ONTARIO COLLEGE OF TRADES

ORDRE DES MÉTIERS DE L'ONTARIO

Apprenticeship Curriculum Standard

Arborist/Utility Arborist Common Core Level One: 444A/444B

Arborist Level 2 Trade Code: 444A

Utility Arborist Level 2 Trade Code: 444B

Date: 2008

Please Note: Apprenticeship Training and Curriculum Standards were developed by the Ministry of Training, Colleges and Universities (MTCU). As of April 8th, 2013, the Ontario College of Trades (College) has become responsible for the development and maintenance of these standards. The College is carrying over existing standards without any changes.

However, because the Apprenticeship Training and Curriculum Standards documents were developed under either the *Trades Qualification and Apprenticeship Act* (TQAA) or the *Apprenticeship and Certification Act, 1998* (ACA), the definitions contained in these documents may no longer be accurate and may not be reflective of the *Ontario College of Trades and Apprenticeship Act, 2009* (OCTAA) as the new trades legislation in the province. The College will update these definitions in the future.

Meanwhile, please refer to the College's website (http://www.collegeoftrades.ca) for the most accurate and up-to-date information about the College. For information on OCTAA and its regulations, please visit: http://www.collegeoftrades.ca/about/legislation-and-regulations

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INTRODUCTION

This new curriculum standard for the **Arborist and Utility Arborist** trades is designed down from the learning outcomes, which were in turn developed from the industry-approved training standard.

The curriculum is organized into **2 levels** of training, each including reportable subjects containing like or similar learning outcomes to reflect the units of the training standard. The hours charts indicates how the curriculum can be delivered in the current block release format and summarizes the hours of training for each reportable by level. Since the reportable subjects are all divisible by three they can be adapted to accommodate a more flexible training delivery other than block release.

The reportable subjects are cross-referenced to the training standard for ease of comparison.

Each reportable subject and learning outcome identifies a recommended number of training hours. This hour allotment is broken into hours for instruction in theory and practical application. The division of the curriculum into reportable subjects that follow a natural progression of learning through the levels and branches of training will allow training centres and apprentices' flexibility in program delivery while still observing the importance of sequencing learning in a logical progression.

The curriculum is framed by and includes specific references to terminal performance objectives in the Apprenticeship Training Standards for Utility Arborist. However, it identifies only the learning that takes place off the job, in a training centre. The in-school program focuses primarily on the theoretical knowledge required to master the performance objectives of the Training Standards. Employers are expected to extend the apprentice's knowledge and skills through appropriate practical training on the work site. Regular evaluations of the apprentice's knowledge and skills is conducted throughout training to assure that all apprentices have achieved the learning outcomes identified in the curriculum standard. The balance between theoretical and practical evaluation is identified for each unit of learning outcomes.

Implementation date:

September, 2009

Program Summary

Unit of Learning	Duration (hours)	
	Theory	Application
Level 1 Arborist/Utility		
S0246 Arborist Workplace Health and Safety I	39	0
S0247 Arborist Theory I	57	0
S0248 Arborist Practices I	0	156
S0249 Arborist Hand Tools I	0	36
S0250 Arborist Equipment I	0	6
S0251 Arboricultural Sciences I	33	0
S0252 Arborist Tree Identification I	33	0
Level 2 Arborist		
S0401 Arborist Theory II	24	0
S0402 Arborist Practices II		156
S0403 Plant Health Care - Pest Management	48	0
S0404 Arboricultural Science II	30	0
S0405 Tree Identification II	36	0
S0406 Crane Assisted Rigging	24	6
S0407 Arborist Equipment II	8	16
S0408 Arborist Calculations	12	0
Level 2 Utility Arborist		
S0259 Utility Arborist Workplace Safety II	18	0
S0260 Utility Arborist Theory II	36	0
S0261 Utility Arborist Practices II – Tree Climbing	0	144
S0262 Utility Arborist Practices II – Aerial Device	0	24
S0263 Utility Arborist Equipment II – Brush Chippers and Aerial Devices	6	6
S0264 Utility Arboricultural Sciences II	9	6
S0265 Utility Arborist Hand Tools II		6
S0266 Utility Arborist Tree Identification II	33	
S0267 Utility Arborist Transmission Line Clearing II	6	6

Level 1 Arborist/Utility Arborist

Summary of Total Program In-School Training Hours Level 1

Reportable Subjects	**Total**	**Theory**	**Practical**
S0246 Arborist Workplace Health and Safety I	39	39	0
S0247 Arborist Theory I	57	57	0
S0248 Arborist Practices I	156	0	156
S0249 Arborist Hand Tools I	36	0	36
S0250 Arborist Equipment I	6	0	6
S0251 Arboricultural Sciences I	33	33	0
S0252 Arborist Tree Identification I	33	33	0
Total	360	162	198

Number: S0246

Title: **Arborist Workplace Health and Safety I**

Duration: 39 Total

Theory: 39 Hours Practical: 0 hours

Prerequisites: N A

Cross-reference to training standard: U6040.01 - .14, U6041.01 - .11, U6042.02, .04, .07, .09, .11, .13 - .16, U6043.05, U6044.05, U6045.01, .02, .11, .12, .20, .23, .24, U6046.02, .03, .05 - .07, .10, .14 - .16, U6047.05, .06, .09, .11, U6048.01, .10, .11, .14, U6050.01, .02, .08, U6051.07 - .10, U7160.01, .10, .13; U7161.01-.11; U7162.02, .04, 05, .08, .09

General Learning Objective:

Demonstrate a working knowledge of pertinent safety and related legislation as they apply to Utility Arboricultural safe workplace practices; and deal with potentially dangerous on-site conditions, emergencies, hazards and materials.

Learning Outcomes and contents:

S0246.1.1 Describe the requirements of federal, provincial and municipal legislation and regulations governing all aspects of the Arboricultural industry.

Occupational Health and Safety Act

Description	Sections
General	4, 3, 50, 51, 52
Internal Responsibility System	
Right to know	37, 38
Right to participate	8,9, 10
Right to refuse unsafe work	43, 44, 45, 46, 47, 48, 49
Duties of employer	25, 26, 29
Duties of worker	28
Duties of supervisor	27
Duties of Suppliers of equipment	31
Penalties	54, 55, 56, 57, 58, 62, 66

Criminal Liability Of Organizations

Description	Sections
Criminal Liability Of Organizations	C-45

Construction Regulation 213

Description	Sections
Alternate methods and materials	3
Accident reporting	11, 12
General	14, 15, 16, 17, 18
PPE	21, 22, 23, 24, 25, 26, 26 (3), 26 (4), 26.2, 27, 43, 47
Fire requirements	52,53, 54, 55
Traffic control	67, 68, 69, 69.1
Ladders	78, 81
Equipment	93, 04, 95, 96, 97, 98, 99, 100, 101, 103, 104, 105, 106, 107, 108, 109, 112, 113, 114, 115, 116
Electrical	181, 182, 183, 187, 191, 192, 193, 194

Industrial Regulation 851

Description	Sections
General	4, 5, 6, 11, 22, 23, 24, 25, 26, 27, 29
Chainsaw	39
Electrical	42.2, 43, 44, 44.1, 44.2
Material Handling	45, 46, 51, 52, 54, 55, 56, 57, 59, 60, 61, 66
Ladders	73
PPE	79, 80, 81, 82, 83, 84, 85, 86, 139
Logging	103, 104, 107, 109, 110, 111

Electrical Utility Safety Rules

Description	Sections
Authorization for work	106
Authorized Worker – defined	
Competent Worker – defined	
Controlling Authority – defined	
Proximity – defined	

MTO Book 7 Traffic Control

Description	Sections
Entire Book	

WHMIS

Description	Sections
Designation of Hazardous Material	1
Application of WHIMS	4, 6,7

First Aid Requirements under Workplace Safety and Insurance Act 1997

Description	Sections
General	1, 2, 3, 4 5, 6, 7
Requirements	8, 9, 10, 11, 12, 13, 16

Dangerous Goods Transportation Act

Description	Sections
Application of Act	2, 3

Municipal Bylaws

Description	Sections
Unique to various regional and local municipalities Tree bylaws:	▪ Right-of-way and public lands ▪ Tree preservation ▪ Tree removal ▪ Wood lots ▪ Pesticide bylaws ▪ Municipal property standards ▪ Hazards ▪ Nuisance trees

Forest Fire Prevention Act

Description	Sections
Regulation 207/96	9 (1-3), 10 (1-4), 11 (1-4), 12

Highway Traffic Act

Description	Sections
License requirements	32
Inspection of vehicle	82, 84,
Circle checks Maintenance Logs	107
Trip log	190
Dimension limits	108, 109, 110, 111,
Weight Limits	120, 121, 122, 123, 124, 125, 126, 127
Off road vehicles on highways	191.8
CVOR	16, 17, 18, 19, 20, 21, 22, 23

Ontario Regional Common Ground Alliance (Best Practices Version 1.0)

Description	Sections
Location and Marking	3
Excavation	4
Compliance	6

Off Road Vehicle Act

Description	Sections
Application of Act	2, 3

Pesticides Act – Ontario

Description	Sections
Prohibition to exterminations	5, 7

S0246.1.2 Identify the hazards of working in an energized environment.

Electrical Theory

- Ohm's Law
- Relationships between: Resistance, Voltage, Current and the - work performed and tools used
- Utility Hazards
- Generation process
- Generation voltage to transmission voltage
- Transmission voltage to distribution voltage
- Second point of contact
- Backfeed
- Touch potential – ground gradients
- Step potential – ground gradients
- Induction –electrostatic and electromagnetic
- Flashover

Electricity and the Body

- Minimum current for injury to human

Shock damage – inadvertent movement contacting

- Damage resulting in human contact with electrical circuits severity factors, physiological effects, internal burns and heart problems,
- What to do if electrical contact – contact EMS, ensure hospital treats according to electrical contact accident
- Proximity to other workers/equipment

Circuit Identification

- Transmission circuit identification
- Distribution circuit identification - tree barrier conductor, underground conductor found overhead
- Service wire identification - triplex, open bus
- Underground hardware identification – pad mounted transformers, pole markers
- Electrical System Configuration
- Loop feeds
- Radial feeds
- Communications conductors – overhead
- Television conductors – overhead
- Underground utilities - natural gas markers, communication pedestals

Electrical Equipment Identification

- Switches
- Reclosures
- Capacitors
- Insulators
- Transformers

- Light standard transformers
- Lightening arresters
- Pole anchors
- Guy wires
- Underground Hardware
- Electrical transformers
- Natural gas markers
- Water line markers

Barriers to Electrical Energy Overhead

- Electrical Safety Rule Book
- Application of proximity to electrical conductors for unauthorized workers
- Notification Controlling Authority
- Requesting isolation and de-energization from Controlling Authority
- Barriers to Electrical Energy Underground
- Ontario Regional Common Ground Alliance Best Practices

Barriers to Electrical Energy Overhead (continued)

- Requesting locates from One Call
- Requesting locates from local utilities

S0246.1.3 Identify all other potential hazards on the work site, including hazards in trees; overhead, on or under the ground; hazards to the public.

Environmental hazards

- Darkness
- Wet/ice/snow conditions
- Wind
- Thunder & lightning
- Temperature extremes
- Ice

Tree hazards

- Hangers and split branches
- Deadwood
- Compression and tension wood
- Spring poles
- Barber chair
- Chicot
- Widow maker
- Free-standing tree
- Wind-thrown trees
- Storm damage
- Falling debris

- Wildlife
- Severed limbs
- Adjacent trees
- Excessive fill over root zone
- Root, stem/trunk and branch rot and cavities
- Cracks, seams and ribs

Ground hazards

- Debris
- Unstable ground
- Slippery ground
- Slopes/uneven ground
- Wildlife, holes and dens
- Trip hazards
- Deep snow

Underground Hardware

- Natural gas markers
- Water line markers

Electrical transformers

- Septic systems, wells
- Communication lines

Poisons Plants

- Poison Ivy
- Poison Oak
- Poison Sumac
- London Plane Tree
- Poison Parsley

S0246.1.4 Identify potential fire hazards in the workplace and describe preventative measures and the required procedures to follow in the event of a fire occurrence.

Sources of ignition

- Open flame
- Spontaneous combustion
- Electricity
- Sources of high temperature, e.g.: hot muffler
- Combustible materials

Types of hazards

- Explosion
- Ignition of combustibles and flammables
- Dust
- Vapour
- Static electricity
- Flashover

Prevention

- Good housekeeping
- Approved containers
- Grounding of equipment
- Ventilation
- Fire hazard policies and procedures
- Fire fighting
- Fire detection
- Forest Fire Prevention Act and work practices
- Type of fire
- Gaseous
- Liquid
- Solid
- Size of fire
- Fire reporting

Fire suppression

- Extinguishing equipment and use

Fire fighting training

- Backpack pumps

S0246.1.5 Identify and describe how to handle, store and dispose of hazardous materials, commonly found in the work place.

Materials

- Lubricants
- Solvents
- Liquid and pressurized fuels
- Pressurized materials
- Wood debris
- Corrosives

Handling and disposal

- Personal protective equipment
- Personal hygiene
- Application of WHMIS
- Securing for transport
- Loading and unloading
- Storage

Disposal methods
- Burying
- Recycling/re-use

Spill response
Labeling
Dispensing
Transport

S0246.1.6 Identify and describe the use of pedestrian and vehicular traffic control devices at the job site.

Hazards to control
- Collision hazards
- Operating machinery
- Obstacles to pedestrian and vehicular traffic

Site securing methodology
- Traffic cones
- Hazard tape
- Flag persons
- Signage
- Temporary barricades
- Temporary traffic signals
- Safe distances to maintain
- Deployment methodology
- Crash truck

Evaluation Methods:
On going written and practical testing

Number: S0247

Title: **Arborist Theory** I

Duration: 57 Total Hours

Theory: 57 hours Practical: 0 hours

Prerequisite: N A

Cross-reference to training standard: U6040.14, U6041.01 - .07, .10, U6042.01 - .03, .06, .07, .09, U6043.01 - .04, .08 - .10, .12, U6044.01 - .03, U6045.01, .02, .05, .06, .08, .09, .13 - .15, .18, .19, 21, .22, .24, U6046.03, .10, .12 - .15, U6047.01 - .03, .05 - .07, .09, .10, U6051.19, U7160.01-13, U7161.01-.06, .09; U7162.01, .03, .05, .07, .08; U7165.01-04, .06, .07, U7162.01; U7163.04, 08, 0.09; U7164.15, 17, 18.

General Learning Objective:

Describe how to plan work safely, identify electrical hazards, identify other hazards outside of the electrical environment, removing of trees, rigging principals and how to manage fire and dangerous goods.

Learning Outcomes and Contents:

S0247.2.1 Plan all work operations safely, in compliance with provincial and municipal legislation and regulations.

Interpret job documents
- Plans and specifications
- Work orders
- Scope of work
- Equipment required
- Personnel required
- Materials required
- Worksite hazards
- Traffic hazards

Other requirements
- Cycle clearance requirements

Determine required personal protective equipment
- Head protection
- Eye protection
- Hearing protection
- Foot protection
- Face protection
- Hand protection

- Chainsaw protection
- Fall protection/work positioning systems

Determine job site limits

- Property lines
- Safe limits of approach
- Overhead utilities
- Buried utilities

Identify job sequences, hazards and required barriers to hazards

- Job / task sequence
- Identified hazards
- Identify barriers
- Identify tools/equipment required
- Identify appropriate job communications
- Identify when to reevaluate hazards and barriers

S0247.2.2 Describe methods of eliminating or controlling electrical hazards.

Electrical Theory
Ohm's Law
Relationships between:

- Resistance
- Voltage
- Current

Work performed and tools used
Utility Hazards

- Generation process
- Generation voltage to transmission voltage
- Transmission voltage to distribution voltage
- Second point of contact
- Backfeed
- Touch potential – ground gradients
- Step potential – ground gradients

Barriers to Electrical Energy

- Electrical Utility Safety Rule Book
- Application of appropriate safe limits of approach
- Application of appropriate job planning
- Proximity to other workers/equipment
- Establishing clear communication between workers

S0247.2.3 Describe how to manage all other potential hazards on the work site, including hazards in trees; overhead, on or under the ground; and hazards to the public.

