Possible Location of Storm Retrofit Pond
- Existing Storm Pond
- Existing Bank Infrastructure (e.g., Rip Rap, Retaining Walls, Weirs)
- Bank Erosion Hotspot

- Candidate Flood / Erosion Control Projects
- Paved Trails
- Gravel Trails
- = Bridge
- Buildings
- Parks (Maintained Turf Areas)
- City Boundary
 Major Roads
 HH Rail

- Streams
- Fish Creek Provincial Park

The non-masked area is based on the greater of:

(i) outer riparian zone of the variable width model,
(ii) City ER setback policy boundary,
(iii) Nose Creek Watershed Partnership recommended setback policy

(See Theme 2-Land and Regulatory Issues)









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RIPARIAN AREA - LOCATION AND FUNCTION PINE CREEK 01



Riparian Zone*

- Inner Riparian Zone Middle Riparian Zone Outer Riparian Zone
 - Potential Outermost Riparian Zone

*Variable Width Riparian Model Outputs

Riparian Health** Healthy Healthy, but with Problems Unhealthy

**Based on field studies of

sampled riparian polygons only

***Based on field studies of major rivers / creeks, excluding private residential riverfront lots or steep valley slopes with limited riparian habitat

Bank Health***

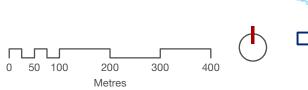
Moderate

Good

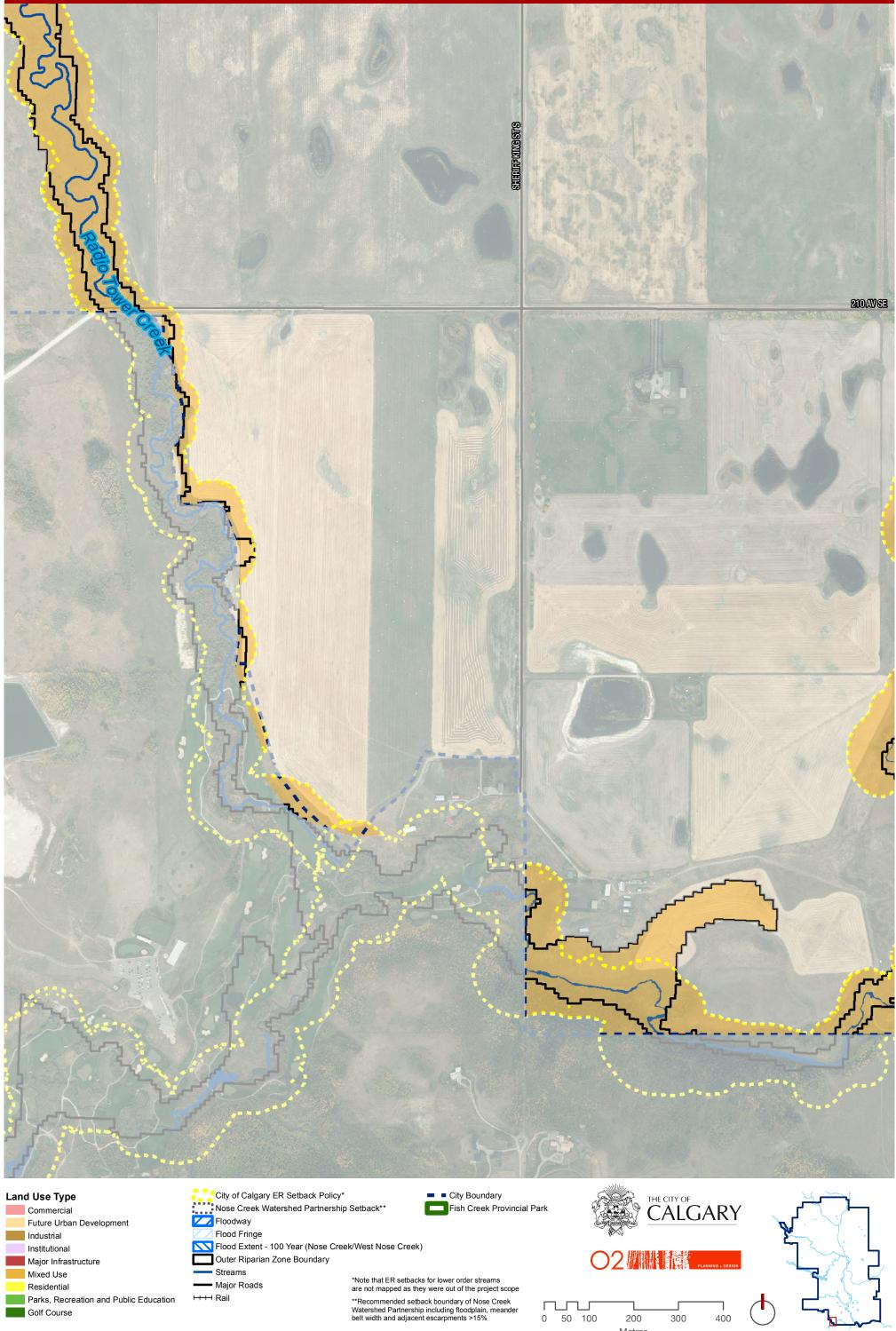
Poor



CALGARY



LAND AND REGULATORY ISSUES PINE CREEK 01



EXISTING INFRASTRUCTURE AND POSSIBLE IMPROVEMENTS PINE CREEK 01



- Storm Outflow Location
- Stormwater Lift Station
- Storm Main (>900mm diameter)
- Sanitary Main (>600mm diameter)
- Water Main (>400mm diameter)
- Siphon
- Pipeline River Crossing Locations
- Water / Waste Water Treament Plants
- Existing Storm Retrofit Pond
- Possible Location of Storm Retrofit Pond
- Existing Storm Pond
- Existing Bank Infrastructure (e.g., Rip Rap, Retaining Walls, Weirs)
- Bank Erosion Hotspot

- Candidate Flood / Erosion Control Projects
- Paved Trails
- Gravel Trails
- Bridge Buildings
- Parks (Maintained Turf Areas)
- City Boundary
 Major Roads
 HH Rail

- Streams
- Fish Creek Provincial Park

The non-masked area is based on the greater of:

(i) outer riparian zone of the variable width model,
(ii) City ER setback policy boundary,
(iii) Nose Creek Watershed Partnership recommended setback policy

(See Theme 2-Land and Regulatory Issues)



