

# ALBERNI-CLAYOQUOT REGIONAL DISTRICT Parks Linear Asset Assessment & Mapping Maplehurst Park



July 29, 2025

Prepared for:

Alberni-Clayoquot Regional District  
3008 Fifth Avenue  
Port Alberni, BC  
V9Y 2E3

Prepared by:

Herold Engineering Limited  
Unit 7, 1920 Lyche Road  
Ucluelet, BC  
V0R 3A0

Attention: Amy Mayo, Asset Management &  
Grants Coordinator



# PARKS LINEAR ASSET ASSESSMENT & MAPPING

## MAPLEHURST PARK, PORT ALBERNI, BC

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Submittal Date: July 29, 2025

Herold Project No.: 6516-001

*Prepared by:*

*Reviewed by:*



PERMIT TO PRACTICE: 1000201

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## EXECUTIVE SUMMARY

The scope of the assignment includes assessment of four bridge structures within the Maplehurst Park boundary. The report includes detailed descriptions of the bridge construction, assessment findings, recommended repairs, risk analysis and associated Class D cost estimates. The assessment was conducted on November 5, 2024. The purpose of the assessment was to document the overall physical condition of the bridges via visual and tactile on-site assessment.

The structures are all remote trail bridges, which do not conform to code-based specifications, and are generally constructed by trail users and/or municipalities without professional oversight. Efforts have been made by stakeholders to limit the impact of the structures on the natural environment. The bridge construction would be considered typical for the application; however, it does not conform to standard design codes as follows:

- § Narrow width,
- § Not founded on appropriate engineered fill,
- § No appropriate foundation system,
- § No guarding (handrails),
- § Insufficient clearance to stream channel,
- § Structural elements not designed to appropriate occupancy loads

Municipalities generally manage risks associated with this type of infrastructure by providing a trail rating system which informs users of the level of difficult/accessibility of the trail and associated bridges. Additionally, risk can be mitigated with “use at your own risk” signage and consistent maintenance/assessment and replacement efforts.

Generally, all four bridges are a mixed timber construction, comprised of sawn and natural (log) timber elements. The bridges are generally comprised of:

- § Sawn timber decking
- § Log stringers
- § Log abutments resting on organic material

The bridges are generally nearing the end of their service life. Assessment results indicate that one bridge requires replacement within the next year and the other three require replacement within one to three years. Generally, the bridges show signs of significant moisture ingress and biological damage. The bridges are very close to the water surface and are founded on organics/soil. The bridges do not have any significant seismic capacity and are not considered good candidates for seismic evaluation, nor load rating.

Some minor remedial work is recommended immediately for all four bridge structures as follows:

- § Re-secure/replace identified deck boards
- § Power-wash or clean surfaces of vegetation
- § Install non-slip surface on the deck boards (e.g.: roofing shingles or profiled metal strips)

It is to be noted that our recommendations are in line with efforts to minimally impact the environment. This philosophy is in line with stakeholder priorities; however, it can be accompanied by an elevated risk to users, and therefore municipalities.

The repairs noted in this report are to Class D standard, in 2024 Canadian dollars. For the immediate repairs, the estimated total cost for all four bridges is \$10,350. Replacement of the bridges in kind is estimated as \$1,470/m<sup>2</sup>. Refer to Section 7 for detailed cost estimates.

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## 1.0 INTRODUCTION

Location: Maplehurst Park, Port Alberni, BC

Assessment by: Shannon Summersides, P. Eng. (Herold Engineering Ltd.)  
Blair Forsyth (Herold Engineering Ltd.)

Date: November 5, 2024

### 1.1 Purpose of Assignment

The assessment was conducted to identify members either requiring repairs or showing signs of deterioration. The assessment results, detailed in the following report, will provide information regarding maintenance, repair, replacement and health and safety on a ten-year forecasted period, allowing for a prioritized repair and maintenance program to be implemented. Other items noticed during the assessment will be reported only in terms of general overall condition.

All repair/replacement recommendations will be accompanied by a Class D cost estimate, as well as a Class D level estimate of costs associated with complete replacement. These estimates are intended to inform maintenance and upgrade budgeting for the ACRD.

Where applicable, recommendations will be made for additional structural assessment in the form of seismic review and/or structural load rating. These recommendations are intended to inform budgeting strategies for future work as required.

### 1.2 Scope of Work

Herold Engineering travelled to the Maplehurst Park and walked the trail to find all four bridge structures.

The structures were assessed from ground level and the structure deck. The assessment is limited to visual and tactile assessment of the accessible components.

Herold Engineering generated and populated a structural checklist for each bridge which includes:

- General dimensions (length and width),
- Structural component sizes and lengths,
- Assessment of the existing condition of the elements based on an owner approved rating scale.

Herold Engineering generated the following report which includes the following:

- Remediation recommendations
- Risk analysis
- Residual life estimates
- Class D cost estimate of the repair recommendations
- Class D cost estimate for full replacement of the structure
- General comments on suitability for seismic loads/analysis and load rating

### 1.3 Reference Material

- Procedures for Inspection and Assessment of Fixed Timber Docks – 1994 September – 4th Edition by R.G. Sexsmith Ltd.
- Canadian Highway Bridge Design Code CAN/CSA S6-19.
- ACRD Risk Management Policy
- ACRD Risk Framework Matrix

### 1.4 Methodology

The infrastructure was reviewed by Herold Engineering Limited (Herold Engineering) from ground, as well as from the deck of the structures. Although these assessments can verify much of the visible and tactile damage, they are somewhat limited in assessing the severity and extent of internal damage, especially damage due to decay and/or borer insect damage.

The assessment included detailed visual and tactile assessment of four bridges located within the Maplehurst Park. The bridges are rudimentary timber construction using a mix of found natural timber elements and sawn lumber. The trail bridges generally comprised of the following components:

- Abutment
- Decking
- Stringers

The condition assessment and residual life estimates were based on previous experience, as well as the reference material noted in Section 1.3. Our recommendations are in line with the philosophy of stakeholders, which is to limit the impact of the structure(s) on the natural environment. This approach does come with elevated risk to users, and potentially to municipalities tasked with management of these areas.