Environmental hazards

- Darkness
- Wet/ice/snow conditions
- Wind
- Thunder & lightning
- Temperature extremes
- Ice

Tree hazards

- Hangers and split branches
- Deadwood
- Compression and tension wood
- Spring poles
- Barber chair
- Chicot
- Widow maker
- Free-standing tree
- Wind-thrown trees
- Storm damage
- Falling debris
- Wildlife
- Severed limbs
- Adjacent trees
- Excessive fill over root zone
- Root, stem/trunk and branch rot and cavities
- Cracks, seams and ribs

Ground hazards

- Debris
- Unstable ground
- Slippery ground
- Slopes/uneven ground
- Wildlife, holes and dens
- Trip hazards
- Deep snow

Underground Hardware

- Natural gas markers
- Water line markers
- Electrical transformers
- Septic systems, wells
- Communication lines

Poisons Plants

- Poison Ivy
- Poison Oak
- Poison Sumac
- London Plane Tree
- Poison Parsley

S0247.2.4 Describe typical tree removal processes using directional felling techniques without rigging equipment.

Identifying tree to be removed
Determine removal method based on tree condition and site condition
Establish communications techniques with fellow workers
Factors affecting removal method

- Crown condition
- Stem condition
- Root condition
- Lean
- Living/dead
- Central leader/multi-stemmed
- Structural defects
- Site conditions
- Job requirements
- Potential hazards
- Conductor location

Felling Zone preparation

- Tree condition – dead, living, diseased
- Property considerations
- Personnel location
- Traffic control
- Potential targets and hazards removed

Danger Zone preparation

- Escape route developed
- Personnel out of Zone
- Property considerations
- Height of tree
- Inspect worksite
- Hangers removed

Tree felling

- Balanced tree
- Felling cuts
- Conventional notch
- Humboldt notch and back cut
- Boring and back cut
- Side notching

- Modifying the hinge to adjust direction of fall
- Felling levers
- Wedges

Gas Powered Tools

- Chainsaw
- Clearing saw
- Blower

Inspect worksite

- Hangers removed
- Rigging equipment removed

S0247.2.5 Describe methods of handling/disposing of debris generated on the job site.

Equipment required

- Setup
- Pre-operational inspection
- Starting/stopping
- Use
- Personal protective equipment

Bucking and limbing

- Progression of operation
- Top to butt/butt to top
- Non-tensioned/tensioned
- Compression/tension wood
- Potential for rolling
- Limb by limb technique

Sweep technique

- Spring poles

Handle/dispose of debris

- Piling brush for chipping
- Lifting/carrying brush and large wood
- Loading brush and large wood on vehicles
- Chipping brush
- Disposal/recycling

Site clean-up

- Lower stumps
- Clean-up site of small debris

Use of chainsaws on the work site

Determine chainsaw selection

- CSA standard
- Job size
- Size of wood to be cut
- Bar length
- Power to weight ratio

Pre-operational inspection/maintenance
- Chassis
- Anti-vibration mounts
- Bar
- Chain - tension and sharp
- Chain catcher
- Sprocket
- Chain brake operation – inertia and mechanical
- Provision for repair
- Fluid levels
- Spark arrestors
- Throttle lock-out
- Engine operation

Handle and carry
- Chain brake on when moving saw from tree to tree
- Engine off when moving to new location
- Bar towards rear
- Two person saw to be carried by two people
- No running

Operation
Personal protective equipment

Starting/stopping chainsaw
- On ground
- Leg lock

Secure/prepare work area
Working position
Escape routes
Ongoing inspection and maintenance
Refueling/lubricants
Chain sharpening/replacement

S0247.2.6 Identify appropriate communication skills to deal effectively with customers and in the workplace.

Tailboard safety discussion
Write effectively
Read effectively
- Job specifications
- Sentence, paragraph structure
- Definition of terms
- Content divisions
- Work orders
- Requirements
- Component tasks

- Safety considerations
- Packing slips and bills of lading
- Company memos and manuals
- Government publications
- Manufacturers' documentation

Listen effectively

- Hearing
- Interpreting directions
- Customer questions
- Main ideas components

S0247.2.7 Describe inspecting, adjusting, maintaining and wearing required personal protective equipment.

Eye protection

- CSA and/or ANSI approved
- Goggles
- Prescription safety glasses
- Non-prescription safety glasses
- Flash

Head protection

- CSA and/or ANSI approved
- Hard hats Class E type

Face protection

- CSA and/or ANSI approved
- Face shield

Hearing protection

- CSA and/or ANSI approved
- Ear muffs
- Ear plugs
- Disposable foam plugs

Hand protection

- CSA and/or ANSI approved
- Work gloves
- Chainsaw gloves

Foot protection

- CSA and/or ANSI approved
- Electrical resistive

Leg protection

- CSA and/or ANSI approved
- Chainsaw pants
- Chaps

S0247.2.8 Describe the selection, use of, and inspection of hand tools and tree maintenance equipment according to manufacturer's recommendations.

Hand Tools

- Chisels
- Mallets
- Axes
- Sledge Hammers
- Shovels/Spades
- Picks
- Rakes
- Brooms
- Ladders
- Knives
- Pole Pruners
- Pole Saws
- Compressors
- Extension Cords
- Maintenance And Adjustment Tools
- Drills
- Augers And Bits
- Brush Saws
- Handsaw
- Rigging ropes
- Friction saver
- Slings
- Whoopie
- Nylon web
- Rope
- Throw pouch
- Sling shot
- Loppers
- Secateurs
- Friction devices
- Friction savers / cambium savers
- Connectors
- Carabiners
- Clevis
- Felling levers
- Wedges
- Rigging blocks
- Wire rope
- Synthetic rope

- Tackle blocks
- Multi-sheave block
- Rope pullers
- Gas Powered Tools
- Chainsaw

S0247.2.9 Identify subject woody plant(s) on site.

- Adjacent features
- Written description
- Flagging/marking subject trees
- Morphological characteristics
- Growth characteristics
- Plant names

S0247.2.10 Describe proper use of knots and hitches.

Rope terminology

- Bight
- Loop
- Turn
- Round turn
- Working end, lead and fall
- Running end, lead and fall
- Standing part, lead and fall
- Lead
- Fall
- Splice
- Bridge
- Bar
- Tail

Rigging Knots (18 knots)

- Square or Reef
- Single bowline
- Double bowline
- Figure 8 on a bight
- Running bowline
- Bowline on a bight
- Figure 8 stopper knot
- Single sheet bend
- Double sheet bend
- Clove hitch and two half hitches
- Half hitch
- Clove hitch (end)

- Clove hitch (middle)
- Snubbing hitch
- Stirrup hitch
- Cow hitch
- Double Fisherman
- Triple Fisherman

Fall Protection Knots (13)

- Tautline hitch – Figure 8 Stopper Knot
- Blake's hitch
- Klemheist
- Prusik (6 coil)
- Swabbish
- Gripping hitch
- Cow hitch (Girth Hitch)
- Beckett bend – Figure 8 Stopper Knot
- Triple fisherman
- Double fisherman
- Anchor hitch
- Bowline – Figure 8 Stopper Knot
- Figure 8 on a bight

Splices on three strand rope only (2)

- Eye splice
- Crown splice

S0247.2.11 Describe the types and purposes of typical pruning processes and the tools and equipment required.

Considerations required for pruning operations.

- Customer consideration
- Species characteristics
- Tree condition

Identify pruning cut location on tree

- Collar
- Branch bark ridge

Pruning cuts

- Drop cut
- Hinge cut
- Snap/bypass cut
- Jump cut
- Stub cut
- Thinning cuts
- Heading cuts

Pruning methods
- Crown thinning
- Side pruning
- Dead wooding
- Crown cleaning
- Crown raising
- Crown reduction
- Pollarding
- Crown restoration
- Overhang pruning
- Directional pruning

Mechanical tools and equipment
- Chipper

Hand Tools
- Handsaw
- Rigging ropes
- Friction saver
- Slings
- Whoopie
- Nylon web
- Rope
- Throw pouch
- Sling shot
- Loppers
- Secateurs
- Friction devices
- Friction savers / cambium savers
- Connectors
- Carabiners
- Clevis
- Felling levers
- Wedges
- Rigging blocks
- Wire rope
- Synthetic rope
- Tackle blocks
- Multi-sheave block
- Rope pullers

Gas Powered Tools
- Chainsaw
- Blower

Tool disinfection as required
Raise, secure and lower tools and equipment

- Ropes
- Lanyards
- Connecting devices
- Conductor location

Raise/lower limbs using ropes

- Control limbs using hinge cuts
- Use of ropes and knots
- Control of cut sections

Inspect worksite

- Hangers removed
- Rigging equipment removed

S0247.2.12 Describe typical tree removal processes using rigging equipment.

Method and tools/equipment selection
Factors affecting removal method
Identifying tree to be removed
Plant characteristics/condition

- Living/Dead
- Central Leader/Multi-Stemmed
- Structural Defects
- Site Conditions
- Job Requirements
- Potential Hazards

Fall zone preparation
Danger zone preparation

- Escape route
- Tree felling
- Tree condition
- Balanced tree

Unbalanced/leaning tree
Tree with splits or cavities
“Hung up” trees
Felling cuts

- Conventional Notch
- “V” Notch And Back Cut
- “Humboldt” Notch And Back Cut
- Felling Assist Devices
- Wedges
- Levers
- Pull Ropes
- Tackle Blocks

S0247.2.13 Describe selecting, inspecting and maintenance procedures for fall protection system components.

Climbing rope
Climbing harness
Work positioning lanyard
Connecting links:
- Captive eye
- Carabiner

Slings
- Redirect climbing line
- Basket hitch attachment
- Girth hitch attachment

Pulleys for redirect
Friction saver
Eye to eye Prusik
Split tail
Mechanical fall arrester

S0247.2.14 Describe various methods for ascending and descending trees to access required work position.

Techniques used to ascend/descend trees
- Use of ladder
- Use of spurs
- Belay technique

Secured body thrust on belay
- Secured body thrust with climbing hitch
- Secured footlock
- Split tail

Pre- climb tree inspection
- Root zone hazards
- Rots
- Decay
- Fruiting bodies
- Conks
- Grade changes
- Root crown excavation to determine root structure condition

Crown zone hazards
- Hangers
- Dead wood
- Animals
- Dieback

- Abnormal growth
- Missing sections of tree
- Limbs in proximity
- Included bark
- Splits, cracks

Stem zone hazards
Structural defects

- Rots
- Decay
- Fruiting bodies
- Conks
- Included bark
- Splits, cracks
- Grade changes

Coring/sounding of wood to determine stem condition
Work to be completed
Select anchor points
Interim anchor point

- Type of load applied
- Direction of loading from stem of tree
- Other loads on the limb (foliage, snow, torque, etc.)
- Tree species and characteristics
- Cross sectional area of limb
- Condition of wood
- Angle of branch attachment
- Size of branch relative to stem
- Characteristics of branch union
- Season and temperature
- Location of limb to electrical conductor, worker can not swing into electrical conductors

Final anchor point

- Type of load applied
- Direction of loading from stem of tree
- Other loads on the limb (foliage, snow, torque, etc.)
- Tree species and characteristics
- Cross sectional area of limb
- Condition of wood
- Angle of branch attachment
- Size of branch relative to stem
- Characteristics of branch union
- Season and temperature
- Location for work and electrical conductor, worker can not swing into electrical conductor

Equipment set up
- Ladder positioning
- Installation of climbing line
- Rope poking tool
- Pole pruner
- Throw line

Tie, dress, set knots for fall protection
Work positioning
Termination knots
Closed climbing system
Open climbing systems
Reposition climbing line
- Utilize fall protection
- Double tie ins
- Work positioning lanyard

Access to work location
Primary anchor
- Double tie-ins, work positioning lanyard, when using sharp tools that could cut climbing line
- Repositioning climbing rope to another anchor point
- Re-directs

Limb walking
- Secure self at work location
- Work positioning lanyard
- Double tie ins

S0247.2.15 Describe aerial tree rescue.

Assess the Emergency
Observation of the scene
- Electrical Conductors/Contact
- Struck by limbs, tree sections, lightning
- Is victim pinned
- Medical conditions (bug/animal bites, heat exhaustion, etc)

Try to communicate with the victim
Verbally
- Assess the victims condition
- Is victim able to descend by him/her self
- Is victim unconscious
- Is victim unresponsive
- Is victim bleeding profusely

Determine need for EMS
- Determine feasibility/appropriateness of aerial rescue
- Electrical Conductors/Contact

- Rigging Systems Hazards
- Ground Hazards
- Rescuer's competency in performing aerial rescue
- First Aid training
- Climbing ability
- Availability of appropriate equipment and personnel

Initiate EMS response
Aerial Rescue Tree
Select ascension technique

- Ascend tree
- Move to victim's location
- Assess victim's condition
- Determine course of action
- Perform rescue

S0247.2.16 Describe rigging principles and equipment.

Determine shock-loading on ropes and equipment

- Newton's laws
- Calculating force
- Progressive calculations
- Safety margin
- Heat
- Elasticity
- Friction
- Safety factors
- Cycles to failure
- Wood densities

Determine mechanical advantage when using block and tackle equipment

- Block and tackle methodology/principles
- Calculations of forces
- Anchor points
- Pulleys
- Lines

Rigging equipment materials, safe working load limits, tensile strength, inspection for:

- s Ropes
- Carabiners
- Slings
- Pulleys
- Arborist blocks
- Friction devices
- Figure-8

- Mechanical lowering devices
- Quick links and shackles
- Block and tackle

Evaluation Methods:
On going written and practical testing

Number: S0248

Title: **Arborist Practices I**

Duration: 156 Total Hours

Theory: 0 hours Practical: 57 hours

Prerequisite: N A

Cross-reference to training standard: U6040.02 - .11, .13, .14, U6041.01 - .07, .09 - .11, U6042.01 - .03, .05, .06, .08, .09, .12 - .15, U6043.02, .05 - .11, U6044.04 - .07, U6045.01 - .07, .10 - .24, U6046.03 - .16, U6047.04 - .09, .11, U6048.01 - .14, U6049.01 - .10, U6050.01 - .09, U 6051.11, .19, U7160.01-.13, U7161.01-.11; U7162.01-09; U7163.01,.02, .10-.12; U7164.01-.11, .13, .14, .16, .17, .19, .20, .22-24; U7165.01-.08; U7169.01-.13; U7170.01-.09; U7171.01-.09; U7172.01-.14

General Learning Objective:

Demonstrate a knowledge of how to plan work safely, utilizing safe work practices, pruning and removing of trees in proximity of electrical conductors, ascending, descending and performing an aerial rescue, inspect, adjust and maintain personal protective equipment and fall protection equipment utilized in the Utility Arboricultural trade and managing fire, waste and dangerous goods.

Learning Outcomes and contents:

S0248.3.1 Demonstrate inspecting, adjusting, maintaining and wearing required personal protective equipment.

Eye protection
- Goggles
- Prescription safety glasses
- Non-prescription safety glasses

Head protection
- Hard hats

Face protection
- Face shield

Hearing protection
- Ear muffs
- Ear plugs
- Disposable foam plugs

Hand protection
- Work gloves

- Chainsaw gloves
- Foot protection
- Work boots

Leg protection

- Chainsaw pants
- Chaps

S0248.3.2 Demonstrate methods of handling and disposing of debris generated on the job site.

Bucking and limbing

- Progression of operation
- Top to butt/butt to top
- Non-tensioned/tensioned
- Compression/tension wood
- Potential for rolling
- Limb by limb technique
- Sweep technique
- Spring poles

Handle/dispose of debris

- Piling brush for chipping
- Lifting/carrying brush and large wood
- Loading brush and large wood on vehicles
- Chipping brush
- Disposal/recycling

Site clean-up

- Lower stumps
- Clean-up site of small debris

Use of chainsaws on the work site

- Equipment required
- Setup
- Pre-operational inspection
- Starting/stopping
- Use
- Personal protective equipment

Pre-operational inspection/maintenance

- Chassis
- Anti-vibration mounts
- Bar
- Chain - tension and sharp
- Chain catcher
- Sprocket
- Chain brake operation – inertia and mechanical
- Provision for repair

- Fluid levels
- Spark arrestors
- Throttle lock-out
- Engine operation

Handle and carry

- Chain brake on when moving saw from tree to tree
- Engine off when moving to new location
- Bar towards rear
- Two person saw to be carried by two people
- No running

Operation

- Personal protective equipment
- Starting/stopping chainsaw
- On ground
- Leg lock
- Secure/prepare work area
- Working position
- Escape routes
- Ongoing inspection and maintenance
- Refueling/lubricants
- Chain sharpening/replacement

S0248.3.3 Demonstrate removing woody plants using directional felling techniques without rigging equipment.