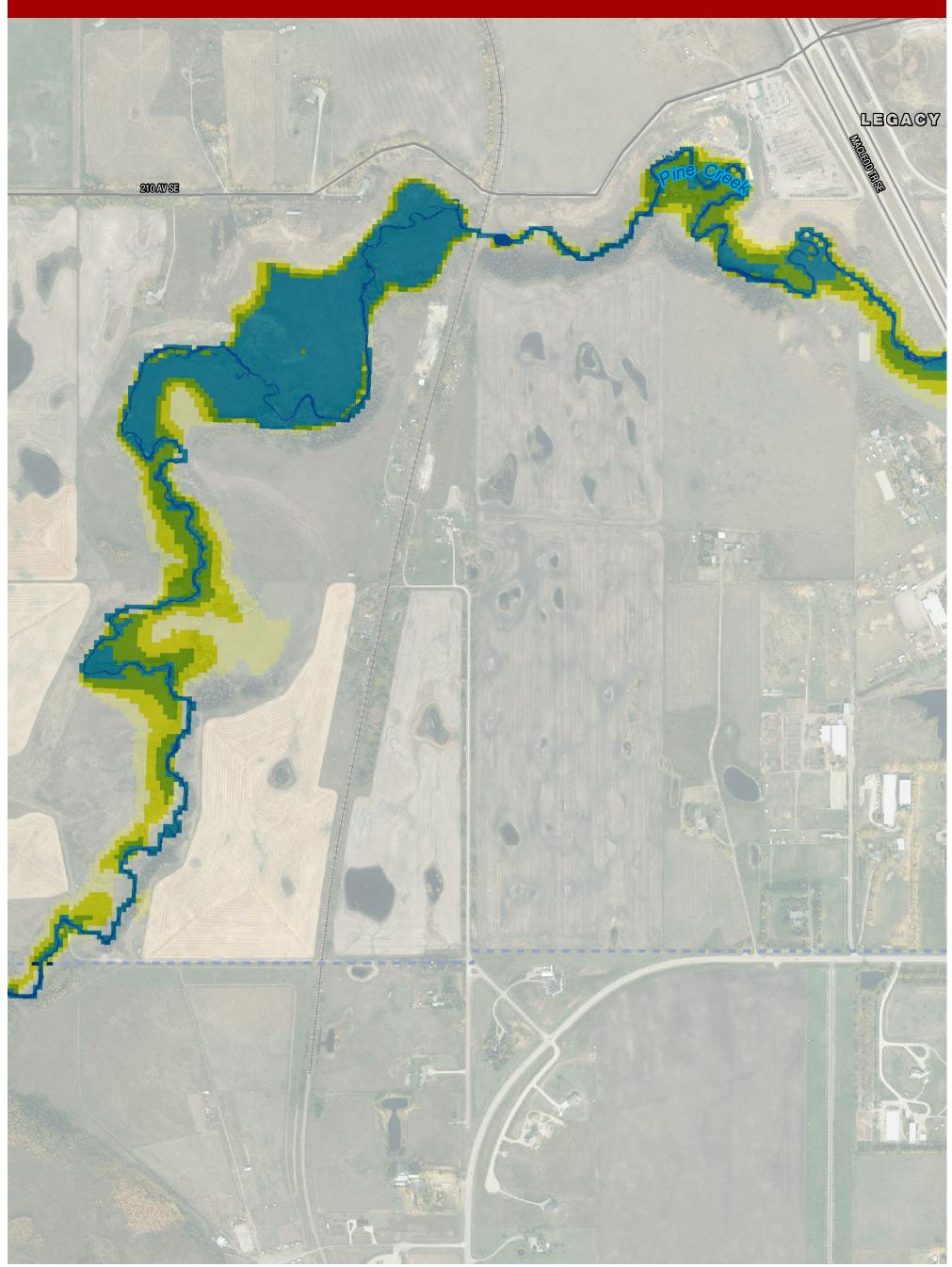
300

400



200 Metres

RIPARIAN AREA - LOCATION AND FUNCTION PINE CREEK 02



Riparian Zone*

Inner Riparian Zone Middle Riparian Zone Outer Riparian Zone

Potential Outermost Riparian Zone

*Variable Width Riparian Model Outputs

 Riparian Health**

 Healthy

 Healthy, but with Problems

 Unhealthy

**Based on field studies of

sampled riparian polygons only

Bank Health*** Good Moderate

Poor

***Based on field studies of major rivers / creeks, excluding private residential riverfront lots or steep valley slopes with limited riparian habitat



THE CITY OF CALGARY

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300



T

400

200 Metres

LAND AND REGULATORY ISSUES PINE CREEK 02

RIPARIAN AREAS MAP PROJECT



Land Use Type Commercial Future Urban Development	City of Calgary ER Setback P		
Industrial	Flood Fringe		
Institutional	Flood Extent - 100 Year (Nose Creek/West Nose Creek)		
Major Infrastructure	Outer Riparian Zone Bounda	ry	
Mixed Use	Streams		
Residential	Major Roads	*Note that ER setbacks for lower order streams are not mapped as they were out of the project scope	
Parks, Recreation and Public Education Golf Course	++++ Rail	**Recommended setback boundary of Nose Creek Watershed Partnership including floodplain, meander belt width and adjacent escarpments >15%	0 50 100 200 30



EXISTING INFRASTRUCTURE AND POSSIBLE IMPROVEMENTS PINE CREEK 02



- Storm Outflow Location
- Stormwater Lift Station
- Storm Main (>900mm diameter)
- Sanitary Main (>600mm diameter)
- Water Main (>400mm diameter)
- Siphon
- Pipeline River Crossing Locations
- Water / Waste Water Treament Plants
- Existing Storm Retrofit Pond
- Possible Location of Storm Retrofit Pond
- Existing Storm Pond
- Existing Bank Infrastructure (e.g., Rip Rap, Retaining Walls, Weirs)
- Bank Erosion Hotspot

- Candidate Flood / Erosion Control Projects
- Paved Trails
- Gravel Trails
- Bridge Buildings
- Parks (Maintained Turf Areas)
- City Boundary
 Major Roads
 HH Rail

