

Title: Carmacks Flood Mapping Study
Composite Flood Hazard Extents
1% Annual Exceedance Probability (AEP)

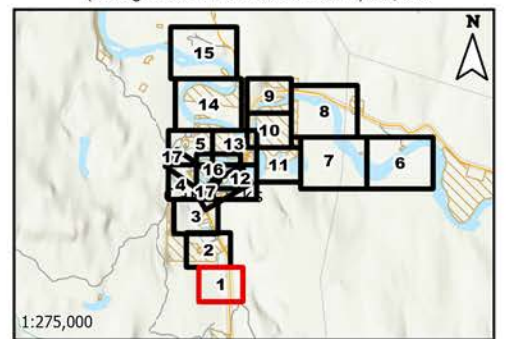
Client/Project:
Government of Yukon
Department of Environment
Water Resources Branch

Project: 123222320

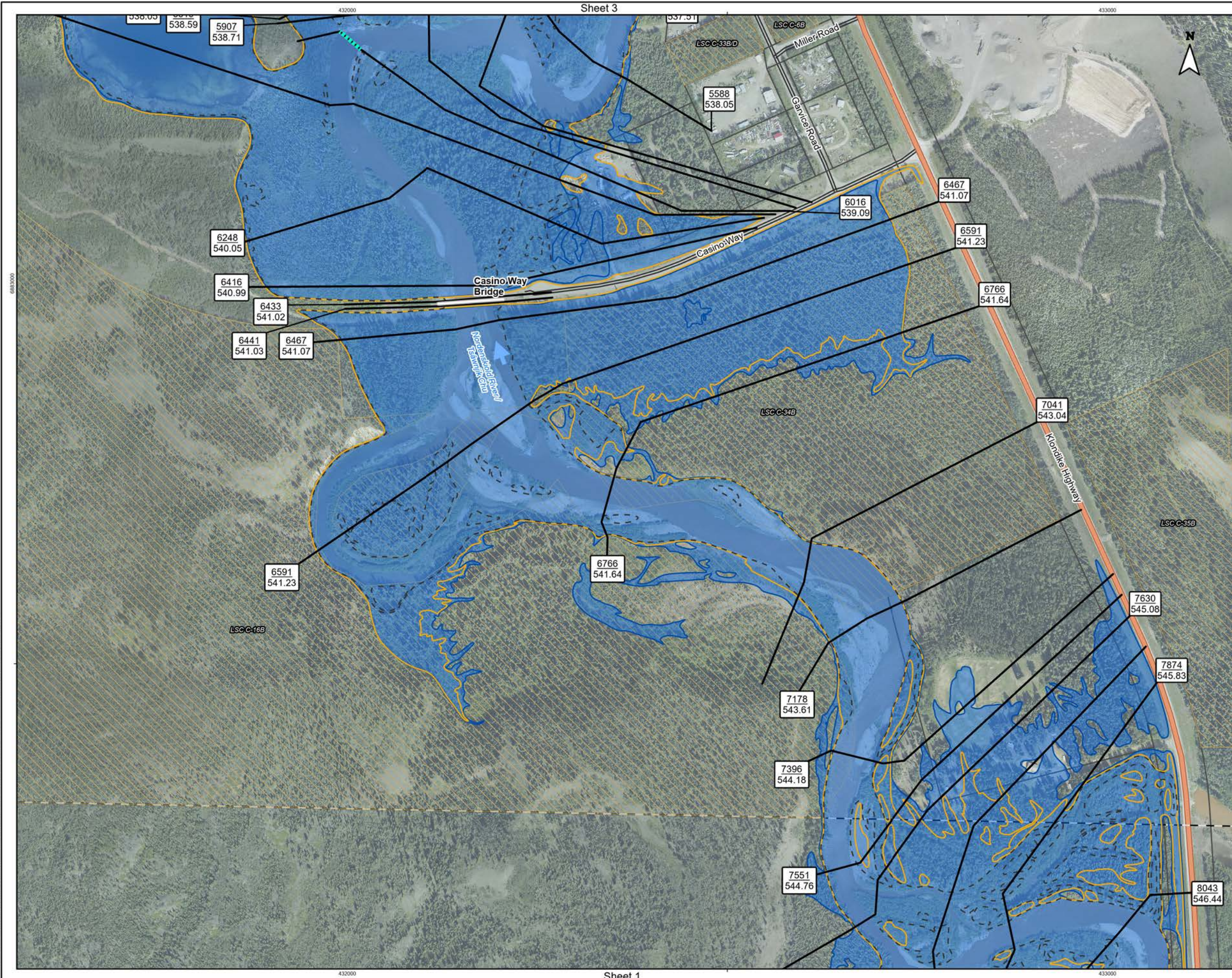
Project Location: Carmacks, Yukon
Prepared by MANDERSON on 2024-05-21
Requested by JMUIRHEAD on 2024-01-07
Review by JMUIRHEAD on 2024-05-21

- | | |
|---|---|
| Flow Direction | Hydraulic Model Cross-Sections |
| Point of Interest | Inundation under Modelled Ice Jam Runs |
| Bridge | Inundation under Modelled Open Water Runs |
| Highway | Composite Flood Hazard Extent |
| Local Road | Ice Jam Location (toe of jam) |
| Little Salmon / Carmacks First Nation Settlement Land | 50 % AEP Extent |
| Land Parcels | Hydraulic Model Cross-Sections |
| Municipal Boundary | Cross-Section Number
WSE (m) in Main Channel
of Cross-Section |
| Study Area | |

Map Publication Date: May 21, 2024
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(At original document size of 11x 17) 1:5,000



- Notes**
1. Coordinate System: NAD 1983 UTM Zone 8N
Vertical Datum: CGVD2013, Geoid: CGG2013a
 2. Data Sources: GeoYukon, Canada Lands Survey (CLS) CCM 982, Canvec.
 3. Background: Yukon Satellites HighRes: Government of Yukon
World Topographic Map: Northwest Territories, State of Alaska, Esri
Canada, Esri, TomTom, Garmin, SafeGraph, METI/NASA, USGS,
EPA, NPS, USDA, NRCAN, Parks Canada
World Hillshade: Esri, USGS
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**Carmacks Flood Mapping Study
Composite Flood Hazard Extents
1% Annual Exceedance Probability (AEP)**

Client/Project:
Government of Yukon
Department of Environment
Water Resources Branch

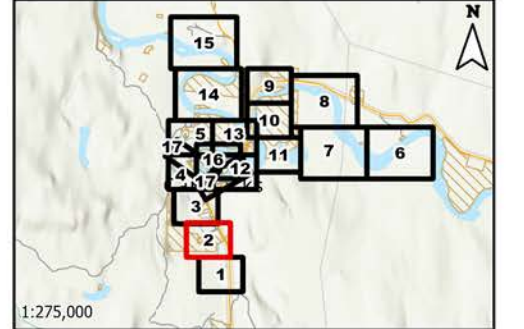
Project: 123222320

Project Location: Carmacks, Yukon

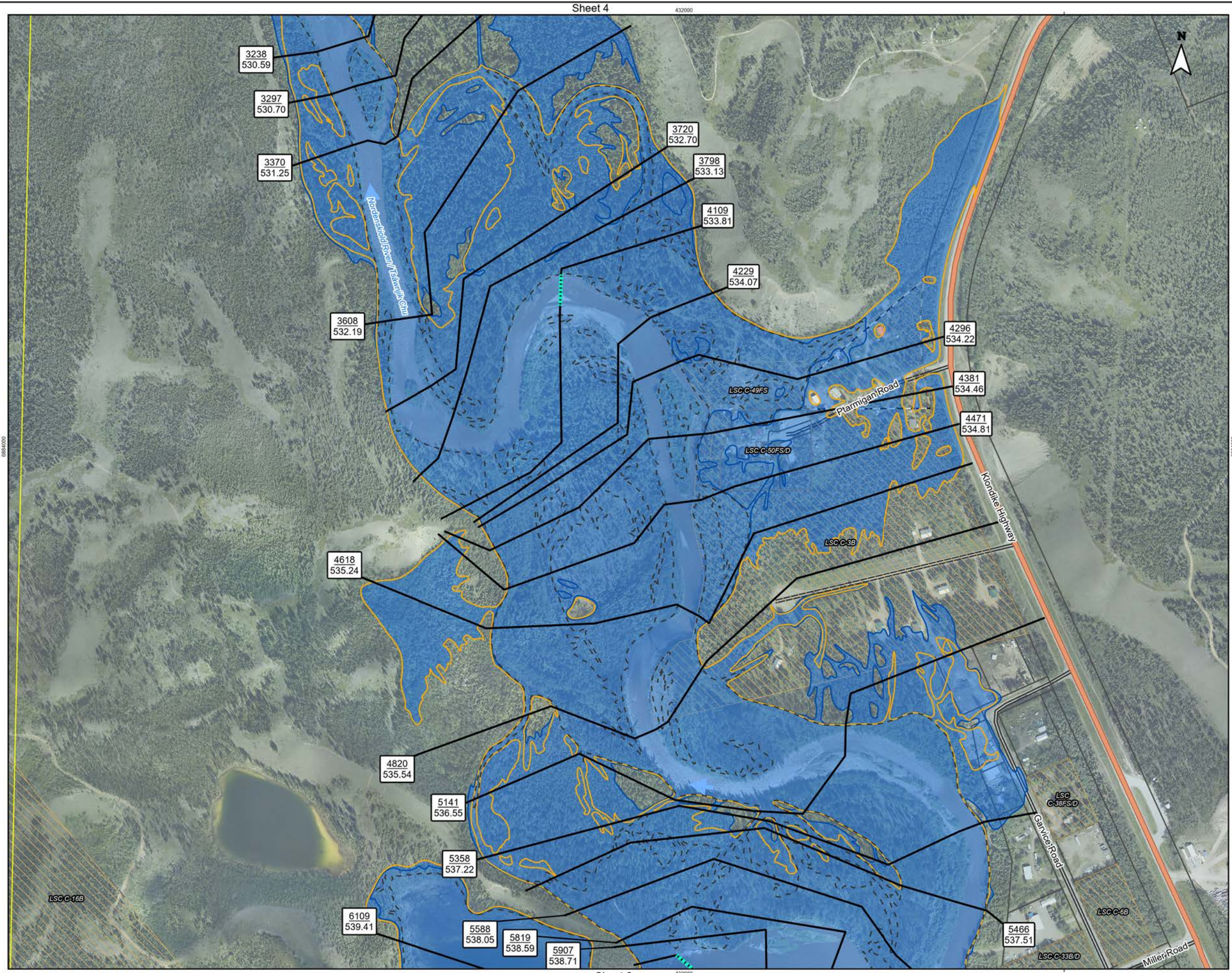
Prepared by MANDERSON on 2024-05-21
Requested by JMUJIRHEAD on 2024-01-07
Review by JMUJIRHEAD on 2024-05-21

- | | |
|---|---|
| Flow Direction | Hydraulic Model Cross-Sections |
| Point of Interest | Inundation under Modelled Ice Jam Runs |
| Bridge | Inundation under Modelled Open Water Runs |
| Highway | Composite Flood Hazard Extent |
| Local Road | Ice Jam Location (toe of jam) |
| Little Salmon / Carmacks First Nation Settlement Land | 50 % AEP Extent |
| Land Parcels | Hydraulic Model Cross-Sections |
| Municipal Boundary | Cross-Section Number |
| Study Area | WSE (m) in Main Channel of Cross-Section |

Map Publication Date: May 21, 2024
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(At original document size of 11x 17) 1:5,000



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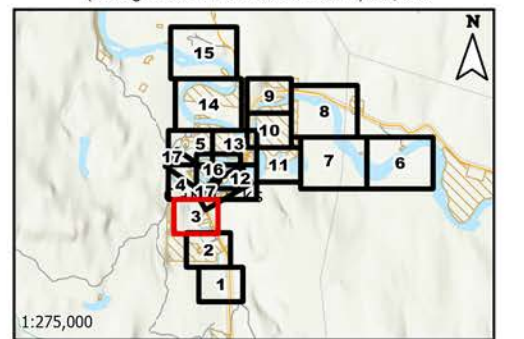
**Carmacks Flood Mapping Study
Composite Flood Hazard Extents
1% Annual Exceedance Probability (AEP)**