Identifying tree to be removed
Determine removal method based on tree condition and site condition
Establish communications techniques with fellow workers
Factors affecting removal method

- Crown condition
- Stem condition
- Root condition
- Lean
- Living/dead
- Central leader/multi-stemmed
- Structural defects
- Site conditions
- Job requirements
- Potential hazards
- Conductor location

Felling Zone preparation
- Tree condition – dead, living, diseased
- Property considerations
- Personnel location
- Traffic control
- Potential targets and hazards removed

Danger Zone preparation
- Escape route developed
- Personnel out of Zone
- Property considerations
- Height of tree

Inspect worksite
- Hangers removed

Tree felling
- Balanced tree
- Felling cuts
- Conventional notch
- Humboldt notch and back cut
- Boring and back cut
- Side notching
- Modifying the hinge to adjust direction of fall
- Felling levers
- Wedges

Gas Powered Tools
- Chainsaw
- Clearing saw
- Blower

Inspect worksite
- Hangers removed
- Rigging equipment removed

S0248.3.4 Demonstrate effective communications skills with customers and workers.

Tailboard safety discussion
Write effectively
Read effectively
- Job specifications
- Sentence, paragraph structure
- Definition of terms
- Content divisions
- Work orders
- Requirements
- Component tasks
- Safety considerations

- Packing slips and bills of lading
- Company memos and manuals
- Government publications
- Manufacturers' documentation

Listen effectively

- Hearing
- Interpreting directions
- Customer questions
- Main ideas components

S0248.3.5 Demonstrate the knowledge of fire suppression techniques.

- Fire extinguisher use
- Use of backpack pumps
- Determine correct fire extinguisher needs

S0248.3.6 Demonstrate the knowledge of proper methods to handle, store and dispose of hazardous materials.

- Spill clean-up
- Application of WHMIS
- Personal Protective Equipment requirements

S0248.3.7 Demonstrate the selection, use of, and inspection of hand tools and tree maintenance equipment according to manufacturer's recommendations.

Hand Tools

- Handsaw
- Rigging ropes
- Friction saver
- Slings
- Whoopie
- Nylon web
- Rope
- Throw pouch
- Sling shot
- Loppers
- Secateurs
- Friction devices
- Friction savers / cambium savers
- Connectors
- Carabiners
- Clevis
- Felling levers

- Wedges
- Rigging blocks
- Wire rope
- Synthetic rope
- Tackle blocks
- Multi-sheave block
- Rope pullers
- Gas Powered Tools
- Chainsaw

Tool disinfection as required

S0248.3.8 Demonstrate selecting, inspecting, adjusting and maintaining fall protection system components.

Climbing rope
Climbing harness
Work positioning lanyard
Connecting links:

- Captive eye
- Carabiner

Slings - redirect climbing line

- Basket hitch attachment
- Girth hitch attachment

Pulleys for redirect
Friction saver
Eye to eye Prusik
Split tail
Mechanical fall arrester

S0248.3.9 Demonstrate various methods of ascending and descending trees to access required work position.

Techniques used to ascend/descend trees

- Use of ladder
- Use of spurs
- Belay technique
- Secured body thrust on belay
- Secured body thrust with climbing hitch
- Secured footlock
- Split tail

Pre- climb tree inspection
Root zone hazards

- Rots
- Decay

- Fruiting bodies
- Conks
- Grade changes

Root crown excavation to determine root structure condition

- Crown zone hazards

Stem zone hazards

- Hangers
- Dead wood
- Animals
- Dieback
- Abnormal growth
- Missing sections of tree
- Limbs in proximity
- Included bark
- Splits, cracks

Structural defects

- Rots
- Decay
- Fruiting bodies
- Conks
- Included bark
- Splits, cracks

Coring/sounding of wood to determine stem condition

Work to be completed

Select anchor points

Interim anchor point

- Type of load applied
- Direction of loading from stem of tree
- Other loads on the limb (foliage, snow, torque, etc.)
- Tree species and characteristics
- Cross sectional area of limb
- Condition of wood
- Angle of branch attachment
- Size of branch relative to stem
- Characteristics of branch union
- Season and temperature
- Location of limb to electrical conductor, worker can not swing into electrical conductors

Final anchor point

- Type of load applied
- Direction of loading from stem of tree
- Other loads on the limb (foliage, snow, torque, etc.)
- Tree species and characteristics
- Cross sectional area of limb

- Condition of wood
- Angle of branch attachment
- Size of branch relative to stem
- Characteristics of branch union
- Season and temperature
- Location for work and electrical conductor, worker can not swing into electrical conductor

Equipment set up
Ladder positioning
Installation of climbing line
Rope poking tool
Pole pruner
Throw line
Tie, dress, set knots for fall protection
Ascending
Work positioning
Termination knots
Closed climbing system

- Reposition climbing line
- Utilize fall protection
- Double tie ins
- Work positioning lanyard

Access to work location
Primary anchor
Double tie-ins, work position lanyard, when using sharp tools that could cut climbing line
Repositioning climbing rope to another anchor point

- Re-directs
- Limb walking
- Secure self at work location
- Work positioning lanyard
- Double tie ins

S0248.3.10 Demonstrate aerial tree rescue using appropriate methods.

Assess the Emergency

- Observation of the scene
- Electrical Conductors/Contact
- Struck by limbs, tree sections, lightning
- Is victim pinned

Medical conditions (bug/animal bites, heat exhaustion, etc)
Try to communicate with the victim

- Verbally
- Assess the victims condition
- Is victim able to descend by him/her self
- Is victim unconscious
- Is victim unresponsive
- Is victim bleeding profusely

Determine need for EMS
Determine feasibility/appropriateness of aerial rescue

- Electrical Conductors/Contact
- Rigging systems hazards
- Ground hazards
- Rescuer's competency in performing aerial rescue
- First Aid training
- Climbing ability
- Availability of appropriate equipment and personnel

Initiate EMS response
Aerial Rescue Tree

- Select ascension technique
- Ascend tree
- Move to victim's location
- Assess victim's condition
- Determine course of action

Perform rescue

Evaluation Methods:
On going written and practical testing

Number: S0249

Title: **Arborist Hand Tools I**

Duration: 36 Total Hours

Theory: 0 hours Practical: 36 hours

Prerequisite: N A

Cross-reference to training standard: U6040.13, U6042.06, U6043.04, .06, .11, U6044.03, .07, U6045.15, .17, U6046.11, 14, .15, U6047.03, .04, .06, .09, U6049.01 - .10, U7163.12; U7169.01 -13

General Learning Objective:

Demonstrate knowledge of how to select, adjust, maintain and store, tools and equipment commonly used in the Utility Arboricultural trade.

Learning Outcomes and contents:

S0249.4.1 Select, inspect, adjust, maintain, set-up, and store manual and powered tools and equipment common to arboricultural operations.

Hand Tools

- Chisels
- Mallets
- Axes
- Sledge Hammers
- Shovels/Spades
- Picks
- Rakes
- Brooms
- Ladders
- Knives
- Pole Pruners
- Pole Saws
- Compressors
- Extension Cords
- Maintenance And Adjustment Tools
- Drills
- Augers And Bits
- Brush Saws
- Handsaw

- Rigging ropes
- Friction saver
- Slings
- Whoopie
- Nylon web
- Rope
- Throw pouch
- Sling shot
- Loppers
- Secateurs
- Friction devices
- Friction savers / cambium savers
- Connectors
- Carabiners
- Clevis
- Felling levers
- Wedges
- Rigging blocks
- Wire rope
- Synthetic rope
- Tackle blocks
- Multi-sheave block
- Rope pullers
- Chainsaw
- Gas Powered Tools

Select appropriate tool

- Pruning methods
- Diameter of limb
- Work to be completed

S0249.4.2 Perform daily maintenance on chainsaws, including filling fuel and lubricant reservoirs according to manufacturers' specifications/ operators' manuals.

Cleaning

- Air filter
- Spark arrestor
- Fuel filter
- Lubrication
- Lubricants
- Fueling
- Gasoline
- 2-stroke oils
- Containers

- Mixing ratios
- Refueling

Manufacturers' specifications/ operators' manuals
Inspect components

- Bar
- Sprockets
- Chain
- Chassis
- Chain brake

Service bars

- Gullet and de-burr

Chains

- Identification
- Removal from bar
- De-burr drive links
- Break/remove/add/re-rivet links
- Sharpening
- Depth gauge adjustment
- Chain installation on bar
- Chain tension adjustment
- Remove
- Clean and lubricate bearing
- Replace
- Adjust/repair recoil

Seasonal adjustment
Test and adjust chain brake

S0249.4.3 Start and stop chainsaws and test chainsaw performance.

Start chainsaw

- Secure chainsaw
- Hold firmly when starting
- Manufacturers' specifications/ operators' manuals

Adjust throttle

- Bench test
- Carburetor adjustment with tachometer
- Load test
- Hold with two hands
- Make test cut

Stopping procedure

- Set chain brake
- Switch off

S0249.4.4 Complete routine repairs and adjustments, to clearing saws and their components according to manufacturers' specifications/ operators' manuals.

Inspect components
- Sprockets
- Blade
- Chassis
- Sharpening
- Set of teeth

Clutch
- Remove
- Clean and lubricate bearing
- Replace

Adjust/repair recoil
Seasonal adjustment

Evaluation Methods:
On going written and practical testing

Number: S0250

Title: **Arborist Equipment I**

Duration: 6 Total Hours

Theory: 0 hours Practical: 6 hours

Prerequisite: N A

Cross-reference to training standard: U6040.12, U6041.04, .07, U6042.06, U6043.04, .06, .10, U6044.06, .07, U6046.01 - .05, .07 - .11, .16, U6047.07, .08, U6048.01 - .14, U6050.01 - .09, U7170.0 -.09

General Learning Objective:

Demonstrate a thorough working knowledge of brush chippers.

Learning Outcomes and contents:

S0250.5.1 Describe types of chippers.

Drum type
Disc type

- Mounting configurations
- Trailer-mounted
- Vehicle-mounted
- Track-mounted

S0250.5.2 Describe how to prepare chipper for transportation and operation.

Chipper circle check
Visual defects

- Loose, worn, cracked, broken nuts/bolts/pins
- Fluid levels and leaks
- Tension of belts
- Condition of guards and shields
- In-feed chute condition
- Cutter knife sharpness
- Reporting deficiencies

Legislated requirements
Towing requirements

- Manufacturers' instructions
- Hitching chipper to tow vehicle
- Pintle or ball hitch
- Pin hitch
- Inspection of hitching mechanism including tongue
- Safety chains attached in crossed (cradled) arrangement and safety hooks facing upward
- Brake inspection and hook-up
- Signal/tail light connection and test
- Chipper jack positioning for travel
- Extendable tongue positioning and securing
- Tire/rim condition
- Discharge chute positioning for travel
- Removal and stowing of wheel chocks

S0250.5.3 Describe how to set up chipper for use on site.

Manufacturers' instructions
Legislated requirements, e.g. Ministry of Transport Book 7
Set up procedure
Site selection

- Level, stable ground
- Work site limits and security
- Efficiency / safety for worker
- Secure chipper
- Discharge chute orientation and control
- Monitor work site changes

Pre-operational checks prior to start-up
Pre-operational checks after start-up

- Start-up procedures
- Gauges and warning lights functioning
- Safety bar
- Roller movement
- Chipper stability
- Discharge deflection
- Clutch engagement and functioning
- Engine speed (RPM)
- Report deficiencies

S0250.5.4 Describe how to operate chipper.

Manufacturers' operating procedures
Legislated requirements
- Personal protective equipment
- Foot protection
- Leg protection / coveralls
- Hand protection
- Head protection
- Hearing protection
- Eye protection
- High visibility clothing

Pedestrian and vehicular control device use
Materials preparation
- Brush pile proximity and organization
- Item size
- Purging of dangerous extraneous materials: metal, stones, nails, contaminated brush

Feeding procedure
- Butt ends first
- Order by size
- Operator positioning
- Controlling chipper feed
- Proximity to feed rollers
- Monitoring discharge
- Use of pusher pieces of wood

Eliminate chute and in-feed blockages
Normal shutdown procedures
Emergency shutdown procedures

S0250.5.5 Describe basic chipper maintenance.

Inspect as per manufacturers instructions
- Inspect guards
- Check fluids
- Check directional control arm if equipped

Describe how to change cutter knives
Describe how to cycle blade bolts
Describe how to rotate anvil

S0250.5.6 Demonstrate how to prepare chipper for transportation and operation.

Chipper circle check
- Visual defects
- Loose, worn, cracked, broken nuts/bolts/pins
- Fluid levels and leaks
- Tension of belts
- Condition of guards and shields
- In-feed chute condition
- Cutter knife sharpness
- Report deficiencies

Legislated requirements
Towing requirements
Manufacturers' instructions
Hitch chipper to tow vehicle
- Pintle or ball hitch
- Pin hitch
- Inspection of hitching mechanism including tongue
- Safety chains attached in crossed (cradled) arrangement and safety hooks facing upward
- Brake inspection and hook-up
- Signal/tail light connection and test
- Tire/rim condition
- Chipper jack positioning for travel
- Discharge chute positioning for travel
- Extendable tongue positioning and securing
- Removal and stowing of wheel chocks

S0250.5.7 Demonstrate how to set up chipper for use on site.

Manufacturers' instructions
Legislated requirements, e.g. Ministry of Transport Book 7
Set up procedure
Site selection
- Level, stable ground
- Work site limits and security
- Efficiency / safety for worker
- Secure chipper
- Discharge chute orientation and control
- Monitor work site changes

Pre-operational checks prior to start-up
Pre-operational checks after start-up
- Start-up procedures
- Gauges and warning lights functioning

- Safety bar
- Roller movement
- Chipper stability
- Discharge deflection
- Clutch engagement and functioning
- Engine speed (RPM)
- Report deficiencies

S0250.5.8 Demonstrate how to operate chipper.

Manufacturer's operating procedures
Select and adjust personal protective equipment

- Foot protection
- Leg protection / coveralls
- Hand protection
- Head protection
- Hearing protection
- Eye protection
- High visibility clothing
- Pedestrian and vehicular control device use

Materials preparation

- Pile brush and material in appropriate location for chipper operation.
- Cut material to appropriate size
- Purge brush pile of dangerous extraneous materials: metal, stones, nails, contaminated brush

Demonstrate brush feeding procedure

- Butt ends first
- Order by size
- Operator positioning
- Lift brush onto feed rollers
- Control chipper feed
- Proximity to feed rollers
- Monitor discharge
- Use of pusher pieces of wood

Eliminate in-feed and chute blockages
Demonstrate normal shutdown procedure
Demonstrate emergency shutdown procedure

Evaluation Methods:
On going written and practical testing

Number: S0251

Title: **Arboricultural Sciences I**

Duration: 33 Total Hours

Theory: 33 hours Practical: 0 hours

Prerequisite: N A

Cross-reference to training standard: U6041.02, .03, U6044.01, .02, U6045.07 - .09, U6047.10, U6051.05, .08, .18, U7167.01-.04, .06-.12, .14.

General Learning Objective:

Demonstrate a knowledge of how to identify various woody plants, growth factors of woody plants, compartmentalization of woody plants, diseases and disorders of trees that could be harmful to the integrity of the electrical system, evaluate the condition of anchor points in trees used for fall protection, evaluation of work operations within environmentally sensitive areas.

Learning Outcomes and contents:

S0251.6.1 Identify and describe the structure, functions and interrelationship of the main organs of plants.

- Leaves
- Vascular system
- Branch structure
- Roots
- Flowers
- Fruits
- Seeds
- The plant as a system
- Interrelationship of plant parts

S0251.6.2 Describe plant growth and all affecting factors, including environmental conditions, soil, plant competition etc.

- Temperature
- Air temperature
- Soil temperature
- Water availability
- Space above and below ground level
- Wind

- Light availability
- Pollution
- Air-borne
- Soil-borne
- Topography
- Slope/aspect
- Soil types and textures
- Drainage
- Aeration/porosity
- Water retention
- Soil structure
- Soil volume
- Soil depth
- Surface area
- Soil nutrients
- Micro
- Macro
- Soil PH

S0251.6.3 Describe the process of compartmentalization of decay in trees.

- Creation of the walls 1-4
- Protection of branch tissue through proper pruning

S0251.6.4 Identify the physical condition and soundness of interim and final anchor points based on tree size, condition and species.

Select anchor points
Interim anchor point

- Type of load applied
- Loading from stem of tree
- Other loads on the limb (foliage, snow, torque, etc.)
- Tree species
- Cross sectional area of limb
- Condition of wood
- Angle of branch attachment
- Size of branch relative to stem
- Characteristics of branch union
- Season/ambient temperature

Final anchor point

- Type of load applied
- Loading from stem of tree
- Other loads on the limb (foliage, snow, torque, etc.)
- Tree species
- Cross sectional area of limb

- Condition of wood
- Angle of branch attachment
- Size of branch relative to stem
- Characteristics of branch union
- Season/ambient temperature

Evaluation Methods:
On going written and practical testing

Number: S0252

Title: **Arborist Tree Identification I**

Duration: 33Total Hours

Theory: 33 hours Practical: 0 hours

Prerequisite: N A

Cross-reference to training standard: U6042.03, U6043.01, U6044.01, U6047.01, U6051.12, U7162.03; U7163.01; U7165.01; U7166.01

General Learning Objective:

Demonstrate a thorough working knowledge of tree genera, species and cultivars by identifying 45 plants commonly found in Ontario.