- Streams
- Fish Creek Provincial Park

The non-masked area is based on the greater of:

(i) outer riparian zone of the variable width model,
(ii) City ER setback policy boundary,
(iii) Nose Creek Watershed Partnership recommended setback policy

(See Theme 2-Land and Regulatory Issues)



300

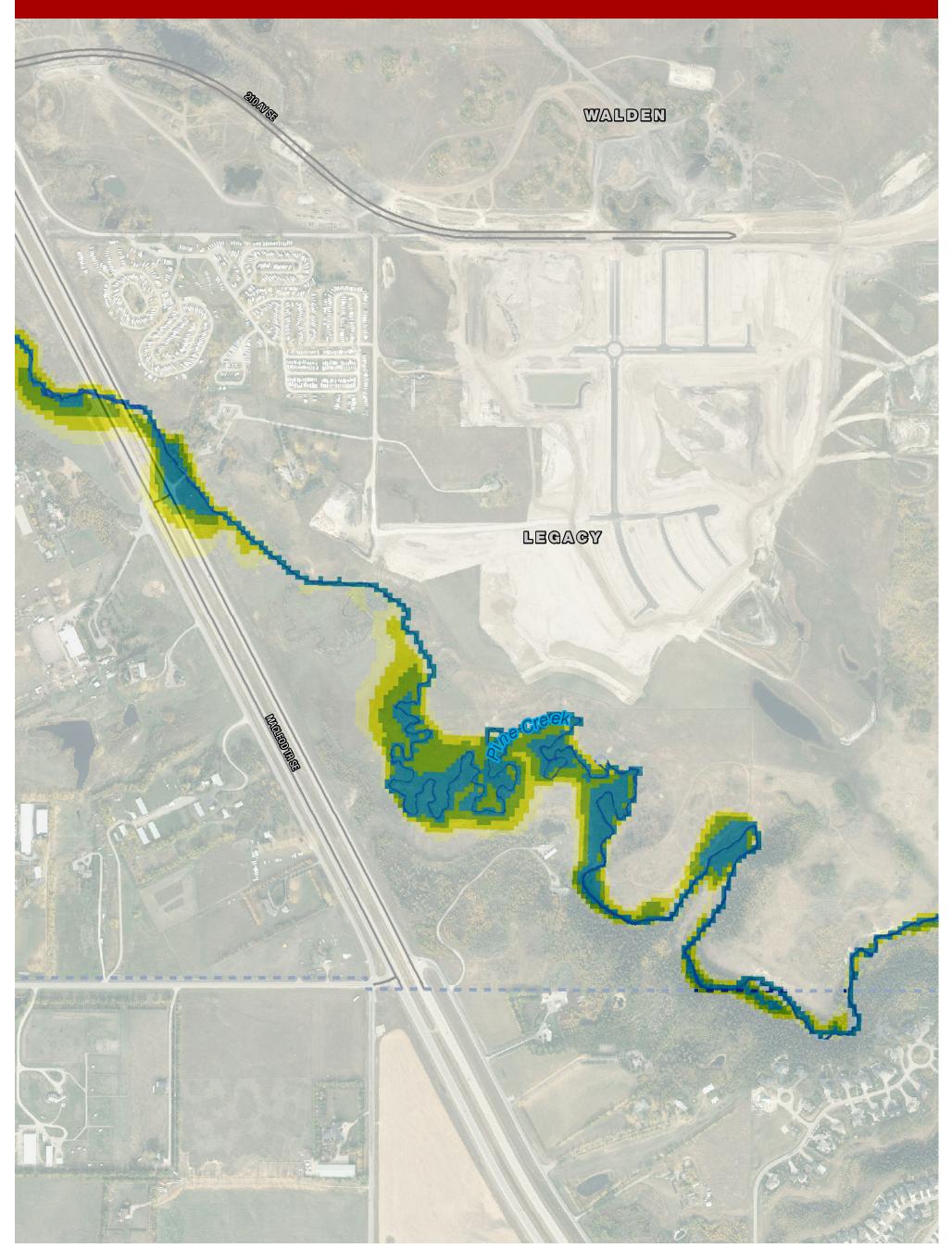


1

400

200 Metres

RIPARIAN AREA - LOCATION AND FUNCTION PINE CREEK 03



Riparian Zone*

Inner Riparian Zone Middle Riparian Zone Outer Riparian Zone

Potential Outermost Riparian Zone

*Variable Width Riparian Model Outputs

 Riparian Health**

 Healthy

 Healthy, but with Problems

 Unhealthy

**Based on field studies of

sampled riparian polygons only

Bank Health*** Good Moderate

Poor

***Based on field studies of major rivers / creeks, excluding private residential riverfront lots or steep valley slopes with limited riparian habitat