The structures are all remote trail bridges, which do not conform to code-based specifications, and are generally constructed by trail users and/or municipalities without professional oversight. Efforts have been made by stakeholders to erect structures which limit impacts on the natural environment, and the bridge construction would be considered typical for the application. However, this philosophy does not conform to standard design codes as follows:

- Narrow width,
- Not founded on appropriate engineered fill,
- No appropriate foundation system,
- No guarding (handrails),
- Insufficient clearance to stream channel,
- Structural elements not designed to appropriate occupancy loads

Municipalities generally manage risks associated with this type of infrastructure by providing a trail rating system which informs users of the level of difficult/accessibility of the trail and associated bridges. Additionally, risk can be mitigated with “use at your own risk” signage and consistent maintenance, assessment, and replacement efforts.

All recommendations related to health and safety are provided based upon our experience with structures similar in form and function.

Comments on seismic aspects of the structure are in general terms only. Should Herold

Engineering locate structure(s) with higher seismic risk a detailed desktop analysis of the structure seismic response will be recommended.

Load rating analysis is considered outside the scope of the assessments; however, structures considered light duty for the intended use will be recommended for a future load rating desktop study.

Class D cost estimates are based on current industry rates for mobilization/demobilization, and material costs for supply and install, as well as historical data from similar projects. All costing is high level and considered appropriate for budget projections only. Construction costs can be challenging to estimate in the current economic climate, and it is to be noted that prices may change often and can differ significantly based on many fluctuating variables (material costs, mobilization costs, etc). Should the ACRD postpone work for greater than six months, it is recommended an updated estimate be generated to reflect current construction costs.

A risk analysis was conducted for the infrastructure, using a modified version of the Alberni-Clayoquot Regional District (ACRD) risk framework (provided to Herold Engineering). The risk framework has been generated to evaluate level of risk of noted deterioration/damage allowing for prioritization of future repairs and their implications on structure use and life safety. All documents were provided by The ACRD and are referenced in Section 1.3 above.

The following appendices can be found appended to this report:

APPENDIX A	-	Site Photographs
APPENDIX B	-	Damage Table
APPENDIX C	-	Condition Assessment Checklists
APPENDIX D	-	Aerial Map

### 1.5 Reference System

The Maplehurst Park trail is accessed from Willow Road, located in Cherry Creek, immediately north of Port Alberni. The park is a four-kilometer loop which follows the Kitsuksis Creek on the eastern side. There are four small trail bridges located around the loop. The structures have all been built and maintained by trail users throughout the years.

Refer to the following trail map identifying Bridges 1-4.

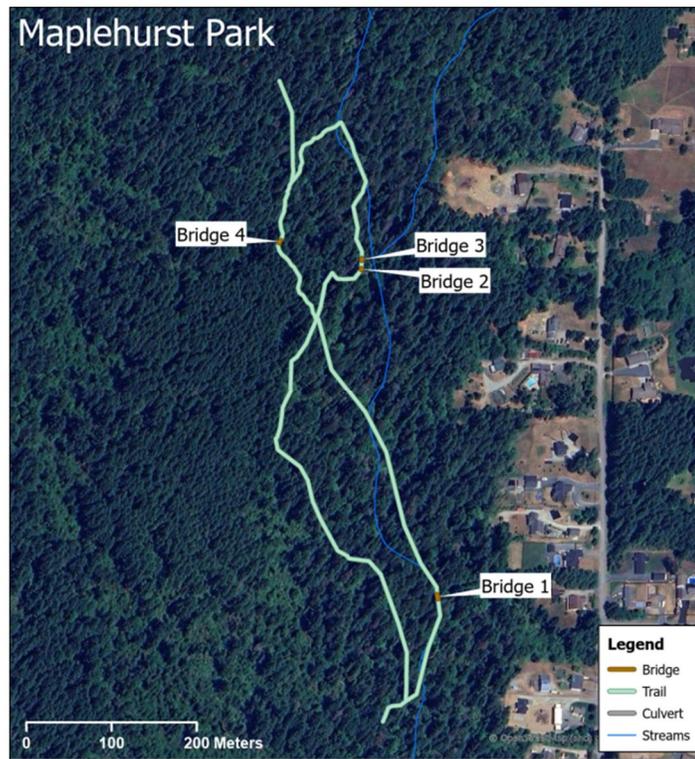


Figure 1: Maplehurst Park Map

### 1.6 Rating Scale and Risk Rating

The following is an explanation of the assessment rating scale used in Sections 2 through 5 as it relates to the estimated time before the next required repair to a specific item.

- |                |   |
|----------------|---|
| Very Good (VG) | - Element is in serviceable condition with no notable deterioration. No repairs are required.   |
| Good (G)       | - Element has minor amounts of superficial deterioration with no noted oversteering or structural damage.   |
| Fair (F)       | - Element has moderate amounts of damage which may increase rates of deterioration long term. No noted oversteering is observed. Repairs to prolong service life may be applicable. |
| Poor (P)       | - Element has significant amounts of damage or deterioration. No oversteering is observed. The element is nearing the end of its service life.                                      |
| Very Poor (VP) | - Element is no longer in serviceable condition with significant damage or loss of structural capacity. Immediate repair or replacement is likely required.                         |

For timber elements exposed to moisture such as the bridges at Maplehurst Park, the assessment rating scale corresponds to an estimated remaining service life as follows:

- |                |                 |
|----------------|-----------------|
| Very Good (VG) | - 10 years      |
| Good (G)       | - 6 to 10 years |
| Fair (F)       | - 3 to 6 years. |
| Poor (P)       | - 1 to 3 years  |
| Very Poor (VP) | - 0 years       |