Learning Outcomes and contents:

S0252.7.1 Identify 45 common woody plants in all seasons according to species and morphological characteristics using the International System of Plant Nomenclature.

Plant groups
- Herbaceous/woody
- Deciduous/evergreen
- Conifers / broadleaf
- Native/exotic
- Invasive

Plant nomenclature
- Family
- Genus
- Species / hybrid
- Variety/cultivar
- Common name

Identification characteristics for each plant
- Leaves
- Flowers/fruit
- Buds
- Bark
- Growth habit and form

- Characteristics as they relate to utility arboriculture and arboriculture
- Brittleness of wood
- Growth rate

S0252.7.2 Tree List

CONIFERS – EVERGREEN AND DECIDUOUS			
	Common Name	*Botanical Name*	Characteristics
1.	Balsam Fir	*Abies balsamea*	Pinaceae
2.	White Fir	*Abies concolor*	Pinaceae
3.	Nootka False Cypress	Chamaecyparis nootkatensis	Cupressaceae
4.	Eastern Red Cedar	*Juniperus virginiana*	Cupressaceae
5.	European Tamarack	*Larix decidua*	Pinaceae
6.	Native Tamarack	*Larix laricina*	Pinaceae
7.	Dawn Redwood	*Metasequoia glyptostroboides*	Cupressaceae
8.	Norway Spruce	*Picea abies*	Pinaceae
9.	White Spruce	*Picea glauca*	Pinaceae
10.	Black Spruce	*Picea mariana*	Pinaceae
11.	Serbian Spruce	*Picea omorika*	Pinaceae
12.	Colorado Spruce	*Picea pungens*	Pinaceae
13.	Jack Pine	*Pinus banksiana*	Pinaceae
14.	Mugo Pine	*Pinus mugo*	Pinaceae
15.	Austrian Pine	*Pinus nigra*	Pinaceae
16.	Red Pine	*Pinus resinosa*	Pinaceae
17.	Eastern White Pine	*Pinus strobus*	Pinaceae
18.	Scots Pine	*Pinus sylvestris*	Pinaceae
19.	Douglas Fir	*Pseudotsuga menziesii*	Pinaceae
20.	Yew	*Taxus sp.*	Taxaceae
21.	Eastern White Cedar	*Thuja occidentalis*	Cupressaceae
22.	Eastern Hemlock	*Tsuga canadensis*	Pinaceae

DECIDUOUS – OPPOSITE ARRANGEMENT			
	Common Name	*Botanical Name*	Family
1.	Amur Maple	*Acer ginnala*	Aceraceae
2.	Manitoba Maple	*Acer negundo*	Aceraceae
3.	Japanese Maple	*Acer palmatum*	Aceraceae
4.	Striped Maple	*Acer pensylvanicum*	Aceraceae
5.	Norway Maple	*Acer platanoides*	Aceraceae
6.	Sycamore Maple	*Acer pseudoplatanus*	Aceraceae
7.	Red Maple	*Acer rubrum*	Aceraceae
8.	Silver Maple	*Acer saccharinum*	Aceraceae

CONIFERS – EVERGREEN AND DECIDUOUS			
	Common Name	*Botanical Name*	Characteristics
9.	Sugar Maple	*Acer saccharum*	Aceraceae
10.	Mountain Maple	*Acer spicatum*	Aceraceae
11.	Common Horsechestnut	*Aesculus hippocastanum*	Hippocastanaceae
12.	Northern Catalpa	*Catalpa speciosa*	Bignoniaceae
13.	White Ash	*Fraxinus americana*	Oleaceae
14.	European Ash	*Fraxinus excelsior*	Oleaceae
15.	Black Ash	*Fraxinus nigra*	Oleaceae
16.	Green Ash	*Fraxinus pennsylvanica*	Oleaceae
17.	Amur Cork Tree	*Phellodendron amurense*	Rutaceae
18.	Ivory Silk Tree Lilac	*Syringa reticulata 'Ivory Silk'*	Oleaceae
19.	Common lilac	*Syringa vulgaris*	Oleaceae
DECIDUOUS – ALTERNATE ARRANGEMENT			
1	American Beech	*Fagus grandifolia*	Fagaceae
2	European Beech	*Fagus sylvatica*	Fagaceae
3	White Oak	*Quercus alba*	Fagaceae
4	Bur Oak	*Quercus macrocarpa*	Fagaceae
5	Pin Oak	*Quercus palustris*	Fagaceae
6	Pyramidal English Oak	*Quercus robur "Fastigiata"*	Fagaceae
7	Red Oak	*Quercus rubra*	Fagaceae
8	Bitternut hickory	*Carya cordiformis*	Juglandaceae
9	Shagbark Hickory	*Carya ovata*	Juglandaceae
10	Butternut	*Juglans cinerea*	Juglandaceae
11	Black Walnut	*Juglans nigra*	Juglandaceae

Evaluation Methods:
On going written and practical testing.

Level 2 Arborist

Summary of Total Program In-School Training Hours Level 2

Reportable Subjects	**Total**	**Theory**	**Practical**
S0401 Arborist Theory II	24	24	0
S0402 Arborist Practices II	156		156
S0403 Plant Health Care – Pest Management	48	48	0
S0404 Arboricultural Sciences II	30	30	0
S0405 Arborist Tree Identification II	36	36	0
S0406 Arborist Crane Assisted Rigging	30	24	6
S0407 Arborist Equipment II	24	8	16
S0408 Arborist Calculations	12	12	0
Total	360	186	174

Number: S0401

Title: **Arborist Theory II**

Duration: 24 Total

Theory: 24 Hours Practical: 0 hours

Prerequisites: Level 1

Cross-reference to training standard: U7161.01-.11, U7162.01; U7166.01-12; U7167.06, 07, 09,14,17; U7168.01, 11

General Learning Objective:

Demonstrate a thorough, working knowledge of safe work site requirements; tree wound/defect corrective measure selection; woody plant selection and installation; and spraying, fertilizing and pneumatic equipment selection, inspection, adjustment, maintenance, set up and use.

Learning Outcomes and contents:

S0401.8.1 Identify, select and describe corrective measures for wounds and defects in woody plants.

Identify types wounds and defects
- Mechanical wounds to root, trunk and branches
- Visible girdling roots
- Sunscald
- Frost cracks
- Seams
- Cavities
- Weak scaffold structure

Severity assessment

Treatment of wounds and defects
- Method selection
- Severity
- Bark tracing
- Girdling root removal
- Sunscald treatment
- Rigid bracing installation
- Flexible bracing installation
- Cavity treatment
- Root pruning on construction site

Monitoring success of treatment

S0401.8.2 Select woody plant materials for installation.

Select nursery stock
- Quantity
- Size
- Species
- Health
- Structure

Site conditions
Cultural requirements
Transplant methodology
Transplant shock
Initial maintenance requirements

S0401.8.3 Describe techniques for transplanting woody plant materials.

Inspect nursery stock
- Selection in the field
- Inspection prior to planting

Digging woody plants for transplanting
- Bare root
- Balled and burlapped
- Tree spading
- Containerized

Transporting woody plants
- Handling
- Loading
- Protecting
- Interim storage

Preparing planting sites
- Planting location
- Planting medium preparation
- Correcting compaction
- Correcting nutrient deficiencies
- Drainage provision
- Excavation
- Pit configuration

Woody plant installation
- Root and crown pruning
- Placement, orientation and leveling
- Planting depth
- Anchoring
- Backfilling

- Removal of burlap, basket wire, containers, labels, seals and ribbons.
- Mulching
- Watering
- Site clean-up

Follow-up inspection, maintenance and monitoring

- Pruning
- Anchor removal
- Trunk guard removal
- Mulching
- Watering
- Nutrients
- Plant health

Evaluation Methods:
On going written testing

Number: S0402

Title: **Arborist Practices II**

Duration: 156 Total Hours

Theory: 0 hours Practical: 156 hours

Prerequisite: Level 1

Cross-reference to training standard: U7160.01-.13; U7161.01-.11, U7162.01, - .09, U7163.01-.12, U7164.01-.24, U7165.05,

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General Learning Objective:

Demonstrate a thorough, working knowledge of arboricultural safety equipment, manual and powered tools, including chainsaws, and work site operations and safety, including ascending to and descending from work positions in trees, standard and specialty tree removal techniques, and tree wound/defect correction.

Learning Outcomes and contents:

S0402.9.1 Work in a safe manner on site

Worksite hazard management update (review Unit S0247.2.2; 2.3)
Worksite security update (review Unit S0247.2.3)
Chainsaw safety (review Unit S049.4.3)
Ascent and descent trees (review Unit S0247.2.14)
Rope terminology (review unit S0247.2.10)
Knots (review unit S0247. 2.10)

S0402.9.2 Ascent and descent tree with climbers (spurs)

Pre-climbing preparation
Spurring with fall restrict tool
Spurring on belay
Spurring with double lanyard

S0402.9.3 Select, inspect, adjust, maintain, set-up, use and store manual and powered tools and equipment common to arboricultural operations.

Manual/power tools and equipment update (review of Unit SO249.4.1)

- Selection
- Inspection

- Adjustment
- Maintenance
- Use
- Storage

Rigging equipment (review Unit S0247.2.16)

- Selection
- Inspection
- Adjustment
- Maintenance
- Operate
- Storage

Perform required pruning operation (review Unit S0247.2.11 not including Pruning methods) using chainsaw aloft

- Chainsaw selection
- Job size
- Size of wood to be cut
- Bar length
- Power to weight ratio
- Pre-operational inspection/maintenance
- Operation
- Personal protective equipment
- Starting/stopping chainsaw
- Secure/prepare work area
- Working position
- Escape routes
- Cuts and notches
- Climbing procedures
- Pruning cuts
- Ongoing inspection and maintenance

S0402.9.4 Remove trees using felling techniques.

Method and tools/equipment selection

- Factors affecting removal method
- Identifying tree to be removed
- Plant characteristics/condition
- Living/dead
- Central leader/multi-stemmed
- Structural defects
- Site conditions
- Job requirements
- Potential hazards

Fall zone preparation
Danger zone preparation
- Escape Route

Tree felling
- Tree condition
- Balanced tree
- Unbalanced/leaning tree
- Tree with splits or cavities
- “Hung up” trees
- Felling cuts
- Conventional notch
- “V” notch and back cut
- “Humboldt” notch and back cut
- Boring and back cut
- Side notching
- Modifying the hinge to adjust direction of fall
- Felling assist devices
- Wedges
- Levers
- Pull ropes
- Tackle blocks
- Free fall
- Conventional drop rigging
- Rigging using lowering devices
- Knots
- Zeppelin bend
- Timber hitch
- Cow hitch
- Alpine butterfly

S0402.9.5 Remove and prune trees using rigging techniques.

Review rigging calculations method and tools/equipment selection
- Factors affecting removal method
- Identifying tree to be removed
- Plant characteristics/condition
- Living/dead
- Central leader/multi-stemmed
- Structural defects
- Site conditions
- Job requirements
- Potential hazards

Fall zone preparation
Danger zone preparation

Sectional removals
- Free fall
- Conventional drop rigging
- Rigging using lowering devices

S0402.9.6 Handle/dispose of debris

Bucking and climbing
- Progression of operation
- Top to bottom/bottom to top
- Non-tensioned/tensioned
- Compression/tension wood
- Potential for rolling
- Limb by limb technique
- Sweep technique

Handle/dispose of debris
- Piling brush for chipping
- Lifting/carrying brush and large wood
- Loading brush and large wood on vehicles
- Chipping brush
- Disposal/recycling

Site clean-up

S0402.4.9.7 Describe the various tree climbing systems

Types of cabling systems

- Dynamic versus static
- Steel versus cobra

Components of climbing systems
- Lags
- Thimbles
- 7 stand 50 gauge cable
- Threaded rod
- Mon eye nuts
- Lock washers and nuts

Installation Procedures
- Steel with J lag
- Steel with threaded rod
- Cobra system

Evaluation Methods:
Ongoing practical/performance testing, supplemented with written testing, as appropriate.

Number: S0403

Title: **Arborist Plant Health Care** - **Pest Management**

Duration: 48 Total Hours

Theory: 48 hours Practical: 0 hours

Prerequisite: N A

Cross-reference to training standard: U7167.01 -.03, 05, 06, .13-16. U7166.01- 03, U7167.01-03, 05, 06, 14-16

General Learning Objective:

Demonstrate a working knowledge of the care and treatment of woody plant insects, mites, diseases and disorders using Integrated Pest Management systems.

Learning Outcomes and contents:

S0403.10.1 Identify insect and mite pests of woody plants

History of pest control in arboriculture
Pest management systems
- Integrated pest management
- Plant health care
- Components of the new systems

Diagnosis of plant problem
- Diagnostic techniques
- Thought process for correct diagnosis
- Diagnostic agencies
- Sampling of soil and woody plant tissue
- Assessment of tree
- Systematic inspection techniques
- Determination of normal and abnormal growth for species

Assessment of site conditions
- Soil
- Ph
- Texture/structure
- Oxygen availability
- Water availability
- Space available
- Light availability

- Environmental conditions
- Temperature extremes/hardiness zones
- Human activities - past and present
- Cultural practices

Identification of primary and secondary stresses
Identification of signs and symptoms
Arboricultural reference material available
Insects
Signs and symptoms of each main group

- Defoliators
- Whole leaf and skeletonizers
  - Sawflies
  - Eastern tent caterpillar
  - Elm leaf beetle
  - Fall webworm
  - Forest tent caterpillar
- Leaf miners
- Birch leaf miner
- Cedar leaf miner
- Elm leaf miner
- Sap suckers
  - Aphids
  - Scales
  - Spider mites
- Wood borers
  - Asian long horned beetle
  - Bronze birch borer
  - Emerald ash borer
- Gall makers
  - Cooley spruce gall Adelgid
  - Eastern spruce gall
- Beneficial insects
  - Lady beetles
  - Parasitic wasps

Amount of damage that can be done by each insect group
Identification features
Life cycle
Timing pest management

S0403.10.2 Discuss and describe control measures.

Life cycle information
- Action threshold information
- Identification of weak link (best time to treat)
- Use of phonology to time control methods

Range of control strategies
- Education
- Prevention of damage
- Redesigning the landscape
- Elimination of problem trees
- Resistant species
- Cultural
- Fertilization
- Mulching
- Watering
- Aeration
- Sanitation
- Mechanical/physical
- Biological
- Insects
- Biological (continued)
- Pathogens e.g. Bacillus thuringiensis varieties

Chemical
- Horticultural oil
- Insecticidal soap
- Sulphur
- Botanical
- Pheromones

Determination of best control method
- Government legislation
- Safety of pesticides
- Ld 50 rating of active ingredients and products
- Applicator's exposure to pesticide
- Effects of pesticide on humans
- Symptoms
- Antidotes
- Safety of non-target organisms
- Possibility of environmental contamination
- Client preference
- Type of woody plant

Integrating treatments for maximum effectiveness at minimum cost
Monitoring success of treatment

S0403.10.3 Identify diseases and disorders of woody plants

Diseases
- Pathogens that cause disease - fungus, bacteria, virus
- Disease cycle
- Pathogen requirements
- Host environments
- Environmental condition requirements

Leaf diseases
- Deciduous -e.g. Apple scab
- Coniferous -e.g. Needle cast
- Signs and symptoms
- Potential damage caused

Branch and stem diseases -e.g. *cytospora canker*
- Signs and symptoms
- Potential damage caused

Root diseases -e.g. *armilleria root rot*
- Signs and symptoms
- Potential damage caused

Vascular diseases -e.g. *Dutch Elm Disease*
- Signs and symptoms
- Potential damage caused

Disorders
- Moisture problems
- Insufficient moisture
- Excessive moisture
- Signs of disorder
- Potential damage caused
- Nutrient deficiencies
- Soil testing
- Foliar testing
- Signs of disorder
- Potential damage caused
- Animal damage
- Signs of disorder
- Potential damage caused
- Human activities
- Construction damage
- Signs of disorder
- Potential damage caused
- Pollution
- Soil, salt
- Air
- Signs of disorder

- Potential damage caused
- Pesticide damage
- Temperature extremes
- Desiccation
- Signs of disorder
- Potential damage caused Signs of disorder
- Potential damage caused
- Poor planting practices
- Planting too low/high
- Girdling ropes and ties
- Girdling roots
- Improper pruning
- Signs of disorder
- Potential damage caused

S0403.10.4 Describe and discuss control measures

Life cycle information

- Action threshold information
- Identification of weak link (best time to treat)
- Use of phenology to time control methods
- Range of control strategies available
- Education
  - Prevention of damage
- Redesigning the landscape
  - Elimination of problem trees
  - Resistant species
- Cultural
  - Fertilizers
  - Mulches
  - Watering
  - Aeration
  - Sanitation
- Mechanical/physical
- Biological
  - Pathogens
- Chemical
  - Sulphur

Determination of best control method

- Government legislation
- Safety of pesticides
- LD 50 Rating of active ingredients and products
- Applicator's exposure to pesticide
- Safety of non-target organisms
- Possibility of environmental contamination

- Client preference
- Type of woody plant

Integrating treatments for maximum effectiveness at minimum cost
Monitoring success of treatments

Evaluation Methods:
Written assignments and ongoing written testing

Number: S0404

Title: **Arboricultural Science II**

Duration: 30 Total Hours

Theory: 30 hours Practical: 0 hours

Prerequisite: N A

Cross reference to training standard: U7167.01, 03, 05, 06, 13,16; U7166.01, 03, U7167.01; 03, 05, 06, 14-16

General Learning Objective:

Demonstrate a working knowledge of plant growth and development, including the impact of sudden and long-term environmental change and soil quality on plant growth. Demonstrate a working knowledge of soils as a medium for plant growth, including testing and prescribing treatment for chemical deficiencies.

