



JOB DEMANDS ANALYSIS

Company: City of Burnaby Parks

Location: Piper Nursery

Job Title: Labourer – Gardener/Nursery

Classification: Regular Duty

Purpose of Activities

The Gardener/Nursery Labourer is responsible for the general landscape maintenance duties required in the City of Burnaby Parks Department, Horticulture Section. These duties are seasonal in nature

Tools and Equipment

The Gardener and his crew will use the following tools and equipment to perform their duties:

- Ford one ton Super Duty Truck and dump box
- Hand tools – shovels, long and short handle scoop shovels, spades, fan rakes, rake, pruner, pick, axe, pitch fork, , sledge hammer, push broom, long bar, trowel, small planting tools, wheel barrow
- Power tools – lawn mower, weed eater, blower, reciprocator, hedge trimmers
- Rubber and leather gloves, long pants, hard hat, face shield or safety glasses, ear protection or foam ear plugs, reflective vest, steel toe boots
- First aid kit
- Traffic cones, traffic signs (lane closure, men and equipment working)

Usual Methods

Winter - Landscape Reconstruction/Installation, winter pruning, leaf removal and general clean up, plant annual trays, Snow Removal from City Hall

Spring - remove bulbs from beds, plant annuals, prepare soil and beds, sculpt beds and spring pruning

Summer – weed suppressant, chemical and manual, general maintenance and watering

Fall – change over flower beds, remove annuals, plant bulbs, perform soil adjustments and add amendments, reshape and sculpt beds

The crew will drive the one ton crew cab with all of their tools to the work site. They will set up traffic signs and cones, closing a lane if required, to notify motorists and the public of their presence in the area. The crew will then perform the activities required depending on the task and time of year. At the completion of the tasks or the end of the day, the crew will



clean any and all debris from the work site and then return all tools and equipment to the truck.

A Truck Driver drops off a dump box at the work site. This dump box may be empty and the crew will fill it with debris as they perform their duties or it may be full of material that the crew will spread at the work site. The dump box is equipped with a ramp for easy wheel barrow access and the top of the sides are approximately 50 centimetres from the ground so shoveling or lifting debris into the dump box is performed quite comfortably.

In the Nursery, the Labourer will assist the Horticulture Assistant with planting (winter task) annual seedlings that will be planted during the following spring and summer. This will involve lifting seedling trays to a push cart, pushing the cart to the planting area, using the “dibbler” to remove the seedlings from one tray and then transplanting them into another tray. The trays are then placed back on the pushcart and wheeled to the greenhouse where they are cared for until they are ready to plant outside. Planting and transplanting seedlings takes approximately two months each winter. The Labourer can choose to sit (unadjustable chair) or stand (rubber mat on concrete floor) during this task. In the greenhouse the seedlings are watered on a regular basis with a garden hose and sprayer.

Prior to planting the seedlings, the Labourer may be required to mix soil for the planting trays. A mixture of soil, sand, peat and fertilizer are turned by hand and the trays are filled and brought into the shop area where they are ready for transplanting.

The presence of ** indicates non-value added tasks. These are tasks that do not contribute to the stated purpose of the work.

Administrative Issues

The Labourer works from Monday to Friday 0700 to 1530 with a ten-minute rest period in the morning, a 30 minute lunch break and a ten minute rest period in the afternoon. The Labourer usually works in a crew that consists of a Lead Hand (supervisory position for crew) and depending on the time of year and/or workload another Labourer. There are typically four crews during peak season. The crews are responsible for 190 designated work site that range from 300 to 15,000 square feet. The crews plant and maintain 100,000 annual plants, 48,000 square feet of plant beds and 1.2 million square feet of shrub beds.

Activity Demand Variables

These variables are tasks that must be carried out by the employee and are implicitly or explicitly required as objectives of the job.

