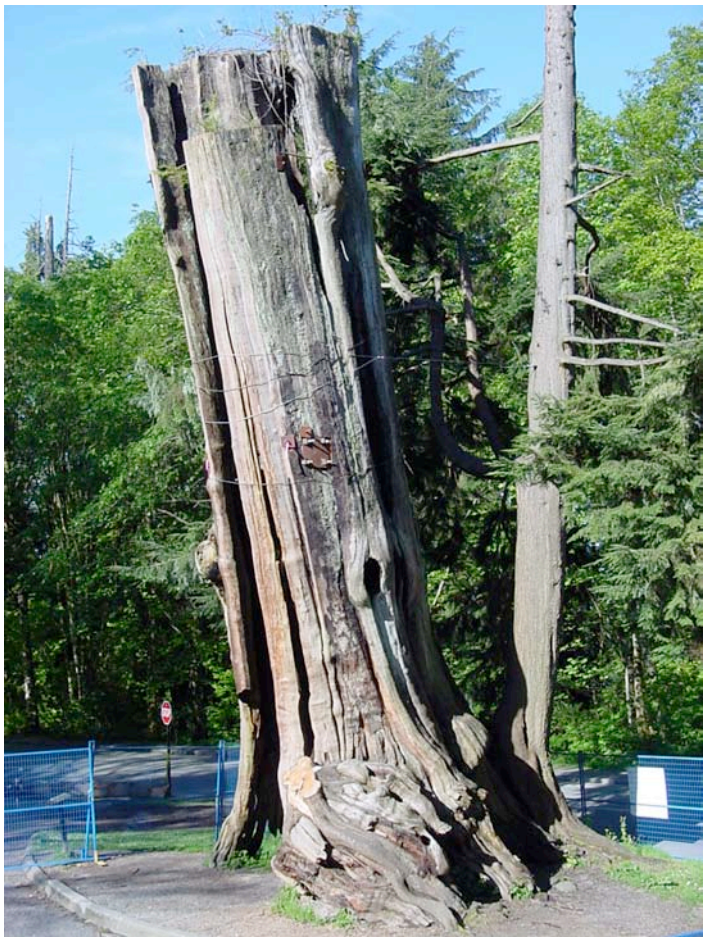
Hollow Tree – Temporary Bracing
Method Statement

Stanley Park
Vancouver, BC



Proposal to: Hollow Tree Committee

Macdonald & Lawrence Timber Framing Ltd
Cobble Hill, BC
250 – 743 – 8840
www.macdonaldandlawrence.ca

Rev - July 23, 2008 (3pm)

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Project Description

Install temporary bracing and stabilization of the Hollow Tree in Stanley Park of Vancouver. The tree currently leans to the east (away from the road) at approximately 12 degrees and is in danger of eminent, catastrophic collapse. Note that the installation of temporary support described here is a hazardous operation -

This work has been requested by Hollow Tree Committee, Lorne Whitehead – Chairman.

Protection of the Hollow Tree as an ancient artifact is a guiding constraint of the program. All activities should maintain this focus and do as little as possible to adversely affect the object or hinder later steps that may occur.

This document is a work in progress because of the urgent nature of the repairs presented. Small changes in method and equipment is expected up until the time of work to achieve the safest possible methodology for the crew and the Hollow Tree artifact.

Location / Directions

Directions:

North Vancouver (M&L crew takes ferry Departure Bay -> Horseshoe Bay)

South over Lion's Gate Bridge

2nd right at bottom of bridge

Left at stop sign onto Stanley Park Drive

Past new parking lot on Point

300 m further on Drive – left side, approach slowly.

Contact Info

Client — Hollow Tree Committee (formerly Friends of Hollow Tree)
Lorne Whitehead – Chairman
604 – 822 – 3075
lorne.whitehead@ubc.ca

Macdonald & Lawrence Timber Framing Ltd
Vancouver Business License # 08-190059
Office 250 – 743 – 8840
Fax 250 – 743 - 8862
Project Manager – Randy Churchill, PhD 250 – 710 – 9068
randy@macdonaldandlawrence.ca
Site Crew — Steve Lawrence 250 – 701 - 2585
Higgs Murphy
Health & Safety / Exec Officer – Gordon Macdonald 250 – 360 - 6433

Engineer — Robin Zirnhelt & Reid Costley
Cascade Engineering
101-621 10th Street
Canmore, AB T1W 2A2
403 – 678 – 4211 (office)
403 – 609 – 5244 (cell)

Arborist — Dr. Julian Dunster
604 – 947 – 0016
jadunster@gmail.com

Other Contacts

Call Before You Dig 604 – 257 – 1940. Ticket # 300593

United Lock Block - Tom 604 – 325 - 9161

Backhoes Unlimited – Ann 604 – 888 – 4000

Duncan Iron Works – Brent 250 – 746 - 5147

General Site Rules

M&L must have unrestricted and non-competitive access to the entire Hollow Tree immediate area during stabilization.

A Controlled Access Zone (CAZ) will be placed around the site, 30 m radius from tree (not including road). This will be identified with fencing, flagging tape, paint on the ground or other appropriate means.

The roadway will remain open, but cautionary signs and traffic cones will be placed to warn motorists of workers in the area. There may be a short window of closure for one lane while concrete anchor blocks are located/dug and dropped off from delivery truck. Crew shall direct traffic as needed to park work vehicles (off the road) and enter / exit the roadway.

Visitors and media are expected, but discouraged from interfering with site operations or distracting the crew. No one will be allowed in the CAZ with permission of the Crew Leader during work.

Every visitor, or other tradesperson, entering the Controlled Access Zone is required to participate in an Orientation Briefing by the M&L Crew Leader or designate. This 5-10 minute briefing will identify major hazards and acquaint the visitor with overhead dangers and other rules of the site.

Every crew member and visitor shall wear approved hard hat protection at all times within the work zone.

Every crew member and visitor shall wear appropriate eye protection while running power tools, welding, or any other potential dangerous situation.

Toilet facilities are NOT provided on site, team members will travel to use facilities at other locations if necessary.

Work crew shall left the site tidy and free of trash from installation operations.

Crew conduct shall be professional and courteous at all times.

Protection of the Hollow Tree as a historical artifact is an objective of this work, all work shall focus upon maintaining the original fabric of the tree and allowing for future conservation work (to be determined by others).

Health & Safety (Procedures)

Orientation Briefings

Every crew member or visitor shall receive an orientation briefing before being allowed to access the work site.

The following items shall be covered in this briefing:

Site rules of play
Site specific health & safety issues

First Aid

Our crew will be carrying a basic first aid kit for traveling small crew. All three (3) members of the M&L crew have up-to-date Level 1 First Aid training.

911 works from this location to call in emergency assistance, several cell phones will be on site.

Fall Protection Plan

Every participant is responsible for immediately alerting the team leaders and their colleagues of any unsafe or hazardous conditions or practices that may cause an injury.

Team Leaders and Participants will not knowingly put themselves or any other person at risk of injury due to a fall from height at any time during this project.

Fall *prevention* (avoidance) shall be the preferred option for every work task.

Good work planning and pre-work briefings will be used to identify and communicate potential fall hazards.

Scaffolding will be used to limit the use of ladders wherever possible.

Fall-protection anchors and access ropes will be installed prior to the frame raising wherever possible.

Harnesses and lanyards will be used at all times when operating work placement equipment.

All participants using fall protection equipment will be trained to do so.

All fall protection equipment will be visually inspected prior to use.

Only safe and appropriate fall protection equipment will be used.

Double-lanyard techniques will be used to pass anchors and obstacles while on fall protection systems. Participants will not disconnect from fall protection systems at any time when there is a fall hazard.