Learning Outcomes and contents:

S0404.11.1 Describe the physical qualities of soil that impact on plant growth

Soil types and textures
- Drainage
- Aeration/porosity
- Water retention

Soil compaction
Soil volume
- Soil depth
- Surface area

S0404.11.2 Prescribe methods of modifying the physical qualities of soil to improve plant growth.

Compaction
Aeration
Drainage
Temperature
Moisture retention
Nutrients
Minimum volume of soil

- Fertilizer
- Humus

S0404.11.3 Determine chemical quality of soil for plant growing purposes

Soil nutrients
- Micro
- Macro

Soil reaction
- Ph
- Cation Exchange Capacity (C.E.C)
- Electrical Conductivity (E.C.)

Soil sampling
- Soil probe
- Sampling locations

Soil/plant tissue testing
- Soil test kits
- Laboratory testing

Test results
- Interpretation

S0404.11.4 Prescribe methods of treating chemical deficiencies in soil

Fertilizing
Ph adjustment
Mycorrhizal inoculation

Evaluation Methods:
Ongoing written testing and assignments.

Number: S0405

Title: **Arborist Tree Identification II**

Duration: 36 Total Hours

Theory: 36 hours Practical: 0 hours

Prerequisite: Level 1

Cross reference to training standard: U7162.03; U7163.01; U7165.01; U7166.01

General Learning Objective:

Demonstrate a thorough working knowledge of tree genera, species and cultivars by identifying 50 additional plants commonly found in Ontario.

Learning Outcomes and contents:

S0405.12.1 Identify an additional 50 common woody plants according to species and morphological characteristics using the International System of Plant Nomenclature.

Review unit S0246.1.7

Plant groups
- Herbaceous/woody
- Deciduous/evergreen
- Needled/broad-leaved conifers
- Native/exotic
- Invasive

Plant nomenclature for each plant
- Family
- Genus
- Species
- Variety/cultivar
- Common name

Identification characteristics for each plant
- Leaves/needles
- Flowers/seeds
- Buds
- Bark
- Growth habit and form

Cultural requirements for each plant

- Moisture
- Light
- Hardiness
- Soil
- Pruning

S0405.12.2 Tree list

DECIDUOUS – ALTERNATE ARRANGEMENT			
	Common Name	Botanical Name	Family
1	Japanese Angelica Tree	*Aralia elata*	Areliaceae
2	Staghorn Sumac	*Rhus typhina*	Amacardiaceae
3	European Alder	*Alnus glutinosa*	Betulaceae
4	Yellow Birch	*Betula alleghaniensis*	Betulaceae
5	River birch	*Betula nigra*	Betulaceae
6	White Birch	*Betula papyrifera*	Betulaceae
7	European White Birch	*Betula pendula*	Betulaceae
8	Hornbeam, Blue Beech	*Carpinus caroliniana*	Betulaceae
9	Turkish Hazel	*Corylus colurna*	Betulaceae
10	Hophornbeam, Ironwood	*Ostrya virginiana*	Betulaceae
11	Honey Locust	*Gleditsia triacanthos*	Caesalpiniaceae
12	Kentucky Coffee Tree	*Gymnocladus dioicus*	Caesalpiniaceae
13	Pagoda Dogwood	*Cornus alternifolia*	Cornaceae
14	Russian Olive	*Elaeagnus angustifolia*	Elaeagnaceae
15	Black Locust	*Robinia pseudoacacia*	Fabaceae
16	Ginkgo, Maidenhair Tree	*Ginkgo biloba*	Ginkgoaceae
17	American Sweetgum	*Liquidamber styraciflua*	Hammamelidaceae
18	Eastern Redbud	*Cercis canadensis*	Leguminoceae
19	Tuliptree, Yellow Poplar	*Liriodendron tulipifera*	Magnoliaceae
20	White Mulberry	*Morus alba*	Moraceae
21	Red Mulberry	*Morus rubra*	Moraceae
22	London Plane Tree	*Platanus X acerifolia*	Platanaceae
23	Sycamore	*Plantanus occidentalis*	Platanaceae
24	European Buckthorn	*Rhamnus cathartica*	Rhamnaceae
25	Downy Serviceberry	*Amelanchier arborea*	Rosaceae
26	Hawthorn	*Crataegus sp.*	Rosaceae
27	Apple, crabapple	*Malus sp.*	Rosaceae
28	Pin Cherry	*Prunus pensylvanica*	Roseceae
29	Black Cherry	*Prunus serotina*	Rosaceae
30	Choke Cherry	*Prunus virginiana*	Rosaceae
31	Pyrus calleryana 'Chanticleer'	*Chanticleer pear*	Rosaceae

32	American Mountain Ash	*Sorbus americana*	Rosaceae
33	European Mountain Ash	*Sorbus aucuparia*	Rosaceae
34	White Poplar	*Populus alba*	Salicaceae
35	Balsam Poplar	*Populus balsamifera*	Salicaceae
36	Carolina Poplar	*Populus x canadensis*	Salicaceae
37	Largetooth Aspen	*Populus grandidentata*	
38	Lombardy Poplar	*Populus nigra "Italica"*	Salicaceae
39	Trembling Aspen	*Populus tremuloides*	Salicaceae
40	Weeping Willow	*Salix alba 'Tristis'*	Salicaceae
41	Crack Willow	*Salix fragilis*	Salicaceae
42	Black Willow	*Salix nigra*	Salicaceae
43	Tree of Heaven	*Ailanthus altissima*	Simaroubaceae
44	American Basswood	*Tilia americana*	Tiliaceae
44	Littleleaf Linden	*Tilia cordata*	Tiliaceae
45	Common Hackberry	*Celtis occidentalis*	Ulmaceae
46	American Elm	*Ulmus americana*	Ulmaceae
47	Scots Elm	*Ulmus glabra*	Ulmaceae
48	English Elm	*Ulmus procera*	Ulmaceae
49	Siberian Elm	*Ulmus pumila*	Ulmaceae
50	Slippery Elm	*Ulmus rubra*	Ulmaceae

Evaluation Methods:
Ongoing written testing and assignments

Number: S0406

Title: **Arborist Crane Assisted Rigging**

Duration: 24 Total Hours

Theory: 24 hours Practical: 6 hours

Prerequisite: Level 1

Cross reference to training standard:

General Learning Outcome:

Demonstrate knowledge of crane-assisted safe work site rigging operations including calculating load weights and distribution, determining balance point, assessing and determining choker locations, ascending to and descending from work points and performing tree and limb removal with rigging devices.

Learning outcomes and contents:

S0406.13.1 Describe how to plan and set up work sites

Interpret worksite documentation
- Worksite specifications
- Crane specifications and load weights, i.e. Load capacity charts, green log charts
- Working radius/ landing zone location
- Hook height
- Load path, i.e. Route from lift to landing
- Work orders
- Scope of work
- Personnel required/ job responsibilities
- Worksite hazards

Equipment required
- Butt rope
- Tag line
- Slings
- Rigging devices
- Ground protection mats

Determine job site limits
- Property lines
- Structures i.e. Buildings, fences

- Safe limits of approach
- Overhead utilities i.e. electrical, communications
- Buried utilities i.e. Water, gas, electrical, communications
- Underground structures i.e. Septic systems, cisterns, wells, gravesites,

Establish work sequence

- Methodologies required
- Identify hazards / plan barriers
- Site conditions
- Tools/equipment selected

Environmental hazards

- Restricted visibility, i.e. Glare, fog, darkness
- Wet/ice/snow conditions
- Wind
- Thunder & lightning
- Temperature extremes

Tree hazards

- Hangers and split branches
- Deadwood
- Excessive fill over root zone
- Root, stem/trunk and branch rot and cavities
- Cracks, seams and ribs
- Wood under tension
- Wind-thrown trees
- Wildlife, i.e. stinging insects, raccoons

Ground hazards

- Debris
- Unstable ground
- Slippery ground
- Slopes/uneven ground/embankments
- Structures, i.e. Bridges, culverts, foundations, retaining walls
- Wildlife, holes and dens
- Trip hazards
- Deep snow

Proximity to other workers/equipment

Wood characteristics

- Tension wood
- Compression wood
- Seasonal fluctuations
- Wood strength

S0406.13.2 Describe methods to establish and maintain worksite communication

Communication Methods **(No response shall be made to unclear signals)**

- Verbal communication – *clear command equals clear response*
- Direct communication
- 2 way radios / cell phones
- Specific hand signals with crane operator:
- Raise load
- Lower load
- Raise boom
- Lower boom
- Stop
- "Dog it"
- Go
- Back up
- Straight
- To the right
- To the left
- Emergency stop
- All clear
- Shut down power
- Traffic control signals

Written communication, i.e. Job plan

- Designated signal person
- Establish a hoist line pretension signal

S0406.13.3 Describe how to perform tree and limb removals with hoisting devices

Establish barriers according to job plan and regulations

- Safe limits of approach for electrical utilities
- Dedicated observer / signal person
- Blind lifts
- Proximity to electrical conductors
- Controlling public access
- Traffic controls including road closure permits
- Controlling load path access

Assist the crane operator to set up crane according to job plan
Collaborate with the crane operator to determine the weight, balance points and sequence of lifts

- Calculate load weights and distribution
- Allowances for seasonal variations such as seed / fruit

foliage and sap content
- Environmental factors such as wind, rain, snow and ice
- Using green log weight charts
- Side loading of cranes
- Considering wood characteristics

Communicate job plan to all personnel
Select rigging equipment
- Types of sling, i.e. Synthetic fibre, wire rope, chain
- Configuration, i.e. Eye to eye, endless loop, spreaders,
- Length and diameter
- Hardware i.e. Clevis, spreader

Inspect rigging equipment for
- Rating tags, attached and legible
- Excessive wear and damage i.e. Abrasion, crushing, bends, bird caging, kinks

Ascend tree
Assess selected attachment point(s)
Structural integrity, i.e. loose bark, decay
Connect to attachment point(s)
Orientation of sling(s) on load
Signal to pretension hoist line to estimated weight of load
Inspect rigging system
Verify connections are secure
Positioning of boom relative to load
Reposition to cutting location
- Remove any branches interfering with cutting operation
- Install guide lines or butt lines if required
- Assess cutting position for inadvertent load movement

Communicate with crane operator the intent to begin the cutting operation
Perform cutting operation
- Simple straight cut

Traditional cuts
Prepare the load to transfer to landing area
- Remove butt line if installed
- Direct usage of guidelines if required

Signal crane operator to land load

S0406.13.4 Describe maintenance and storage of rigging equipment

Maintain rigging equipment as per manufacturer's instructions
- Cleaning
- Lubricating / oiling
- Repairing as required
- Drying as required

Storage as per manufacturer's instructions

- Coiling, wrapping, hanging
- Out of direct sunlight
- Out of corrosive atmosphere
- Protected from nicks or abrasions
- Away from destructive substances

Evaluation Methods:
Ongoing written testing and assignments

Number: S0407

Title: **Arborist Equipment 2**

Duration: 24 Hours

Theory: 8 Hours Practical: 16 Hours

Prerequisite: Level 1

GENERAL LEARNING OBJECTIVE:

Demonstrate a thorough working knowledge of stumpers and aerial devices.

Learning outcomes and contents:

S0407.14.1 Describe types of stumpers

Self propelled
Trailer mounted

S0407.14.2 Describe how to prepare stumper for transport

Stumper circle check
- Visual defects
- Loose, worn, cracked, broken nuts/bolts/pins
- Fluid levels and leaks
- Tension of belts
- Condition of guards and shields
- Cutter teeth sharpness
- Reporting deficiencies

Legislated requirements
- Towing requirements

Manufacturer's instructions
Loading and securing non-trailered stumper for transport
Hitching stumper to tow vehicle
- Pintle or Ball Hitch
- Pin hitch
- Inspection of hitching mechanism including tongue
- Safety chains attached in crossed (cradled) arrangement and safety hooks facing upward
- Brake inspection and hookup
- Signal tail light connection and test
- Tire/rim condition
- Stumper jack positioning for travel

- Cutter wheel positioning and locking
- Extendable tongue positioning and securing
- Removal and stowing of wheel blocks

S0407.14.3 Describe how to setup stumper for use on site.

Manufacturer's instructions
Legislated requirements
Underground utility locations
Setup procedure
- Site selection
- Level ground
- Stable ground
- Work site limits and security
- Securing stumper
- Grinding wheel orientation and control
- Monitoring work site changes
- Stumper work positioning
- Stable ground
- Stump site preparation
- Unhitching from tow vehicle
- Locking pin removal
- Safety curtains and operator shield
- Movable control panel setup
- Monitoring work site changes

Preoperational checks prior to start-up
- Stumper circle check
- Visual defects
- Loose, worn, cracked broken nuts/bolts/pins
- Fluid levels and leaks
- Tension of belts
- Condition of guards and shields
- Teeth sharpness, angle and condition
- Grinder wheel condition
- Reporting deficiencies

Operational inspection
- Start up procedures
- Gauges and warning lights functioning
- Position of cutter wheel to stump
- Clutch engagement and functioning
- Engine speed
- Chain oil function
- Reporting deficiencies

S0407.14.4 Describe how to operate stumpers

Manufacturer's operating procedures
- Legislated requirements
- Personal protective equipment
- Footwear
- Coveralls
- Gloves
- Headgear
- Eye protection
- Ear protection
- Pedestrian and vehicular control device use

Stump/site preparation
- Chain oil activation
- Initial grinder wheel location
- First cut – light
- Progressive wheel lowering
- Desired depth of cut
- Significance of wood type
- Re-positioning for second cut, if necessary

Normal shut-down procedures
Emergency shut down procedures
Post operational clean-up

S0407.14.5 Describe preparation for using aerial device

Types of aerial device
- Truck mounted
- Self propelled

Legislated requirements
Manufacturer's instructions
Pre-operational checks
- Vehicle circle check
- Check tire pressures
- PTO check
- Aerial device circle check
- Bucket inspection
- Hand line
- Dielectric test certificate
- Electrical integrity of boom
- Holding valve check
- Safety interlock check
- Control valve checks
- Hydraulic system check
- Leaks

- Loose fittings
- Hydraulic oil level
- Breather cap
- Fall protection systems check
- Bucket escape equipment check
- Bucket rescue equipment check
- Outriggers and pads inspection

Aerial device setup

- Traffic control devices
- Vehicular
- Pedestrian
- Flag person
- Vehicle warning light
- Site selection
- Surface slope/terrain
- Overhead obstructions
- Removal/stowing of covers
- Stabilizing vehicle
- Vehicle parking brake
- Wheel chocks
- Engaging PTO
- Setting outriggers/equipment holders

Personal protective equipment

- Approved footwear
- Eye protection
- Hand protection
- Safety helmet

Fall protection systems

- Body harness
- Shock-absorbing lanyard

S0407.14.6 Describe the use of aerial device for arboricultural operations

Loading tools, equipment and materials into bucket

- Job requirements
- Manufacturers instructions
- Legislated requirements
- Hydraulic tool attachment
- Emergency equipment
- Coordination with ground crew

Aerial device operation

- Manufacturer’s instructions
- Legislative requirements
- Mounting/dismounting bucket using 3 points of contact

- Ground person responsibilities
- Engaging PTO
- Upper/lower controls
- Raise bucket
- Rotate boom
- Lower bucket
- Work positioning
- Electrical awareness
- Tree pruning from bucket
- Tree sectional removal from bucket
- Tree maintenance from bucket
- Transferring between bucket and tree
- Fall arrest system
- Monitoring aerial device condition
- Emergency hydraulic shut off
- Hydraulic failure
- Engine failure

Aerial device movement with operator in bucket

- Short distances
- Speed and direction of movement
- Operator and bucket security
- Boom positioning
- Surface conditions
- Disengaged PTO

Aerial device transport

- Manufacturer's instructions
- Legislative requirements
- Securing aerial device for transport
- Stowing and securing boom
- Retracting outriggers
- Disengage PTO
- Debris removal

S0407.14.7 Describe aerial device escape and rescue procedures

- Source of problem
- Investigation/diagnosis of cause
- Control/correction/alleviation
- Condition of operator
- Calling for assistance

Escape from a disabled aerial device

- Operator functional
- Proximity of energized conductors
- Use of emergency pump

- Use of lower controls
- Transferring from a disabled aerial device into a second aerial device
- Transferring from a disabled aerial device into a tree
- Use of lifeline

Rescue of a disable operator

- Lower control use
- Positioning of bucket to flat surface
- Tipping bucket
- Using a rescue rig
- Removing disabled worker
- Emergency first aid

S0407.14.8 Describe aerial device preventative maintenance

Manufacturer's instructions
Legislative requirements

Evaluation methods:
On going written and practical testing

Number: S0408

Title: **Arborist Calculations**

Duration: 12 Total Hours

Theory: 12 Hours Practical: 0 Hours

Prerequisite: N A

Cross-reference to training standard:
U7162.01; U7163.04, 08, .09; U7164.15, 17, 18

GENERAL LEARNING OBJECTIVE:

Demonstrate a thorough knowledge of mathematics typically necessary in the industry.