The assessment rating scale then correlates to the risk rating based on the associated consequences associated with element deterioration and/or failure. The consequence rating scale is as follows:

- Negligible (N) - Element failure has no effect on structural capacity, nor usage/performance (e.g.: coating failures)
- Minor (M) - Element failure results in no effect on structural capacity and has a minor effect on usage/performance (e.g.: damage to guarding, signage etc.)
- Moderate (Mod) - Element failure leads to local failure only. This can impact usage (e.g.: settlement of abutments, listing of the structure, loose decking)
- Significant (S) - Element failure probably does not lead to total collapse due to continuity and/or multiple load paths. Other main structural members in the system may become overloaded due to the failure. This includes main load carrying members (e.g.: girder in a multi-girder system)
- Collapse (C) - Element failure leads to total collapse of the structure. This includes failure of main members with no benefit from continuity or multiple-load paths (e.g.: simply supported girder in a two-girder system)

The assessment and consequence rating scales are combined to create a risk rating matrix as follows:

		Assessment Rating				
		VG	G	F	P	VP
Consequence Rating	N	1	2	3	4	5
	M	2	4	6	8	10
	Mod	3	6	9	12	15
	S	4	8	12	16	20
	C	5	10	15	20	25

Refer to Appendix B for damage table and associated risk rating.

## 2.0 BRIDGE 1

### 2.1 Description and Geometry

Bridge 1 is a mix of sawn timber and natural timber construction. The deck is supported by log stringers and abutments. Intermediate supports are generally comprised of various configurations of sawn timber cribbing and log sections.

The bridge is a multi-span structure which is elevated approximately 300 millimeter above grade. The bridge has no visible guarding, nor foundation and is generally utilized by able-bodied hikers/recreators. Refer to Appendix A, photograph 2 for a view of the general arrangement. Overall bridge dimensions are as follows:

- Length: 8.4 meters
- Width: 0.66 meters
- Stream Clearance: 0.3 meters

The component sizes are as follows:

Decking	-	50mm x 165mm x 660mm long
Log Stringers	-	240mm diameter (approx.) cut in half lengthwise
Int. Supports	-	varying diameter log sections and cribbed supports
Abutments	-	varying diameter log sections and/or sawn lumber

## 2.2 Assessment Results

The bridge is in overall poor condition. It is narrow and spans a small stream channel. The bridge elevation is near the water level. Generally, the elements rest on organic matter and have visible signs of moisture ingress. Timber elements are weathered with evidence of biological decay. The bridge does not have any guarding and has an uneven surface. The structure is clearly intended for use by able-bodied hikers/recreators. The following items were noted on-site:

- Two deck boards are loose,
- Decking cut ends are soft and easily penetrated with a probe,
- Decking is slippery with moisture and biological accumulation (moss, etc.),
- Stringers are soft and easily penetrated with a probe in localized areas,
- Intermediate supports and abutments founded on organics with no foundation system

Refer to Appendix A for photographs of the bridge and noted damage.

## 2.3 Recommendations

Based on the condition of the log stringers, replacement of the structure is recommended within one year. If structure is replaced in kind, consideration should be given to widening the deck and ensuring a level and anti-slip surface for users. If the structure is replaced in kind, consideration should also be given to signage at the trailhead indicating the level of difficulty and accessibility restrictions.

Recommended repairs to be completed immediately are as follows:

- Re-secure two loose deck boards
- Power-wash or clean surfaces of vegetation
- Install non-slip surface on the deck boards (e.g.: roofing shingles or profiled metal strips)

Should the ACRD want to pursue a structure with lower maintenance, consideration should be given to an aluminum span with FRP (fiber reinforced polymer) grating resting on engineered fill and cast-in-place concrete abutments. This option would require little maintenance and may be light enough to bring into the trail and erect by hand.

Refer to Appendix B for detailed locations, accounts of the damage, and repair recommendations. Refer to Section 7.0 for cost estimates associated with the recommendations above.

### 3.0 BRIDGE 2

#### 3.1 Description and Geometry

Bridge 2 is a mix of sawn timber and natural timber construction. The deck is supported by log stringers. The stringers are supported at one end by a log abutment and are resting directly on native soil on the other side of the stream channel. The bridge is a single span elevated approximately 300 to 400 millimeters above the water surface. The bridge is a rudimentary structure with no guarding, no foundation, and is utilized by able-bodied hikers/recreators. Refer to Appendix A, photograph 7, for a view of the general arrangement. Overall bridge dimensions are as follows:

- Length: 3.35 meters
- Width: 0.66 meters
- Stream Clearance: 0.3-0.4 meters

The component sizes are as follows:

Decking	-	50mm x varied width x 660mm (±) long
Log Stringers	-	240mm diameter (approx.) cut in half lengthwise

#### 3.2 Assessment Results

The bridge is in overall very poor condition. It is narrow and spans a small stream channel. The bridge elevation is near the water level. Timber elements are generally weathered with biological damage and visible decay/vegetative growth. The bridge does not have any guarding and has an uneven surface. The following items were noted on-site:

- One deck board is missing,
- Decking cut ends are soft and easily penetrated with a probe,
- Decking is slippery with moisture and biological accumulation (moss, etc.),
- The abutment is soft with visible decay of the cross section and biological damage.

Refer to Appendix A for photographs of the bridge and noted damage.

#### 3.3 Recommendations

Based on the overall condition the bridge is recommended to be replaced within the next one to three years. If structure is replaced in kind, consideration should be given to widening the deck and ensuring a level and anti-slip surface for users. If structure is replaced in kind, consideration should also be given to signage at the trailhead indicating the level of difficulty and accessibility restriction.

Recommended repairs to be completed immediately are as follows:

- Replace one deck board,
- Power-wash or clean surfaces of vegetation,
- Install non-slip surface on the deck boards (e.g.: roofing shingles or profiled metal strips)

Should the ACRD want to pursue a structure with lower maintenance, consideration should be given to an aluminum span with FRP grating resting on engineered fill and cast-in-place concrete abutments. This option would require little maintenance and may be light enough to bring into the trail and erect by hand.