Controlled Access Zones (CAZ) will be established around all fall hazards and live edges. These will be clearly marked, and their locations will be communicated to all participants. Only designated participants will work within the CAZ.

Tool Inspections

All power tools and rigging gear must be inspected by the crew's safety officer, or qualified person designee, before use at the work site. This inspection will take place prior to travel to site in M&L shop, or on site for equipment rented or brought by other trades. Any tools found unsafe during this inspection, or determined so during the course of work, shall be marked and removed from service.

Power tools:

i) Must be certified by UL or CSA and bear one of these marks:

ii) Cables must be sound: no cuts through sheathing (can be patched on-site with tape if no wires are exposed)
iii) Trigger switch must be positive on and off
iv) Tool must start and stop OK (no screaming bearings or flashes of blue lightning)
v) Chuck and arbors must not have undue 'slop'
vi) Saw guards must retract and drop back smoothly
vii) Safety guards / riving knives must be in place
viii) There can be no sign of modifications that might make the tool unsafe

Chainsaws:

i) Must have a working brake (full stop while chain spinning)
ii) Chain catcher must be in good condition
iii) No fuel leaks from chainsaws
iv) Fuel containers look OK

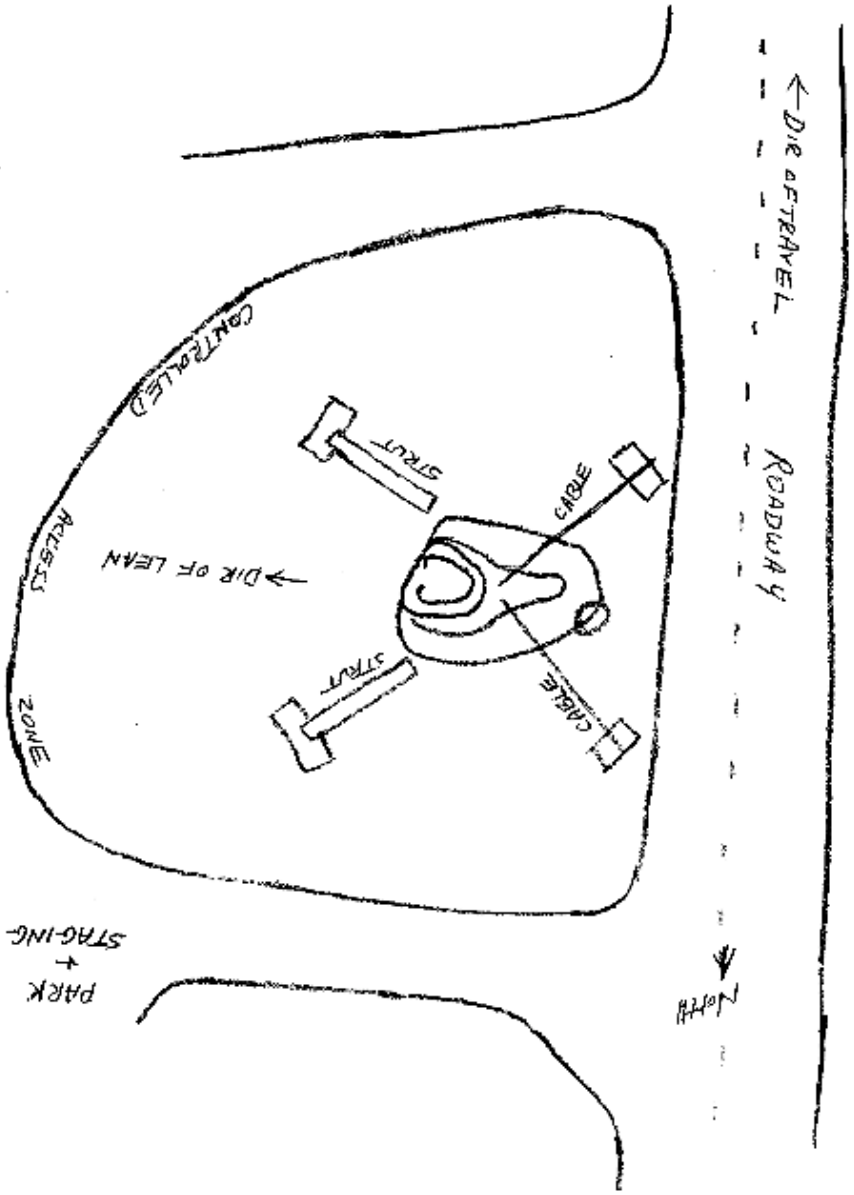
Rigging & Lifting Tackle:

i) Must bear manufacturers' breaking load or SWL markings
ii) Inspector shall fill out proper inspection form for rigging before the event

Program (Schedule of Events)

M-W July 21 – 23		Prep of plans, equipment & supplies for install – M&L Shop. Permits & approvals for work – Lorne
W July 23		Distribution of work Method Statement to HTC & VPR – Randy
Th July 24		Load trailer & confirm checklists – M&L Shop.
	Afternoon	Backhoe dropped on/near site
Fr July 25	6:20 am	First ferry from Nanaimo – Horseshoe Bay
	9:00	M&L crew arrives on site
	9:30	Start Backhoe work
	10:00	Scheduled delivery of lock blocks
	12:00	Installation of cables complete. Lunch break ½ hr.
	6:00 pm	Estimated end of work
	9:00 pm	Reserved ferry from Tsawwassen

Site Plan


DIR OF TRAVEL
ROADWAY
CONTROLLED
ACCESS
ZONE
STRUT
CABLE
DIR OF LEAN
STRUT
CABLE
PARK
+
STAGING
NORTH

Preparations Prior To Site Work

Two cables – assemble & clamp ends.
Mount strut top end plate (1/2 of universal).
Drill one (1) hole in each top plate – locator for mapping on site.
Paint all metal assemblies w/ Galvacon cold galvanizing paint.

Temporary Stabilization – Installation Script

Layout location of Lock Blocks.
Backhoe begins digging spots for cables near roadway, digs all 4 spots.
Assemble scaffolding to access W plate for cable top ends – both sides w/ plank.
Map & drill cable top end plate bolt holes.
Mount cable top end plate & secure w/ nuts; attach cables.
Lay cable in Lock Block holes prior to block placement.
Delivery of Lock Blocks – install all in prepared holes.
Backfill cable blocks and tension cables (prior to working under tree).
Move scaffolding to plates on E side of tree, one tower to each.
Map & drill strut top plates.
Install & secure strut top plates.
Drill & prepare strut anchor blocks to accept base plates.
Measure & cut log struts to exact length.
Assemble struts and install using backhoe for lifting.
Backfill strut blocks.
Disassemble scaffolding.
Pack up tools & clean sweep site.

Raising Crew Kit Checklist

First Aid kit
Hard hats – one each plus spares
Individual tool belts & kits
50’ tape
Cans spray paint (bright 2 colors)
Shovels (2)
Mattock (1)
4’ level
Scaffolding (12 frames, 12 braces, 8 platforms, railings)
24’ scaffolding plank
Honda EUi3000 generator
50’ heavy extension cord
Mag drill & shell bits for 1” bolt; other size bits.
Rapid tap cutting fluid
Wrench set – large
Socket set – large
Chain for lifting blocks
10’ lifting straps (4)
Plumb bob
Sawhorse pair w/ saddle
Chainsaw & kit & fuel & oil
Shackles – large (4)
Tote of misc rope
Cutting torch
Threaded rod to replace existing if needed
Surepac – fill for blocks (backhoe bring to site?)
Tamper to compact around blocks
Galvacon – cold galvanizing paint. Brush, solvent, rages
Hammer drill w/ bits (1”)
Drill motor
5/8” wood auger bits (other sizes)
Epoxy gun & refills (4)
Fall Protection gear - each
Lineup bar
BBB – big blue bar
Large pry bar

Engineer's Specification – Stamped Drawings

Project: HOLLOW TREE - STANLEY PARK Project #: 08-327

By: RZ Date: July 17/08

TEMPORARY SHORING SCEME

- DESIGN LIFE IS ASSUMED TO BE 6 months
- THIS TEMPORARY SHORING MUST BE FOLLOWED UP BY DETAILED DESIGN FOR MORE PERMANENT STABALIZATION
- ACCESS TO THE SITE MUST BE RESTRICTED AS SMALL FALLING HAZARDS HAVE NOT BEEN ADDRESSED.