Client/Project:
Government of Yukon
Department of Environment
Water Resources Branch

Project: 12322320
Project Location: Carmacks, Yukon
Prepared by MANDERSON on 2024-05-21
Requested by JMUJHEAD on 2024-01-07
Review by JMUJHEAD on 2024-05-21

- Flow Direction
- Point of Interest
- Bridge
- Highway
- Local Road
- Little Salmon / Carmacks First Nation Settlement Land
- Land Parcels
- Municipal Boundary
- Study Area
- Hydraulic Model Cross-Sections
- Inundation under Modelled Ice Jam Runs
- Inundation under Modelled Open Water Runs
- Composite Flood Hazard Extent
- Ice Jam Location (toe of jam)
- 50 % AEP Extent
- Hydraulic Model Cross-Sections
- Cross-Section Number
- WSE (m) in Main Channel of Cross-Section

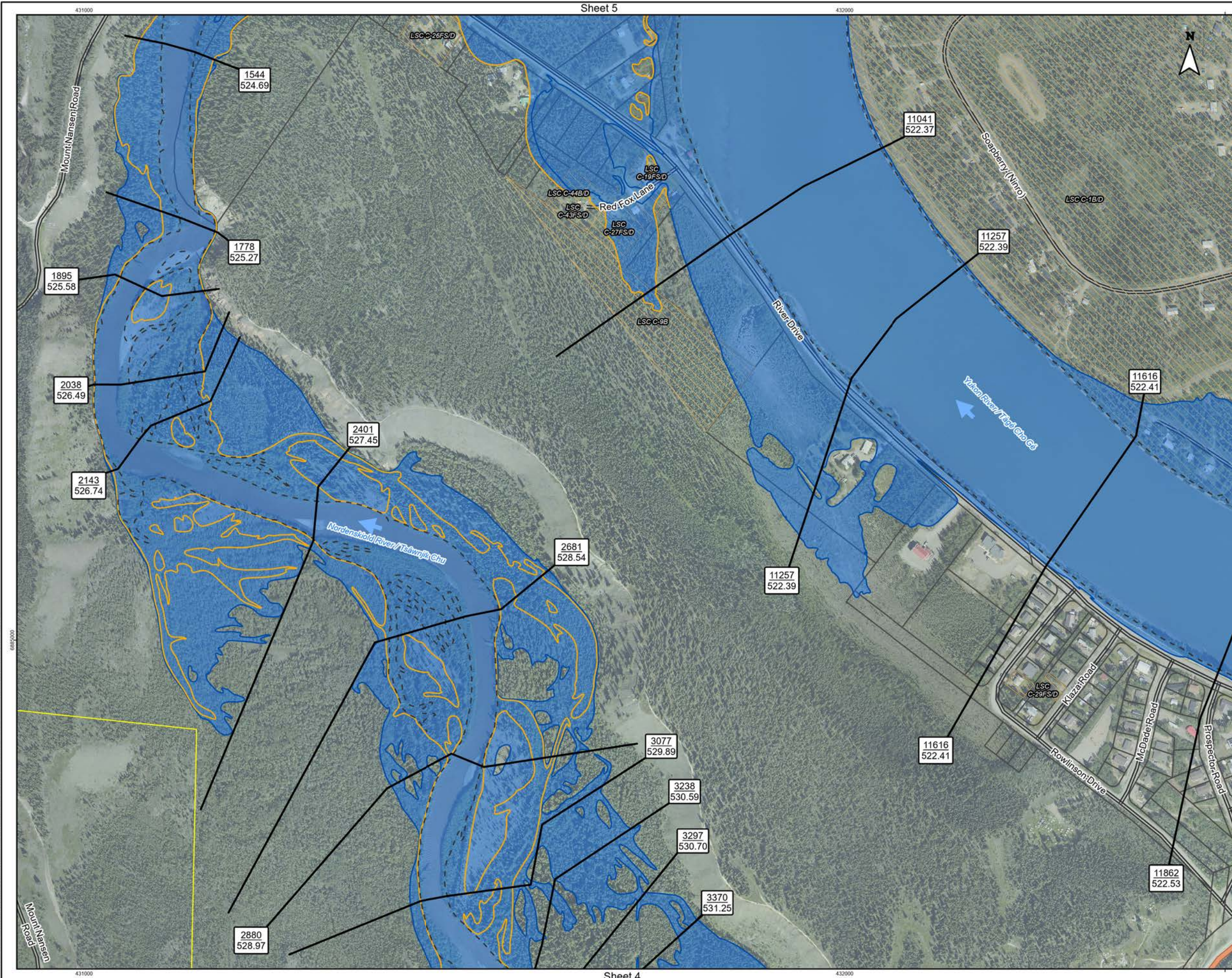
Map Publication Date: May 21, 2024
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**Carmacks Flood Mapping Study
Composite Flood Hazard Extents
1% Annual Exceedance Probability (AEP)**

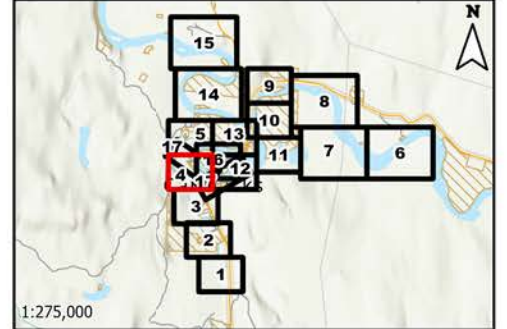
Client/Project:
Government of Yukon
Department of Environment
Water Resources Branch

Project: 123222320
Project Location: Carmacks, Yukon
Prepared by MANDERSON on 2024-05-21
Requested by JMUJIRHEAD on 2024-01-07
Review by JMUJIRHEAD on 2024-05-21

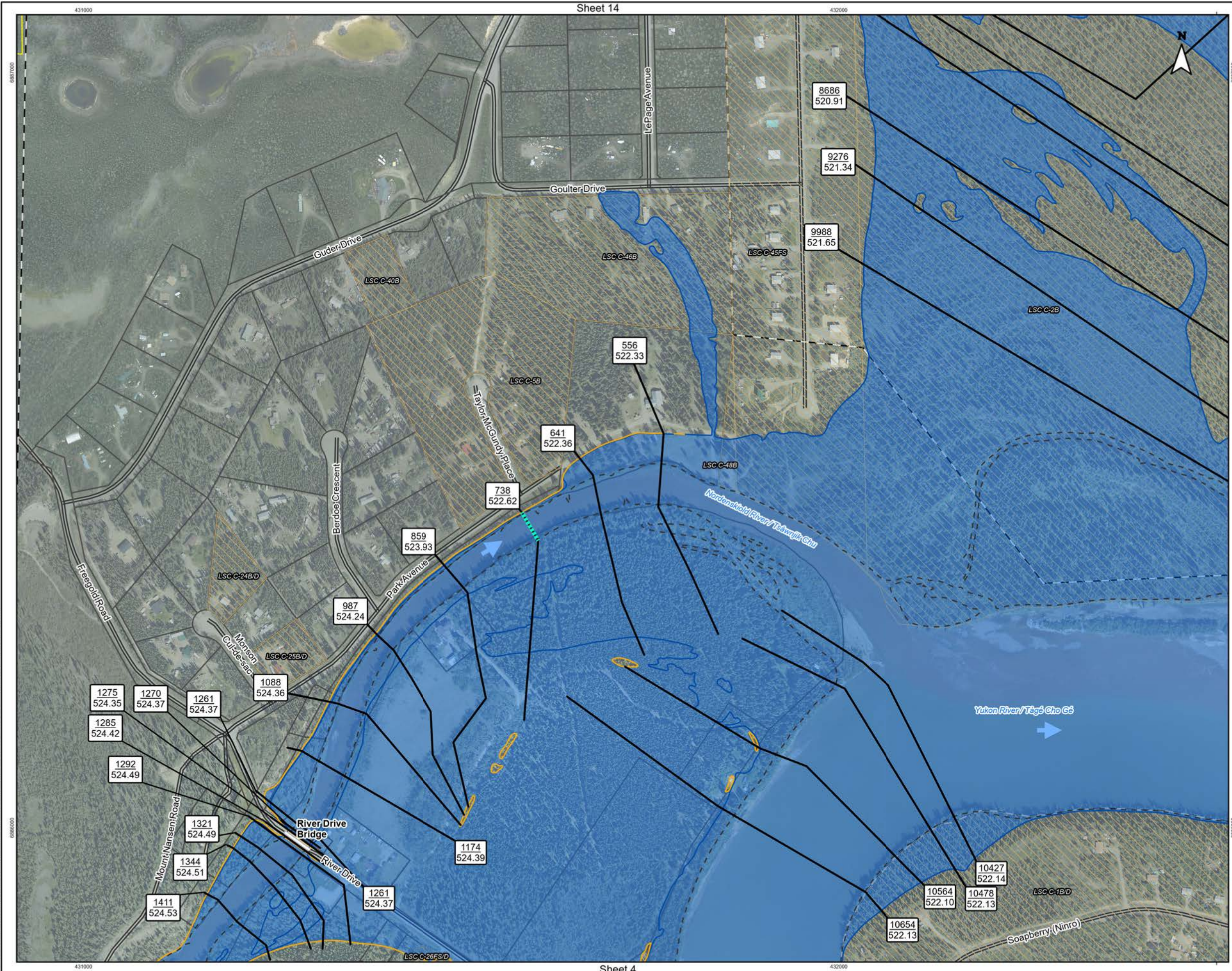
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| Flow Direction | Hydraulic Model Cross-Sections |
| Point of Interest | Inundation under Modelled Ice Jam Runs |
| Bridge | Inundation under Modelled Open Water Runs |
| Highway | Composite Flood Hazard Extent |
| Local Road | Ice Jam Location (toe of jam) |
| Little Salmon / Carmacks First Nation Settlement Land | 50 % AEP Extent |
| Land Parcels | Hydraulic Model Cross-Sections |
| Municipal Boundary | Cross-Section Number
WSE (m) in Main Channel of Cross-Section |
| Study Area | |

Sheet 12

Map Publication Date: May 21, 2024
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(At original document size of 11x 17) 1:5,000



- Notes**
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Vertical Datum: CGVD2013, Geoid: CGG2013a
 2. Data Sources: GeoYukon, Canada Lands Survey (CLS) CCM 982, Canvec.
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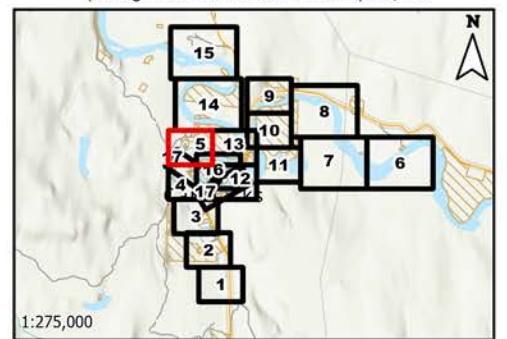
**Carmacks Flood Mapping Study
Composite Flood Hazard Extents
1% Annual Exceedance Probability (AEP)**

Client/Project:
Government of Yukon
Department of Environment
Water Resources Branch
Project: 12322320

Project Location: Carmacks, Yukon
Prepared by MANDERSON on 2024-05-21
Requested by JMUIRHEAD on 2024-01-07
Review by JMUIRHEAD on 2024-05-21

- | | |
|---|--|
| Flow Direction | Hydraulic Model Cross-Sections |
| Point of Interest | Inundation under Modelled Ice Jam Runs |
| Bridge | Inundation under Modelled Open Water Runs |
| Highway | Composite Flood Hazard Extent |
| Local Road | Ice Jam Location (toe of jam) |
| Little Salmon / Carmacks First Nation Settlement Land | - - - 50 % AEP Extent |
| Land Parcels | Hydraulic Model Cross-Sections |
| Municipal Boundary | 57 Cross-Section Number |
| Study Area | 517.2 WSE (m) in Main Channel of Cross-Section |