Refer to Appendix B for detailed locations, accounts of the damage, and repair recommendations. Refer to Section 7.0 for cost estimates associated with the recommendations above.

## 4.0 [BRIDGE 3](#)

### 4.1 Description and Geometry

Bridge 3 is a mix of sawn timber and natural timber construction. The deck is supported on log stringers. The stringers are supported at both ends by a log abutment resting on organics. The bridge is a single span elevated approximately 400 millimeter above the water surface. The bridge is a rudimentary structure with no guarding and is utilized by able-bodied hikers/recreators. Refer to Appendix A, photograph 11 for a view of the general arrangement. Overall bridge dimensions are as follows:

- Length: 3.05 meters
- Width: 0.61 meters
- Stream Clearance: 0.4 meters

The component sizes are as follows:

Decking	-	50mm x varied width x 610mm (±) long
Log Stringers	-	215mm diameter (approx.) cut in half lengthwise

### 4.2 Assessment Results

The bridge is in overall very poor condition. It is narrow and spans a small stream channel. The bridge elevation is near the water level. Timber elements are generally weathered with biological damage and visible decay/vegetative growth. The bridge does not have any guarding and has an uneven surface. The following items were noted on-site:

- Decking cut ends are soft and easily penetrated with a probe,
- Decking is slippery with moisture and biological accumulation (moss, etc.),
- Stringers are soft and easily penetrated with a probe in localized areas,
- Abutments are deteriorating due to biological damage; at one end the abutment is nearly gone, and the stringers are resting in organics/soil.
- The abutments are soft with visible decay of the cross section and biological damage,

Refer to Appendix A for photographs of the bridge and noted damage.

### 4.3 Recommendations

Based on the overall condition the bridge is recommended to be replaced within the next year. If structure is replaced in kind, consideration should be given to widening the deck and ensuring a level and anti-slip surface for users. If structure is replaced in kind, consideration should also be given to signage at the trailhead indicating the level of difficulty and accessibility restriction.

Recommended repairs to be completed immediately are as follows:

- Power-wash or clean surfaces of vegetation,
- Install non-slip surface on the deck boards (e.g.: roofing shingles or profiled metal

strips)

Should the ACRD want to pursue a structure with lower maintenance, consideration should be given to an aluminum span with FRP grating resting on engineered fill and cast-in-place concrete abutments. This option would require little maintenance and may be light enough to bring into the trail and erect by hand.

Refer to Appendix B for detailed locations, accounts of the damage, and repair recommendations. Refer to Section 7.0 for cost estimates associated with the recommendations above.

## 5.0 BRIDGE 4

### 5.1 Description and Geometry

Bridge 4 is a mix of sawn timber and natural timber construction. The deck is supported on log stringers. The stringers are supported at both ends by a log abutment resting on organics. There are asphalt roofing shingles on the deck to provide a non-slip surface. The bridge is a single span elevated above the water. The bridge is a rudimentary structure with no guarding and is utilized by able-bodied hikers/recreators. Refer to Appendix A, photograph 13 for a view of the general arrangement. Overall bridge dimensions are as follows:

- Length: 3.48 meters
- Width: 0.61 meters
- Stream Clearance: VARIES (0.075 meters minimum)

The component sizes are as follows:

Decking	-	38mm x varied width x 610mm (±) long
Log Stringers	-	215mm diameter (approx.) cut in half lengthwise

### 5.2 Assessment Results

The bridge is in overall very poor condition. It is narrow and spans a small stream channel. The bridge elevation is near the water level. Timber elements are generally weathered with biological damage and visible decay/vegetative growth. The bridge does not have any guarding and has an uneven surface. The following items were noted on-site:

- One deck board is loose.
- Decking cut ends are soft and easily penetrated with a probe,
- Stringers are soft and easily penetrated with a probe in localized areas,
- Abutments are deteriorating due to biological damage; at one end the abutment is nearly gone, and the stringers are resting in organics/soil.
- There is evidence of settlement at the abutment. One side of the bridge has only 75mm of clearance to the ground below,

Refer to Appendix A for photographs of the reported damage.

### 5.3 Recommendations

Based on the overall condition and construction, the bridge is recommended to be replaced within the next year. If structure is replaced in kind, consideration should be given to widening the deck and ensuring a level surface for users. If structure is replaced in kind, consideration

should also be given to signage at the trailhead indicating the level of difficulty and accessibility restriction.

Recommended repairs to be completed immediately are as follows:

- Re-secure deck board,
- Power-wash or clean surfaces of vegetation,

Should the ACRD want to pursue a structure with lower maintenance, consideration should be given to an aluminum span with FRP grating resting on engineered fill and cast-in-place concrete abutments. This option would require little maintenance and may be light enough to bring into the trail and erect by hand.

Refer to Appendix B for detailed locations, accounts of the damage, and repair recommendations. Refer to Section 7.0 for cost estimates associated with the recommendations above.

## 6.0 RESIDUAL LIFE ESTIMATES

The residual life estimates are based on the rating scale defined in Section 1.6 above. These estimates represent the worst-case members inspected in any member group. For this reason, the overall condition of the member group is not necessarily reflected by the following residual life estimates.

