

BRADY ROAD RESOURCES MANAGEMENT FACILITY OPERATING PLAN

3.0 Existing Site Infrastructure

3.1 SITE DESCRIPTION AND PRIMARY SITE ACCESS

The facility is located on Brady Road, south of the Perimeter Highway, four kilometers west of Pembina Highway, Winnipeg, Manitoba. See Figure 1-1.

The layout of the site is shown on Figure 2-1.

3.1.1 Site Access

Access to the landfill is currently via Brady Road. Future roadway improvements will provide an improved access (e.g., from a lighted intersection).

New temporary roads are constructed as required to allow ongoing access to phased fill areas.

Site roads are maintained to allow all-weather access to various areas on the site.

Refer to Figure 2-1 for site access and on-site roads.

3.2 SCALE FACILITY

The scale house is a fully serviced and self-contained prefabricated building. The building is serviced with electrical power, LAN, phones, and radio, with electric heat and an indoor toilet. Bottled water is used for potable purposes.

Refer to Figure 3-1A for the location of the building and vehicle weigh scale.

3.2.1 Vehicle Weigh Scale

There are two inbound scales and one outbound scale all three scales are manufactured by Cardinal Scales and serviced by Protech they are a pit-less type with a certified 60 tonne gross vehicle weight rating capacity. Its physical dimensions are 27 m long by 3 m wide.

The scales are certified annually by Weights and Measures.

3.3 BUILDINGS

On-site buildings include the scalehouse, site office, equipment storage and maintenance buildings and compact shed site buildings are illustrated in Figures 3-1A and B.

3.3.1 Equipment Storage and Maintenance

The Equipment Storage and Maintenance buildings are as shown in Figure 3-1A.



EQUIPMENT STORAGE AND MAINTENANCE

BRADY RD

INBOUND SCALES

OUTBOUND SCALE
SCALE HOUSE

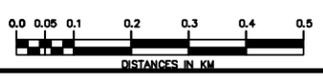
CHARETTE RD

EQUIPMENT STORAGE AND MAINTENANCE

BRADY ROAD SITE OFFICE

PARKING

THIS DRAWING CONTAINS A 2009 AERIAL PHOTO



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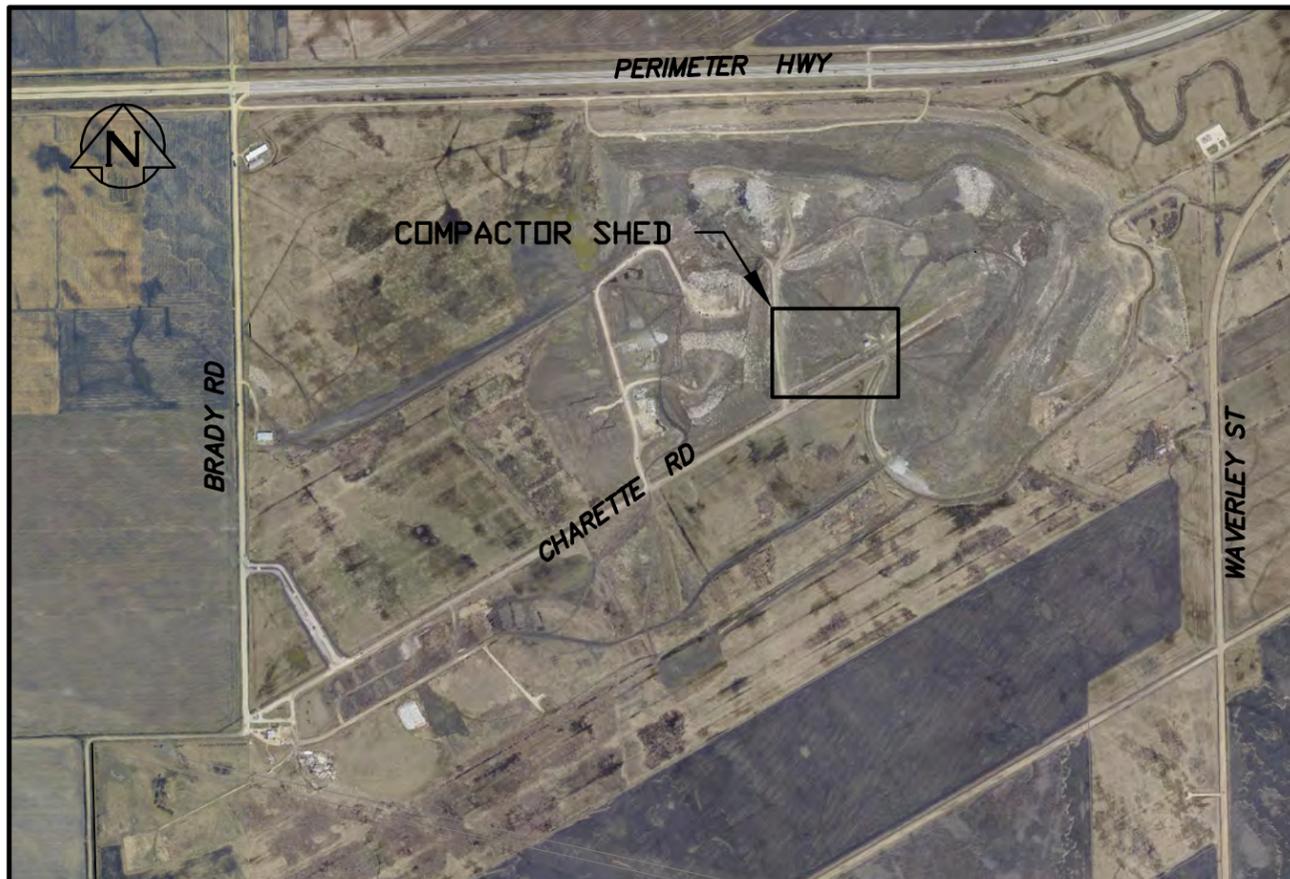
THE CITY OF WINNIPEG
Winnipeg
WATER AND WASTE DEPARTMENT