Learning outcomes and contents:

S0408.15.1 Determine quantities of materials required based on linear, area and volume calculations, in both systems of measurement.

Systems of measurement
- System International (metric)
- Foot Pound Second and Imperial
- Conversions

Dimensions of measurement
- Linear / Area measures
- Volume / Mass measures

Quantity determination
- Appropriate units of measure
- Shrinkage and expansion factors

S0408.15.2 Determine rigging equipment

Ropes
- Construction
- Materials
- Safe working load limits
- Tensile strength
- Inspection

Carabiners
- Construction
- Materials
- Safe working load limits
- Tensile strength
- Inspection

Slings
- Construction
- Materials
- Safe working load limits
- Tensile strength
- Inspection

Pulleys
- Construction
- Materials
- Safe working load limits
- Tensile strength
- Inspection

Arborist blocks
- Construction
- Materials
- Safe working load limits
- Tensile strength
- Inspection

Port-a-wrap
- Construction
- Materials
- Safe working load limits
- Tensile strength
- Inspection

Figure 8
- Construction
- Materials
- Safe working load limits
- Tensile strength
- Inspection

Mechanical lowering devices
- Construction
- Materials
- Safe working load limits
- Tensile strength
- Inspection

Quick links and shackles
- Construction
- Materials
- Safe working load limits
- Tensile strength
- Inspection

Block and tackle
- Construction
- Materials
- Safe working load limits
- Tensile strength
- Inspection

S0408.15.3 Determine shock loading on ropes and equipment

Newton's law
Calculating force
Progressive calculations
Safety margin
- Heat
- Elasticity
- Friction
- Safety factors
- Cycles to failure
- Wood densities

S0408.15.4 Determine mechanical advantage when using block and tackle equipment.

Block and tackle methodology/principles
Calculations of forces
- Anchor points
- Pulleys
- Lines

Evaluation methods:
Written testing

Level 2 Utility Arborist

Summary of Total Program In-School Training Hours Level 2

Reportable Subjects	Total	Theory	Practical
Utility Arborist Workplace Safety II	18	18	
Utility Arborist Theory II	36	36	
Utility Arborist Practices II – Tree Climbing	144		144
Utility Arborist Practice II – Aerial Device	24		24
Utility Arborist Equipment II – Brush Chipper and Aerial Device	12	6	6
Utility Arboricultural Sciences II	15	9	6
Utility Arborist Hand Tools II	6		6
Utility Arborist Tree Identification II	33	33	
Utility Arborist Transmission Line Clearing II	12	6	6
Total	300	108	192

Number: S0259

Title: **Utility Arborist Workplace Safety II**

Duration: 18 Total Hours

Theory: 18 hours Practical: 0 hours

Prerequisite: Arborist Workplace Health and Safety I

Cross-Reference to training standard: U6040.01 - .14, U6041.01 - .11, U6042.02, .04, .07, .09, .11, .13 - .16, U6043.05, U6044.05, U6045.01, .02, .11, .12, .20, .23, .24, U6046.02, .03, .05 - .07, .10, .14 - .16, U6047.05, .06, .09, .11, U6048.01, .10, .11, .14, U6050.01, .02, .08, U6051.07 - .10

General Learning Objective:

Demonstrate a working knowledge of pertinent safety and related legislation as they apply to Utility Arboricultural safe workplace practices; and deal with potentially dangerous on-site conditions, emergencies, hazards and materials.

Learning Outcomes and contents:

S0259.16.1 Describe the requirements of federal, provincial and municipal legislation and regulations governing all aspects of the Utility Arboricultural industry.

Review Unit: S0246.1.1

Electrical Utility Safety Rules

Description	Sections
Sections related to Line Clearing	100-118, 122-124, 127-130, 134-135, 143, 145, 147 EUSR Supplemental Rules

Construction Regulation 213

Aerial devices	143, 144, 145, 146, 147, 148, 149

Highway Traffic Act

Description	Sections
License requirements	32
Inspection of vehicle	82, 84,
Circle checks Maintenance Logs	107

Trip log	190
Dimension limits	108, 109, 110, 111,
Weight Limits	120, 121, 122, 123, 124, 125, 126, 127
Off road vehicles on highways	191.8
CVOR	16, 17, 18, 19, 20, 21, 22, 23

Pesticide Act

Description	Sections
Prohibition to exterminations	5, 7

Off Road Vehicle Act

Description	Sections
Application of Act	2, 3

S0259.16.2 Identify the hazards of working in an energized environment.

Review Unit: S0246.1.2

Circuit Identification

- Distribution circuit identification - tree barrier conductor, underground conductor found overhead
- Service wire identification - triplex, open bus
- Crossarms / pole top
- Neutral identification

Electrical System Configuration

- Loop feeds
- Radial feeds
- Communications conductors – overhead
- Television conductors – overhead
- Underground utilities - natural gas markers, communication - pedestals

Electrical Equipment Identification

- Switches
- Insulators
- Transformers
- Lightening arresters
- Pole anchors
- Guy wires

S0259.16.3 Identify all other potential hazards on the work site, including hazards in trees; overhead, on or under the ground; hazards to the public.

Review Unit: S0246.1.3

Tree hazards
- Root, stem/trunk and branch rot and cavities
- Cracks, seams and ribs
- Compression and tension wood
- Wind-thrown trees
- Storm damage

S0259.16.4 Identify the hazards of working in an energized environment.

Review Unit: S0246.1.2

Circuit Identification
- Transmission circuit identification
- Underground hardware identification – pad mounted transformers, pole markers
- Restricted conductors
- Defective poles

Electrical Equipment Identification
- Reclosures
- Capacitors

S0259.16.5 Identify and describe how to handle, store and dispose of hazardous materials, commonly found in the work place.

Materials
- Pesticides

Handling and disposal
- Storage
- Notification to governing bodies e.g. fire department pesticides storage

Evaluation Methods:
On going written and practical testing

Number: S0260

Title: **Utility Arborist Theory II**

Duration: 36 Total Hours

Theory: 36 hours Practical: 0 hours

Prerequisite: Arborist Theory I

Cross-reference to training standard: U6040.14, U6041.01 - .07, .10, U6042.01 - .03, .06, .07, .09, U6043.01 - .04, .08 - .10, .12, U6044.01 - .03, U6045.01, .02, .05, .06, .08, .09, .13 - .15, .18, .19, 21, .22, .24, U6046.03, .10, .12 - .15, U6047.01 - .03, .05 - .07, .09, .10, U6051.19

General Learning Objective:

Describe how to plan work safely, identify electrical hazards, identify other hazards outside of the electrical environment, use of various knots and hitches in the Utility Arboricultural trade, pruning and removing of trees in proximity of electrical conductors, ascending, descending and performing an aerial rescue, rigging principals and how to manage fire and dangerous goods .

Learning Outcomes and contents:

S0260.17.1 Plan all work operations safely, in compliance with provincial and municipal legislation and regulations.

Review Unit: S0246.1.1

Determine required personal protective equipment
- Fall protection/work positioning systems
- Rubber Gloves
- Flame resistant clothing

Determine job site limits
- Safe limits of approach
- Overhead utilities
- Buried utilities

S0260.17. 2 Describe inspecting, adjusting, maintaining and wearing required personal protective equipment.

Review Unit: S0247.2.7

Rubber gloves
- CSA approved
- Voltage class
- Pre-use inspection
- Air test
- Expiry date
- Leather covers

Flame Resistant clothing
- Correct fit
- Repair
- Cleaning
- Appropriate ASTM standard

S0260.17.3 Describe methods of eliminating or controlling electrical hazards.

Review Unit: S0246.1.2

Barriers to Electrical Energy
- Application of Utility Work Protection Code
- Use of hold offs for equipment protection
- Use of cover up
- Use of insulated aerial device

S0262.17.4 Describe how to manage all other potential hazards on the work site, including hazards in trees; overhead, on or under the ground; and hazards to the public.

Review Unit: S0246.1.3

Mechanical tools and equipment
- Hydraulic tools

S0260.17.5 Describe proper use of knots and hitches.

Rigging Knots (9 knots)
- Bowline tied away
- Jacked Bowline
- Slippery bowline
- Stilson hitch
- Timber hitch
- Marline hitch
- Machard Tresse

- Slippery knot
- Quick hitch

S0260.17.6 Describe the types and purposes of typical pruning processes and the tools and equipment required.

Review Unit: S0247.2.11

Considerations required for pruning operations.
Clearance cycles
- Cycle length
- Voltage
- Proximity
- Customer consideration
- Species characteristics
- Tree condition
- Skirts
- Overhang

Mechanical tools and equipment
- Hydraulic tools
- Pruner
- Saw
- Circular saw
- Chainsaw

Chainsaw use aloft
- Secured to climber
- Start in branch union, chain brake on
- Climber secured with secondary fall protection system e.g. work positioning lanyard
- Smooth controlled cuts
- Chainsaw shut off between climber's movements

S0260.17.7 Describe typical tree removal processes.

Review Unit: S0247.2.14

Felling Trees in proximity to energized apparatus
- Conductor location
- Pole hardware e.g. guys, primary conductors, service conductors
- Use of guide rope
- Perpendicular felling
- Skirt hazards
- Parallel felling

Felling assist devices

- Ropes
- Tackle blocks
- Mechanical assists

Use of ropes and knots
Sectionalizing tree

S0260.17.8 Describe aerial device rescue and escape methods.

Assess the Emergency
Observation of the scene

- Electrical Conductors/Contact
- Struck by limbs, tree sections, lightning
- Is victim pinned
- Medical conditions (bug/animal bites, heat exhaustion, etc)
- Try to communicate with the victim
- Verbally

Assess the victim's condition

- Is victim able to descend by him/her self
- Is victim unconscious
- Is victim unresponsive
- Is victim bleeding profusely

Determine need for EMS

- Determine feasibility/appropriateness of aerial rescue
- Electrical Conductors/Contact
- Rigging systems hazards
- Ground hazards
- Rescuer's competency in performing aerial rescue
- First Aid training
- Climbing ability
- Availability of appropriate equipment and personnel

Initiate EMS response

- Aerial Device Rescue
- Use of emergency pump
- Use of lower controls
- Transfer from a disabled aerial device into a tree
- Use of lifeline and controlled descent device
- Apply Emergency First Aid
- Aerial device Escape
- Use of rescuing devices

S0260.17.9 Describe methods to prune and remove trees using an aerial device in proximity to energized electrical apparatus.

Review Units: S0247.2.6; 2.7; 2.11

Inspect, adjust and wear fall protection equipment according to manufacturer's recommendations
Load tools, equipment and materials into bucket
Access aerial device bucket and secure fall protection system according to manufacturer's instructions
Operate aerial device control's while accessing desired work location

- Monitoring limits of approach
- Monitoring boom position, over roadways, near adjacent trees, poles, electrical conductors
- Position bucket in optimum positions to reduce body strains while performing work

Operate tools aloft
Hand Tools

- Handsaw
- Fiberglass Reinforced Plastic (FRP) Pole pruner
- Fiberglass Reinforced Plastic (FRP) Pole saw
- Rigging ropes
- Friction saver
- Slings
- Whoopie
- Nylon web
- Rope

Loppers
Secateurs
Friction devices
Friction savers / cambium savers
Connectors

- Carabiners
- Clevis

Felling levers
Wedges
Rigging blocks

- Wire rope
- Synthetic rope

Tackle blocks

- Multi-sheave block

Rope pullers
Gas Powered Tools

- Chainsaw

Hydraulic tools

- Pruner
- Saw
- Circular saw
- Chainsaw

- Tool disinfection as required

Sectional removals from aerial device

- Conductor location
- Directional free fall away from energized conductor
- Conventional rigging, guide ropes, pull ropes
- Rigging using lowering devices

Control movement of cut limbs and trunk sections from aerial device

- Conductor location
- Raise/lower limbs using ropes and mechanical advantage
- Cut limbs so they will not span conductors
- Control limbs using hinge cuts
- Lower cut limbs using friction devices
- Top tree using ropes and rigging equipment
- Creating false crotch

Secure aerial device for travel according to manufacturer's instructions
Aerial device rescue using appropriate methods
Aerial device evacuation using appropriate methods

S0260.17.10 Describe methods of herbicide application

Identify differing conditions of right of way in order to select application method.

- Species
- Brush densities
- Environmental conditions
- Terrain
- Soil type

Application methods

- Broadcast
- Stump treatment
- Basal treatment
- Soil sterilant
- Stem foliar

S0260.17.11 Identify appropriate communication skills to deal effectively with customers and in the workplace.

Speak effectively

- Give directions or responses
- Clear enunciation
- Accurate and concise speech
- Coherence of message

- Use of proper language for listener
- Monitor resultant response or action

Solve problems on job
Function as part of a team
Develop personal and work related goals
Work in a responsible manner
Solve problems occurring on the job
Function as part of a team/crew
Develop personal and work-related goals
Work in a responsible manner

Evaluation Methods:
Written testing

Number: S0261

Title: **Utility Arborist Practices II –Tree Climbing**

Duration: 144 Total Hours

Theory: 0 hours Practical: 144 hours

Prerequisite: Arborist Practices I

Cross-reference to training standard: U6040.02 - .11, .13, .14, U6041.01 - .07, .09 - .11, U6042.01 - .03, .05, .06, .08, .09, .12 - .15, U6043.02, .05 - .11, U6044.04 - .07, U6045.01 - .07, .10 - .24, U6046.03 - .16, U6047.04 - .09, .11, U6048.01 - .14, U6049.01 - .10, U6050.01 - .09, U 6051.11, .19

General Learning Objective:

Demonstrate a knowledge of how to plan work safely, utilizing safe work practices, pruning and removing of trees in proximity of electrical conductors, ascending, descending and performing an aerial rescue, inspect, adjust and maintain personal protective equipment and fall protection equipment utilized in the Utility Arboricultural trade and managing fire, waste and dangerous goods.

Learning Outcomes and contents:

S0261.18.1 Demonstrate compliance with provincial acts, regulations and municipal bylaws through appropriate job planning.

Interpret job documents

- Plans and specifications
- Work orders
- Scope of work
- Equipment required
- Personnel required
- Materials required
- Worksite hazards
- Traffic hazards

Other requirements

Determine required personal protective equipment
- Head protection
- Eye protection
- Hearing protection
- Foot protection
- Face protection
- Hand protection
- Chainsaw protection

Determine job site limits
- Property lines
- Safe limits of approach to electrical conductors
- Overhead utilities
- Buried utilities

Identify job sequences, hazards and required barriers to hazards
- Job / task sequence
- Identified hazards
- Identify barriers
- Identify tools/equipment required
- Identify appropriate job communications
- Identify when to reevaluate hazards and barriers

Interpret job documents
- Cycle clearance requirements
- Determine required personal protective equipment
- Fall protection/work positioning systems
- Flame resistant clothing

S0261.18.2 Demonstrate safe work practices when working within proximity to energized electrical apparatus.