Map Publication Date: May 21, 2024
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(At original document size of 11x 17) 1:5,000



- Notes**
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 - Background: World Topographic Map: Northwest Territories, State of Alaska, Esri Canada, Esri, TomTom, Garmin, SafeGraph, METI/NASA, USGS, EPA, NPS, USDA, NRCAN, Parks Canada World Hillshade: Esri, USGS
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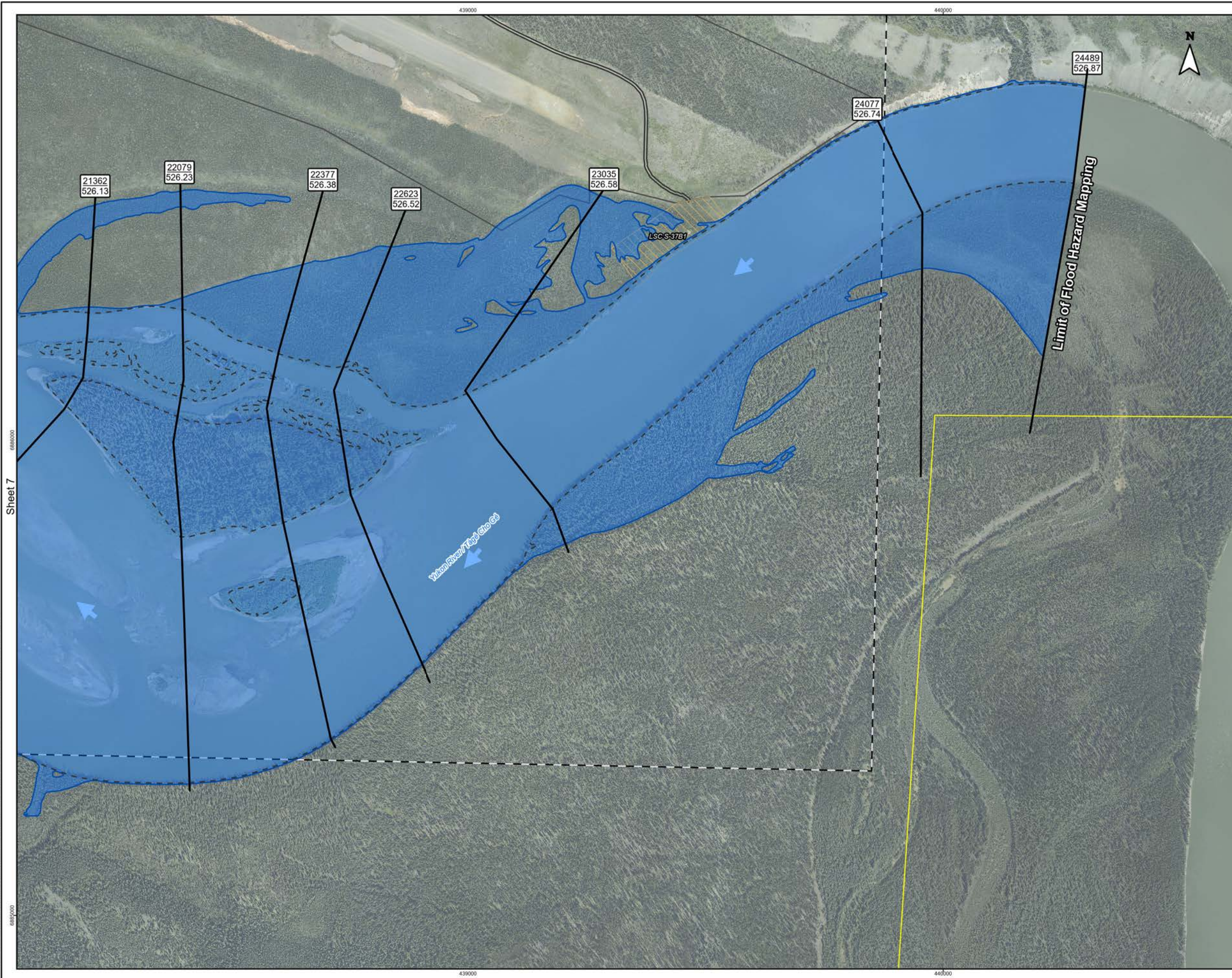


Figure No. **E.3.6** Sheet 6 of 17

Title: **Carmacks Flood Mapping Study
Composite Flood Hazard Extents
1% Annual Exceedance Probability (AEP)**

Client/Project:
Government of Yukon
Department of Environment
Water Resources Branch

Project: 123222320

Project Location: Carmacks, Yukon

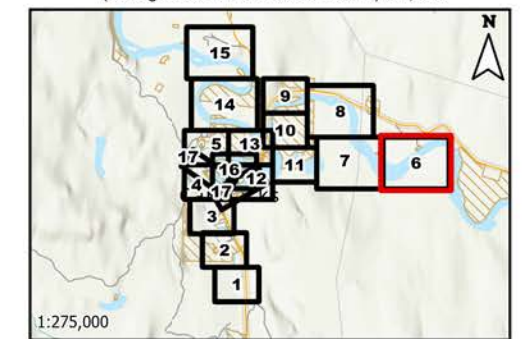
Prepared by MANDERSON on 2024-05-21
Requested by JMUIRHEAD on 2024-01-07
Review by JMUIRHEAD on 2024-05-21

- | | |
|---|---|
| Flow Direction | Hydraulic Model Cross-Sections |
| Point of Interest | Inundation under Modelled Ice Jam Runs |
| Bridge | Inundation under Modelled Open Water Runs |
| Highway | Composite Flood Hazard Extent |
| Local Road | Ice Jam Location (toe of jam) |
| Little Salmon / Carmacks First Nation Settlement Land | 50 % AEP Extent |
| Land Parcels | Hydraulic Model Cross-Sections |
| Municipal Boundary | Cross-Section Number
WSE (m) in Main Channel
of Cross-Section |
| Study Area | |

Map Publication Date: May 21, 2024

0 70 140 210 280 350
m

(At original document size of 11x 17) 1:8,000



Notes

1. Coordinate System: NAD 1983 UTM Zone 8N
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3. Background: World Topographic Map: Northwest Territories, State of Alaska, Esri Canada, Esri, TomTom, Garmin, SafeGraph, METI/NASA, USGS, EPA, NPS, USDA, NRCan, Parks Canada World Hillshade: Esri, USGS
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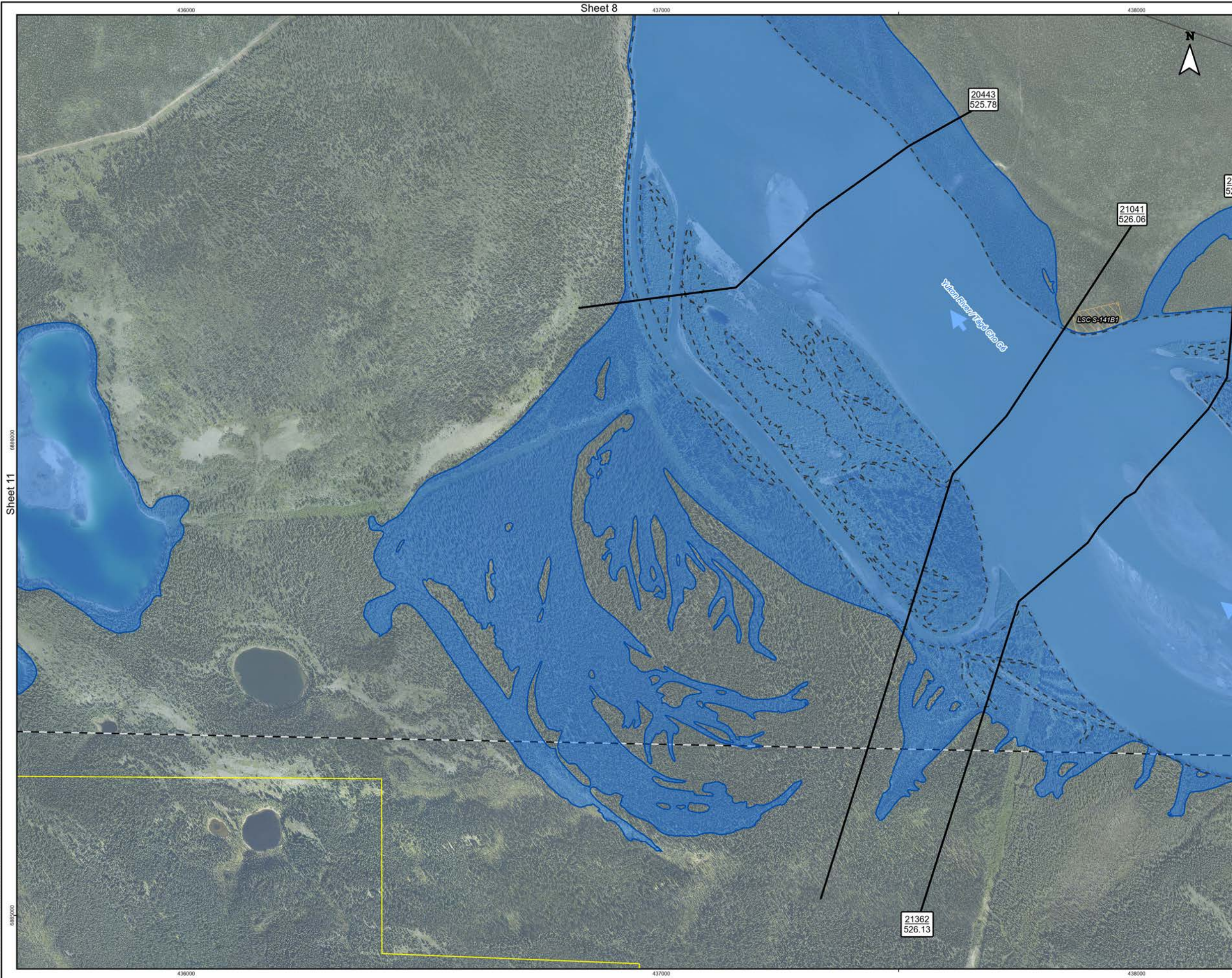


Figure No. **E.3.7** Sheet 7 of 17

Title: **Carmacks Flood Mapping Study
Composite Flood Hazard Extents
1% Annual Exceedance Probability (AEP)**

Client/Project:
Government of Yukon
Department of Environment
Water Resources Branch

Project: 12322320

Project Location: Carmacks, Yukon

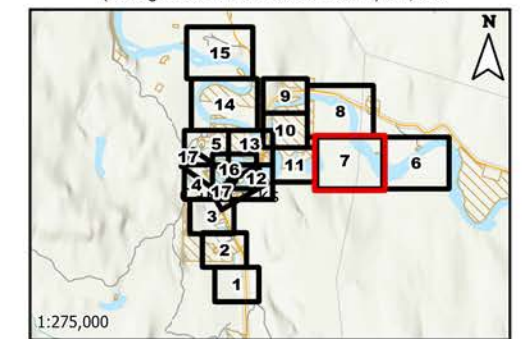
Prepared by MANDERSON on 2024-05-21
Requested by JMUIRHEAD on 2024-01-07
Review by JMUIRHEAD on 2024-05-21

- | | |
|---|---|
| Flow Direction | Hydraulic Model Cross-Sections |
| Point of Interest | Inundation under Modelled Ice Jam Runs |
| Bridge | Inundation under Modelled Open Water Runs |
| Highway | Composite Flood Hazard Extent |
| Local Road | Ice Jam Location (toe of jam) |
| Little Salmon / Carmacks First Nation Settlement Land | 50 % AEP Extent |
| Land Parcels | Hydraulic Model Cross-Sections |
| Municipal Boundary | Cross-Section Number |
| Study Area | WSE (m) in Main Channel of Cross-Section |

Map Publication Date: May 21, 2024

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(At original document size of 11x 17) 1:8,000