BRADY ROAD LANDFILL

EQUIPMENT AND STORAGE BUILDINGS

SHEET 1 OF 1

FIGURE 3-1 A



 THE CITY OF WINNIPEG WATER AND WASTE DEPARTMENT SOLID WASTE DIVISION	
BRADY ROAD LANDFILL	SHEET 1 OF 1
EQUIPMENT AND STORAGE BUILDINGS	FIGURE 3-1 B

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3.3.2 Brady Road Site Office

The Brady Road Site Office is as shown in Figure 3-1A. Facilities include computer server, files, accounting and site management offices.

3.4 COMMUNITY RESOURCE RECOVERY FACILITY

Details to be determined. The purpose of this facility is to provide a drop off for privately delivered small loads of recyclable material and/or waste.

3.5 PARKING AREAS

The main site visitor and staff parking area is located east of the office building.

Refer to Figure 3-1A for location of on-site parking.

3.6 FENCING, GATES AND SECURITY

Site security measures are designed to prevent unauthorized persons from entering the site, to protect the facility and its equipment from possible damage caused by trespassers, and to prevent disruption of facility operations caused by unauthorized site entry. Access to the facility is restricted by fences. The site entrances are secured by gates and are monitored by authorized personnel during site operating hours. Outside operating hours, the gates to the site are locked.

Entry to the active portion of the site is restricted to designated personnel, approved waste haulers, and properly identified persons whose entry is authorized by assigned Landfill staff. Visitors are allowed at the active area only when accompanied by the assigned Landfill staff or his/her representative.

3.7 SEGREGATED STORAGE AND RECYCLING AREAS

A storage area is available for recyclable bulk materials. See Section 7.5 for details.

3.8 ON-SITE SURFACE-WATER MANAGEMENT SYSTEMS

Surface drainage is designed to contain a 1:25 year storm event.

3.9 BUFFER AREAS, BERMS AND TREE SCREENING

Berms and tree planting is carried out to screen operations from adjacent developing lands.

BRADY ROAD RESOURCES MANAGEMENT FACILITY OPERATING PLAN

4.0 Operations – General

4.1 FACILITY ADMINISTRATION

The landfill is owned and operated by the City on City-owned land. Figure 4-1 identifies the organization structure and the respective responsibilities of the City's Water and Waste Department staff.

4.1.1 Manitoba Conservation

Manitoba Conservation is the regulatory authority responsible for approving current operations, environmental monitoring and future facility development and operations.