*See Appendix B to determine which members the residual life estimate applies to.*

### 6.1 Bridge 1

Deck Boards	0 years (based on two loose boards); 1-3 years otherwise
Stringers	1 year (based on the overall condition of the elements)
Intermediate Supports	1-3 years (based on the overall condition of the elements)
Abutments	1-3 years (based on the overall condition of the elements)

### 6.2 Bridge 2

Deck Boards	0 years (based one missing board), 1-3 years otherwise
Stringers	1-3 years (based on the overall condition of the elements)
Abutments	1-3 years (based on the overall condition of the elements)

### 6.3 Bridge 3

Deck Boards	1-3 years (based on the overall condition of the elements)
Stringers	1-3 years (based on the overall condition of the elements)
Abutments	0 years (based on level of deterioration at one end)

### 6.4 Bridge 4

Deck Boards	0 years (based on one loose board); 1-3 years otherwise
Stringers	1-3 years (based on the overall condition of the elements)
Abutments	0 years (based on the observed settlement)

## 7.0 COST ESTIMATES

The repairs noted in this report are estimated to Class D standard, in 2025 Canadian dollars. They are based on historical data, current industry rates, as well as our experience with projects of this nature.

The following cost estimates assume that a construction crew has mobilized one time to repair/replace all four bridges. It is to be noted that construction costs fluctuate significantly in the current economic climate. It is recommended that if repairs are delayed more than six months, a revised estimate be generated. Additionally, should detailed design of replacement structures occur, costing should be redone to ensure accuracy for budgeting and maintenance projections.

Costing associated with full replacement includes removal and appropriate disposal of existing bridge structures.

*Table 7.1 Cost Estimate for Recommended Repairs*

ITEM	LOCATION	RECOMMENDATION	COST (\$)
Mobilization/Demobilization			\$5,000.00
Bridge 1			
Deck Boards	General	Install non-slip material such as roofing shingles or profiled metal traction strips.	\$500
Deck Boards	At 1.50m	Re-secure deck boards to the substructure	\$75
Stringer	General	Ongoing monitoring. Replace log stringers within one year.	\$1,500
General	General	Clean structure	\$150
Bridge 2			
Deck Boards	General	Install non-slip material such as roofing shingles or profiled metal traction strips.	\$250
Deck Boards	at 1.5m	Replace deck board.	\$100
General	General	Clean structure	\$100
Bridge 3			
Deck Boards	General	Install non-slip material such as roofing shingles or profiled metal traction strips.	\$200
General	General	Clean structure	\$100
Bridge 4			
Deck Boards	at 0m	Re-secure deck boards to the substructure	\$50
Abutment	at 3.05m	Replace abutment within the next year	\$500
General	General	Clean structure	\$100

Subtotal (\$)	\$8,625
Contingency (20%)	\$1,725
<b>TOTAL (\$)</b>	<b>\$10,350.00</b>

*Table 7.2 Cost Estimate for Full Replacement*

(NOTE: l.s. = lump sum, l.m. = lineal meter, m<sup>2</sup> = square meter)

ITEM	SIZE	UNITS	QUANTITY	UNIT RATE	COST (\$)
Mobilization/Demobilization					\$10,000.00
Bridge 1					
Deck Boards	50mm x 165mm	l.m.	37.0	\$100	\$3,700
Stringer	240 diameter log	l.m.	16.8	\$150	\$2,520
Intermediate Spans	Varies	each	4	\$200	\$800
Abutment	Varies	each	2	\$500	\$1,000
Bridge 2					

ITEM	SIZE	UNITS	QUANTITY	UNIT RATE	COST (\$)
Deck Boards	50mm x 165mm	l.m.	15.2	\$100	\$1,520
Stringers	240 diameter log	l.m.	6.70	\$150	\$1,005
Abutment	Varies	each	2	\$500	\$1,000
<b>Bridge 3</b>					
Deck Boards	50mm x 165mm	l.m.	15.9	\$100	\$1,590
Stringers	215 diameter log	l.m.	7.0	\$150	\$1,050
Abutment	Varies	each	2	\$500	\$1,000
<b>Bridge 4</b>					
Deck Boards	38mm x 165mm	l.m.	14.0	\$75	\$1,043
Stringers	215 diameter log	l.m.	6.1	\$150	\$915
Abutment	Varies	each	2	\$500	\$1,000

Subtotal (\$)	\$28,143.00
Contingency (20%)	\$5,628.60
<b>TOTAL (\$)</b>	<b>\$33,771.60</b>

# Appendix A

## Site Photographs



Photograph 1: Maplehurst Park Trailhead



Photograph 2: Bridge 1, general arrangement



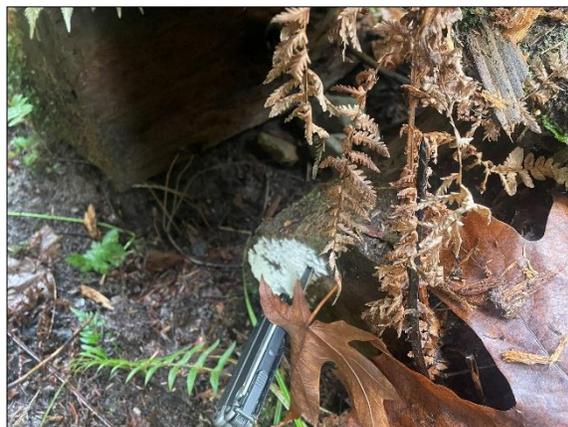
Photograph 3: Bridge 1 Decking, note: soft at cut ends



Photograph 4: Bridge 1 Stringer, note: decayed section



Photograph 5: Bridge 1 intermediate support, note: biological damage and decay



Photograph 6: Bridge 1 log abutment, note: biological damage and decayed section



Photograph 7: Bridge 2, general arrangement



Photograph 8: Bridge 2, note: missing deck board



Photograph 9: Bridge 2 abutment, note: decayed section



Photograph 10: Bridge 2 abutment, note: decayed section



Photograph 11: Bridge 3, general arrangement



Photograph 12: Bridge 3 abutment, note: deteriorated cross section such that stringers nearly rest on organics below



Photograph 13: Bridge 4, general arrangement



Photograph 14: Bridge 4 abutment and stringers,  
note: biological damage to  
sections