- Shovels use to turn plant and shrub beds at change of season
- Throw soil amendments with shovel to change the soil mix and composition
- Lift, carry, hold and operate hand and power tools (one to 15 kg)
- Lift, carry and throw or place debris from the ground to the back of the truck (one to one and a half metres high)
- Balance on a ladder or edge of a truck
- Lift, carry, place bags of peat, fertilizers or other soil amendments (floor to above shoulder)
- Kneel, crouch, bend, stoop to plant, prune and maintain plant and shrub beds
- Push and/or pull tools and equipment



- Two ten minute rest periods (one in the morning and one in the afternoon) and a 30 minute lunch break
- Work in all weather conditions including prolonged periods of rain or heat

Worker Decision Variables

These variables are the sub-routines and cognitive/physical decisions made by the worker in carrying out the objectives of the job.

- Ask for assistance from a second person during a heavy lift or sustained lifting tasks (unload trucks, etc.)
- Change positions frequently when performing repetitive tasks (sit, stand or perch when planting trays in nursery)

Accommodative Considerations

1. People with injuries to the spine, in any region, may have difficulty with the static and dynamic movements required of the Labouring position.
2. People with shoulder injuries such as rotator cuff tendonitis, bursitis and instability may have difficulty with dynamic and static loading and reaching activities required to perform the tasks and duties of the Labourer.
3. People with forearm and elbow injuries such as tennis elbow may have difficulty with the repeated jarring from hand tool use as well as the static grip forces required to hold the tool, implement or equipment.
4. People with nerve compression injuries in the upper extremities may have difficulty with the repeated and prolonged use of hand tools (compression).
5. People with injuries to the lower extremities will have difficulty with the dynamic position changes (walking, standing, bending, stooping, crouching and kneeling) required to function in this position.
6. Individuals who do not cope in open low-autonomy work environments would have difficulty with this position.
7. Advanced education in Horticulture and knowledge of power tool use is an asset in this position.

Prepared By: Jeffrey J. McGinn, Kinesiologist

February 10, 1999



Summary of Stresses

Metabolic Stresses

The aerobic energy systems will be the major source of energy requirement while performing the duties and responsibilities of the Labourer Gardener/Nursery. This energy system will be utilized during planting, pruning, lifting, carrying, hand and power tool use as well as snow removal. The anaerobic energy systems may be required to supply energy for brief intense periods of work, which may include heavy or sustained lifting or carrying; or towards the end of the day when the aerobic energy system has been depleted. In this last instance the anaerobic energy system becomes the primary energy source

Structural Stresses

Spine – the dynamic nature of this position will require concentric, static and eccentric muscle contractions of the cervical, thoracic and lumbar spine in flexion, extension, lateral flexion and rotation. Typically, these movements will be performed while the Labourer is handling a load (hand or power tools, plants, plant trays, shrubs, peat and fertilizer bags or debris, 1-27 kg). Therefore, significant loading of the spinal structures is likely in this position. Forward flexed or uncontrolled postures require no activity from the torso musculature, but increase asymmetrical disc compression and passive stretch on the posterior spinal ligaments and disc fibres. This can contribute to disc integrity problems as well as contributing to deconditioning of the torso support musculature. Lateral flexion and/or rotation with or without forward flexion (loaded or unloaded) will significantly increase the shear forces encountered by the discs, fibres and spinal ligaments.

Shoulders and Upper Extremity– will be taxed during the many dynamic and static movements required during hand and power tool use associated with planting, pruning, seasonal change over and general clean up. The static and dynamic movements through the shoulder and upper extremity often require the rotator cuff muscle groups, upper trapezius and scalene muscles of the neck to maintain a prolonged and significant load. Hand, air and power tool use (predominately dominant hand) will increase the static and dynamic loading of the forearm flexors, extensors, supinator, pronator teres and the pronator quadratus. Power and air tool use will also increase the vibration, jarring and compressive forces from the grip to the elbow and shoulder that may lead to over use tendon or nerve injuries.

Hips and Lower Extremities – will be taxed in the many dynamic movements associated with walking, standing, climbing, lifting and carrying on stable and unstable surfaces (grass, gravel, dirt, rock, concrete, asphalt, mud, ladders, truck boxes, etc.). These surfaces may be wet or dry. Slip and fall with a load are the greatest threat to the lower extremities.

INTERVENTIONS

Recommendations that could be implemented to increase productivity and lessen the risk of injury are listed below:

1. Encourage the Labourer to maintain an increased level of fitness away from work that will focus on cardiovascular endurance, muscular strength, muscular endurance and flexibility.