Its responsibilities include:

- Permitting
- Approvals
- Environmental-Compliance Monitoring
- Enforcement
- Facility Inspections
- Regulatory-Issues Management

The responsible party at Manitoba Conservation is:

Director of Environmental Approvals
Manitoba Conservation
160-123 Main Street
Winnipeg, MB R3C 1A5

4.1.2 Site Management

The Supervisor of Disposal is responsible for facility operations and is assisted by the Technologists/Foreman and staff. The Planning and Environmental Engineer is designated as the contact person for regulatory compliance matters. The Environmental Services Division is consulted in matters of acceptability in special wastes such as hydrocarbon-impacted soils. The Supervisor of Disposal develops policies for disposal operations and is responsible for assuring that adequate personnel and equipment are available to provide facility operation in accordance

Solid Waste Services Division

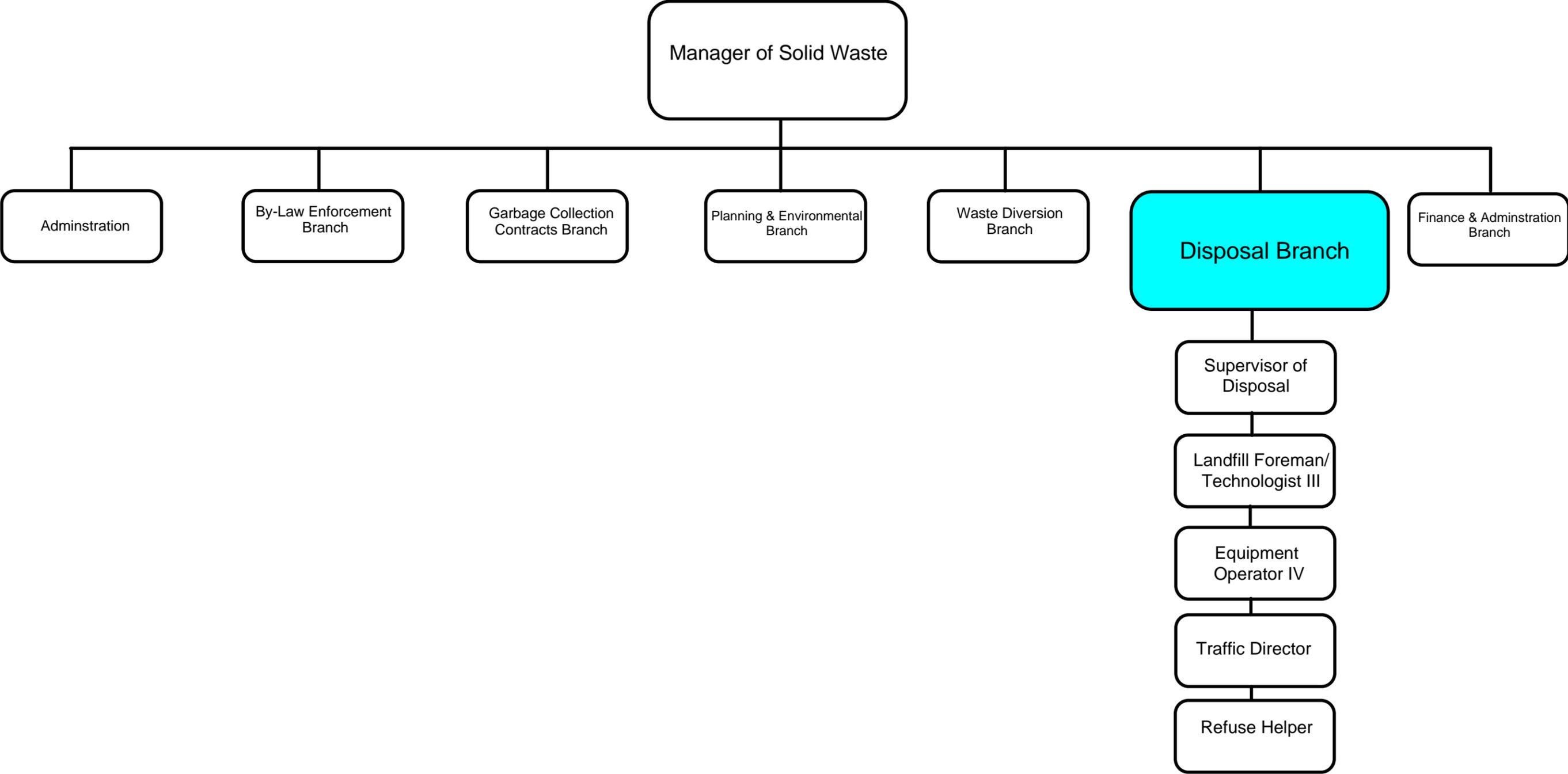


Figure 4-1 Organization Structure

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with the SOPs. Under the general direction of the Supervisor of Disposal, the Technologists and landfill Foreman are responsible for daily operations and administration of the SOPs.

4.1.3 Weighmaster / Administrative Staff

The duties of the Weighmaster stationed at the site entrance include: vehicle weighing in and out, waste screening, directing traffic, communicating with the Technologists and Foreman, and collecting tipping fees. A clerk will be responsible for the administrative tasks at the landfill including administration records, and personnel activities. All clerks report to the Finance and Administration Division for financial matters and receive direction from the Supervisor of Disposal regarding operations matters.