- WORK SHOULD ONLY BE PERFORMED BY PERONAL EXPERIENCED IN SHORING HIGH HAZARD STRUCTURES
- A FIELD REVIEW OF THE WORK SHOULD BE PERFORMED BY THIS OFFICE.

- ALL PLATE TO BE BE MIN G.40.21 300W.
- BOLTS TO BE A325
- WELDS TO CSA W59-M1989

PROFESSIONAL ENGINEER PROVINCE OF ALBERTA A.N. WILSON

SKETCH LIST :

SK-1	TITLE
SK-2	ELEVATION
SK-3	PLAN
SK-4	TOP STRUT CONNECTION
SK-5	BOTTOM STRUT CONNECTION
SK-6	TOP CONNECTION DETAIL
SK-7	COUPLER DETAIL.
SK-8	CABLE / TURN-BUCKLE DETAIL.

101- 621 10th st, canmore, ab t1w 2a2
t [403] 678 4211 f [403] 609-0437

SK-1

cascade engineering group

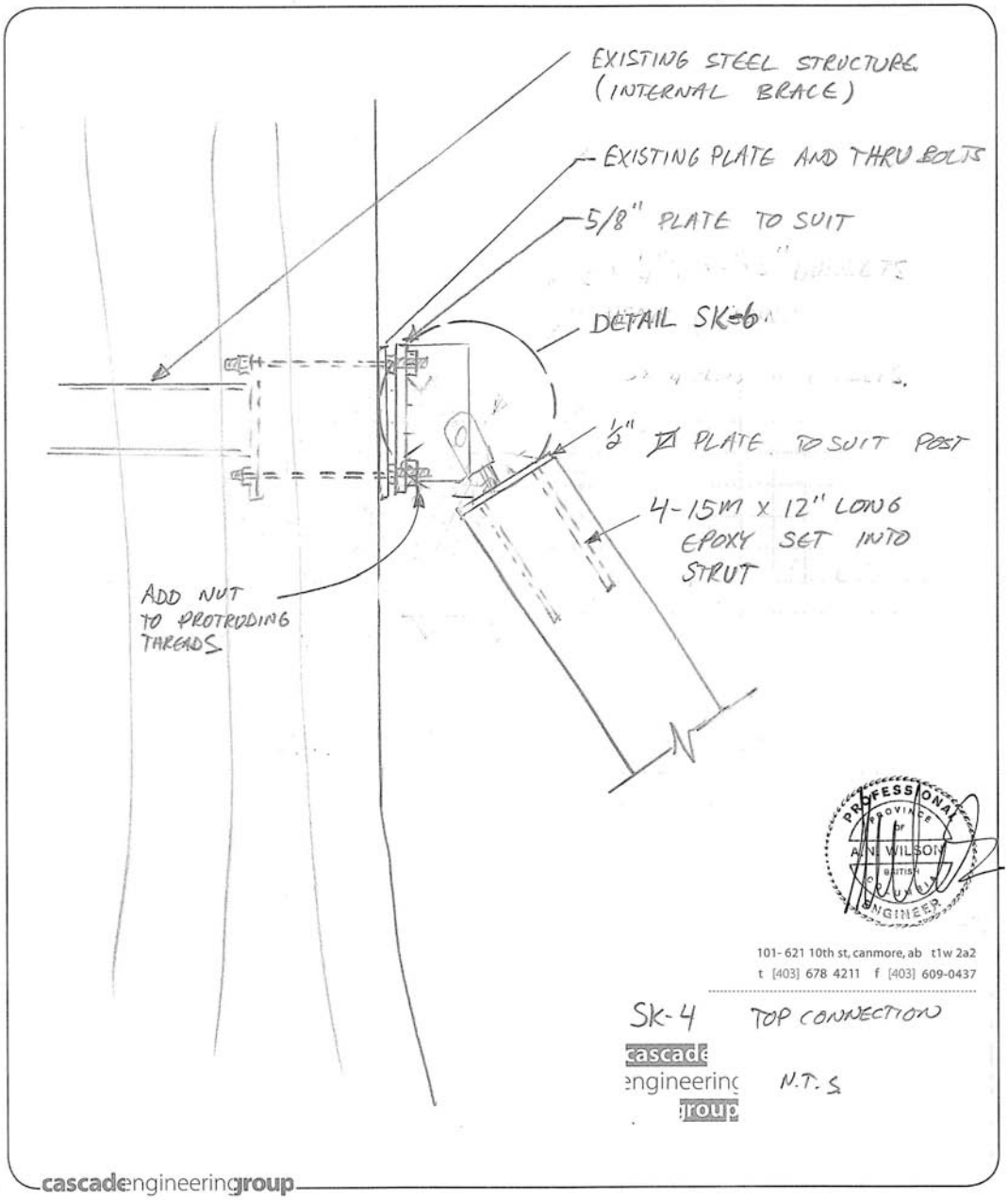
Page ____of____

EXISTING STEEL FRAME
2 x 3/8" Ø CABLES
C/W TURN BUCKLES
2- LOCK BLOCKS AT BASE OF EACH CABLE (30"x30"x5')
C.O.G.
~44
~14°
~18
~9
30°
SEE DETAIL SK-4
2 X MIN. 10x10 D.FIR-L #1 STRUT OR 10 3/4" Ø @ MID. HEIGHT
SEE DETAIL SK-5
CONCRETE LOCK BLOCK AT EACH STRUT BASE
July 17/08
08-327
SK-2
HOLLOW TREE
STANLEY PARK;
ELEVATION; N.T.S.
cascade engineering group
101-621 10th st, Canmore, AB T1W 2a2
t [403] 678 4211 f [403] 609-0437
PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA
J.N. WILSON

08-327
101-621 10th st, canmore, ab t1w 2a2
t [403] 678 4211 f [403] 609-0437
SK-3 HOLLOW TREE
STANLEY PARK:
cascade engineering group
PLAN VIEW: N.T.S.
LOG / TIMBER STRUT
30-45°
DIRECTION OF LEAN
30-45°
LOG / TIMBER STRUT
PROFESSIONAL ENGINEER
PROVINCE OF ALBERTA
ANDY WILSON

Project: HOLLOW TREE - STANLEY PARK Project #: 08 - 327

By: RZ Date: July 17/08.