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300

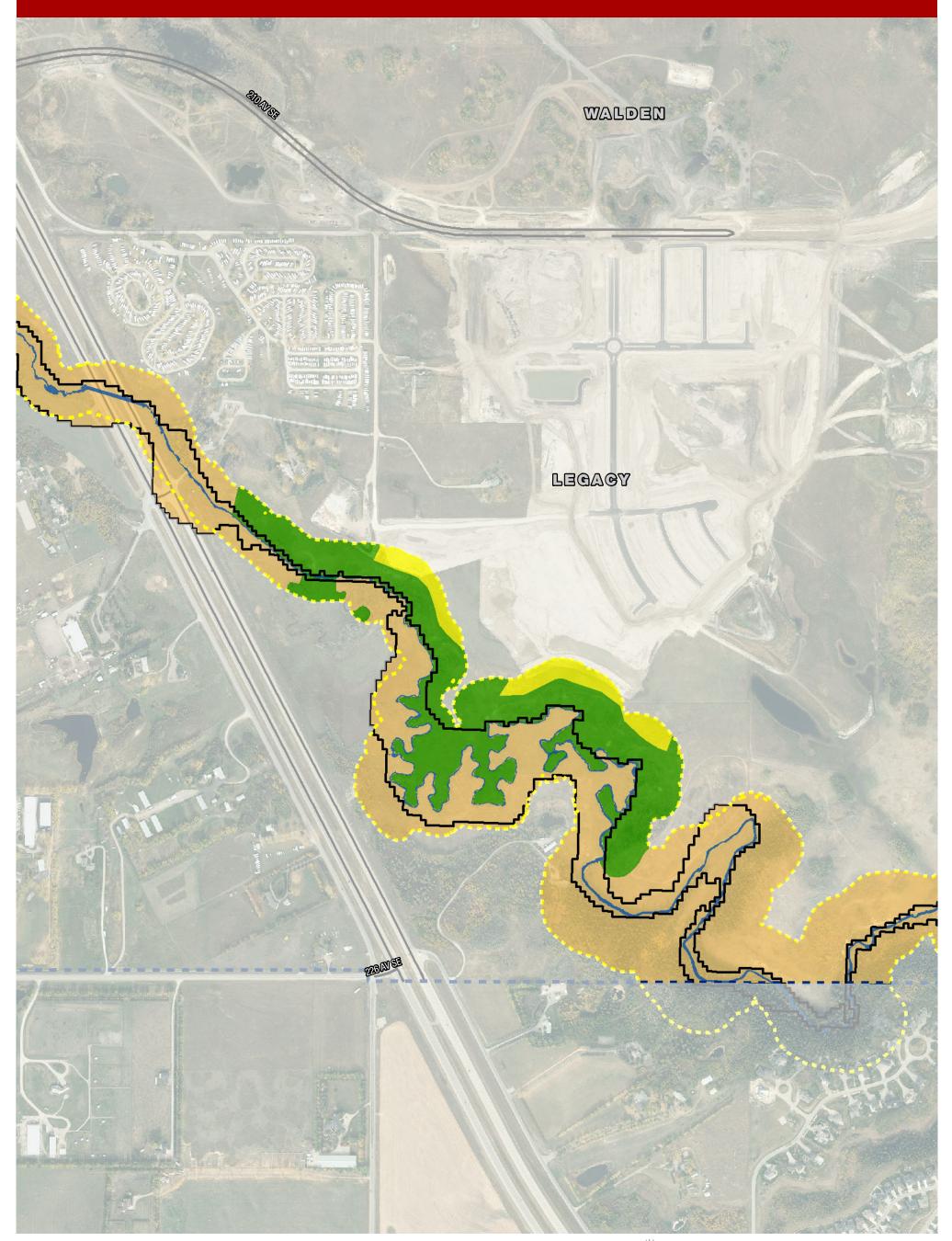


T

400

200 Metres

LAND AND REGULATORY ISSUES PINE CREEK 03



Land Use Type Commercial Future Urban Development	City of Calgary ER Setback Policy Nose Creek Watershed Partnersh Floodway Flood Fringe		
Major Infrastructure Mixed Use Residential	Flood Extent - 100 Year (Nose Cru Outer Riparian Zone Boundary Streams Major Roads	eek/West Nose Creek) *Note that ER setbacks for lower order streams are not mapped as they were out of the project scope	
Parks, Recreation and Public Education Golf Course	++++ Rail	**Recommended setback boundary of Nose Creek Watershed Partnership including floodplain, meander belt width and adjacent escarpments >15%	0 50 100 200 300 400



Metres

T

EXISTING INFRASTRUCTURE AND POSSIBLE IMPROVEMENTS PINE CREEK 03





- Storm Outflow Location
- Stormwater Lift Station
- Storm Main (>900mm diameter)
- Sanitary Main (>600mm diameter)
- Water Main (>400mm diameter)
- Siphon
- Pipeline River Crossing Locations
- Water / Waste Water Treament Plants
- Existing Storm Retrofit Pond
- Possible Location of Storm Retrofit Pond
- Existing Storm Pond
- Existing Bank Infrastructure (e.g., Rip Rap, Retaining Walls, Weirs)
- Bank Erosion Hotspot

- Candidate Flood / Erosion Control Projects
- Paved Trails
- Gravel Trails
- Bridge Buildings
- Parks (Maintained Turf Areas)
- City Boundary
 Major Roads
 HH Rail

- Streams
- Fish Creek Provincial Park

The non-masked area is based on the greater of:

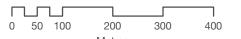
(i) outer riparian zone of the variable width model,
(ii) City ER setback policy boundary,
(iii) Nose Creek Watershed Partnership recommended setback policy

(See Theme 2-Land and Regulatory Issues)