4.1.4 Equipment Operators

Equipment operators are responsible for the safe and effective operation of equipment. As the personnel most closely involved with the final disposal of the waste, these employees are responsible for being alert for noticing potentially dangerous conditions, or careless and improper actions on the part of employees and other persons while on the premises. Equipment operators will monitor and direct unloading vehicles, push and compact waste, and may handle minor maintenance, construction, litter abatement and general site cleanup. The equipment operators will intervene as necessary to prevent accidents and report unsafe conditions immediately to the Foreman.

4.1.5 Other Staff

Other site personnel such as technical staff, labourers, mechanics, or other staff may be employed from time to time in categories such as maintenance, construction, litter abatement, general site cleanup, and traffic control.

4.1.6 Waste Contractors

The City may contract waste contractors for on-site activities related to the facility or ancillary facilities. Specific activities might include:

- Battery collection
- Tire collection
- Scrap metal collection
- Propane tank collection
- Wood grinding and recycling
- Other recycling activities

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4.1.7 Construction Contractors

Construction of site facilities and landfill cells will be carried out by the City forces and/or qualified contractors. The responsibilities of construction contractors will be defined in contract agreements and may include:

- Site grading
- Cell construction
- Leachate collection system construction
- Leachate pumping and hauling
- Landfill gas system construction and operations
- Road construction
- Wood grinding
- Landscaping and drainage system construction
- Materials salvaging

4.1.8 Consultants

Design, construction inspection services and environmental investigations and monitoring will be carried out by the City forces and/or private consultants selected by the City. The responsibilities of consultants will be defined in contract agreements and may include:

- Engineering, Operations Plans and other design services
- Construction services and surveying
- Cost estimating
- Contract administration
- Geotechnical, stratigraphic, hydrogeological and groundwater-quality investigations
- Operations or environmental monitoring and reporting

Future landfill cells must be sited, developed and designed in accordance with appropriate guidance received from City staff, Manitoba Conservation regulators, or available from other

suitable/acceptable jurisdictions; e.g., Sections 3.1 and 3.2 of the “Standards and Guidelines for Landfills in Alberta,” and the Master Plan as it evolves.

4.2 REGULATIONS / BY-LAWS

The City staff and management shall be familiar with Manitoba Conservation's pertinent regulations, standards and guidelines. Any and all conditions and requirements of the current and future *Environment Act* licences granted for either general landfill operations or the specific operations of the landfill-gas recovery project must be adhered to by the City staff. Copies of the licences, relevant regulations, and other relevant prescriptions are located in the site office.

Pertinent provincial environmental regulations and guidelines will be updated as they are issued by Manitoba Conservation with the most recent references utilized. Regulations will be filed in the site office and an up-to-date copy provided to the Landfill Supervisor.

Provincial:

- *The Environment Act, c. E125*
 - *Classes of Development Regulation, Man. Reg. 164/88*
 - *Waste Disposal Grounds Regulation, Man. Reg. 150/91*
 - *Litter Regulation, Man. Reg. 92/88 R*
 - *Pesticides Regulation, Man. Reg. 94/88 R*
- *Dangerous Goods Handling and Transportation Act, c. D12*
 - *Special Waste (Shredder Residue) Regulation, Man. Reg. 113/2003*
- *The Ozone Depleting Substances Act, c. O80*
 - *Ozone Depleting Substances and Other Halocarbons Regulation, Man. Reg. 103/94*
- *The Water Protection Act, c. W65*
 - *Nutrient Management Regulation, Man. Reg. 62/2008*
- *The Public Health Act, c. P210*
 - *Collection and Disposal of Wastes Regulation, Man. Reg. 321/88 R*
 - *Protection of Water Sources Regulation, Man. Reg. 326/88 R*
- *Workplace Safety and Health Act, c. W210*
 - *Workplace Safety and Health Regulation, Man. Reg. 217/2006*
- *The Waste Reduction and Prevention Act, c. W40*

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- *Electrical and Electronic Equipment Stewardship Regulation, Man. Reg. 17/2010*
- *Household Hazardous Material and Prescribed Material Stewardship Regulation, Man. Reg. 16/2010*
- *Packaging and Printed Paper Stewardship Regulation, Man. Reg. 195/2008*
- *Tire Stewardship Regulation, 2006, Man. Reg. 222/2006*
- *Used Oil, Oil Filters and Containers Stewardship Regulation, Man. Reg. 86/97*