PROFESSIONAL ENGINEER PROVINCE OF BRITISH COLUMBIA A.N. WILSON

101- 621 10th st, canmore, ab t1w 2a2
t [403] 678 4211 f [403] 609-0437

Sk-4 TOP CONNECTION

N.T.S

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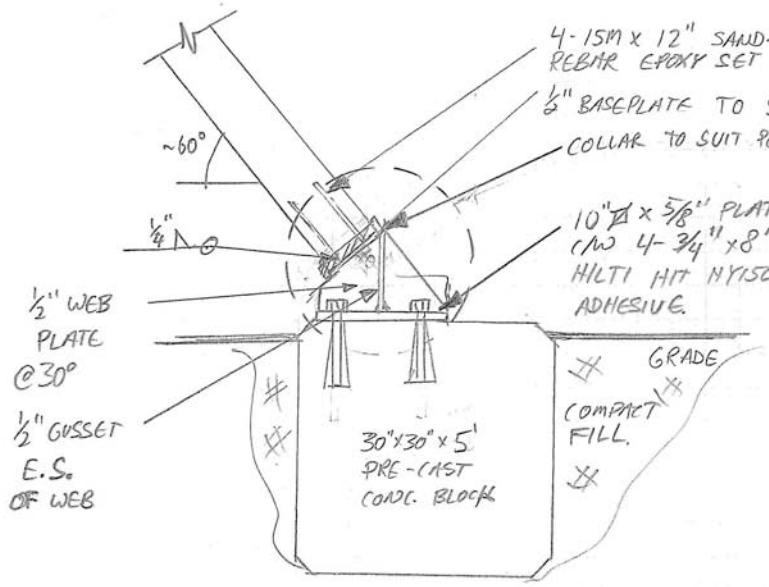
Project: HOLLOW TREE - STANLEY PARK Project #: 08-327

By: RZ Date: JULY 17/08



SOIL TO HAVE MIN. 100 kPa ALLOWABLE BEARING CAPACITY

PROFESSIONAL ENGINEER PROVINCE OF BRITISH COLUMBIA A.N. WILSON

101-621 10th st, canmore, ab t1w 2a2
t [403] 678 4211 f [403] 609-0437

SK-5 BASE CONNECTION

N.T.S

cascade engineering group

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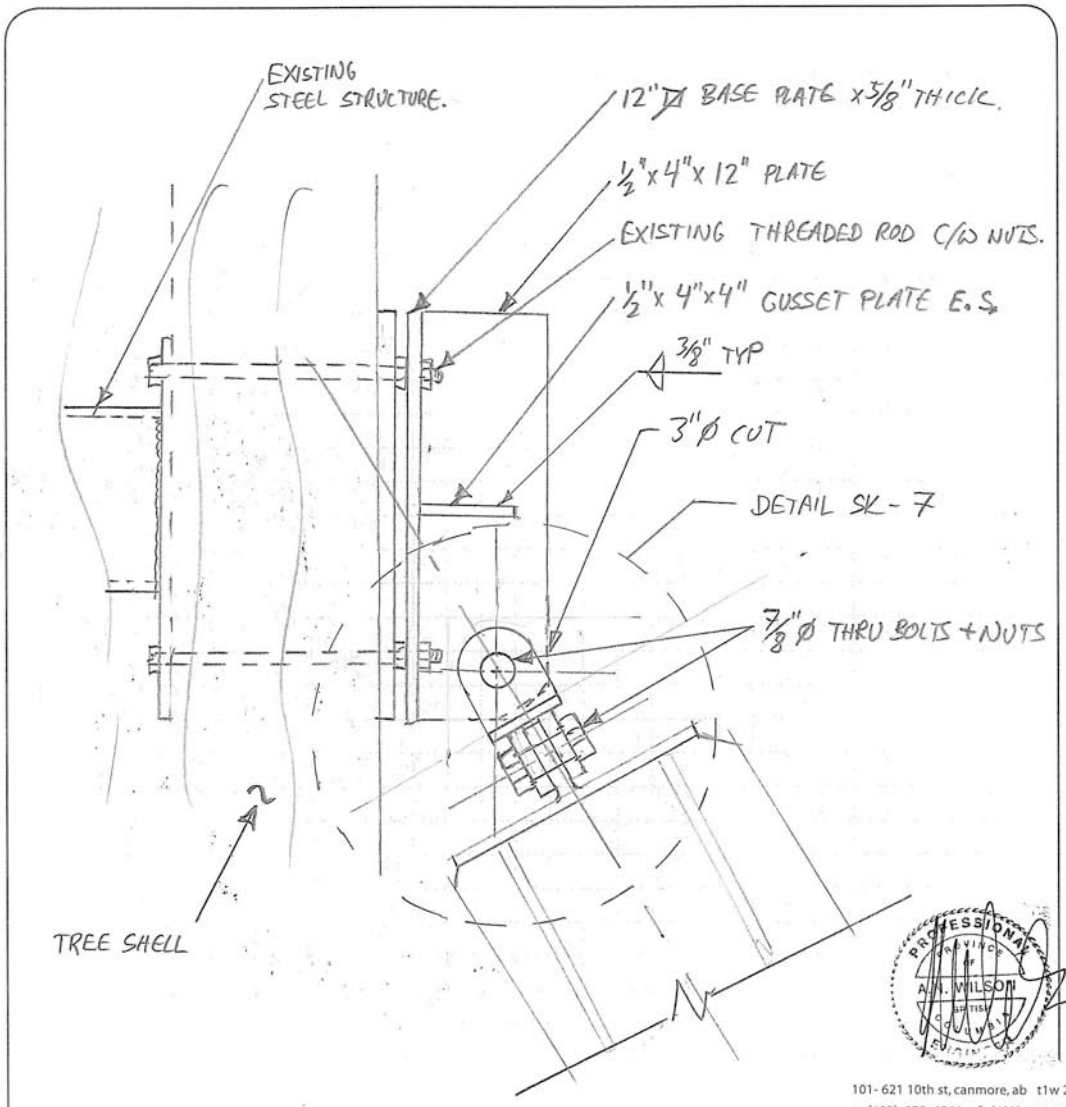
Project: HOLLOW TREE - STANLEY PARK Project #: 08-327