# Appendix B Damage Table

Table B1 Damage Table

*\*Note: all locations measured from zero datum at entry to the bridge*

ITEM	LOCATION	DAMAGE	CONDITION	COMMENTS	RECOMMENDATION	RISK	REMEDIAL YEAR
<b>Bridge 1</b>							
Deck Boards	General	Missing	Fair	Deck boards are slippery	Install non-slip material such as roofing shingles or profiled metal traction strips.	6	2025
Deck Boards	at 6.0m	Mechanical/ Biological	Very Poor	Two deck boards are loose.	Re-secure deck boards to the substructure	15	2025
Stringer	Various	Biological	Poor	Decay has compromised the section through the span.	Ongoing monitoring. Replace log stringers within one year.	20	2025/2026
<b>Bridge 2</b>							
Deck Boards	General	Missing	Fair	Deck boards are slippery	Install non-slip material such as roofing shingles or profiled metal traction strips.	6	2025
Deck Boards	at 1.5m	Missing	Very Poor	Missing deck board.	Replace deck board.	15	2025
<b>Bridge 3</b>							
Deck Boards	General	Biological	Fair	Deck boards are slippery	Install non-slip material such as roofing shingles or profiled metal traction strips.	6	2025
<b>Bridge 4</b>							
Deck Boards	at 0m	Mechanical/ Biological	Very Poor	One deck board is loose.	Re-secure deck boards to the substructure	15	2025
Abutment	General	Mechanical/ Biological	Poor to Very Poor	Abutment has visibly settled resulting in listing of the structure	Replace abutment within the next year	25	2025/2026

# Appendix C

## Bridge Checklist

# HEROLD ENGINEERING

## BRIDGE ASSESSMENT REPORT

**BRIDGE NAME** BRIDGE 1 **LOCATION** MAPLEHURST PARK

**LENGTH** 8.4m **ROADWAY WIDTH** 660mm **CLEARANCE** 300mm  
**No. SPANS** 5 **SPAN TYPE** SIMPLY SUPPORTED **MAX. SPAN** 3.5m  
**POSTED LOAD** N/A **YEAR BUILT** N/A **UTILITIES** N/A

ITEM	CONSTRUCTION	24																	
<b>DECK</b>	50x165mm SAWN TIMBER	F-P																	
<b>STRINGERS</b>	240mm DIAMETER LOG	P																	
<b>ABUTMENTS</b>	VARYING DIAMETER LOG	F-P																	
<b>INT. SUPPORTS</b>	CRIBBING AND LOG SUPPORTS	F-P																	
<b>GUARDING</b>	N/A																		
<b>STREAM CHANN.</b>	CLEAR	P																	

**RATING SCALE**

- VERY GOOD (VG) - ELEMENT IS IN SERVICEABLE CONDITION WITH NO NOTABLE DETERIORATION. NO REPAIRS ARE REQUIRED.
- GOOD (G) - ELEMENT HAS MINOR AMOUNTS OF SUPERFICIAL DETERIORATION WITH NO NOTED OVERSTRESSING OR STRUCTURAL DAMAGE.
- FAIR (F) - ELEMENT HAS MODERATE AMOUNTS OF DAMAGE WHICH MAY INCREASE RATES OF DETERIORATION LONG TERM. NO NOTED OVERSTRESSING IS OBSERVED. REPAIRS TO PROLONG SERVICE LIFE MAY BE APPLICABLE.
- POOR (P) - ELEMENT HAS SIGNIFICANT AMOUNTS OF DAMAGE OR DETERIORATION. HOWEVER NO OVERSTRESSING IS OBSERVED. THE ELEMENT IS NEARING THE END OF SERVICE LIFE.
- VERY POOR (VP) - ELEMENT IS NO LONGER IN SERVICEABLE CONDITION WITH SIGNIFICANT DAMAGE OR LOSS OF STRUCTURAL CAPACITY. IMMEDIATE REPAIR OR REPLACEMENT IS LIKELY.

**REMARKS**

2024 - TWO DECK BOARDS ARE LOOSE  
 DECK BOARDS ARE SOFT AT CUT ENDS AND SLIPPERY  
 STRINGERS ARE SOFT WHEN PROBED THROUGH SECTION  
 ALL ELEMENTS ARE SOFT WITH VISIBLE BIOLOGICAL DECAY AND VEGETATIVE GROWTH  
 STREAM CLEARANCE TO THE BRIDGE SOFFIT IS LESS THAN CODE SPECIFIED MINIMUMS



# HEROLD ENGINEERING BRIDGE ASSESSMENT REPORT

**BRIDGE NAME** BRIDGE 1 **LOCATION** MAPLEHURST PARK

**LENGTH** 8.4m **ROADWAY WIDTH** 660mm **CLEARANCE** 300mm  
**No. SPANS** 5 **SPAN TYPE** SIMPLY SUPPORTED **MAX. SPAN** 3.5m  
**POSTED LOAD** N/A **YEAR BUILT** N/A **UTILITIES** N/A

ITEM	CONSTRUCTION	24																		
<b>DECK</b>	50x165mm SAWN TIMBER	F-P																		
<b>STRINGERS</b>	240mm DIAMETER LOG	P																		
<b>ABUTMENTS</b>	VARYING DIAMETER LOG	F-P																		
<b>INT. SUPPORTS</b>	CRIBBING AND LOG SUPPORTS	F-P																		
<b>GUARDING</b>	N/A																			
<b>STREAM CHANN.</b>	CLEAR	P																		

**RATING SCALE**

- VERY GOOD (VG) - ELEMENT IS IN SERVICEABLE CONDITION WITH NO NOTABLE DETERIORATION. NO REPAIRS ARE REQUIRED.
- GOOD (G) - ELEMENT HAS MINOR AMOUNTS OF SUPERFICIAL DETERIORATION WITH NO NOTED OVERSTRESSING OR STRUCTURAL DAMAGE.
- FAIR (F) - ELEMENT HAS MODERATE AMOUNTS OF DAMAGE WHICH MAY INCREASE RATES OF DETERIORATION LONG TERM. NO NOTED OVERSTRESSING IS OBSERVED. REPAIRS TO PROLONG SERVICE LIFE MAY BE APPLICABLE.
- POOR (P) - ELEMENT HAS SIGNIFICANT AMOUNTS OF DAMAGE OR DETERIORATION. HOWEVER NO OVERSTRESSING IS OBSERVED. THE ELEMENT IS NEARING THE END OF SERVICE LIFE.
- VERY POOR (VP) - ELEMENT IS NO LONGER IN SERVICEABLE CONDITION WITH SIGNIFICANT DAMAGE OR LOSS OF STRUCTURAL CAPACITY. IMMEDIATE REPAIR OR REPLACEMENT IS LIKELY.