- *The Sustainable Development Act, c. S270*
 - *Sustainability Guidelines for Local Governments, School Divisions, Universities, Colleges and Regional Health Authorities Regulation, Man. Reg. 4/2004*

- *The City of Winnipeg Charter, c.39*

- *The Municipal Act, c. M225*

- *The Climate Change and Emissions Reduction Act, c.135*
 - *Prescribed Landfills Regulation, M.R. 180/2009*

Municipal:

- City of Winnipeg Solid Waste Bylaw No. 1340/76
- City of Winnipeg Bio-medical Waste Sharps Bylaw No. 6001/92
- City of Winnipeg Neighbourhood Liveability Bylaw No. 1/2008

Guidelines:

- Guidelines for the Storage of Scrap Tires in Manitoba, Manitoba Environment Guideline No. 94-04E
- Draft Manitoba Compost Facility Guidelines, June 2001
- Guidelines for the Management of Waste Materials Containing Polychlorinated Biphenyls (PCBs)
- Guidelines for the Siting of a Class 1 Waste Disposal Ground in Manitoba, Guideline No. 94-91E
- Solid Waste Management Facility Guidelines
- CCME Canadian Drinking Water Quality Guidelines

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- CCME Water Quality Guidelines

Policies:

- “OurWinnipeg” By-law No. 67/2010
 - Draft Sustainable Water and Waste Direction Strategy

4.3 HOURS OF OPERATION

The facility will have full-time site supervision by the operations staff during hours that the landfill is open (Table 4-1). During non-operating hours, the facility will be closed and the site office and entrance gate will be closed and locked.

Season	Opens	Closes
Summer (May to October)	5:30 a.m.	8:00 p.m.
Winter (November to April)	5:30 a.m.	6:00 p.m.

The site is closed November 11 (Remembrance Day), December 25 (Christmas Day) and January 1 (New Year’s Day).

4.3.1 Illegal Dumping

After hours, illegal dumping of wastes may periodically occur at the entrance gate or elsewhere in the vicinity of the landfill. Should illegal dumping occur, landfill staff will arrange for cleanup and seek to identify the responsible party. Any evidence obtained will be used for prosecution purposes.

4.3.2 Site Lighting

During shorter daylight hours in the winter, a lighting tower will be used to illuminate the tipping area to ensure good visibility and safe operations.

4.4 PUBLIC RELATIONS

Courteous, helpful attitudes of the City staff and professional appearance of the complete facility is required to assist in maintaining good public relations while adhering to the requirements necessary for a safe and successful landfill operation.

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Acceptance and support for site policies, rules, fees etc., will be achieved when the public understands the City's reasons. Knowledgeable staff that provide effective communication regarding these issues is important in gaining cooperation from clients and the public.

On-going efforts to advise clients and the public will be undertaken using pamphlets, signs and oral advice, to optimize operation of the site. Copies of any written information will be maintained on file at the Brady Road office. Selected information may be posted on the City's website.

Any requirements for disclosure of information to any citizens' or neighbours' group that may be mandated by the future *Environment Act* licence will be met to ensure the satisfaction of the Director of Environmental Approvals.

4.5 SIGNAGE

A prominent sign will be displayed and well maintained at the entrance to the site. This sign will state the name of the site, its purposes, hours and days of operation. The site sign shall also include a 24-hour emergency contact. Along with the standard identification sign, guidelines for waste acceptance and rules of conduct will be posted at the facility entrance.

The following information will be posted on signs at the facility entrance:

- Landfill Class (Class I Landfill)
- Waste Restrictions, including:
 - No hazardous waste
 - No liquid waste
 - No biomedical waste
 - No sewage
 - No hydrocarbon-contaminated soils
 - No spent containers for herbicides or insecticides

Additional signs at the facility will be posted as necessary to provide on-site information such as:

- Signs at gate/scale/site office to indicate:
 - Direction of traffic flow
 - Procedure at scale
 - Information regarding acceptable wastes
 - Speed limit

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- Safety requirements
- Hours of operation
- Current tipping fee schedule
- Signs after the scale to indicate:
 - Direction to tipping area
 - Direction to recycling area
 - Direction to other segregation areas (such as concrete or clean fill)
 - Unloading procedures
 - Information on additional materials to be separated, i.e., scrap tires, waste metal, etc.
 - Additional directional signs for traffic flow and unloading locations for various materials in the active landfill area

These signs will be changed or removed, and new signs installed, as information and processes change.

The signs will be of professional quality and will be cleaned on a regular basis as part of site-housekeeping duties.