2. Provide knee pads for the Labourer when performing work in a kneeling position.
3. Provide anti-fatigue matting at the planting, transplanting bench so the Labourer is not standing on concrete all day.
4. Allow the Labourer frequent breaks from the same or similar tasks to decrease the rate of overall and specific muscle fatigue.
5. Allow the Labourer to modify the hand grip on tools and implements so that static grip forces can be minimized.
6. Ensure all cutting hand tools and equipment are sharp prior to use.
7. Provide movement education and body care instruction to teach the Labourer how to use effective body mechanics and reduce fatigue.
8. Encourage the Labourer to ask for help when unloading trucks at the nursery or handling heavy objects in the field.

Referral: Lana Ho		Organization: City of Burnaby						Title: Labourer - Gardner/Nursery		
Dept.: Engineering		Division: Parks - Horticulture						Contact:		
		FREQUENCY*						Date: February 5, 1999		
PHYSICAL DEMANDS		R E Q D	S I D E	Sel 1	Low 2	Mod 3	High 4	Max. Weight (kg)	Usual Weight (kg)	COMMENTS
S T R E N G T H	Lifting - Floor to Knuckle	X	D			X		23	<3	plants,shrubs,tool/ equip.,bag,baskets
	Lifting - Knuckle to Waist	X	D			X		36	<3	plants,shrubs,tool/ equip.,bag,baskets
	Lifting - Waist to Shoulder	X	D			X		36	<3	plants,shrubs,tool/ equip.,bag,baskets
	Lifting - Over Head	X	D		X			36	<3	truck box, hang baskets in greenhouse
	Carrying - With Handles	X	D			X		23	<3	some power tools
	Carrying - Without Handles	X	D			X		36	<3	tools, plants, shrubs, bags, baskets
	Pushing - Upper Extremity	X	D				X	27	<3	hand/power tools, pull bags from pile
	Pushing - Hip/Leg Assist	X	D			X		27	<3	wheel barrow, carts, lawn mower
	Pulling - Upper Extremity	X	D				X	27	<3	hand/power tools, pull bags from pile
	Pulling - Hip/Leg Assist	X	D			X		27	<3	wheel barrow, carts, lawn mower
	Reach - Shoulder or Above	X	D			X		36	<3	prune, carry tools/equip. hang baskets
	Reach - Sho. or Above extnd	X	D		X			36	<3	hang baskets, retrieve baskets
	Reach - Below Shoulder	X	D				X	36	<3	plant, prune, lift, carry tools/equipment
	Reach - Bel. Shoulder extnd	X	D			X		36	<3	lift/carry peat/fertilizer bags,tools, etc
Handling	X	D				X	36	<3	hand, power tools, plants, shrubs	
Gripping	X	D				X	36	<3	hand, power tools, plants, shrubs	
Fine Finger Movements	X	D				X	Max.	low	plant, prune and tool use	
E N R G	Aerobic (percent)	X					90			plant, prune, clear debris, hand and power tool use
	Anaerobic (percent)				10					possibly when fatigued or during heavy lift
	High Energy Expenditure				X					possibly when fatigued or during heavy lift
	Low Energy Expenditure	X					X			plant, prune, clear debris, hand and power tool use
P O S T U R E + M O B I L I T Y	Neck - Static Flexion	X					X			work below shlders to plant, prune, hand/power tool use
	Neck - Static Neutral	X					X			stand, walk, sit
	Neck - Static Extension	X			X					work above shoulders from bend/stoop, crouch, etc.
	Neck - Rotation	X	L/R				X			plant, prune, hand and power tool use
	Throwing	X			X					throw dirt, debris from shovel to truck box
	Sitting	X			X					in truck to/from work site, possibly when planting
	Standing	X					X			at work site, at nursery
	Walking	X					X			to/from truck, plant, prune, hand or power tools use
	Running/Jumping									
	Climbing - Arms and Legs	X		X						in/out of back of truck
	Climbing - Legs Only	X		X						hills in parks, to back of truck
	Bending/Stooping	X					X			plant, prune, lift and carry, hand and power tool use
	Crouching	X				X				planting, pruning, clean up
	Kneeling	X			X					planting, pruning, clean up
Crawling	X		X						planting, pruning	
T W Y G E N E R A L	Twisting	X					X			plant, prune, lift and carry, hand and power tool use
	Balancing	X			X					ladders, edge of truck
	Traveling	X			X					in city of Burnaby 20 to 50 km per day
	Work Alone									usually work in a crew of Gardner & 1-2 Labourers
N O T E	Interact with Public	X			X					in parks, boulevards, in traffic
	Operate Equip/Machinery	X				X				lawn mower, hedge trimmers, blower, weed eater, etc.
	Irregular/Extended Hours									8 hour shift, no OT, 2X10 min rest period, 30 min lunch