Notes

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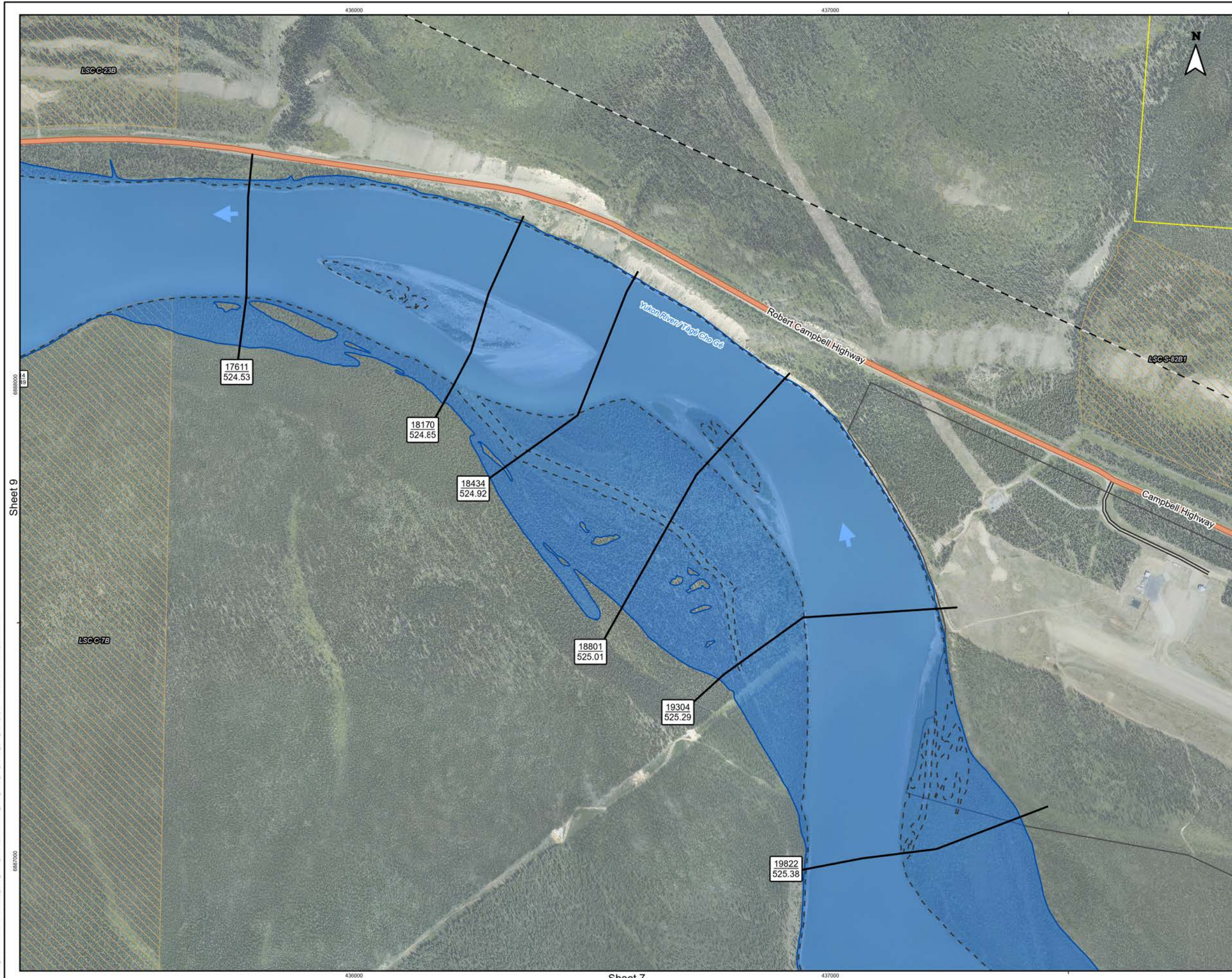


Figure No. **E.3.8** Sheet 8 of 17

Title: **Carmacks Flood Mapping Study
Composite Flood Hazard Extents
1% Annual Exceedance Probability (AEP)**

Client/Project:
Government of Yukon
Department of Environment
Water Resources Branch

Project: 123222320

Project Location: Carmacks, Yukon

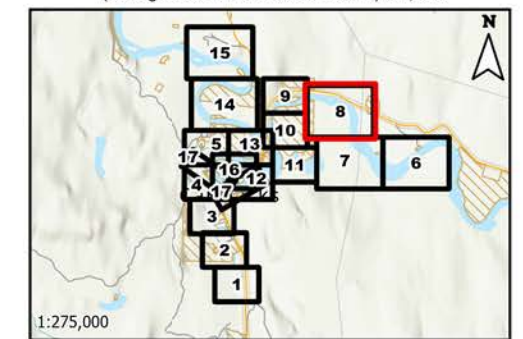
Prepared by MANDERSON on 2024-05-21
Requested by JMUJIRHEAD on 2024-01-07
Review by JMUJIRHEAD on 2024-05-21

- | | |
|---|---|
| Flow Direction | Hydraulic Model Cross-Sections |
| Point of Interest | Inundation under Modelled Ice Jam Runs |
| Bridge | Inundation under Modelled Open Water Runs |
| Highway | Composite Flood Hazard Extent |
| Local Road | Ice Jam Location (toe of jam) |
| Little Salmon / Carmacks First Nation Settlement Land | 50 % AEP Extent |
| Land Parcels | Hydraulic Model Cross-Sections |
| Municipal Boundary | Cross-Section Number
WSE (m) in Main Channel
of Cross-Section |
| Study Area | |

Map Publication Date: May 21, 2024

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(At original document size of 11x 17) 1:8,000

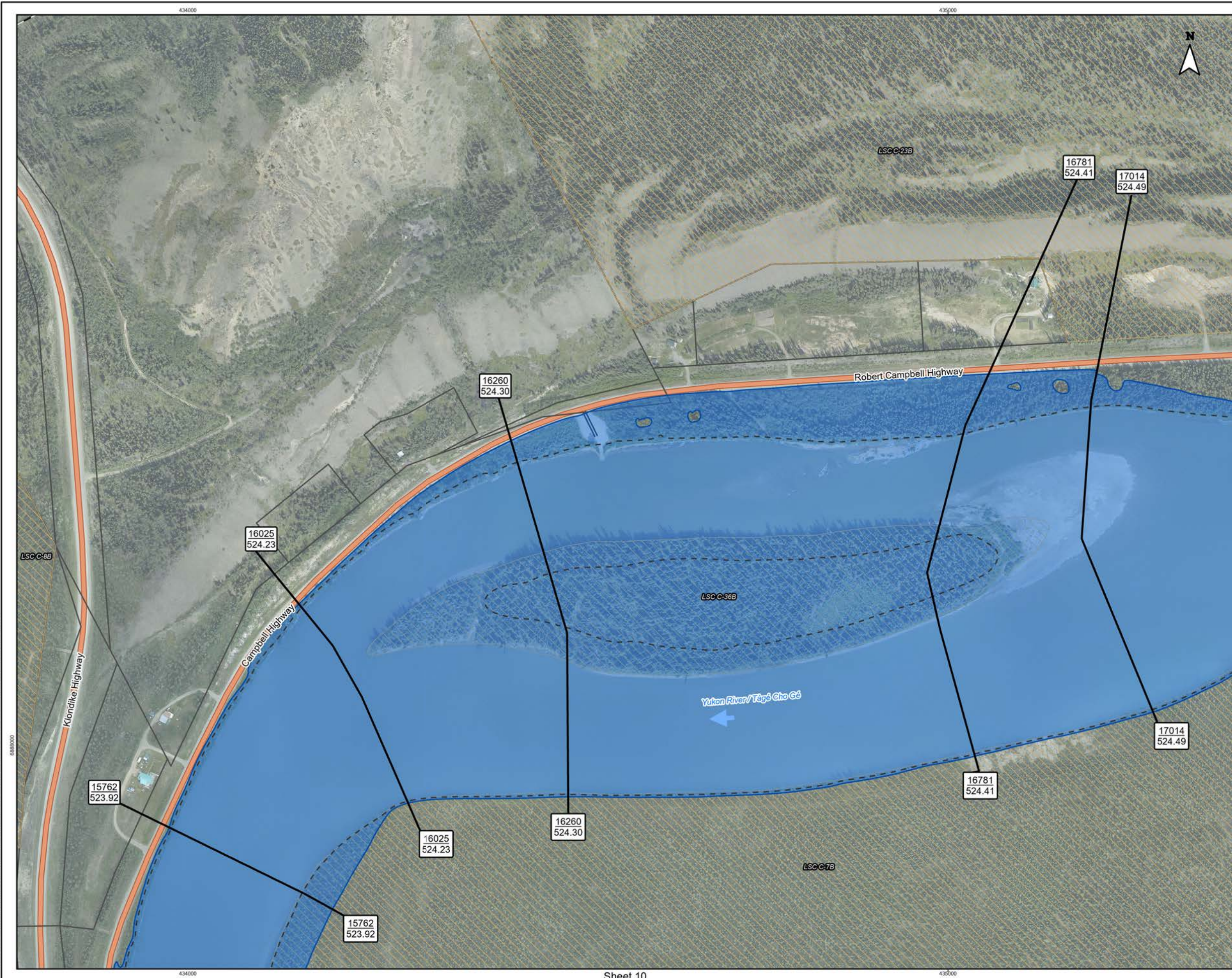


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**Carmacks Flood Mapping Study
Composite Flood Hazard Extents
1% Annual Exceedance Probability (AEP)**

Client/Project:
Government of Yukon
Department of Environment
Water Resources Branch

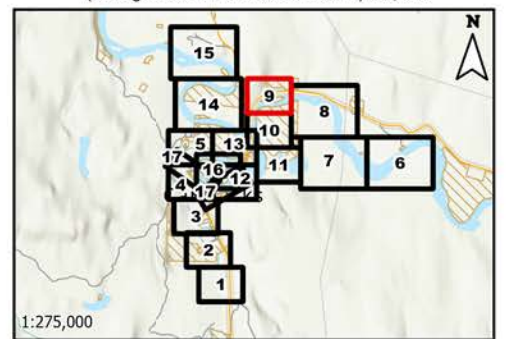
Project: 12322320

Project Location: Carmacks, Yukon
Prepared by MANDERSON on 2024-05-21
Requested by JMUIRHEAD on 2024-01-07
Review by JMUIRHEAD on 2024-05-21

- | | |
|---|---|
| Flow Direction | Hydraulic Model Cross-Sections |
| Point of Interest | Inundation under Modelled Ice Jam Runs |
| Bridge | Inundation under Modelled Open Water Runs |
| Highway | Composite Flood Hazard Extent |
| Local Road | Ice Jam Location (toe of jam) |
| Little Salmon / Carmacks First Nation Settlement Land | 50 % AEP Extent |
| Land Parcels | Hydraulic Model Cross-Sections |
| Municipal Boundary | Cross-Section Number
WSE (m) in Main Channel
of Cross-Section |
| Study Area | |

Sheet 8

Map Publication Date: May 21, 2024
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(At original document size of 11x 17) 1:5,000