By: RZ Date: JULY 22/08



101-621 10th st, canmore, ab t1w 2a2
t [403] 678 4211 f [403] 609-0437

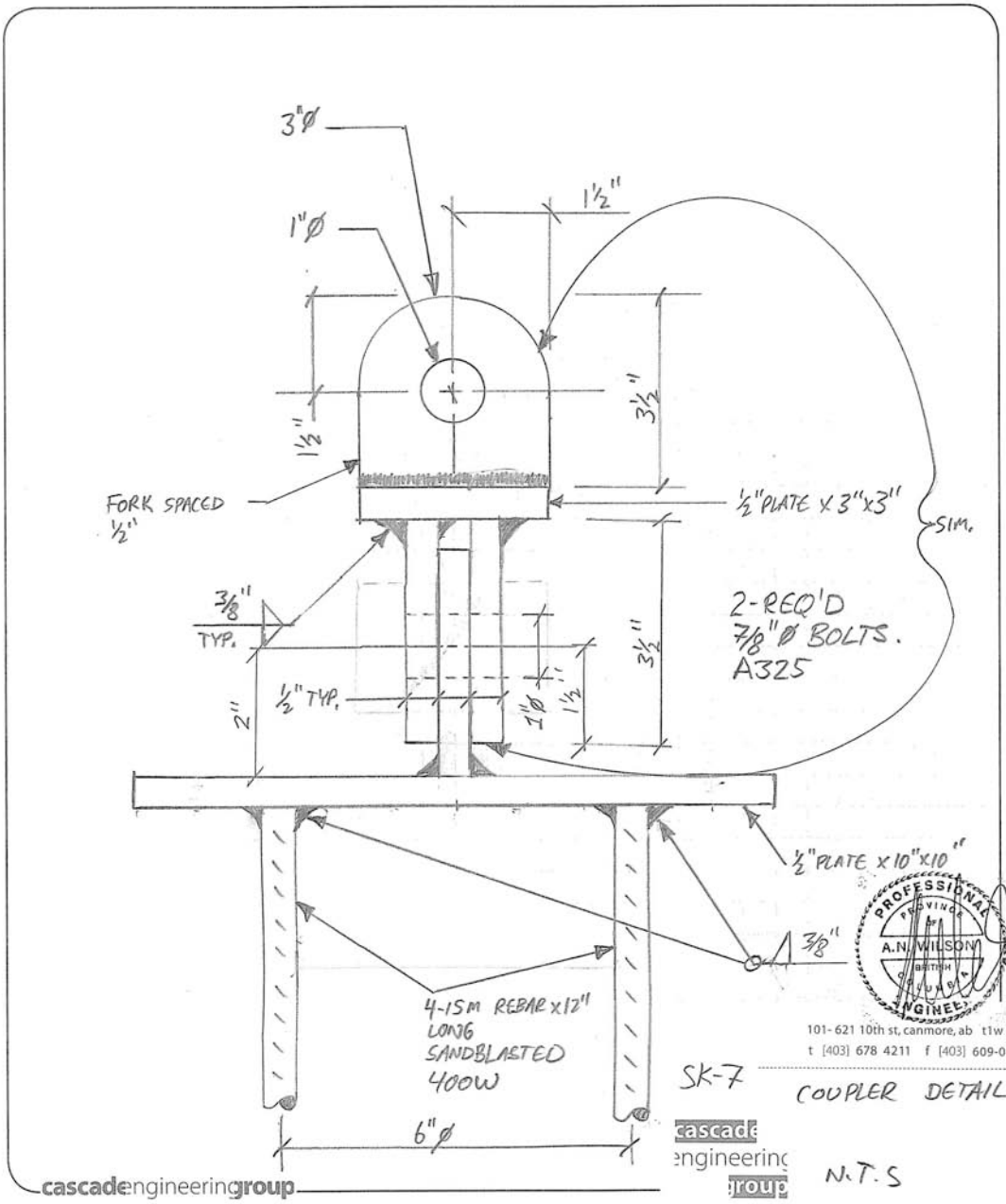
SK-6 TOP CONNECTION DETAIL

N.T.S

cascadeengineeringgroup

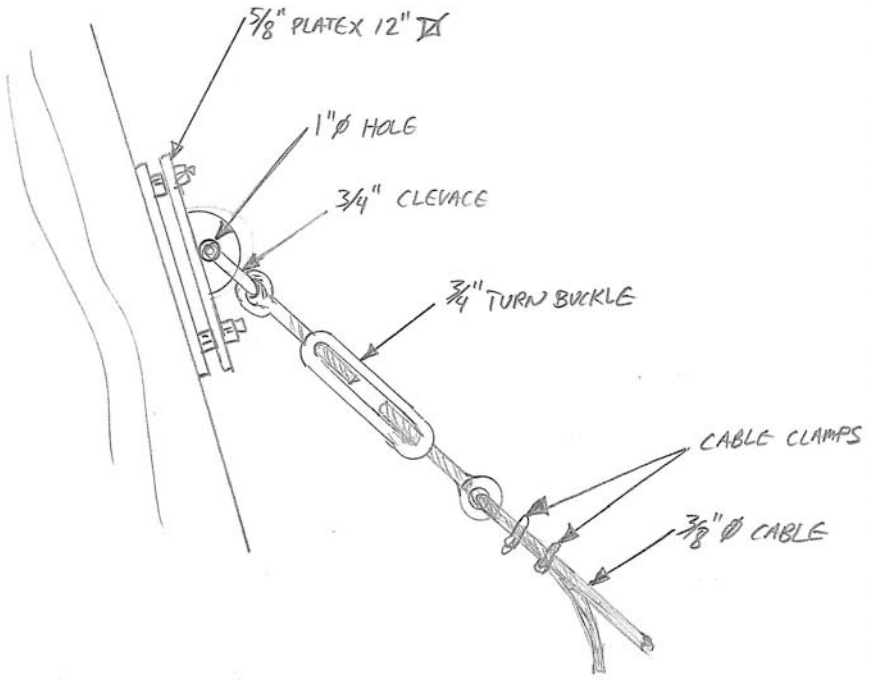
Project: HOLLOW TREE - STANLEY PARK Project #: OR-327

By: RZ Date: JULY 22/08.



Project: HOLLOW TREE Project #: 08-328

By: RZ Date: JULY 22/08.



2- CABLE / TURN-BUCKLE ASSEMBLIES REQ'D.

PROFESSIONAL ENGINEER
A.N. WILSON
101- 621 10th st, canmore, ab t1w 2a2
t [403] 678 4211 f [403] 609-0437

SK-8 CABLE / TURN-BUCKLE CONNECTION DETAIL

N.T.S.

cascadeengineeringgroup

WCB Compliance Letter – M&L

WORK SAFE BC
WORKING TO MAKE A DIFFERENCE

Assessment Department
Mailing Address
PO Box 5350
Station Terminal
Vancouver BC V6B 5L5

Location
6951 Westminster Highway
Richmond BC
V7C 1C6
www.worksafebc.com

Clearance Section
Telephone 604 244 6180
Toll Free within Canada
1 888 922 2768
Fax 604 244 6390

Macdonald & Lawrence Timber Framing Ltd.
1356 Ball Road
PO Box 10
COBBLE HILL, BC V0R 1L0

July 17, 2008

Person/Business : MACDONALD & LAWRENCE TIMBER FRAMING LTD
749207 AQ (023)

This letter provides clearance information for the purposes of Section 51 of the *Workers Compensation Act*.

We confirm that the above-referenced firm is active, in good standing, and has met WorkSafeBC's criteria for advance clearance. Accordingly, if the addressee on this letter is the prime contractor, the addressee will not be held liable for the amount of any assessment payable for work undertaken by the above-referenced firm to **October 01, 2008.**

This firm has had continuous coverage with us since June 01, 2005.

Employer Service Centre
Assessment Department

Clearance Reference # : C125180322
CLRAAA-5

For more information about Section 51 and clearance letters visit WorkSafeBC.com

Please refer to your account number in your correspondence or when contacting the Assessment Department.

To alter this document constitutes fraud.

-1-

Certification of Insurance Coverage – M&L

GENERAL CERTIFICATE OF INSURANCE

CITY OF VANCOUVER

Section 6 b) – Staff to select the required # of days Written Notice before sending the certificate out for completion.
Section 2 through 8 – to be completed and executed by the Insurer or its Authorized Representative

1. THIS CERTIFICATE IS ISSUED TO: City of Vancouver, as represented by its Board of Parks & Recreation
2099 Beach Avenue, Vancouver, BC, V5Y 1V4

and certifies that the insurance policies as listed herein have been issued to the Named Insured(s) and are in full force and effect as of the effective date of the agreement described below.

2. NAMED INSURED: *(must be the same name as the Permittee/Licensee or Party(ies) to the Contract and is/are either an individual(s) or a legally incorporated company(ies))* MACDONALD + LAWRENCE TIMBER FRAMING LTD.
MAILING ADDRESS: PO BOX 10, COBBLE HILL, BC. V0R 1L0
LOCATION ADDRESS: STANLEY PARK, VANCOUVER, BC
DESCRIPTION OF OPERATION, CONTRACT, AGREEMENT, LEASE, PERMIT OR LICENSE: INSTALLATION OF TEMPORARY SUPPORTS FOR HOLLOW TREE

3. PROPERTY INSURANCE **naming the City of Vancouver and its Board of Parks & Recreation as Named Insureds and/or Loss Payees with respect to their interests and shall contain a waiver clause in favour of the City of Vancouver and its Board of Parks & Recreation**
(All Risks Coverage including Earthquake and Flood)
INSURER: AXA PACIFIC INS CO
TYPE OF COVERAGE:
POLICY NUMBER: 1352693
POLICY PERIOD: From NOV 5/07 to NOV 5/08
INSURED VALUES: (Replacement Cost)
Building and Tenants' Improvements: N/A
Contents and Equipment: $
Deductible Per Loss: $

4. COMMERCIAL GENERAL LIABILITY INSURANCE (Occurrence Form)
Including the following extensions:
√ Personal Injury
√ Products and Completed Operations
√ Cross Liability or Severability of Interest
√ Employees as Additional Insureds
√ Blanket Contractual Liability
√ Non-Owned Auto Liability
INSURER: AXA PACIFIC INS CO
POLICY NUMBER: 1352693
POLICY PERIOD: From NOV 5/07 to NOV 5/08
LIMITS OF LIABILITY: (Bodily Injury and Property Damage Inclusive)
Per Occurrence: $ 5,000,000
Aggregate: $ 5,000,000
All Risk Tenants' Legal Liability: $ 1,000,000
Deductible Per Occurrence: $ 5,000. EXCEPT TENANTS LEGAL IS $10,000

5. AUTOMOBILE LIABILITY INSURANCE for operation of owned and/or leased vehicles
INSURER: N/A
POLICY NUMBER:
POLICY PERIOD: From ____ to ____
LIMITS OF LIABILITY:
Combined Single Limit: $
If vehicles are insured by ICBC, complete and provide Form APV-47.