* Frequency Legend 1 = Seldom; Not Daily 2 = Low Daily Activity; < 1hr
3 = Moderate Demand; Repetition 1 - 3 hrs daily 4 = High Frequency Demand; Repetition > 3 hrs daily

The following shading denotes a HIGH RISK TASK: Modifications should be considered

REQD is marked with an X if the particular demand or category is relevant to the purpose of the job.

SIDE refers to the side or limb required to execute a task. If it is marked **E**, it indicates either side, the most common choice is listed first. **D** refers to dominant and **B** to both sides.

Referral:		Organization:						Title: see 1st page header	
Dept.:		Division:						Contact:	
PHYSICAL DEMANDS		R E Q D	S I D E	FREQUENCY*				COMMENTS	
				Sel. 1	Low 2	Mod. 3	High 4		
P E R C E P T I O N	Hearing - Conversations	X				X		crew, lead hand, public	
	Hearing - Other Sounds	X					X	traffic, equipment motors	
	Vision - Far	X					X	dig, plant, tool use, winter pruning, leaf removal	
	Vision - Near								
	Vision - Colour	X					X	plants, shrubs, ID disease, follow maps	
	Vision - Depth	X					X	planting, pruning, tool use, work near traffic	
	Perception - Spatial	X					X	plant, prune, lift, carry, tool use, work near traffic	
	Perception - Form	X					X	plant/shrub identification, gas/oil mixture for tools	
	Feeling (Tactile)	X					X	plant, prune tool use, spray plants and shrubs	
	Reading								
W O R K E N V I R O N M E N T	Writing								
	Speech	X				X		crew, lead hand, public	
	Inside Work	X					X	in shop, nursery depending on season and type of work	
	Outside Work	X					X	in parks, boulevards, shrub beds, etc.	
	Hot Conditions >25 deg. C	X		X				possibly in spring, summer or fall	
	Cold Conditions <10 deg.C	X		X				possibly in fall, winter or spring	
	Humid	X					X	in the green house area	
	Dust	X					X	pollens from plants and shrubs, dirt dust at beds	
	Vapor Fumes								
	Hazardous Machines	X					X	lawn mower, weed eater, blowers, hedge trimmers	
	Proximity to Moving Object	X					X	power tools parts, traffic	
	Noise	X					X	street noise, traffic, in nursery	
	Electrical Hazard								
	Sharp Tools	X					X	power and hand tools	
	Radiant/Thermal Energy	X					X	hot motors, sun	
	Slippery Conditions			X				water on nursery floor, rain, wet grass	
	Vibration and Related	X				X		power tool use, possibly digging with shovel & pick	
	Chemical Irritants	X		X				weed suppressant fatty acid spray, gas, oil	
	Organic Substances	X		X				feces in parks, discarded food items, etc.	
	Medical Waste	X		X				needles in parks	
	Blood Products	X		X				cuts, abrasions by crew through tool use	
	Congested Worksite	X		X				depends on area	
	Lighting - Direct	X					X	sun light, overhead fluorescent lights in shop	
	Lighting - Indirect	X					X	sunlight	
	Lighting - Adjustable								
	Lighting - Fluorescent	X					X	overhead lights in shop	
	Lighting - Incandescent								
	Lighting - Shadows etc.	X				X		depends on location	

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For detailed descriptions of each of the different categories, please refer to the reference guide or inquire with Human Effort at 1-888-4EFFORT