- Notes**
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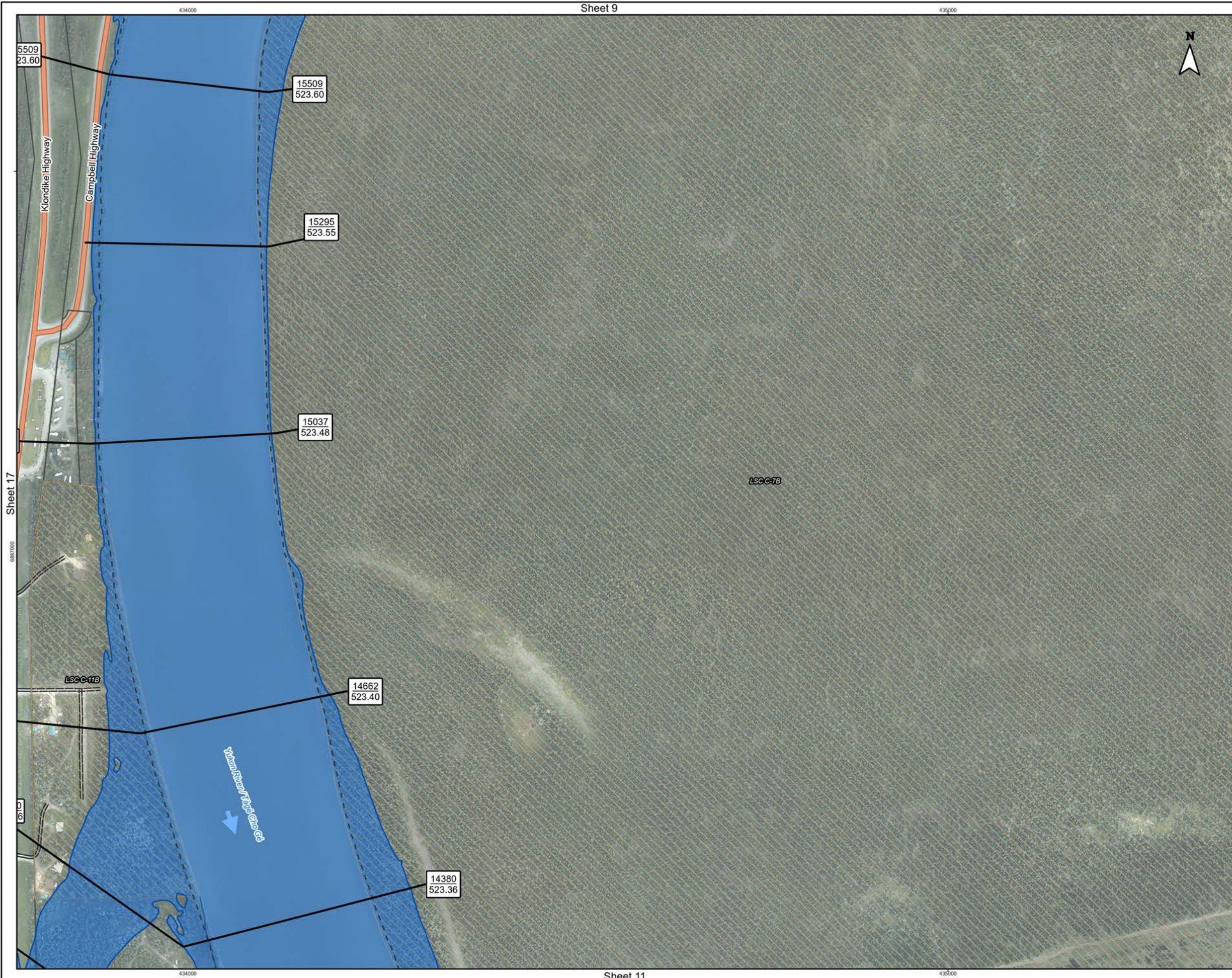


Figure No. **E.3.10** Sheet 10 of 17

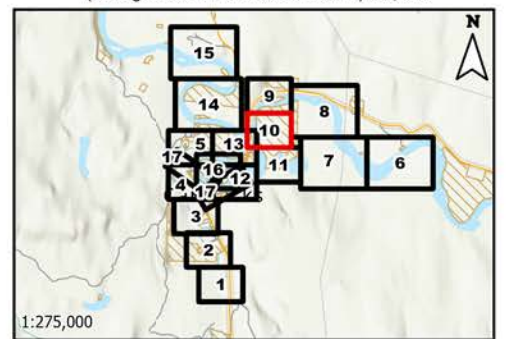
Title: Carmacks Flood Mapping Study
Composite Flood Hazard Extents
1% Annual Exceedance Probability (AEP)

Client/Project:
Government of Yukon
Department of Environment
Water Resources Branch
Project: 12322320

Project Location: Carmacks, Yukon
Prepared by MANDERSON on 2024-05-21
Requested by JMUJIRHEAD on 2024-01-07
Review by JMUJIRHEAD on 2024-05-21

- | | |
|---|---|
| Flow Direction | Hydraulic Model Cross-Sections |
| Point of Interest | Inundation under Modelled Ice Jam Runs |
| Bridge | Inundation under Modelled Open Water Runs |
| Highway | Composite Flood Hazard Extent |
| Local Road | Ice Jam Location (toe of jam) |
| Little Salmon / Carmacks First Nation Settlement Land | 50 % AEP Extent |
| Land Parcels | Hydraulic Model Cross-Sections |
| Municipal Boundary | Cross-Section Number
WSE (m) in Main Channel
of Cross-Section |
| Study Area | |

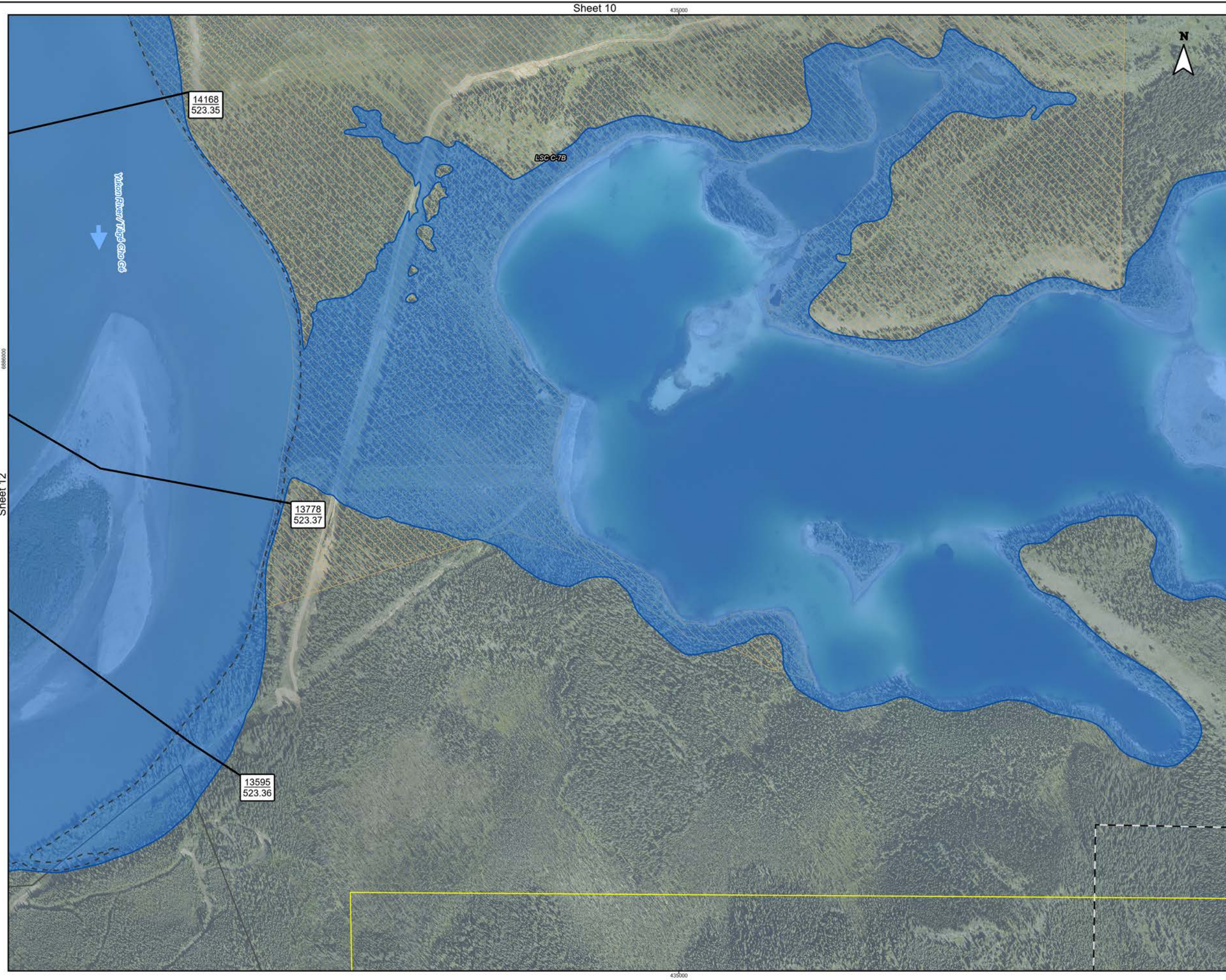
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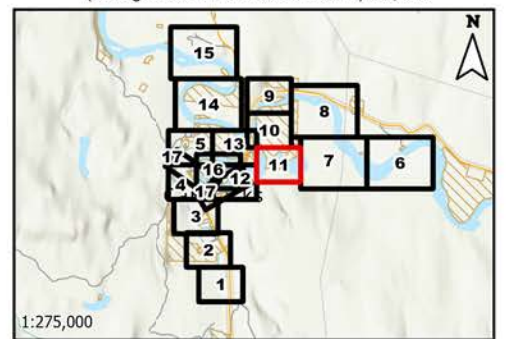
Title:
Carmacks Flood Mapping Study
Composite Flood Hazard Extents
1% Annual Exceedance Probability (AEP)

Client/Project:
 Government of Yukon
 Department of Environment
 Water Resources Branch
 Project: 123222320

Project Location: Carmacks, Yukon
 Prepared by MANDERSON on 2024-05-21
 Requested by JMUIRHEAD on 2024-01-07
 Review by JMUIRHEAD on 2024-05-21

- | | |
|---|---|
| Flow Direction | Hydraulic Model Cross-Sections |
| Point of Interest | Inundation under Modelled Ice Jam Runs |
| Bridge | Inundation under Modelled Open Water Runs |
| Highway | Composite Flood Hazard Extent |
| Local Road | Ice Jam Location (toe of jam) |
| Little Salmon / Carmacks First Nation Settlement Land | 50 % AEP Extent |
| Land Parcels | Hydraulic Model Cross-Sections |
| Municipal Boundary | Cross-Section Number
WSE (m) in Main Channel
of Cross-Section |
| Study Area | |

Map Publication Date: May 21, 2024
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Sheet 12

Sheet 7

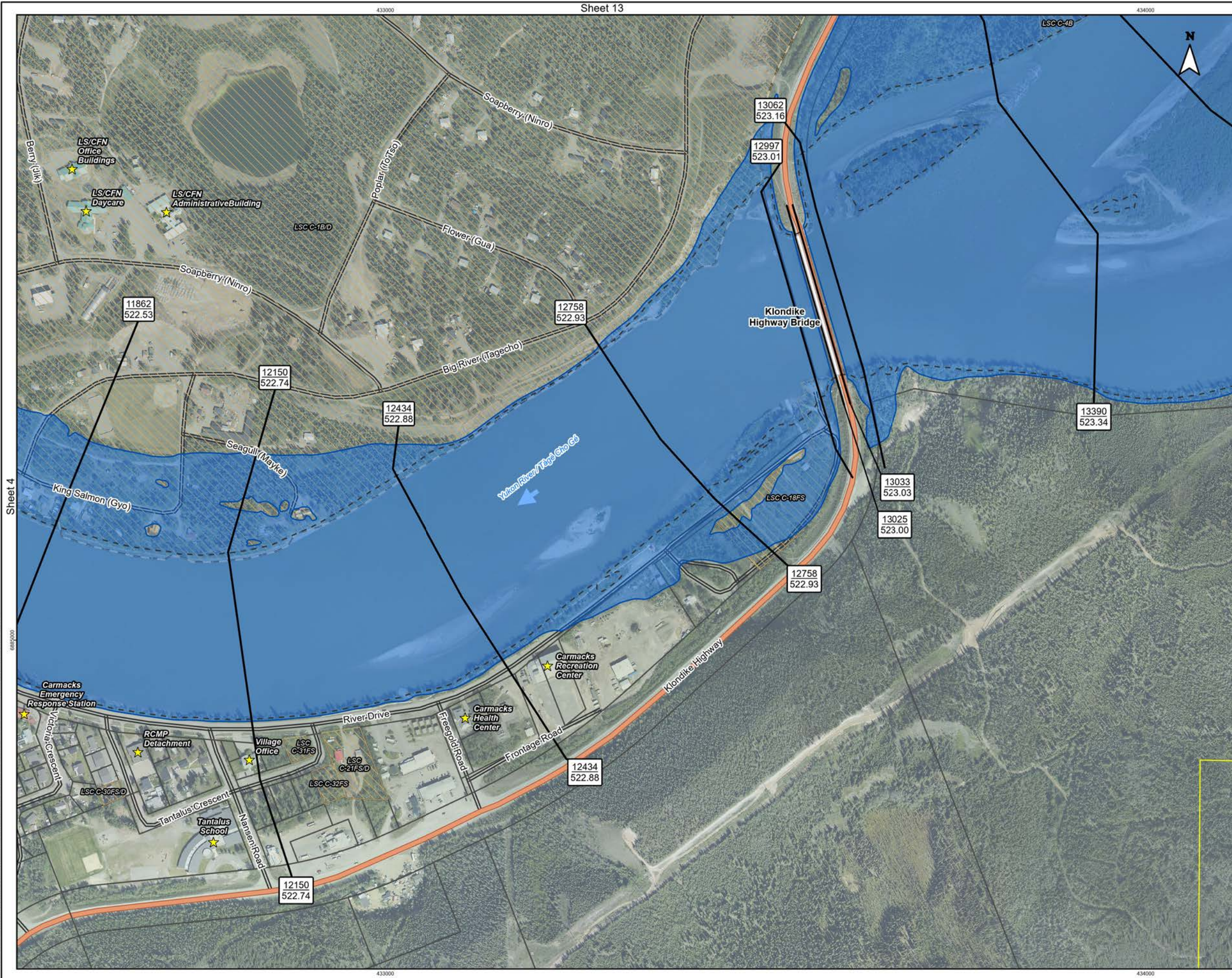
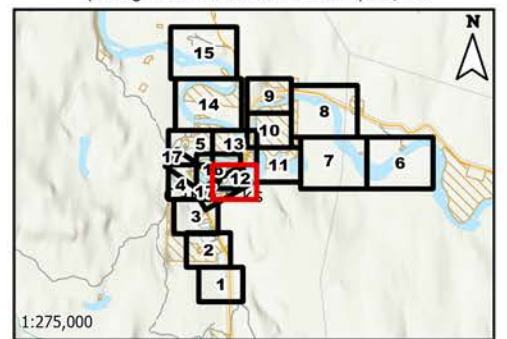