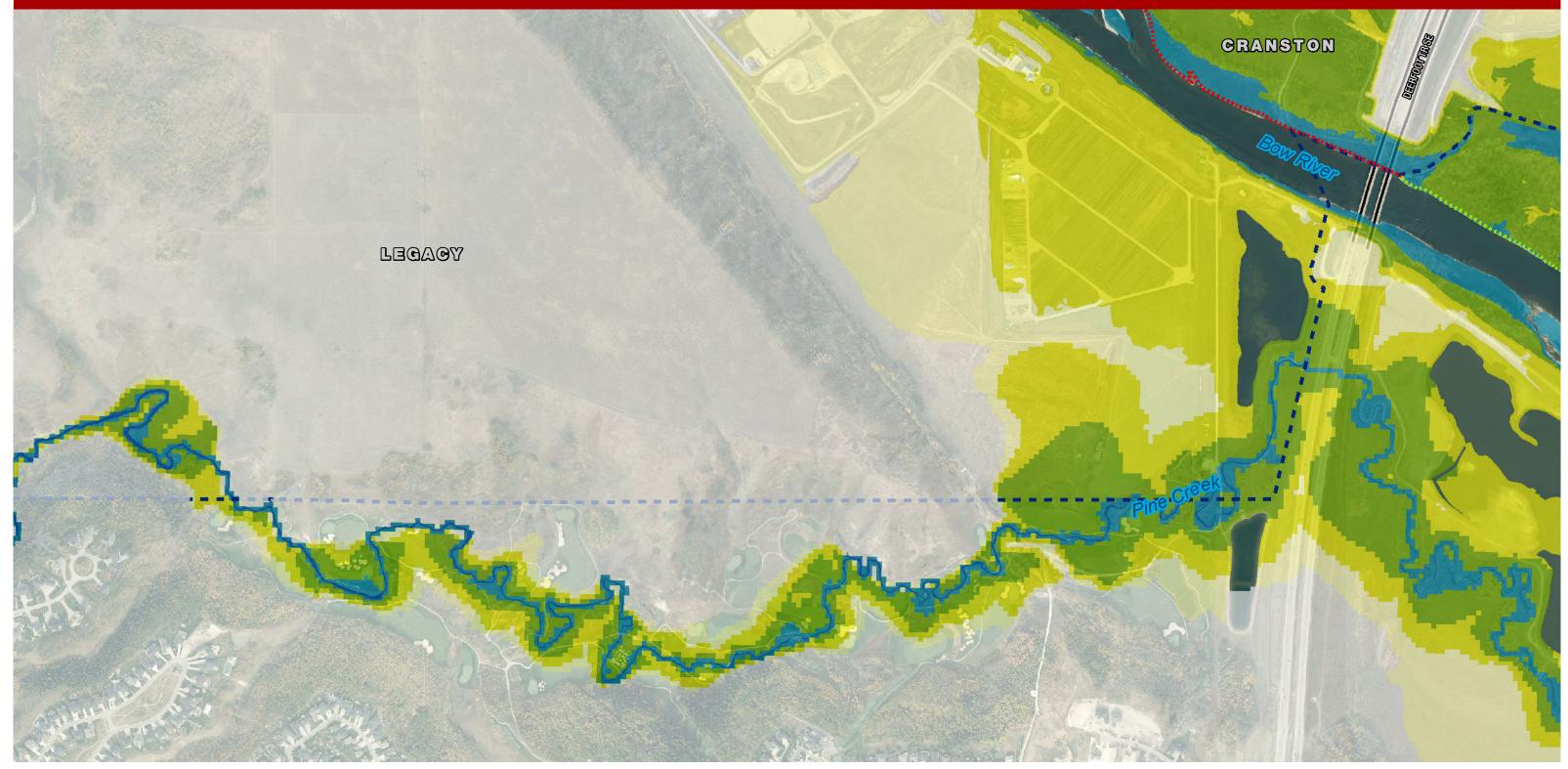




1







Riparian Zone*



Riparian Health**

Healthy Healthy, but with Problems Unhealthy

Bank Health***

Good Moderate

Poor

***Based on field studies of major rivers / creeks, excluding private residential riverfront lots

+++++ Rail Streams



City Boundary

— Major Roads



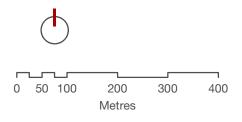


*Variable Width Riparian Model Outputs

**Based on field studies of sampled riparian polygons only

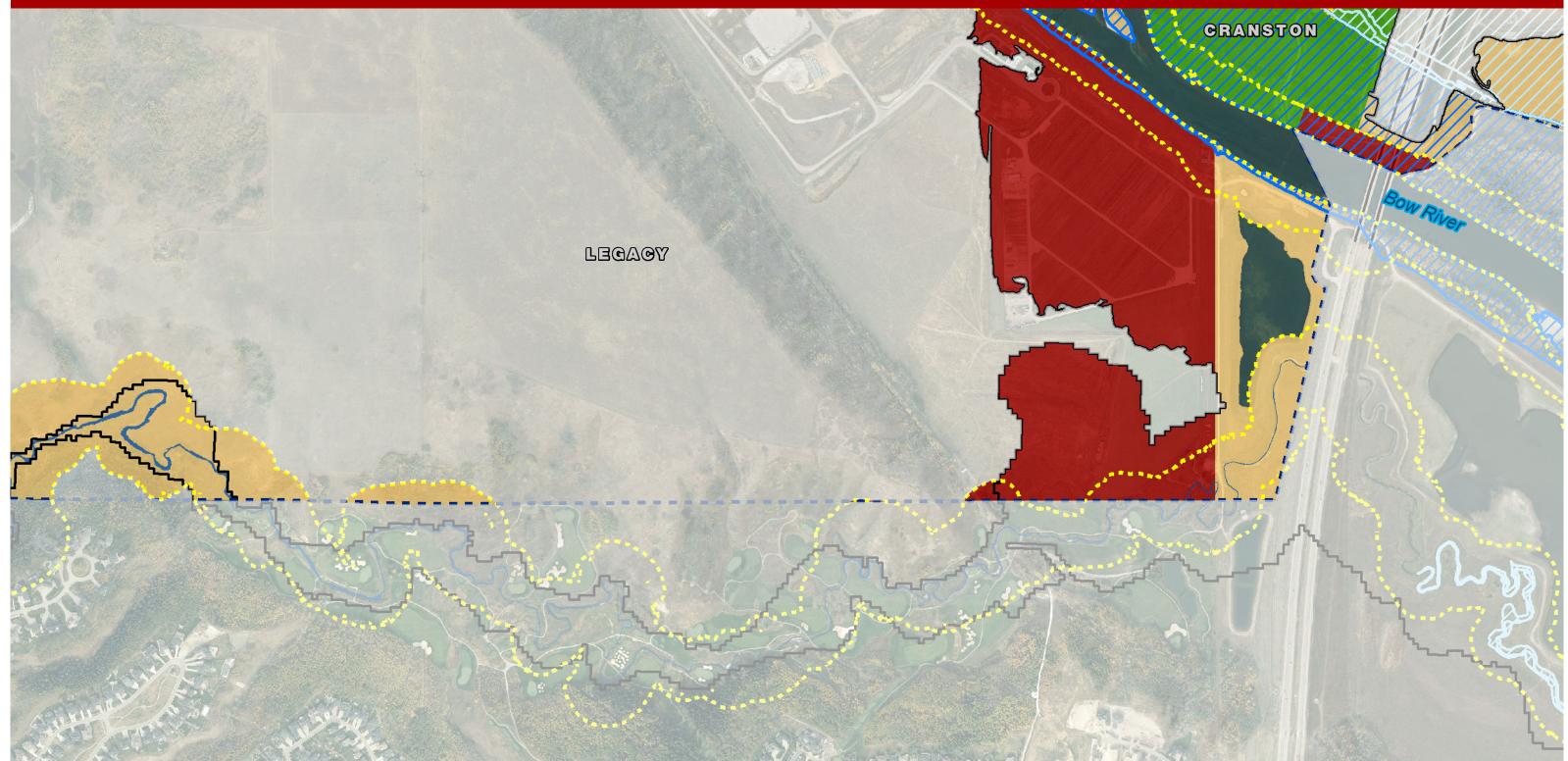
or steep valley slopes with limited riparian habitat

RIPARIAN AREA - LOCATION AND FUNCTION PINE CREEK 04













City of Calgary ER Setback Policy* Nose Creek Water Management Plan Setback **