Environmental hazards identified
- Darkness
- Wet/ice/snow conditions
- Wind
- Thunder & lightning
- Temperature extremes

Tree hazards controlled
- Hangers and split branches
- Deadwood
- Excessive fill over root zone
- Compression and tension wood
- Spring poles
- Barber chair
- Chicot
- Widow maker

- Free-standing tree
- Falling debris
- Wildlife
- Severed limbs
- Adjacent trees

Ground hazards identified

- Debris
- Unstable ground
- Slippery ground
- Slopes/uneven ground
- Wildlife, holes and dens
- Trip hazards
- Deep snow

Underground hardware identified

- Natural gas markers
- Water line markers
- Electrical transformers
- Septic systems, wells
- Communication lines

Poisonous plants identified and controlled

- Poison Ivy
- Poison Oak
- Poison Sumac
- London Plane Tree
- Poison Parsley

Application of Electrical Utility Safety Rule Book

- Application of appropriate safe limits of approach
- Notification Controlling Authority
- Application of appropriate job planning
- Application of Utility Work Protection Code
- Use of hold offs for equipment protection
- Use of cover up
- Isolation/de-energization of circuits

Establishing clear communication between workers
Maintaining distances between workers and equipment

- Notification Controlling Authority
- Application of Utility Work Protection Code
- Use of rubber gloves
- Use of live line tools

Tree hazards
- Root, stem/trunk and branch rot and cavities
- Cracks, seams and ribs
- Wind-thrown trees
- Storm damage

S0261.18.3 Demonstrate inspecting, adjusting, maintaining and wearing required personal protective equipment.

Review Unit: 2.7

Fall Protection
Full Body Harness
- CSA or Equivalent approved
- Cuts, buckles operational
- Shock Absorbing Lanyard
- CSA or Equivalent
- Cuts, snaps working

Rubber gloves
- Voltage class
- Pre-use inspection
- Air test
- Expiry date
- Leather covers

Flame Resistant clothing
- Correct fit
- Repair
- Cleaning

S0261.18.4 Demonstrate pruning woody plants in proximity to energized electrical apparatus.

Considering required pruning operations.
- Clearance cycles
- Cycle length
- Voltage
- Proximity
- Customer consideration
- Species characteristics
- Tree condition
- Skirts
- Overhang

Identify pruning cut location on tree
- Collar
- Branch bark ridge

Pruning cuts
- Drop cut
- Hinge cut
- Snap/bypass cut
- Jump cut
- Stub cut
- Thinning cuts
- Heading cuts

Pruning methods
- Crown thinning
- Side pruning
- Dead wooding
- Crown cleaning
- Crown raising
- Crown reduction
- Pollarding
- Crown restoration
- Overhang pruning
- Directional pruning

Raise/lower limbs using ropes only no mechanical advantage
- Cut limbs so they will not span conductors
- Control limbs using hinge cuts
- Use of ropes and knots
- Lower cut limbs using friction devices, wraps around tree
- Top tree using ropes and rigging equipment
- Creating false crotch for rigging
- Use of ropes and knots
- Control of cut sections
- Control cut sections without rigging systems
- Free falling to ground
- Manual manipulation e.g. hinging, cut and throwing limbs
- Assess weight and controllability of limb
- Species consideration, breakage, weight
- Environmental conditions
- Use appropriate knots
- Inspect worksite
- Hangers removed
- Rigging equipment removed
- Chainsaw use aloft
- Secured to climber

- Start in branch union, chain brake on
- Climber secured with secondary fall protection system e.g. - work positioning lanyard
- Smooth controlled cuts
- Chainsaw shut off between climber's movements

S0261.18.5 Demonstrate removing woody plants in proximity to energized electrical apparatus.

Review Unit: S0247.2.4

Identifying tree to be removed
Determine removal method
Factors affecting removal method

- Crown condition
- Stem condition
- Root condition
- Lean
- Living/dead
- Central leader/multi-stemmed
- Structural defects
- Site conditions
- Job requirements
- Potential hazards
- Conductor location
- Lodged trees

Felling Zone preparation

- Tree condition – dead, living, diseased
- Property considerations
- Personnel location
- Traffic control
- Potential targets and hazards removed

Danger Zone preparation

- Escape route developed
- Personnel out of Zones
- Property considerations
- Height of tree
- Use ropes and knots as required
- Felling cuts
- Conventional notch
- Humboldt notch and back cut
- Boring and back cut
- "V" notch and back cuts
- Side notching
- Modifying the hinge to adjust direction of fall

Felling Trees in proximity to energized apparatus
- Conductor location
- Pole hardware e.g. guys, primary conductors, service conductors
- Use of guide rope
- Perpendicular felling
- Skirt hazards
- Parallel felling

Felling assist devices
- Tackle blocks
- Mechanical assists

Sectional removals
- Directional free fall away from energized conductor
- Conventional drop rigging
- Rigging using lowering devices

Removal of trees that have fallen during storm conditions
- Electrical hazards (isolated and de-energized)
- Energy forces (conductor, tree)
- Surrounding hazards
- Mechanical means of removal
- Removal methods from ground
- Removal methods from aerial lift

Inspect worksite
- Hangers removed
- Rigging equipment removed

S0261.18.6 Demonstrate the selection, use of, and inspection of hand tools and tree maintenance equipment according to manufacturer's recommendations.

Review Unit: S0247. 2.4

Mechanical tools and equipment
- Hydraulic tools
- Pruner
- Saw
- Circular saw
- Chainsaw

S0261.18.7 Demonstrate various methods of ascending and descending trees to access required work position.

Review Unit: S0247.2.8

Techniques used to ascend/descend trees
- Use of ladder
- Use of spurs
- Belay technique
- Secured body thrust on belay
- Secured body thrust with climbing hitch
- Secured footlock
- Split tail

S0261.18.8 Demonstrate controlling underbrush in proximity to transmission and distribution voltage conductors.

Prepare underbrush felling area
- Establish escape route
- Limits of approach (distance from conductors)
- Eliminate/control hazards
- Identify felling area

Fell underbrush using predetermined methods
- Directional felling techniques using clearing saw and chainsaw

Site clean-up
- Handle/dispose of underbrush debris
- Piling brush for chipping
- Lifting/carrying brush
- Loading brush on vehicle/trailer
- Chipping brush
- Disposal/recycling
- Reduce stump height
- Apply herbicide techniques
- Simulate stump application using water
- Simulate brush application using water

Use clearing saw on worksite
Determine clearing saw selection
Job size
Size of wood to be cut
Power to weight ratio

Pre-operational inspection/maintenance
- Chassis
- Anti-vibration mounts
- Blade
- Provisions for repair
- Fluid levels
- Throttle lock-out
- Engine operation

Operation
Starting/stopping clearing saw
- On ground
- On operator

Secure/prepare work area
Working position
Ongoing inspection and maintenance
Refueling/lubricants
Blade sharpening/replacement
Use of chainsaw

Evaluation Methods:
On-going practical/performance testing, supplemental and written testing, as appropriate

Number: S0262

Title: **Utility Arborist Practices II – Aerial Device**

Duration: 24 Total Hours

Theory: 0 hours Practical: 24 hours

Prerequisite: Arborist Practices I

Cross-reference to training standard: U6040.12, U6041.04, .07, U6042.06, U6043.04, .06, .10, U6044.06, .07, U6046.01 - .05, .07 - .11, .16, U6047.07, .08, U6048.01 - .14, U6050.01 - .09

General Learning Objective:

Demonstrate a thorough working knowledge of aerial devices used in utility arboriculture practices.

Learning Outcomes and contents:

S0262.19.1 Demonstrate the preparation of an aerial device.
Preparation as per manufacturers' instructions
Pre-operational checks

- PTO check
- Aerial device circle check
- Bucket inspection
- Dielectric test certificate
- Electrical integrity of boom
- Holding valve check
- Safety interlock check
- Control valves checks
- Hydraulic system check
- Leaks
- Loose fittings
- Hydraulic oil level
- Breather cap
- Fall protection systems inspection
- Bucket escape equipment check
- Bucket rescue equipment check
- Outriggers and pads inspection
- Wheel chocks

Aerial device set up

- Traffic control devices
- Vehicular
- Pedestrian
- Traffic control person
- Vehicle warning lights
- Site selection
- Surface slope/terrain
- Overhead obstructions
- Removal/stowing of covers
- Stabilizing vehicle
- Axle lockouts
- Vehicle parking brake
- Wheel chocks
- Setting outriggers and pads
- Engaging PTO
- Rescue ropes
- Equipment holders (e.g. chainsaw scabbards)
- Connect hydraulic tools

Select and use personal protection equipment

- Foot protection
- Eye protection
- Hand protection
- Head protection

Fall protection systems

- Full body harness, adjust and fit
- Shock-absorbing lanyard, inspect for wear
- Attach fall protection system to anchor point

S0262.19.2 Demonstrate aerial device escape and rescue procedures.

Source of problem
- Investigation/diagnosis of cause
- Control/correction/alleviation
- Condition of operator
- Calling for assistance/EMS

Escape from a disabled aerial device
- Operator functional
- Proximity of energized conductors
- Use of emergency pump
- Use of lower controls
- Transfer from a disabled aerial device into a tree
- Use of lifeline and controlled descent device

Rescue of a disabled operator
- Lower control use
- Positioning bucket to flat surface
- Tipping bucket
- Using a rescue rig
- Removing disabled worker
- Emergency first aid as required

S0262.19.3 Demonstrate aerial device preventative maintenance.

Manufacturer’s instructions
Lubrication
Cleaning
Legislative requirements

S0262.19.4 Demonstrate the use of an aerial device in utility arboricultural.

Loading tools, equipment and materials into bucket

- Job requirements
- Manufacturers' instructions
- Hydraulic tool attachment
- Emergency equipment
- Coordination with ground crew

Aerial device operation

- Manufacturer's instructions
- Mounting/dismounting bucket using 3 points of contact
- Ground person responsibilities
- Engaging PTO
- Upper/lower controls
- Raise bucket
- Rotate boom
- Lower bucket
- Work positioning
- Limits of Approach maintained
- Transfer between bucket and tree
- Fall protection system attached
- Monitor aerial device condition
- Emergency hydraulic shut-off
- Hydraulic failure procedures
- Engine failure procedures

Aerial device movement with operator in bucket

- Short distances
- Speed and direction of movement
- Operator & bucket security
- Boom positioning
- Surface conditions
- Disengaged PTO

Aerial device transport

- Manufacturer's instructions
- Legislative requirements
- Securing aerial device for transport
- Stowing and securing boom
- Retracting outriggers
- Disengage PTO
- Debris removal

S0262.19.5 Demonstrate pruning and removing trees with aerial device in proximity to energized electrical apparatus.

Inspect, adjust and wear fall protection equipment according to manufacturer's recommendations
Load tools, equipment and materials into bucket
Access aerial device bucket and secure fall protection system according to manufacturer's instructions
Operate aerial device controls while accessing desired work location

- Monitoring limits of approach
- Monitoring boom position, over roadways, near adjacent trees, poles, electrical conductors
- Position bucket in optimum positions to reduce body strains while performing work

Operate tools aloft according to pre-determined methods while working from bucket
Hand Tools

- Handsaw
- Fiberglass Reinforced Plastic (FRP) Pole pruner
- Fiberglass Reinforced Plastic (FRP) Pole saw
- Rigging ropes
- Slings
- Whoopie
- Nylon web
- Rope

Friction savers / cambium savers
Connectors

- Carabiners
- Clevis

Rigging Blocks

- Synthetic rope
- Tackle blocks
- Multi-sheave block

Gas Powered Tools

- Chainsaw

Hydraulic Tools

- Pruner
- Saw
- Chainsaw
- Circular saw

Sectional removals from aerial device

- Conductor location
- Directional free fall away from energized conductor
- Conventional rigging, guide ropes, pull ropes
- Rigging using lowering devices

Control movement of cut limbs and trunk sections from aerial device

- Conductor location
- Raise/lower limbs using ropes and mechanical advantage
- Cut limbs so they will not span conductors
- Control limbs using hinge cuts
- Lower cut limbs using friction devices
- Top tree using ropes and rigging equipment
- Creating false crotch

Secure aerial device for travel according to manufacturer's instructions

Evaluation Methods:
On going written testing and practical evaluation

Number: S0263

Title: **Utility Arborist Equipment II – Brush Chippers and Aerial Devices**

Duration: 12 Total Hours

Theory: 6 hours Practical: 6 hours

Prerequisite: Arborist Equipment I

Cross-reference to training standard: U6040.12, U6041.04, .07, U6042.06, U6043.04, .06, .10, U6044.06, .07, U6046.01 - .05, .07 - .11, .16, U6047.07, .08, U6048.01 - .14, U6050.01 - .09

General Learning Objective:

Demonstrate a thorough working knowledge of brush chippers and aerial devices used in utility arboricultural practices.

Learning Outcomes and contents:

S0263.20.1 Perform basic chipper maintenance.

Review Units: S0250.5.5 to 5.8

- Inspect as per manufacturers instructions
- Inspect guards
- Check fluids
- Check directional control arm if equipped
- Demonstrate how to change blades
- Demonstrate how to cycle blade bolts
- Demonstrate how to rotate anvil

S0263.20.2 Describe preparation for using aerial device

Types of aerial devices
Legislated requirements
Manufacturers' instructions
Pre-operational checks
- PTO check
- Aerial device circle check
- Bucket inspection
- Dielectric test certificate
- Electrical integrity of boom
- Holding valve check
- Safety interlock check
- Control valves checks
- Hydraulic system check
- Leaks
- Loose fittings
- Hydraulic oil level
- Breather cap
- Fall protection systems check
- Bucket escape equipment check
- Bucket rescue equipment check
- Outriggers and pads inspection
- Wheel chocks

Aerial device set up
- Traffic control devices
- Vehicular
- Pedestrian
- Traffic control person
- Vehicle warning lights
- Site selection
- Surface slope /terrain
- Overhead obstructions
- Removal/stowing of covers
- Stabilizing vehicle
- Axle lockouts
- Vehicle parking brake
- Wheel chocks
- Setting outriggers and pads
- Engaging PTO
- Rescue ropes
- Equipment holders (e.g. chainsaw scabbards)
- Connect hydraulic tools

Personal protection equipment

- Foot protection
- Eye protection
- Hand protection
- Head protection

Fall protection systems

- Full body harness
- Shock-absorbing lanyard

S0263.20.3 Describe the use of aerial device for utility arboricultural operations.

Loading tools, equipment and materials into bucket

- Job requirements
- Manufacturers' instructions
- Legislated requirements
- Hydraulic tool attachment
- Emergency equipment
- Coordination with ground crew
- Aerial device operation
- Manufacturer's instructions
- Legislative requirements
- Mounting/dismounting bucket using 3 points of contact
- Ground person responsibilities
- Engaging PTO
- Upper/lower controls
- Raise bucket
- Rotate boom
- Lower bucket
- Work positioning
- Limits of Approach maintained
- Tree pruning from bucket
- Tree sectional removal from bucket
- Tree maintenance from bucket
- Transferring between bucket and tree
- Fall arrest system
- Monitoring aerial device condition
- Emergency hydraulic shut-off
- Hydraulic failure
- Engine failure
- Aerial device movement with operator in bucket
- Short distances
- Speed and direction of movement

- Operator & bucket security
- Boom positioning
- Surface conditions
- Disengaged PTO

Aerial device transport

- Manufacturer's instructions
- Legislative requirements
- Securing aerial device for transport
- Stowing and securing boom
- Retracting outriggers
- Disengage PTO
- Debris removal

S0263.20.4 Describe aerial device escape and rescue procedures.

Source of problem

- Investigation/diagnosis of cause
- Control/correction/alleviation
- Condition of operator
- Calling for assistance

Escape from a disabled aerial device

- Operator functional
- Proximity of energized conductors
- Use of emergency pump
- Use of lower controls
- Transferring from a disable aerial device into a second aerial device

Transferring from a disabled aerial device into a tree
Use of lifeline and controlled descent device/technique
Rescue of a disabled operator

- Lower control use
- Positioning bucket to flat surface
- Tipping bucket
- Using a rescue rig
- Removing disabled worker
- Emergency medical procedure

S0263.20.5 Describe aerial device preventative maintenance.

- Manufacturer's instructions
- Lubrication
- Cleaning
- Legislative requirements
- Electrical theory testing of aerial device
- Preconditioning

- Maximum voltage levels
- AC / DC voltages used for testing
- Interval testing
- CSA / ASTM standards

S0263.20.6 Describe hydraulic theory and basic hydraulic system components.