Figure No. **E.3.12** Sheet 12 of 17
 Title: **Carmacks Flood Mapping Study Composite Flood Hazard Extents 1% Annual Exceedance Probability (AEP)**
 Client/Project: Government of Yukon, Department of Environment, Water Resources Branch
 Project: 123222320
 Project Location: Carmacks, Yukon
 Prepared by MANDERSON on 2024-05-21
 Requested by JMUIRHEAD on 2024-01-07
 Review by JMUIRHEAD on 2024-05-21

- Flow Direction
- Point of Interest
- Bridge
- Highway
- Local Road
- Little Salmon / Carmacks First Nation Settlement Land
- Land Parcels
- Municipal Boundary
- Study Area
- Hydraulic Model Cross-Sections
- Inundation under Modelled Ice Jam Runs
- Inundation under Modelled Open Water Runs
- Composite Flood Hazard Extent
- Ice Jam Location (toe of jam)
- 50 % AEP Extent
- Hydraulic Model Cross-Sections
- Cross-Section Number
- WSE (m) in Main Channel of Cross-Section

Map Publication Date: May 21, 2024
 0 40 80 120 160 200 m
 (At original document size of 11x 17) 1:5,000



- Notes**
1. Coordinate System: NAD 1983 UTM Zone 8N
 Vertical Datum: CGVD2013, Geoid: CGG2013a
 2. Data Sources: GeoYukon, Canada Lands Survey (CLS) CCM 982, Canvec.
 3. Background: World Topographic Map: Northwest Territories, State of Alaska, Esri Canada, Esri, TomTom, Garmin, SafeGraph, METI/NASA, USGS, EPA, NPS, USDA, NRCAN, Parks Canada World Hillshade: Esri, USGS
 4. Flood hazard extents shown on these maps are based on LIDAR collected on June 8 - 10 of 2019, and bathymetric/topographic survey collected in July and August of 2023.



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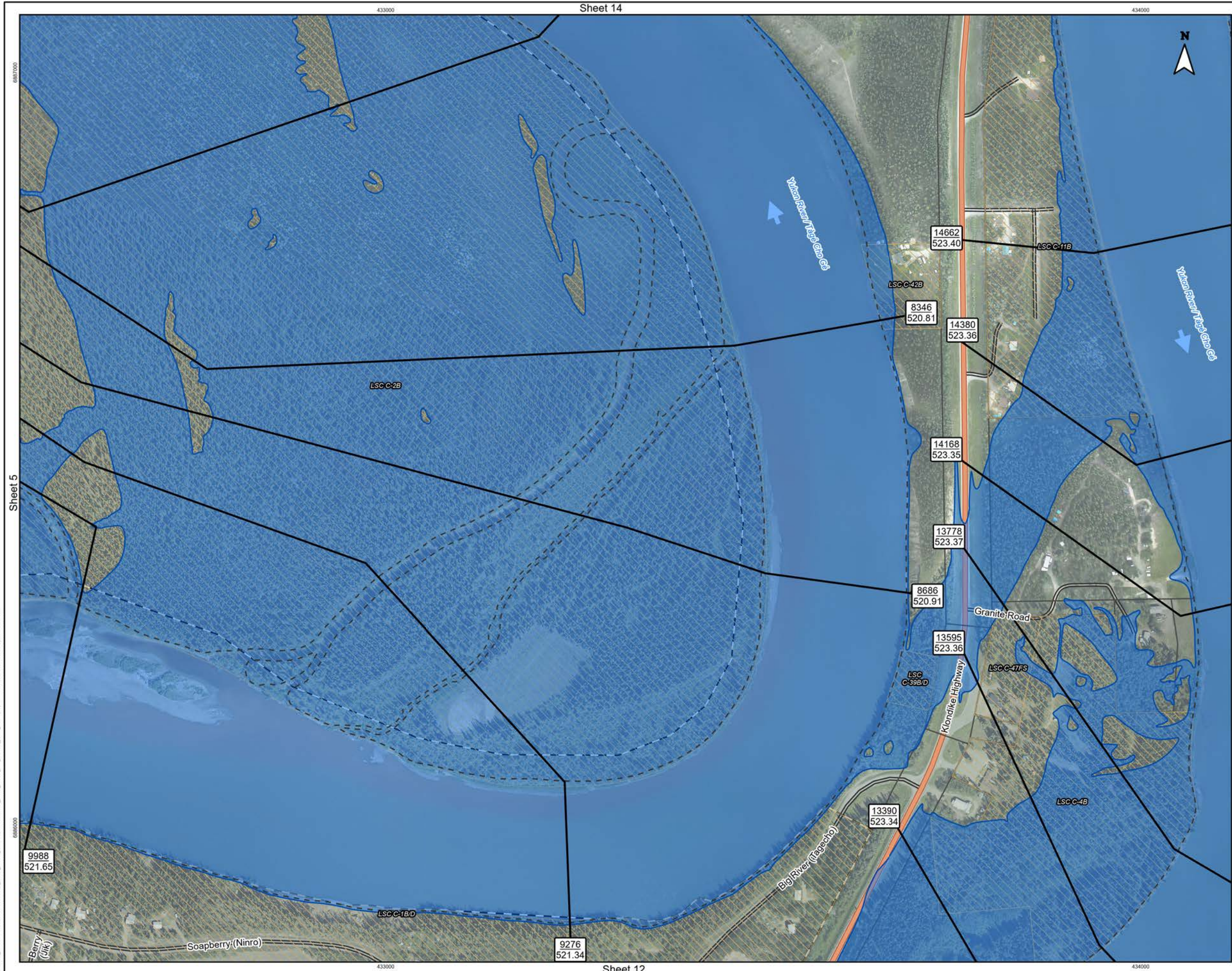
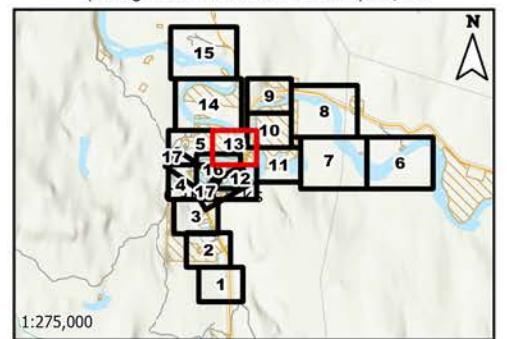


Figure No. **E.3.13** Sheet 13 of 17
 Title: **Carmacks Flood Mapping Study
 Composite Flood Hazard Extents
 1% Annual Exceedance Probability (AEP)**
 Client/Project:
 Government of Yukon
 Department of Environment
 Water Resources Branch
 Project: 123222320
 Project Location: Carmacks, Yukon
 Prepared by MANDERSON on 2024-05-21
 Requested by JMUIRHEAD on 2024-01-07
 Review by JMUIRHEAD on 2024-05-21

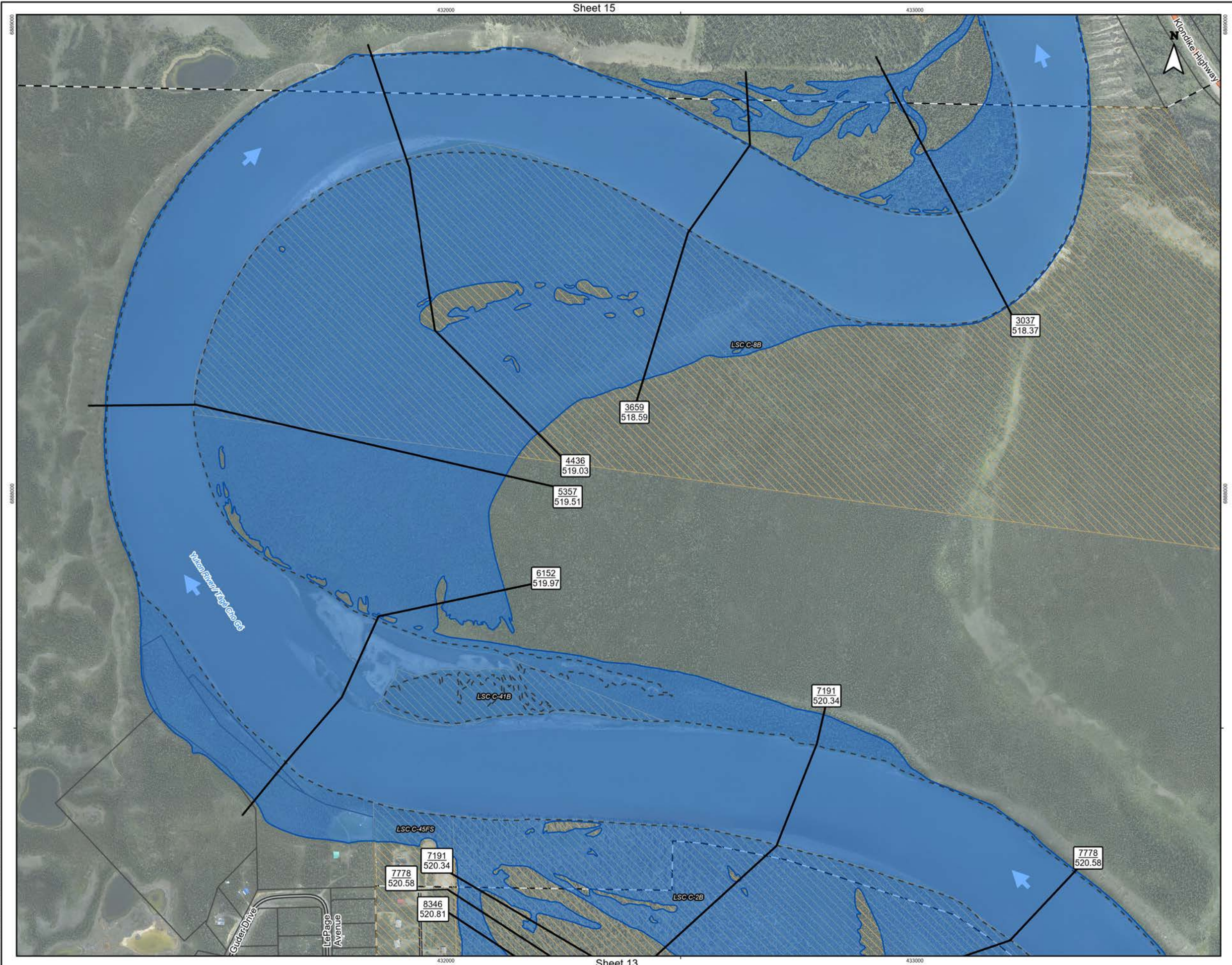
- | | |
|---|--|
| ➡ Flow Direction | — Hydraulic Model Cross-Sections |
| ★ Point of Interest | — Inundation under Modelled Ice Jam Runs |
| — Bridge | — Inundation under Modelled Open Water Runs |
| — Highway | — Composite Flood Hazard Extent |
| — Local Road | — Ice Jam Location (toe of jam) |
| ▨ Little Salmon / Carmacks First Nation Settlement Land | — 50 % AEP Extent |
| ▭ Land Parcels | — Hydraulic Model Cross-Sections |
| — Municipal Boundary | 57 Cross-Section Number |
| ▭ Study Area | 517.2 WSE (m) in Main Channel of Cross-Section |