**REMARKS**

2024 - TWO DECK BOARDS ARE LOOSE  
 DECK BOARDS ARE SOFT AT CUT ENDS AND SLIPPERY  
 STRINGERS ARE SOFT WHEN PROBED THROUGH SECTION  
 ALL ELEMENTS ARE SOFT WITH VISIBLE BIOLOGICAL DECAY AND VEGETATIVE GROWTH  
 STREAM CLEARANCE TO THE BRIDGE SOFFIT IS LESS THAN CODE SPECIFIED MINIMUMS



# HEROLD ENGINEERING

## BRIDGE ASSESSMENT REPORT

**BRIDGE NAME** BRIDGE 3 **LOCATION** MAPLEHURST PARK

**LENGTH** 3.35m **ROADWAY WIDTH** 660mm **CLEARANCE** 300-400mm  
**No. SPANS** 1 **SPAN TYPE** SIMPLY SUPPORTED **MAX. SPAN** 3.35m  
**POSTED LOAD** N/A **YEAR BUILT** N/A **UTILITIES** N/A

ITEM	CONSTRUCTION	24																		
<b>DECK</b>	50mm x VARIED SAWN TIMBER	VP																		
<b>STRINGERS</b>	240mm DIAMETER LOG	F-P																		
<b>ABUTMENTS</b>	VARYING DIAMETER LOG	P																		
<b>GUARDING</b>	N/A																			
<b>STREAM CHANN.</b>	CLEAR	P																		

**RATING SCALE**

- VERY GOOD (VG) - ELEMENT IS IN SERVICEABLE CONDITION WITH NO NOTABLE DETERIORATION. NO REPAIRS ARE REQUIRED.
- GOOD (G) - ELEMENT HAS MINOR AMOUNTS OF SUPERFICIAL DETERIORATION WITH NO NOTED OVERSTRESSING OR STRUCTURAL DAMAGE.
- FAIR (F) - ELEMENT HAS MODERATE AMOUNTS OF DAMAGE WHICH MAY INCREASE RATES OF DETERIORATION LONG TERM. NO NOTED OVERSTRESSING IS OBSERVED. REPAIRS TO PROLONG SERVICE LIFE MAY BE APPLICABLE.
- POOR (P) - ELEMENT HAS SIGNIFICANT AMOUNTS OF DAMAGE OR DETERIORATION. HOWEVER NO OVERSTRESSING IS OBSERVED. THE ELEMENT IS NEARING THE END OF SERVICE LIFE.
- VERY POOR (VP) - ELEMENT IS NO LONGER IN SERVICEABLE CONDITION WITH SIGNIFICANT DAMAGE OR LOSS OF STRUCTURAL CAPACITY. IMMEDIATE REPAIR OR REPLACEMENT IS LIKELY.

**REMARKS**

2024 - ONE DECK BOARD IS MISSING  
 DECK BOARDS ARE SOFT AT CUT ENDS AND SLIPPERY  
 ABUTMENTS ARE SOFT AND DECAYED. THERE IS HEAVY BIOLOGICAL DAMAGE AND VEGETATIVE GROWTH.  
 ALL ELEMENTS ARE SOFT WITH VISIBLE BIOLOGICAL DECAY AND VEGETATIVE GROWTH  
 STREAM CLEARANCE TO THE BRIDGE SOFFIT IS LESS THAN CODE SPECIFIED MINIMUMS



# HEROLD ENGINEERING BRIDGE ASSESSMENT REPORT

**BRIDGE NAME** BRIDGE 4 **LOCATION** MAPLEHURST PARK

**LENGTH** 3.48m **ROADWAY WIDTH** 610mm **CLEARANCE** VARIES (75mm MIN)  
**No. SPANS** 1 **SPAN TYPE** SIMPLY SUPPORTED **MAX. SPAN** 3.48m  
**POSTED LOAD** N/A **YEAR BUILT** N/A **UTILITIES** N/A

ITEM	CONSTRUCTION	24																		
<b>DECK</b>	38mm x VARIED SAWN TIMBER	F-P																		
<b>STRINGERS</b>	215mm DIAMETER LOG	P																		
<b>ABUTMENTS</b>	VARYING DIAMETER LOG	VP																		
<b>GUARDING</b>	N/A																			
<b>STREAM CHANN.</b>	CLEAR	P																		