In general, signs will provide site users with necessary information to safely dispose of acceptable materials in an orderly and efficient manner. Proper signage will minimize operational problems and reduce time requirements of staff in directing and informing the public and collecting and disposing of wastes unloaded at incorrect locations.

4.6 COMMUNICATIONS ON-SITE

Communications are an integral part of the overall operation of the facility. Adequate communications aid in waste placement, waste discrepancy observations, waste discrepancy resolutions and in dealing with emergency situations.

The scale house is equipped with a telephone and data line for outside communications. Facility staff will utilize a two-way radio system that allows direct communications between the equipment operator and other ground or equipment operators, as well as with other site staff.

The maintenance buildings are equipped with a telephone and data line for outside communications.

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4.7 SITE AND SCALEHOUSE SECURITY

The site is secured with a perimeter fence and lockable gates. The facility will be locked during non-operational hours. The scalehouse is equipped with a security system maintained by City Central Control.

All groundwater-monitoring wells will be capped and locked to prevent vandalism. Copies of keys for well-cap locks will be kept in a secured location in the site office.

4.8 SCAVENGING AT THE LANDFILL

Because scavengers could be seriously injured (or killed) while scavenging at the site, or when using or consuming scavenged materials, ***scavenging will not be allowed at the facility***. Such activities also interfere with operations.

The City of Winnipeg Solid Waste By-law prohibits scavenging at all waste processing or disposal facilities operated by the City of Winnipeg. The Supervisor of Disposal may, however, authorize the sampling of materials from wastes received at the facility for purposes of study, research, testing for inherent value and repurposing or processing, etc.

4.9 BURNING

Fires are a hazard to the business and lives of workers and clients, therefore, ***no open burning whatsoever will be allowed at the facility***.

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5.0 Safety and Emergency Response

5.1 HEALTH, SAFETY AND ENVIRONMENTAL POLICY

Applicable health and safety regulations must be followed. City staff are trained in the relevant Health, Safety, and Environmental regulations, and:

- Personnel shall be properly trained and equipped with appropriate personal protection equipment (PPE).
- Waste acceptance and disposal activities are supervised directly by facility staff.
- Facility staff attend regular safety meetings on a weekly basis.
- Facility staff undertake an orientation and training session before commencing work, and take part in in-house safety training courses.
- Incidents will be documented on an Incident Report.

5.2 SITE HEALTH AND SAFETY

Ongoing operations at the facility typically involve the movement of various mobile equipment (e.g., packer, excavator, dozer, rock truck, and grader), that operate in close proximity to both public and commercial vehicles delivering waste to the facility. This can present an elevated risk of accidents.

In addition, the nature of the materials can pose an elevated hazard to workers and clients. Job Hazard Analysis and Safe Work Procedures are appended in Appendix A.

5.2.1 Personal Protective Equipment

Personal Protective Equipment (PPE) at the landfill must include the following as required:

- Hard hat (CSA approved)
- Safety (High visibility) headwear
- Ear plugs
- Gloves
- Goggles
- Approved CSA safety vest

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- Work boots with steel shank and toe (CSA approved)
- Safety overalls

Common sense must prevail with regard to the use of PPE. PPE policies must be followed by landfill staff:

- Hard hats (CSA approved) must be worn around equipment
- Leather gloves must be worn when handling garbage
- Earplugs must be worn when operating or working near equipment
- CSA approved work boots must be worn on-site

5.2.2 Safety of Site Users and Facility Tours

Visitors and patrons of the facility will also abide by the PPE requirements. Tours of the facility will be pre-arranged and shall be conducted by the Site Manager or other designated employee. Tour participants shall be provided with PPE. Facility staff shall advise tour participants of the identified potential hazards.

Unauthorized scavenging by employees and other site users is strictly prohibited. It is a serious safety hazard and is viewed by the City as a serious lack of judgment.

Safety rules for site users include the following:

- No scavenging
- Only adults allowed to leave vehicle
- Children and pets must remain in the vehicle
- Waste must be unloaded at designated areas away from moving equipment
- Smoking is only permitted at designated areas

5.2.3 Safety Meetings

Safety meetings will be held at least weekly and immediately following an incident. The monthly safety meetings will be conducted as follows:

- Direct and to the point
- Based on applicable topics

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- Short duration – 5 to 10 minutes
- Documented notes will be maintained of safety meetings
- Facility staff shall attend
- Facility staff shall sign the meeting notes

Periodic safety drills such as fire drills, mock emergencies etc., will be carried out. They must be both pre-planned and unannounced.

5.3 MEDICAL CONCERNS/ACCIDENTS

Medical concerns and accidents will be following up by a written “Incident Report” within 24 hours of the incident.