6. ☐ UMBRELLA OR ☐ EXCESS LIABILITY INSURANCE
INSURER: N/A
POLICY NUMBER:
POLICY PERIOD: From ____ to ____
LIMITS OF LIABILITY: (Bodily Injury and Property Damage Inclusive)
Per Occurrence: $
Aggregate: $
Self-Insured Retention: $

7. OTHER INSURANCE (e.g. Boiler & Machinery, Business Interruption, Crime, etc.) – Please specify Name of Insurer(s), Policy Number, Policy Period, and Limit.
N/A

8. POLICY PROVISIONS:
Where required by the governing contract, agreement, lease, permit or license, it is understood and agreed that:
a) *The City of Vancouver and its Board of Parks & Recreation, their officials, officers, employees, servants and agents have been added as Additional Insureds with respect to liability arising out of the operation of the Named Insured pursuant to the governing contract, agreement, lease, permit or license;*
b) *THIRTY (30) days written notice of cancellation or material change resulting in reduction of coverage with respect to any of the policies listed herein, either in part or in whole, will be given by the Insurer(s) to the Holder of this Certificate; the exception is cancellation for non-payment of premiums in which case the applicable statutory conditions will apply;*
c) *The insurance policy (policies) listed herein shall be primary with respect to all claims arising out of the operation of the Named Insured. Any insurance or self-insurance maintained by the City of Vancouver and its Board of Parks & Recreation shall be in excess of this insurance and shall not contribute to it.*

SIGNED BY THE INSURER OR ITS AUTHORIZED REPRESENTATIVE HUB International Barton Insurance Brokers
HUB International Barton Insurance Brokers
Dated: JULY 22/08
PRINT NAME OF INSURER OR ITS AUTHORIZED REPRESENTATIVE, ADDRESS AND PHONE NUMBER
FRANCES KOOSTRA
InsCertParkGeneral.dot Jan.08

Call-Before-You-Dig Replies

BC hydro

reliable power,
at low cost,
for generations

Underground Locates
BC 1 Call Phone: 1-800-474-6886
BC Hydro Phone: 1-866-960-3740
BC Hydro Fax: 1-866-844-3498
BC Hydro Email: bchlocates@bchydro.com

Location of B.C. Hydro's Underground Electrical System

The attached drawing shows the location of our underground electrical system.

The underground system can be at a depth of 1 to 5 feet, depending on terrain, and/or changes to streets, boulevards and private properties since the original installation.

- Attached are the available drawings showing BC Hydro underground distribution facilities in the area requested. No additional accuracy should be assumed by using electronic remote locating devices.
- In accordance with WCB regulations, the contractor remains responsible for locating the facilities in the field before starting to excavate or drill.

CAUTION ! Energized Cable
OBEY THESE RULES !

- First locate the underground facilities (a qualified locate contractor is recommended).
- Controlled excavation may be used to remove the excess overburden.
- Hand digging must then be used to expose facilities and prove exact location.
- Once exposed, mechanical digging may be used up to 50 cm from the facilities.
- Within 50 cm only hand digging is permitted.

DISCLAIMER

PLEASE NOTE:
BChydro does not guarantee the location of our underground installation as shown on our drawings. Exact location of our underground plant must be proven by hand digging prior to excavating in proximity.

A locate contractor is recommended for all construction activity with one (1.0) meter from B.C. Hydro facilities.

PLEASE DIG CAREFULLY AND SAFELY!

If through some unforeseen circumstances the ducts are damaged **stop** work immediately and call our office at 1-888-769-3766.

British Columbia Hydro & Power Authority, Bag 6500, 3333 22nd Ave., Prince George, BC V2N 4K4
www.bchydro.com


BC hydro
BC ONE CALL
Ticket No: 2008300593
Name: RANDY CHURCHILL
Company: MACDONALD & LAWRENCE TIMBER FRAMING
2008-07-23
Street No. From:
Street No. To:
Phone No.: 2507438840
Scale: 1:2500
Street: STANLEY PARK CAUSE
FAX No.: 2507438862
City: VANCOUVER
Email: randy@macdonaldandlawrence.ca
0m 30m 60m 90m 120m
STANLEY PARK CAUSE WAY
STANLEY PARK DR
PIPELINE RD
SMK 1173
PB
MH 914
MH 158
MH 3846
MH 3603
MH 990
MH 2067
PMT 4424
3JB 4723
DOES NOT REFLECT PRIVATE INSTALLATION
THIS PRINT IS PROVIDED FOR GENERAL INFORMATION ONLY
BC Hydro does not accept any responsibility for errors or omissions. The information provided is the most accurate information we have available. Beware that underground electrical systems may exist that have not been record "AS CONSTRUCTED" yet.
The onus is on the operator to hand dig to locate the actual underground utility before any mechanized digging proceeds.
Legend
distribution underground [Gis]
Duct Bank.Existing Line
Junction.Existing Location
Main Switch.Existing Location
Manhole.Existing Location
Pull Box.Existing Location
Service Box.Existing Location
Switch Gear.Existing Location
U/G Neutral.Existing Line
U/G Primary.Existing Duct Only Line
U/G Primary.Existing Phase 3 Line
U/G Secondary.Existing Phase 3 Line
U/G Transformer.Existing Location
Vault.Existing Location

Hollow Tree
Temporary Stabilization Report

Stanley Park

Vancouver, BC

Prepared for: Hollow Tree Committee

by

Randy Churchill, PhD
Macdonald & Lawrence Timber Framing Ltd
Cobble Hill, BC
250 – 743 – 8840
www.macdonaldandlawrence.ca

July 29, 2008

Table of Contents

Contact Info

Client — Hollow Tree Committee (formerly Friends of Hollow Tree)
Lorne Whitehead – Chairman
604 – 822 – 3075
lorne.whitehead@ubc.ca

Macdonald & Lawrence Timber Framing Ltd
Vancouver Business License # 08-190059
Office 250 – 743 – 8840
Fax 250 – 743 - 8862
Project Manager – Randy Churchill, PhD 250 – 710 – 9068
randy@macdonaldandlawrence.ca
Site Crew — Steve Lawrence 250 – 701 - 2585
Higgs Murphy
Health & Safety / Exec Officer – Gordon Macdonald 250 – 360 - 6433

Engineer — Robin Zirnhelt & Reid Costley
Cascade Engineering
101-621 10th Street
Canmore, AB T1W 2A2
403 – 678 – 4211 (office)
403 – 609 – 5244 (cell)

Arborist — Dr. Julian Dunster
604 – 947 – 0016
jadunster@gmail.com

Pre-stabilized Conditions

The Hollow Tree in Stanley Park was in a precarious state prior to this stabilization work. No longer a 'tree' because of its iconic status, this historical artifact continues to decay as nature intended because it is exposed to the elements. Its current lean appears to be 12-13 degrees by field observation during this work – more than the 11 degrees quoted a year ago indicating that the propagation would have continued without intervention. The lean in this case is caused by loss of root structure due to root rot on the hollow east side, not the affects of storm damage as commonly reported.