**RATING SCALE**

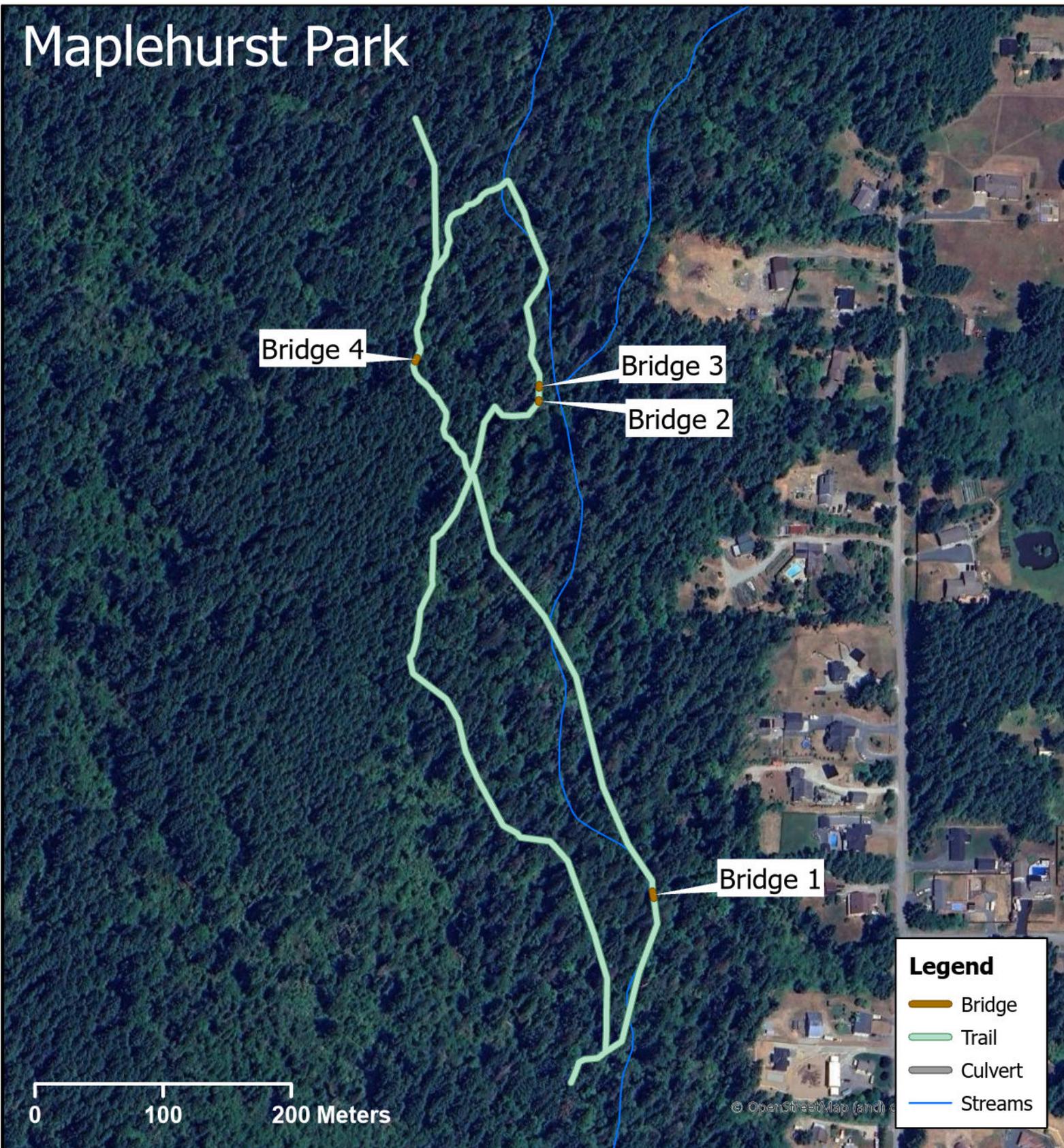
- VERY GOOD (VG) - ELEMENT IS IN SERVICEABLE CONDITION WITH NO NOTABLE DETERIORATION. NO REPAIRS ARE REQUIRED.
- GOOD (G) - ELEMENT HAS MINOR AMOUNTS OF SUPERFICIAL DETERIORATION WITH NO NOTED OVERSTRESSING OR STRUCTURAL DAMAGE.
- FAIR (F) - ELEMENT HAS MODERATE AMOUNTS OF DAMAGE WHICH MAY INCREASE RATES OF DETERIORATION LONG TERM. NO NOTED OVERSTRESSING IS OBSERVED. REPAIRS TO PROLONG SERVICE LIFE MAY BE APPLICABLE.
- POOR (P) - ELEMENT HAS SIGNIFICANT AMOUNTS OF DAMAGE OR DETERIORATION. HOWEVER NO OVERSTRESSING IS OBSERVED. THE ELEMENT IS NEARING THE END OF SERVICE LIFE.
- VERY POOR (VP) - ELEMENT IS NO LONGER IN SERVICEABLE CONDITION WITH SIGNIFICANT DAMAGE OR LOSS OF STRUCTURAL CAPACITY. IMMEDIATE REPAIR OR REPLACEMENT IS LIKELY.

**REMARKS**

2024 - ONE LOOSE DECK BOARD.  
 DECK BOARDS ARE SOFT AT CUT ENDS.  
 DECK BOARDS HAVE ROOFING SHINGLES INSTALLED TO PROVIDE NON-SLIP SURFACE.  
 ABUTMENTS ARE SOFT AND DECAYED. ONE ABUTMENT HAS SETTLED AND BRIDGE IS LISTING.  
 ABUTMENT IS SIGNIFICANTLY DECAYED AND STRINGERS ARE RESTING IN ORGANICS.  
 ALL ELEMENTS ARE SOFT WITH VISIBLE BIOLOGICAL DECAY AND VEGETATIVE GROWTH.  
 STREAM CLEARANCE TO THE BRIDGE SOFFIT IS LESS THAN CODE SPECIFIED MINIMUMS

# Appendix D Aerial Map

# Maplehurst Park



## LIST OF BRIDGES WITHIN MAPLEHURST PARK

'Condition' & 'Risk' columns evaluate all of the bridge components and displays the worst condition value and highest risk value.

UniqueID	Name	Description	Surface	Length (m)	Width (m)	Condition	Risk
13440001	Bridge 1	Sawn timber & natural timber, no guarding	Timber	8.4	0.66	Poor	20
13440002	Bridge 2	Sawn timber & natural timber, no guarding	Timber	3.35	0.66	VeryPoor	15
13440003	Bridge 3	Sawn timber & natural timber, no guarding	Timber	3.05	0.61	VeryPoor	6
13440004	Bridge 4	Mix of timber, no guarding, asphalt shingles	Timber	3.48	0.61	VeryPoor	25