5.3.1 Life-Threatening Emergency

The following actions must be undertaken:

- Notify scale operator, Site Manager, Landfill Supervisor and other site personnel of the accident immediately.
- Scale Operator shall call and report the emergency as indicated below:
 - Ambulance 911
 - Fire Alarm 911
 - Police 911
- Scale Operator and/or site staff shall prevent incoming vehicles from traveling past the scale. Vehicles entering the site will be directed to leave the site until the emergency condition has subsided.
- Site personnel shall direct emergency vehicles to the accident/emergency location.

5.3.2 General Information

Emergency first-aid kits and fire extinguishers are located in the scale house building, maintenance building, at the fuel tank, and on the operating equipment.

5.3.3 Major Emergency

A major emergency includes an uncontrolled fire, an explosion, loss of life or severe injuries, collapse of a structure, major equipment damage, and an uncontrolled release of a hazardous

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substance. Should a major emergency occur, it may be necessary to evacuate the site. Two way radios will be used to attract the attention of staff; and site staff will advise users of the facility. In the event of incident affecting off-site property the City Directors, government officials and adjacent landowners shall be notified by the Supervisor of Disposal or designate.

It is important that the emergency is represented accurately from the City's media protocol for covering media requests.

A primary and secondary meeting area shall be identified to facility staff and other site users in the event of an emergency. The site office will be the primary designated meeting site.

5.4 HAZARD IDENTIFICATION AND CONTROL

Facility staff shall conduct ongoing worksite inspections and assessment. Staff shall be aware of potentially dangerous conditions such as poor road conditions, sharp materials and saturated slopes.

5.4.1 Adverse Weather Conditions and Wind

Wind, wet snow or icy conditions can affect heavy equipment handling. Fog, rain or falling/blowing snow can affect visibility.

During adverse weather conditions (wet, snow or icy conditions, and periods of fog or rain), work speed may be slowed and, if necessary, be stopped. Poor access to the landfill working face due to wet, muddy roads may require that a waste-offloading be directed to the "Wet Cell." The Landfill Supervisor will be responsible for making this decision or designation.

Heavy rainfall may affect access to various areas of the site by two-wheel drive vehicles. The City shall advise users to call when they are not sure of accessibility conditions.

5.4.2 Other Equipment, Traffic

Proximity of landfill equipment to commercial and private vehicles could develop situations that may cause collisions.

When it appears that clearance between vehicles may lead to a condition where it is unsafe for staff to proceed past another vehicle, staff shall acknowledge the driver of the other vehicle with a blast of the horn. Staff will stop, if necessary, to assess the situation and make eye contact with the driver of the other vehicle to ensure that both staff and the other driver are aware of the situation.

Traffic signs and signals shall be obeyed. Staff shall be aware that traffic signs will change, especially those indicating the location of the working face of the landfill area. As a facility

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employee, staff shall be aware of the changing traffic patterns, including the fact that other drivers visiting the facility may not have the advantage of daily review of the traffic pattern.

5.4.3 Mobile Equipment Stability

The stability of mobile equipment is an identifiable hazard. For City vehicles, refer to the vehicle Operator's Manual.

Several key considerations include:

- Slope of ground surface – be alert for slides, unstable ground.
- Roughness of ground – relative to equipment under carriage clearance.
- Vehicle speed – ensure speed is appropriate for weather and sight conditions.
- Bearing capacity of ground – watch for soft, unconsolidated material.
- Vehicle direction – avoid cross-slope travel whenever possible.
- Ground conditions – wet clay can be very slippery, which can increase stopping distances. Refer to vehicle Operation Manuals for maximum angle of traversing slopes and braking distances in various weather conditions.

5.5 INCIDENT REPORTING/RECORD KEEPING AND INVESTIGATION

Facility staff shall immediately report incidents to the Supervisor of Disposal, who in turn will immediately report incidents to the Manager of Solid Waste Services Division at (204) 986-4484, if deemed necessary. The Manager may require the person responsible to provide a written report of any contravention of provincial requirements.

Incidents reported verbally to the Supervisor of Disposal must be followed by a written "Incident Report" within 24 hours of the incident.

Records shall be kept of incidents that occur at the facility, such as, traffic accidents, injuries, fires, hazardous material spills, etc. The records must be accurate and concise. Facility staff shall NOT provide opinions in incident reports.

Should an investigation of an incident be conducted, it will be coordinated by the Supervisor of Disposal.