Map Publication Date: May 21, 2024
 0 40 80 120 160 200
 m
 (At original document size of 11x 17) 1:5,000



Notes
 1. Coordinate System: NAD 1983 UTM Zone 8N
 Vertical Datum: CGVD2013, Geoid: CGG2013a
 2. Data Sources: GeoYukon, Canada Lands Survey (CLS) CCM 982, Canvec.
 3. Background: World Topographic Map: Northwest Territories, State of Alaska, Esri Canada, Esri, TomTom, Garmin, SafeGraph, METI/NASA, USGS, EPA, NPS, USDA, NRCAN, Parks Canada World Hillshade: Esri, USGS
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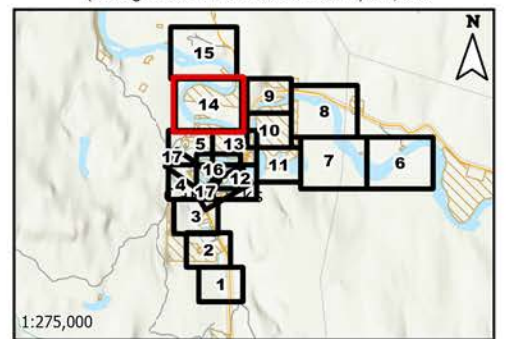
**Carmacks Flood Mapping Study
Composite Flood Hazard Extents
1% Annual Exceedance Probability (AEP)**

Client/Project:
Government of Yukon
Department of Environment
Water Resources Branch
Project: 123222320

Project Location: Carmacks, Yukon
Prepared by MANDERSON on 2024-05-21
Requested by JMUJIRHEAD on 2024-01-07
Review by JMUJIRHEAD on 2024-05-21

- | | |
|---|---|
| Flow Direction | Hydraulic Model Cross-Sections |
| Point of Interest | Inundation under Modelled Ice Jam Runs |
| Bridge | Inundation under Modelled Open Water Runs |
| Highway | Composite Flood Hazard Extent |
| Local Road | Ice Jam Location (toe of jam) |
| Little Salmon / Carmacks First Nation Settlement Land | 50 % AEP Extent |
| Land Parcels | Hydraulic Model Cross-Sections |
| Municipal Boundary | Cross-Section Number |
| Study Area | WSE (m) in Main Channel of Cross-Section |

Map Publication Date: May 21, 2024
0 70 140 210 280 350
m
(At original document size of 11x 17) 1:8,000



- Notes**
1. Coordinate System: NAD 1983 UTM Zone 8N
Vertical Datum: CGVD2013, Geoid: CGG2013a
 2. Data Sources: GeoYukon, Canada Lands Survey (CLS) CCM 982, Canvec.
 3. Background: World Topographic Map: Northwest Territories, State of Alaska, Esri Canada, Esri, TomTom, Garmin, SafeGraph, METI/NASA, USGS, EPA, NPS, USDA, NRCAN, Parks Canada World Hillshade: Esri, USGS
 4. Flood hazard extents shown on these maps are based on LIDAR collected on June 8 - 10 of 2019, and bathymetric/topographic survey collected in July and August of 2023.

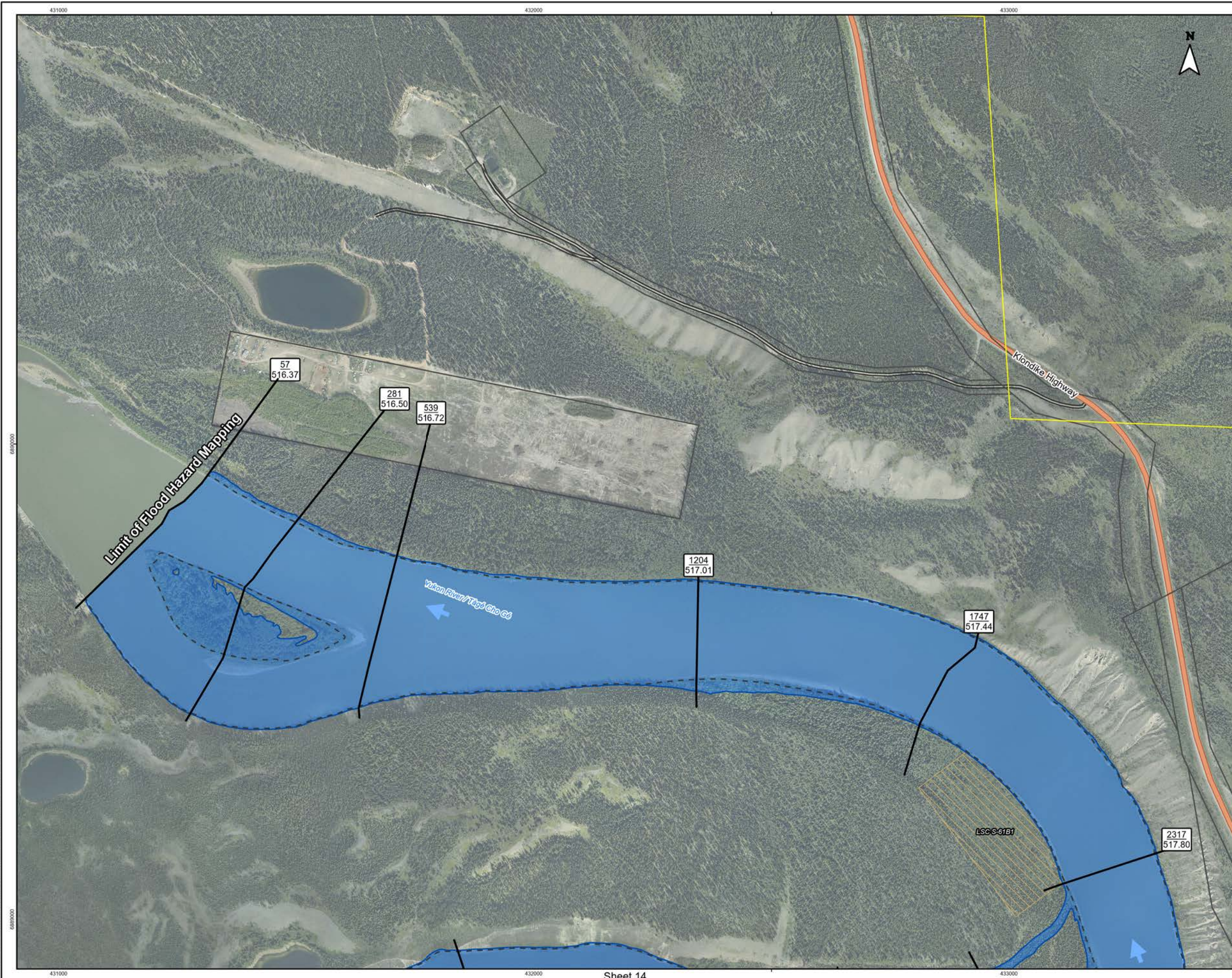


Figure No. **E.3.15** Sheet 15 of 17

Title: **Carmacks Flood Mapping Study
Composite Flood Hazard Extents
1% Annual Exceedance Probability (AEP)**

Client/Project:
Government of Yukon
Department of Environment
Water Resources Branch

Project: 123222320

Project Location: Carmacks, Yukon

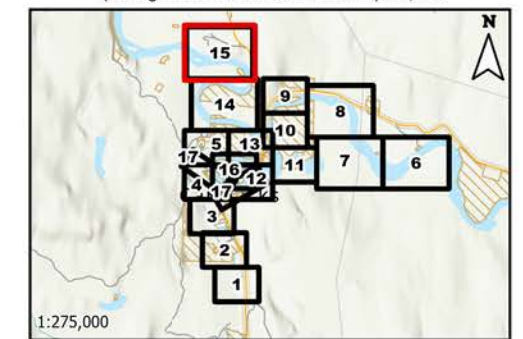
Prepared by MANDERSON on 2024-05-21
Requested by JMUIRHEAD on 2024-01-07
Review by JMUIRHEAD on 2024-05-21

- | | |
|---|---|
| Flow Direction | Hydraulic Model Cross-Sections |
| Point of Interest | Inundation under Modelled Ice Jam Runs |
| Bridge | Inundation under Modelled Open Water Runs |
| Highway | Composite Flood Hazard Extent |
| Local Road | Ice Jam Location (toe of jam) |
| Little Salmon / Carmacks First Nation Settlement Land | 50 % AEP Extent |
| Land Parcels | Hydraulic Model Cross-Sections |
| Municipal Boundary | Cross-Section Number
WSE (m) in Main Channel
of Cross-Section |
| Study Area | |

Map Publication Date: May 21, 2024

0 70 140 210 280 350
m

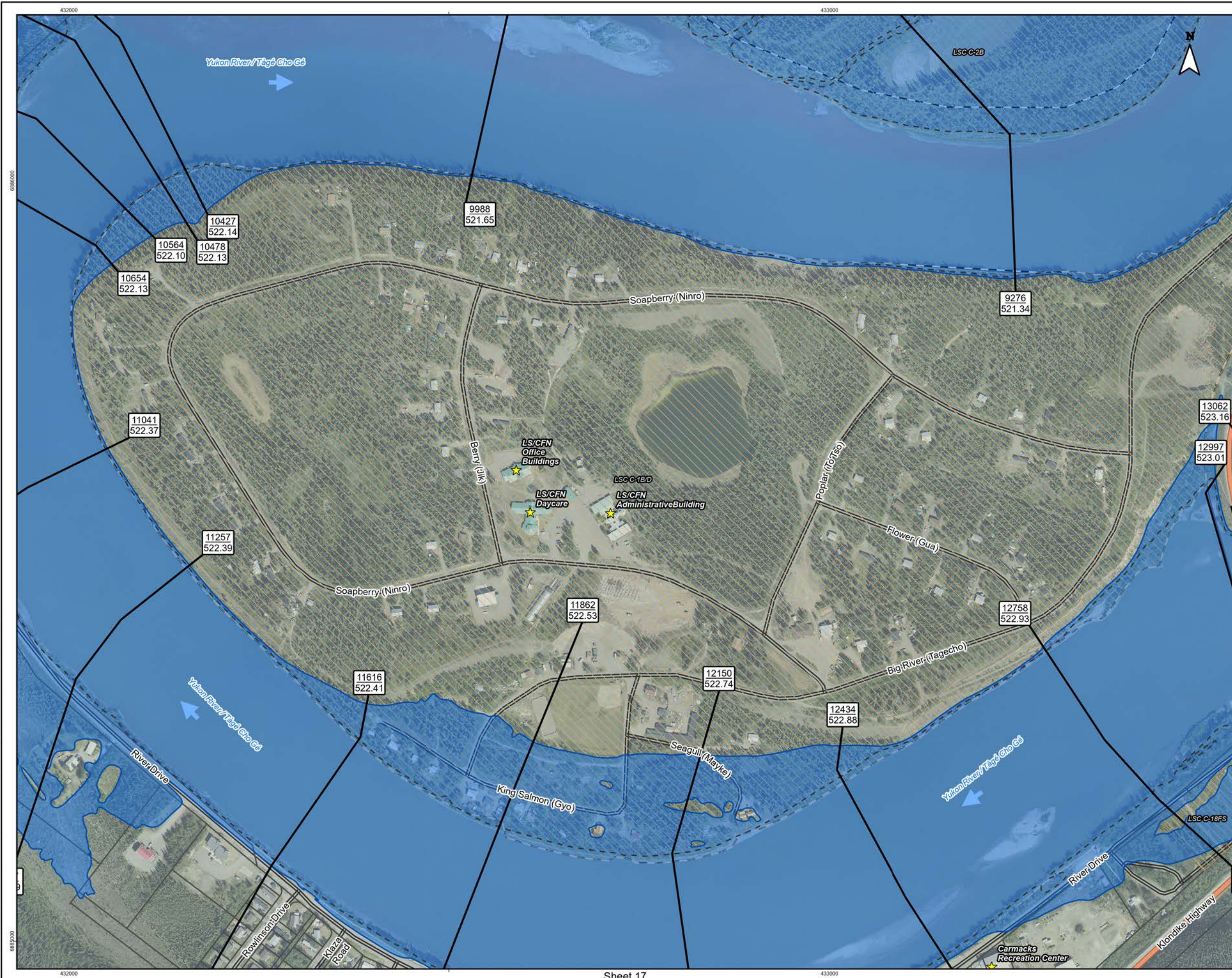
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- Notes**
1. Coordinate System: NAD 1983 UTM Zone 8N
Vertical Datum: CGVD2013, Geoid: CGG2013a
 2. Data Sources: GeoYukon, Canada Lands Survey (CLS) CCM 982, Canvec.
 3. Background: World Topographic Map: Northwest Territories, State of Alaska, Esri Canada, Esri, TomTom, Garmin, SafeGraph, METI/NASA, USGS, EPA, NPS, USDA, NRCan, Parks Canada World Hillshade: Esri, USGS
 4. Flood hazard extents shown on these maps are based on LIDAR collected on June 8 - 10 of 2019, and bathymetric/topographic survey collected in July and August of 2023.