Flood Extent - 100 Year (Nose Creek/West Nose Creek) _____ Fish Creek Provincial Park

Outer Riparian Zone Boundary

- Streams — Major Roads
- +++++ Rail City Boundary

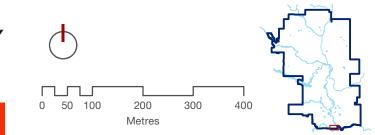




*Note that ER setbacks for lower order streams are not mapped as they were out of the project scope

**Recommended setback boundary of Nose Creek Watershed Partnership including floodplain, meander belt width and adjacent escarpments >15%

LAND AND REGULATORY ISSUES PINE CREEK 04



EXISTING INFRASTRUCTURE AND POSSIBLE IMPROVEMENTS PINE CREEK 04



Storm Outflow Location
 Stormwater Lift Station
 Storm Main (> 900mm diameter)
 Sanitary Main (>600mm diameter)
 Water Main (>400mm diameter)
 Siphon
 Pipeline River Crossing Locations
 Water / Waste Water Treatment Plants

Existing Storm Retrofit Pond

Possible Location of Storm Retrofit Pond

- Existing Storm Pond
- Existing Bank Infrastructure (e.g., Rip Rap, Retaining Walls, Weirs)
- Bank Erosion Hotspot
- Candidate Flood / Erosion Control Projects
- Paved Trails
- ----- Gravel Trails
- =____ Bridge
- Buildings
- Parks (Maintained Turf Areas)

- City Boundary
- ──── Major Roads ⊢++++ Rail
- Streams
 Fish Creek Provincial Park

The non-masked area is based on the greater of:

(i) outer riparian zone of the variable width model,
(ii) City ER setback policy boundary,
(iii) Nose Creek Watershed Partnership recommended setback policy
(See Theme 2-Land and Regulatory Issues)