Figure 1. Overview of Hollow Tree prior to stabilization. (RC June 2008)

Figure 1 above shows Hollow Tree before the stabilization efforts described here. Viewed from the NE, the wrapping cables and one plate from the mid-span internal support can be seen. Not well seen are 2 cables from the hollow stump to the nursed hemlock tree to the West. Out of the frame of the picture the hemlock has been topped and decayed. The arborist Dr. Dunster confirms that the hemlock is not healthy itself and endangers the Hollow Tree with its presence in several ways. The blue security fence was put up by Vancouver Parks to shut off the parking area and keep visitors at a safe distance should the tree fall on its own or during a storm.

Figure 2 below shows the internal steel framework installed previously to retain the roughly cylindrical shape. The stump has split lengthwise several times so wire cables were wrapped around the tree to maintain relative position of the various parts and try to maintain some structural integrity to the whole. These measures did maintain almost all of the original tree material which is admirable from a conservation point of view. The thru bolt holes and some wood removal to flatten locations of bearing plates are the only loss of artifact fabric.

Figure 2. Mid-span steel internal support structure. (RC June 2008)

Two other internal supports are in place at the time of this work – at approximately ¼ and ¾ height. These are site built wooden platforms inside the hollow core with bolts thru the shell. Unfortunately most of these bolt holes are angled up and out so that they will attract water to the core and promote decay. The purpose of these supports was to provide strength during the lay down phase when the tree was scheduled for cutting earlier this summer.

Summary of Stabilization Methodology

On Friday, July 25, three crew members from M&L joined Lorne Whitehead, Bruce Macdonald, Julian Dunster and Robin Zirnhelt on site to install a temporary stabilization structure for Hollow Tree. The work objective was to stop propagation of the eastern lean and provide a safe environment for the evaluation and conservation work necessary to determine the tree's current status and therefore future conservation plan.

The engineering design, materials and methodology were written and distributed prior to the work for review and comment, including a copy to Vancouver Parks & Recreation. This document included the stamped engineering details as required by VPR and Robin (engineer) was on site to make decisions and assessments in real time.

The primary concern of everyone on site was personal safety. To that end traffic cones were on hand and used in conjunction with someone directing traffic as necessary. All non-crew visitors were kept out of the Controlled Access Zone.

The installation work conformed very closely to the plans presented, with a minor slide in the schedule due to typical site challenges. A minor glitch with ferry regulations regarding dangerous goods held up Randy and the trailer, but Steve got to site to start excavation and coordinate delivery of the lock blocks as planned. The cables to the west were installed first and then the struts to the east.

Two pieces of equipment greatly aided the installation effort. A backhoe and operator was hired for the day with the intent of using this machine for digging, back filling, tamping, and lifting into the place the log struts. The struts each way 700 lbs with metal brackets attached and had to be placed and removed a couple of times for proper fit. The use of such equipment greatly enhances the speed and safety of operations compared to using hand labor and complicated rope rigging.

The other piece of equipment on site was a boom lift – where the operator can ride a basket to work at height efficiently and safely. Regular scaffolding would not have reached to the places required and would have taken lots of time to set up and move.

Three items differed during site work from the prepared engineer's plans. Robin approved these variations on site. They are:

1) Strut top end mounting plates were not large enough originally as 12" x 12". A backup plate of ¼" thick x 16" x 16" was added and then cut out for mounting bolts.

2) North strut foot bracket was poorly aligned during assembly and required a significant 'spacer' for the outer anchor bolts (about 1"). This foot was also further back on the lock block than desired – in the middle of the block more than the front edge.

3) North strut top end bracket was angled to the thru bolts resulting in nuts & washers that don't make full (360 deg) contact when tightened. Four bolts (3/4" dia) were fully engaged and secured.

In all other respects the materials and results exceeded the engineer's specifications, including:

1) One inch (1") x 12" anchor bolts for strut bases instead of ¾" x 8".

2) Logs for struts were 11"+ diameter at mid-span, specified at 10-1/2".

3) Three cable clamps used for each connection instead of 2, cut threads for security.

4) Ground at all four locations was very solid & well compacted – crushed macadam used for bearing backfill. All blocks a couple inches below grade.

With the installation of cables and struts the two small cables to hemlock were cut to confirm the solidity of the bracing installed. While the hemlock sprung a couple inches away to the west, the Hollow Tree did not move and is now fully supported and stable for the short-term future. A small excavation of the east side roots confirm the expectation of very little support structure there.

Work on site ended at 9 pm; no injuries nor close calls reported.

Both the backhoe and boom lift were left on site and picked up Saturday.

Stabilization – As Built

Figure 3 below shows the top of the cables attached to the west side of Hollow Tree. A 12" x 12" plate was already in place as part of the mid-height internal steel structure. A new plate was added with mounting for clevis to which was attached 2 turn buckle units (1"). Cables of 3/8" diameter were used with an eye formed (thimble plus 3 clamps) at the turn buckle. The other end of cable was passed below two (2) lock blocks buried in the ground directly beside road bed. The free end was wrapped around block and secured to standing line with 3 clamps. The threads on these clamps were crimped to prevent accidental loosening. With installation of all the components the turn buckles were tightened until equally taut as judged by hand. The purpose of these cables is to prevent sideways movement of the stump during winds or storms.