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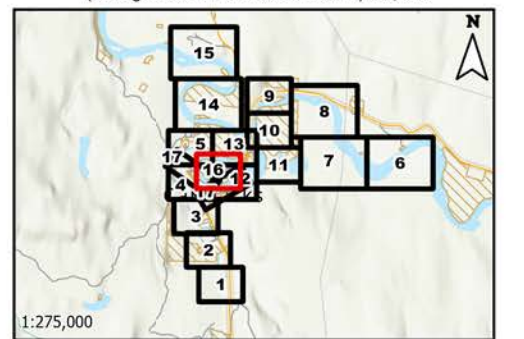
**Carmacks Flood Mapping Study
Composite Flood Hazard Extents
1% Annual Exceedance Probability (AEP)**

Client/Project:
Government of Yukon
Department of Environment
Water Resources Branch
Project: 12322320

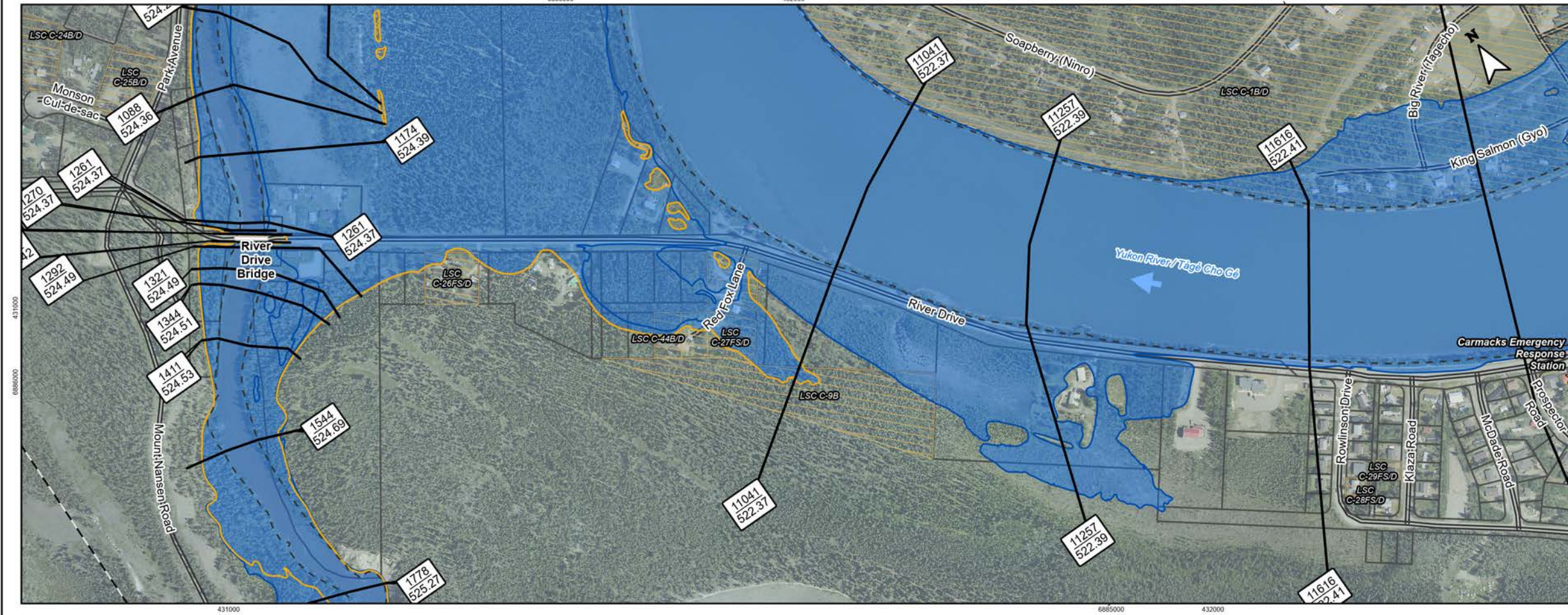
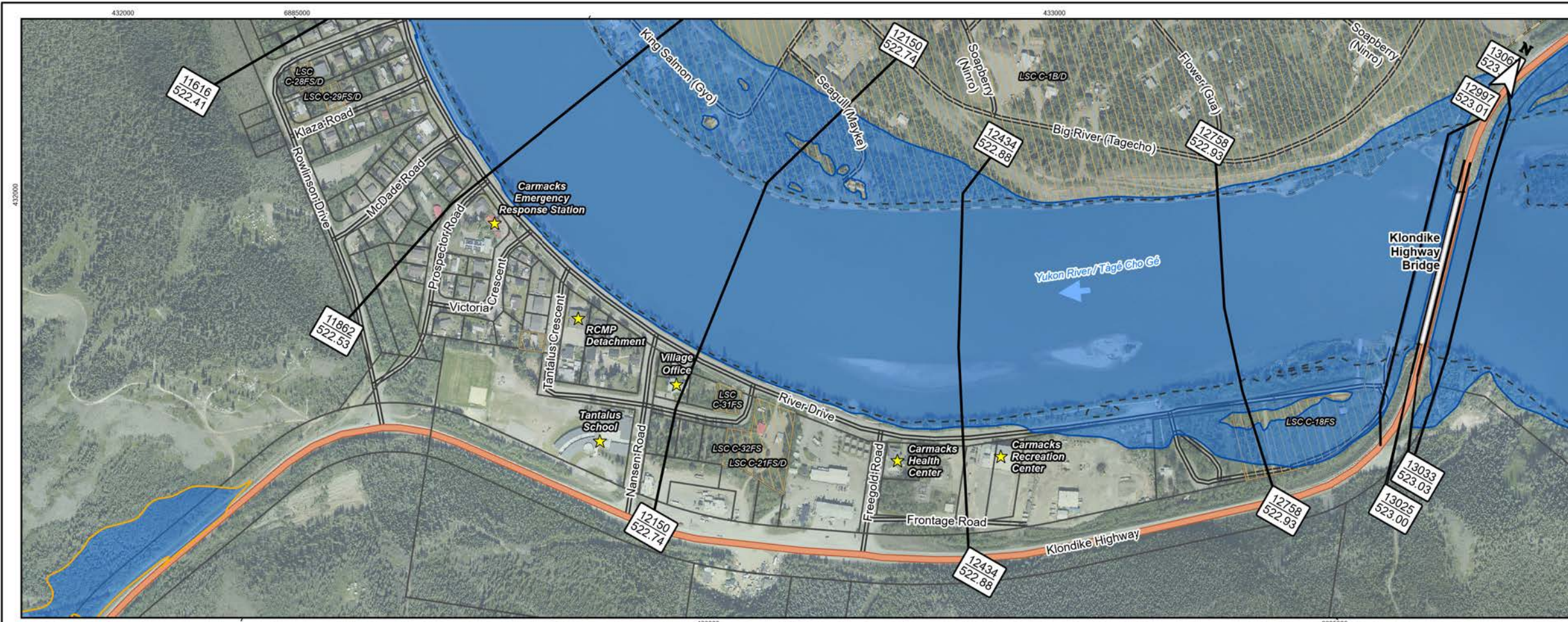
Project Location: Carmacks, Yukon
Prepared by MANDERSON on 2024-05-21
Requested by JMUIRHEAD on 2024-01-07
Review by JMUIRHEAD on 2024-05-21

- | | |
|---|---|
| Flow Direction | Hydraulic Model Cross-Sections |
| Point of Interest | Inundation under Modelled Ice Jam Runs |
| Bridge | Inundation under Modelled Open Water Runs |
| Highway | Composite Flood Hazard Extent |
| Local Road | Ice Jam Location (toe of jam) |
| Little Salmon / Carmacks First Nation Settlement Land | 50 % AEP Extent |
| Land Parcels | Hydraulic Model Cross-Sections |
| Municipal Boundary | Cross-Section Number
WSE (m) in Main Channel
of Cross-Section |
| Study Area | |

Map Publication Date: May 21, 2024
0 40 80 120 160 200 m
(At original document size of 11x 17) 1:5,000



- Notes**
1. Coordinate System: NAD 1983 UTM Zone 8N
Vertical Datum: CGVD2013, Geoid: CGG2013a
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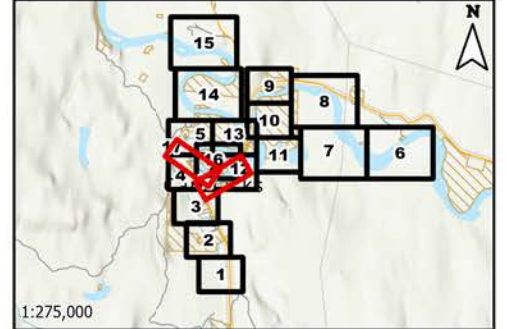
**Carmacks Flood Mapping Study
Composite Flood Hazard Extents
1% Annual Exceedance Probability (AEP)**

Client/Project:
Government of Yukon
Department of Environment
Water Resources Branch

Project: 123222320
Project Location: Carmacks, Yukon
Prepared by MANDERSON on 2024-05-21
Requested by JMUIRHEAD on 2024-01-07
Review by JMUIRHEAD on 2024-05-21

- Flow Direction
- Point of Interest
- Bridge
- Highway
- Local Road
- Little Salmon / Carmacks First Nation Settlement Land
- Land Parcels
- Municipal Boundary
- Study Area
- Hydraulic Model Cross-Sections
- Inundation under Modelled Ice Jam Runs
- Inundation under Modelled Open Water Runs
- Composite Flood Hazard Extent
- Ice Jam Location (toe of jam)
- 50 % AEP Extent
- Hydraulic Model Cross-Sections
- Cross-Section Number
WSE (m) in Main Channel of Cross-Section

Map Publication Date: May 21, 2024
0 50 100 150 200 250 m
(At original document size of 11x 17) 1:6,000



- Notes**
1. Coordinate System: NAD 1983 UTM Zone 8N
Vertical Datum: CGVD2013, Geoid: CGG2013a
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 3. Background: World Topographic Map: Northwest Territories, State of Alaska, Esri Canada, Esri, TomTom, Garmin, SafeGraph, METI/NASA, USGS, EPA, NPS, USDA, NRCAN, Parks Canada World Hillshade: Esri, USGS
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