Hydraulic Theory
Definitions
Force
Pressure
Pascal's Law
Law of Conservation of Energy
Liquid as a Force multiplier
Atmospheric pressure
Energy in an Hydraulic System
Hydraulic Safety and Inspection
Hydraulic Components

- Hydraulic pump
- Hydraulic oil filter
- Oil reservoir
- Lower control pressure relief valve
- Selector valves
- Outrigger control valves
- Emergency by-pass valve
- Upper arm drive cylinders
- Holding valves
- Directional control valves
- Fluid site glass indicator
- Emergency lowering devices
- Actuators
- Pressure gauges
- Hydraulic motors

S0263.20.7 Identify Basic Hydraulic components

- Hydraulic Components
- Hydraulic pump
- Hydraulic oil filter
- Oil reservoir
- Lower control pressure relief valve
- Selector valves
- Outrigger control valves
- Emergency by-pass valve
- Upper arm drive cylinders

- Holding valves
- Directional control valves

Fluid site glass indicator
Emergency lowering devices

- Actuators
- Pressure gauges
- Hydraulic motors

Number: S0264

Title: **Utility Arboricultural Sciences II**

Duration: 15 Total Hours

Theory: 9 hours Practical: 6 hours

Prerequisite: Arboricultural Sciences I

Cross-reference to training standard: U6041.02, .03, U6044.01, .02, U6045.07 - .09, U6047.10, U6051.05, .08, .18

General Learning Objective:

Demonstrate a knowledge of how to identify various woody plants, growth factors of woody plants, compartmentalization of woody plants, diseases and disorders of trees that could be harmful to the integrity of the electrical system, evaluate the condition of anchor points in trees used for fall protection, evaluation of work operations within environmentally sensitive areas.

Learning Outcomes and contents:

S0264.21.1 Identify the impact and mode of action of systemic and contact herbicides on woody and herbaceous plants.

Determination of best control methods
- Environmental factors
- Efficacy
- Application restrictions
- Pesticide label
- Specificity

Describe application techniques
- Stem Foliar
- Broadcast Foliar
- Basal Bark
- Cut stump

Describe off target impacts e.g. Agriculture crops

S0264.21.2 Describe the impact of work operations on environmentally sensitive locations.

- Herbicide application
- Soil erosion/compaction

- Species at Risk
- Slope/aspect
- Water
- ANSI sites

S0264.21.3 Identify appropriate pruning methods according to tree health and cycle clearance.

Characteristics related to pruning technique used

- Species cycle clearances
- Growth characteristics
- Shape tree for aesthetics
- Disease prevention
- Branch Collar
- Branch bark ridge
- Branch protection zone
- Shoot invigoration
- Sucker growth
- Coppice growth
- Epicormic branching/ watersprout production
- Lateral prunes

S0264.21.4 Identify diseases, disorders, wounds and defects of woody plants

Diseases

- Pathogens that cause disease - fungus, bacteria, virus
- Disease cycle
- Pathogen requirements
- Host environments
- Environmental condition requirements

Structural defects of woody plants

- Included bark
- Splits/cracks

Leaf diseases

- Deciduous
- Coniferous
- Signs and symptoms
- Potential damage caused

Branch and stem diseases –e.g. Cytospora canker, Hypoxylon Canker

- Signs and symptoms
- Potential damage caused

Root diseases -e.g. Armilleria root rot

- Signs and symptoms
- Potential damage caused

Vascular diseases -e.g. Dutch elm disease

- Signs and symptoms
- Potential damage caused

Disorders

Biotic Disorder

- Wood boring insects – Heartwood borer, Locust borer
- Shoot borer – Bronze Birch Borer
- Stem borer - Asian Long Horn Beetle,
- Emerald Ash Borer, - -
- Dutch Elm

Diseases

Cankers, Basidiocarps, Galls (14 examples)

- Cytosopora Canker
- Hypoxylon Canker
- Armilleria Root Rot
- Butternut Dieback
- Yellow Birch Canker
- Ash Die Back
- Black Knot Of Cherry
- Eutypella Canker
- Necteria Canker
- Annosum Root and Butt Rot
- Pine Gall Rust
- White Pine Blister Rust
- Wet Wood
- Slime Flux

Abiotic Disorder

- Carpenter ants
- Evidence of frass
- Animal damage
- Porcupin
- Beaver
- Sap sucker damage
- Wood pecker damage

Human damage

- Soil compaction
- Change of grade
- Over watering
- Under watering
- Contact with equipment
- Off-target pesticide damage
- Improper pruning

Environmental

- Lightening strikes
- Nutrient deficiencies

- Frost cracks
- Included bark
- Temperature extremes, sun scald
- Pollution (air, soil, salt) 2.4.6 Identify the physical condition and soundness of interim and final anchor points based on tree size, condition and species.

S0264.21.5 Identify the physical condition and soundness of interim and final anchor points based on tree size, condition and species.

Select anchor points
Interim anchor point

- Type of load applied
- Loading from stem of tree
- Other loads on the limb (foliage, snow, torque, etc.)
- Tree species
- Cross sectional area of limb
- Condition of wood
- Angle of branch attachment
- Size of branch relative to stem
- Characteristics of branch union
- Season/ambient temperature

Final anchor point

- Type of load applied
- Loading from stem of tree
- Other loads on the limb (foliage, snow, torque, etc.)
- Tree species
- Cross sectional area of limb
- Condition of wood
- Angle of branch attachment
- Size of branch relative to stem
- Characteristics of branch union
- Season/ambient temperature

Number: S0265

Title: **Utility Arborist Hand Tools II**

Duration: 6 Total Hours

Theory: 0 hours Practical: 6 hours

Prerequisite: Arborist Hand Tools I

Cross-reference to training standard: U6040.13, U6042.06, U6043.04, .06, .11, U6044.03, .07, U6045.15, .17, U6046.11, .14, .15, U6047.03, .04, .06, .09, U6049.01 - .10

General Learning Objective:

Demonstrate knowledge of how to select, adjust, maintain and store, tools and equipment commonly used in the Utility Arboricultural trade.

Learning Outcomes and contents:

S0265.22.1 Select, inspect, adjust, maintain, set-up, and store live line tools according to manufacturers' recommendations.

Considering required pruning operations.

- Clearance cycles
- Cycle length
- Voltage
- Proximity
- Customer consideration
- Species characteristics
- Tree condition
- Skirts
- Overhang

Live Line Tools

- Fiberglass Reinforced Plastic Pole pruner
- Fiberglass Reinforced Plastic Pole saw

Select appropriate tool

- Pruning methods
- Voltage level
- Diameter of limb
- Work to be completed

Inspect

- Defects

- Test sticker (legible and current)
- Loose components
- Leaks
- Maintain Sharpen blade
- Lubrication
- Spot clean
- Daily clean
- Wipe with drying agent

Storage

- Store in appropriate location

S0265.22.2 Select, inspect, adjust, maintain, set-up, and store live line tools according to manufacturers' recommendations.

Live Line Tools

- Telescopic measuring stick
- Hydraulic pruner
- Hydraulic pole saw
- Hydraulic circular saw
- Hydraulic chainsaw

Electrical testing of live line tools

- CSA standard ASTM standard
- Preconditioning requirements
- AC / DC voltage
- Procedural testing
- Theory

Select appropriate tool

- Pruning methods
- Voltage level
- Diameter of limb
- Work to be completed

Inspect

- Defects
- Test sticker (legible and current)
- Loose components
- Leaks

Maintain

- Adjust stroke
- Sharpen blade
- Lubrication
- Spot clean
- Daily clean
- Wipe with drying agent

Storage

- Store in appropriate location

Evaluation Methods:
On going written and practical evaluation

Number: S0266

Title: **Utility Arborist Tree Identification II**

Duration: 33 Total Hours

Theory: 33 hours Practical: 0 hours

Prerequisite: Arborist Tree Identification I

Cross-reference to training standard: U6042.03, U6043.01, U6044.01, U6047.01, U6051.12

General Learning Objective:

Demonstrate a thorough working knowledge of tree genera, species and cultivars by identifying 45 plants commonly found in Ontario.

Learning Outcomes and contents:

S0266.23.1 Identify 45 common woody plants in all seasons according to species and morphological characteristics using the International System of Plant Nomenclature.

Review Unit: S0252.7.1 (Common core)

DECIDUOUS – ALTERNATE ARRANGEMENT			
	Common Name	Botanical Name	Family
1	Japanese Angelica Tree	*Aralia elata*	Areliaceae
2	Staghorn Sumac	*Rhus typhina*	Amacardiaceae
3	European Alder	*Alnus glutinosa*	Betulaceae
4	Yellow Birch	*Betula alleghaniensis*	Betulaceae
5	River birch	*Betula nigra*	Betulaceae
6	White Birch	*Betula papyrifera*	Betulaceae
7	European White Birch	*Betula pendula*	Betulaceae
8	Hornbeam, Blue Beech	*Carpinus caroliniana*	Betulaceae
9	Turkish Hazel	*Corylus colurna*	Betulaceae
10	Hophornbeam, Ironwood	*Ostrya virginiana*	Betulaceae
11	Honey Locust	*Gleditsia triacanthos*	Caesalpiniaceae
12	Kentucky Coffee Tree	*Gymnocladus dioicus*	Caesalpiniaceae
13	Pagoda Dogwood	*Cornus alternifolia*	Cornaceae
14	Russian Olive	*Elaeagnus angustifolia*	Elaeagnaceae
15	Black Locust	*Robinia pseudoacacia*	Fabaceae

16	Ginkgo, Maidenhair Tree	*Ginkgo biloba*	Ginkgoaceae
17	American Sweetgum	*Liquidamber styraciflua*	Hammamelidaceae
18	Eastern Redbud	*Cercis canadensis*	Leguminoceae
19	Tuliptree, Yellow Poplar	*Liriodendron tulipifera*	Magnoliaceae
20	White Mulberry	*Morus alba*	Moraceae
21	Red Mulberry	*Morus rubra*	Moraceae
22	London Plane Tree	*Platanus X acerifolia*	Platanaceae
23	Sycamore	*Plantanus occidentalis*	Platanaceae
24	European Buckthorn	*Rhamnus cathartica*	Rhamnaceae
25	Downy Serviceberry	*Amelanchier arborea*	Rosaceae
26	Hawthorn	*Crataegus sp.*	Rosaceae
27	Apple, crabapple	*Malus sp.*	Rosaceae
28	Pin Cherry	*Prunus pensylvanica*	Roseceae
29	Black Cherry	*Prunus serotina*	Rosaceae
30	Choke Cherry	*Prunus virginiana*	Rosaceae
31	Pyrus calleryana 'Chanticleer'	*Chanticleer pear*	Rosaceae
32	American Mountain Ash	*Sorbus americana*	Rosaceae
33	European Mountain Ash	*Sorbus aucuparia*	Rosaceae
34	White Poplar	*Populus alba*	Salicaceae
35	Balsam Poplar	*Populus balsamifera*	Salicaceae
36	Carolina Poplar	*Populus x canadensis*	Salicaceae
37	Largetooth Aspen	*Populus grandidentata*	
38	Lombardy Poplar	*Populus nigra "Italica"*	Salicaceae
39	Trembling Aspen	*Populus tremuloides*	Salicaceae
40	Weeping Willow	*Salix alba 'Tristis'*	Salicaceae
41	Crack Willow	*Salix fragilis*	Salicaceae
42	Black Willow	*Salix nigra*	Salicaceae
43	Tree of Heaven	*Ailanthus altissima*	Simaroubaceae
44	American Basswood	*Tilia americana*	Tiliaceae
44	Littleleaf Linden	*Tilia cordata*	Tiliaceae
45	Common Hackberry	*Celtis occidentalis*	Ulmaceae
46	American Elm	*Ulmus americana*	Ulmaceae
47	Scots Elm	*Ulmus glabra*	Ulmaceae
48	English Elm	*Ulmus procera*	Ulmaceae
49	Siberian Elm	*Ulmus pumila*	Ulmaceae
50	Slippery Elm	*Ulmus rubra*	Ulmaceae

NOTE: The following lists are for utility arborists only

COMPATIBLE PLANTS

	Common Name	Botanical Name	Family
1	Speckled Alder	*Alnus rugosa*	Betulaceae
2	Dogwood	*Cornus spp*	Cornaceae
3	Beaked Hazel	*Corylus cornuta*	Betulaceae
4	Leatherwood	*Dirca palustris*	Thymelaeaceae
5	Witch-Hazel	*Hamamelis virginiana*	Hamamelidaceae
6	Canada Plum	*Prunus nigra*	Rosaceae
7	Gooseberries & Currents	*Ribes spp*	Saxifragaceae
8	Black Elderberry	*Sambucus canadensis*	Caprifoliaceae
9	Red Elderberry	*Sambucus pubens*	Caprifoliaceae
10	Maple-leaved Viburnum	*Viburnum acerifolium*	Caprifoliaceae
11	Hobble Bush	*Viburnum alnifolium*	Caprifoliaceae
12	Nannyberry	*Viburnum lentago*	Caprifoliaceae
13	High Bush Cranberry	*Viburnum trilobum*	Caprifoliaceae

POISONOUS PLANTS

	Common Name	*Botanical Name*	Family
1.	Poison Parsley	*Carum petroselinum*	
2.	Poison Oak		
3.	Poison Ivy	*Toxicodeudron radicans*	
4.	Poison Sumac	*Toxicodeudron vernix*	

Evaluation Methods:
Weekly identification testing and sample collection.

Number: S0267

Unit title: **Utility Arborist Transmission Line Clearing II**

Duration: 12 Total Hours

Theory: 6 hours Practical: 6 hours

Prerequisite: N A

Cross-reference to training standard: U6040.14, U6041.05, .06, U6042.09, U6051.01 - .19

General Learning Objective:

Describe and demonstrate how to manage vegetation along transmission voltage corridors and rights of way.

Learning Outcomes and contents:

S0267.24.1 Identify Transmission Right of Way properties from drawings, maps specifications and system diagrams

- Identify system information including voltages, structures, and feeders, using maps, drawings and specifications.
- Identify right of way location using maps, drawings, specifications and system diagrams.

S0267.24.2 Demonstrate capabilities for communicating with other work groups, controlling authority and emergency contacts.

- Identify methods for communication, including cellular phones, mobile radios, and satellite phones.
- Establish requirement for notifying other work groups operating in the vicinity.
- Notify the controlling authority as required.
- Identify emergency contacts

S0267.24.3 Demonstrate ability to perform a condition patrol, identify and maintain Right of Way access points, identify and acquire required external permits, and comply with environmental regulations.

- Perform a condition patrol
- Identify hazards to line integrity

- Document information from patrol
- Measure width of Right of Way and document alterations to Right of Way
- Visually inspect structures, hardware, bridges, water crossings, presence of soil erosion, screens and condition of access roads
- Identify Right of Way access points
- Assess and identify requirement for external permits.
- Describe process for acquiring external permits
- Describe methods for complying with environmental regulations

S0267.24.4 Demonstrate ability to plan work, including selection of required tools, emergency response plan and required content for daily tailboard conference.

- Plan work
- Determine tools and equipment required
- Describe limitations of equipment, including off road vehicles
- Create emergency plan
- Establish required content for daily tailboard conference

S0267.24.5 Assess vegetation for compatibility within Right of Way and measuring height of trees and conductors.

- Identify compatible vegetation within the Right of Way
- Measure height of trees and brush
- Use of tree measuring devices e.g. clinometer, laser range finders and measuring sticks
- Measure height of conductor
- Use of tree measuring devices e.g. clinometer, laser range finders

S0267.24.6 Prune and remove incompatible vegetation in proximity of electrical apparatus, including maintenance of screens and buffers.

- Demonstrate live line techniques for use in transmission line clearing
- Determine standing and falling clearances (at maximum sag position) of dead, danger and live trees, for transmission line voltages from profile maps and condition survey data.
- Perform maintenance of screens and buffers

S0267.24.7 Select appropriate vegetation control methods.

- Describe use parameters for herbicide application, cutting and grubbing in the following locations; stations, buildings, generation facilities and Right of Ways.
- Identify restrictions to work use to do potential for soil erosion, presence of incompatible species, slope/aspect and presence of water.

S0267.24.8 Demonstrate herbicide application techniques using Integrated Pest Management principles

- Demonstrate broadcast spraying techniques
- Demonstrate basal bark application techniques
- Demonstrate stump spray techniques
- Demonstrate stem foliar techniques
- Demonstrate soil sterilization techniques

Evaluation Methods:
On going written testing and practical evaluation