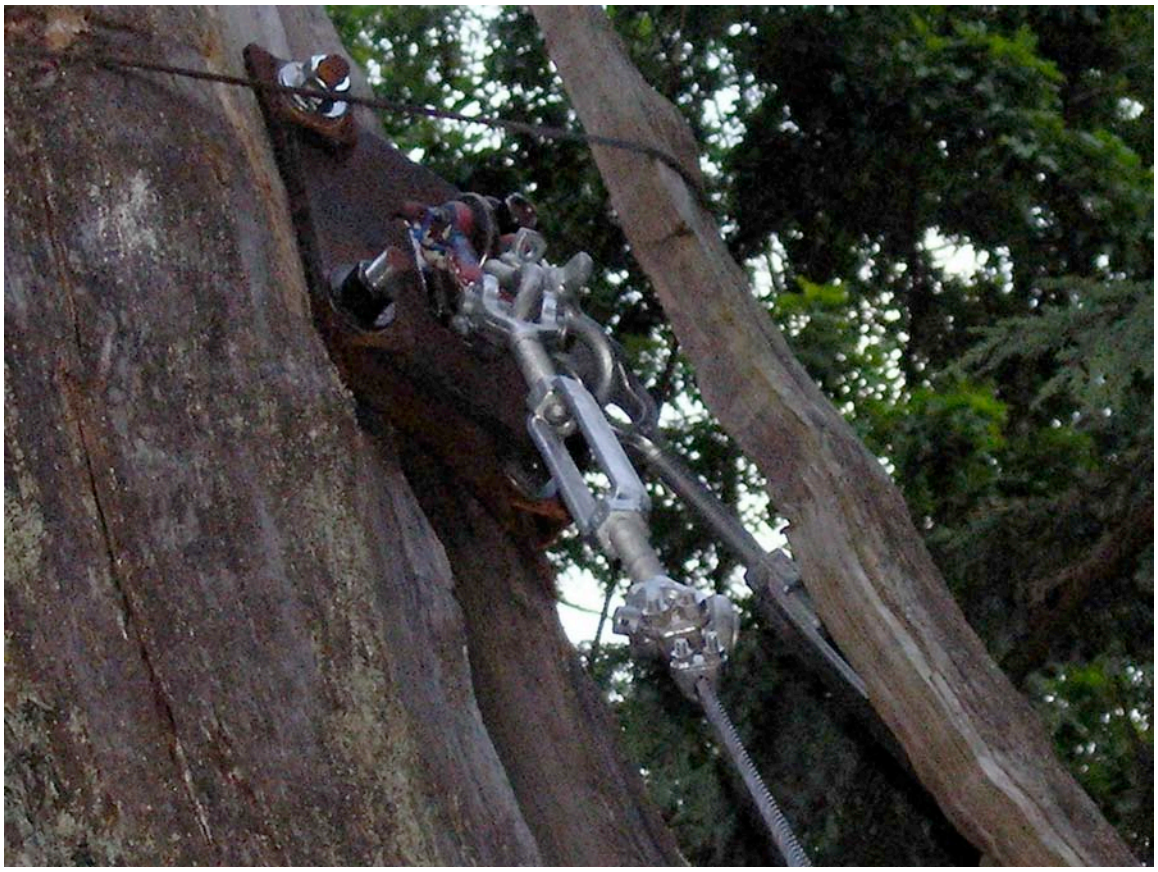


Figure 3. Cables attached to west side of tree. (RAC July 25, 2008)

The base plates for the north and south struts set on lock blocks buried in the ground. Both of these are located in the paved parking area so the ground is very compacted and the material is gravel. The lock blocks are 30” x 30” x 60” and weigh approximately 4400 lbs (2,000 kg). Specifications call for the line of force down the brace to hit the blocks as close to the front of the block as practical (to still get 4 bolts securely fastened to the blocks). Figure 4 shows the south strut base plate on the lock block. The blocks were leveled and backfilled with compaction. The base plate is secured to the log strut with 4 epoxied rebar pins 12” long that are welded to the plate. To allow for water draining away from wood end grain, a 1” hole was cut at the low point in the collar. The anchor bolts are 1” x 12” and epoxied to the lock block with Simpson AT-13 quick set epoxy.

Figure 4. Base plate for south strut. (RAC July 25, 2008)

The strut top end joint was designed as a universal to ease installation and give options to the final solution methodology, Figure 5. With this joint these temporary struts can be used to 'push' the tree upright later, if that is the preferred solution. The thinner backup plate was an on site fix because the original plate (size estimated from pictures only) was not large enough to catch the 4 thru bolts. For this south side bracket the new plate is square to the existing plate and to the 4 bolts. Tightening the nuts brought all corners of the bracket into hard contact with the nuts left on for the internal support structure. The log strut is secured to the bracket with 4 rebar pins 12" long and epoxied into the log end with Simpson AT-13 quick set epoxy. None of the top or foot brackets are painted nor galvanized because of the short expected life of their placement. Also shown in this picture is one of the ¼" cables pulled around the circumference to hold the various pieces of the tree in relative position.

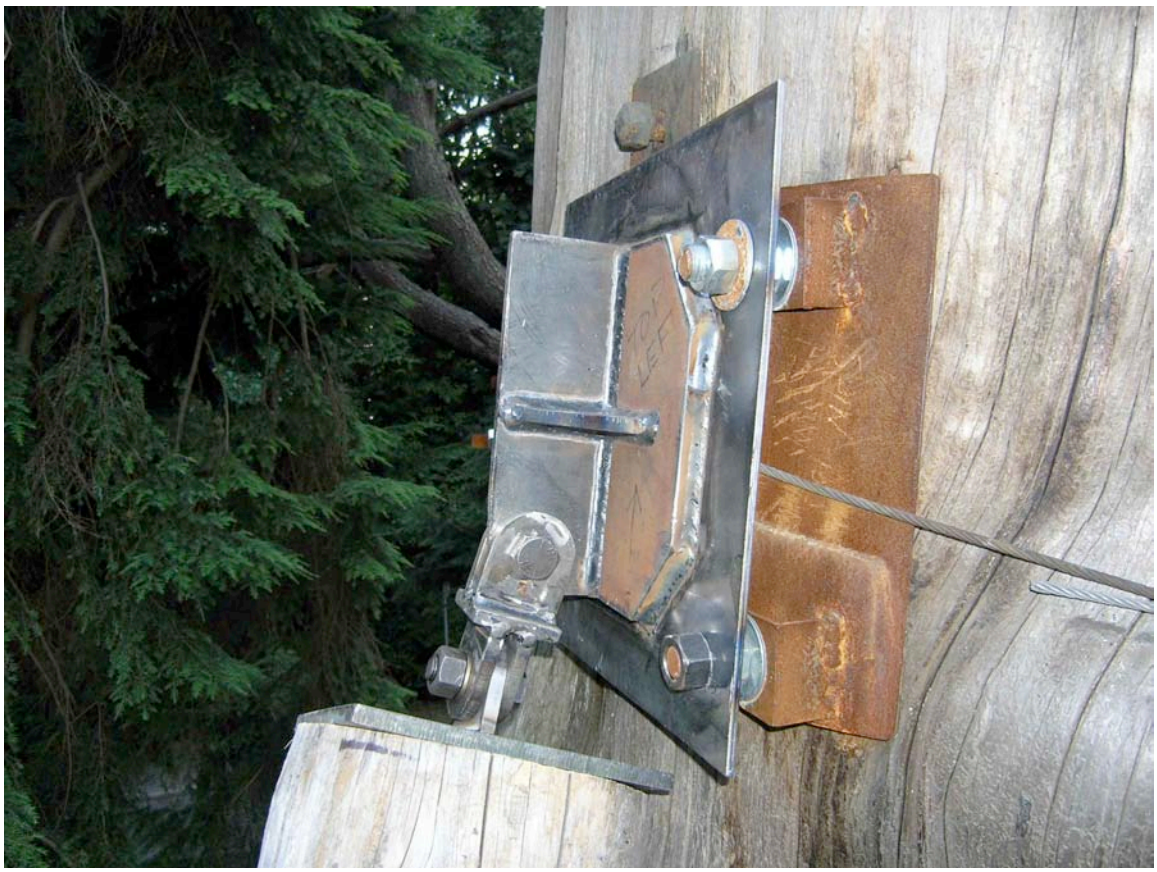


Figure 5. South strut top end universal bracket. (RAC July 25, 2008)

Exactly similar to the base plate for the south strut, the north strut is shown in Figure 6. The bottom plate was not as carefully aligned with the axis of the log resulting in the need for spacers to be used on the outer 2 anchor bolts. Note, the plate length is 16” and the block width is 30”.

Figure 6. Base plate of north strut. (RAC July 25, 2008)

As with the strut on the south, the north strut top end bracket is a universal joint and modified on site with the ¼" backing plate, Figure 7. In this case the 4 thru bolts are not perpendicular to the plane of the plates so the washers and nuts do not engage fully. To make the alignment better, the two far nuts from the original structure were removed. The three other small plates shown are from previous stabilization attempts and are not currently engaged. In the background laying against the hemlock trunk is the cut ¼" cable that had been tied between the hemlock and the cedar stump.

Figure 7. North strut top end universal bracket. (RAC July 25, 2008)

The north side of the Hollow Tree in Figure 8 shows the strut to the east and cable stay to the west. Various cables, plates, brackets, and other bits from previous stabilization efforts are left in place; these to be addressed by the Conservation Plan. Figure 9 shows the Tree from the east with its new standing logs struts.

Figure 8. North side of Hollow Tree showing strut & cable. (RAC July 25, 2008)

Figure 9. View of stabilized Hollow Tree from east showing two (2) struts and two (2) cables. (RC July 25, 2008)