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5.6 EMERGENCY RESPONSE PROGRAM

The City's Emergency Response Plan for the site is under development and will be kept in the site office. In the interim, calling 911 is the emergency response procedure. The Site Supervisor or designate will act as the emergency response coordinator whose duties will include:

- Maintenance of liaison with local authorities and organizations such as Police, Fire and EMS
- Maintenance of records of current employee safety issues and review of these and other safety matters on a regular basis
- Notification of responsible authorities of potential risks to public health or the environment
- Supervision of activities should an emergency occur by:
 - Assessing the situation
 - Notifying response agencies (fire, police, EMS)

5.7 COMPLIANCE AND AWARENESS

5.7.1 Training

Landfill staff will be provided training on the relevant contents of the SOPs in this Plan. A record of training activities undertaken shall be maintained (see Table 5-1 Training Chart).

Table 5-1: Training Chart					
Staff				Date	
Position	Name Added	Name Deleted	Training Received	Signature	D/M/Y

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Training shall address the following topics:

- Customer notification and load-inspection procedures
- Identification of hazardous wastes, and other prohibited wastes
- Waste-handling procedures (acceptable and prohibited wastes)
- Segregation of waste
- Health and safety issues
- Safety and Emergency Response procedures
- Landfill fire-prevention and response and general fire safety
- Record keeping and reporting
- Background on facility design
- Existing site infrastructure
- Operations – general
- Waste-reduction initiatives
- Waste-acceptance protocol
- Waste placement and compaction
- Cover operations
- Nuisance management
- Composting operations
- Surface-water management
- Leachate management
- Liner system
- Monitoring
- Equipment

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- Closure and reclamation
- Post-closure care
- Corrective action

Annual compliance training will include:

- Spill Prevention Control and Spill Response Plan
- Storm Water Pollution Prevention Plan
- Site Operating Plan
- Waste surveillance
- Groundwater monitoring and reporting
- Surface water monitoring and reporting
- Landfill gas management
- Litter management
- Vector management

Documentation of introductory and continued training will be placed in the site operating record. Equipment operators, load inspectors, and other personnel will receive training at departmental safety meetings and training sessions, or other approved training courses.

Employees shall be trained regarding relevant aspects of respective job functions and those required by law.

Training programs will include internal and external courses. The internal training program will be provided by trained staff from the City, or through use of outside consultants. External landfill training will consist of courses offered through organizations such as the local chapter of the Solid Waste Association of North America (SWANA), U.S. Environmental Protection Agency, Canadian Public Works Association (CPWA), American Public Works Association and various educational agencies.

Training programs will vary depending of the job function of each staff member, including:

- Manager/supervisor
- Technologists

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- Mobile equipment operators
- Safety supervisor
- Weighmaster
- General labor force

The importance of training programs includes promotion of teamwork and the interaction of staff to work together in a safe environment.

All employees shall attend a series of classes for compliance and awareness training, including:

- General landfill operation practices
- Safety issues
- Waste-acceptance procedures
- Emergency-response procedure
- Basic public relations

The Supervisor of Disposal and/or Technologists/Foreman (one of whom must be on-site, or readily available) shall possess a valid Certified Landfill Operator certificate.

Depending on staff classification, annual training will also include, but not necessarily be limited to:

Basic Requirements:

- Manager of Landfill Operations (MOLO) Landfill Operator Training Course
- Basic Landfill Operations and Management
- Confined Spaces
- Cardio-Pulmonary Resuscitation (CPR)
- Equipment Operations
- First Aid
- Workplace Hazardous Materials Information System (WHMIS)
- Transportation of Dangerous Goods (TDG)

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Additional Requirements:

- Acceptable waste types
- Emergency first aid (certification every three years)
- Emergency preparedness plan and procedures
- Environmental and facility safety inspections
- Equipment fuelling procedures
- Equipment maintenance
- Landfill environmental issues
- Leachate collection and recirculation/treatment/disposal
- Lock out/tag out
- Personal protective equipment (PPE)
- Portable fire extinguishers and operation
- Safe mobile equipment operation
- Slings/wire rope
- Spills/releases and containment
- Stormwater monitoring and collection

5.7.2 Evaluation

The need for periodic training by a safety specialist will be addressed as part of the awareness evaluation program.

Annual interviews between the site staff and the Site Manager will be conducted to ensure that staff understand site operational procedures and to allow opportunity for feedback to the City.

New staff will be interviewed at three and 12-month intervals following employment. Interviews will be documented and utilized to assist the facility in its planning and development of ongoing training programs.

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5.8 FIRE CONTROL

Facility staff shall practice fire drills on a regular basis (minimum once per year).

Fire can be recognized by elevated temperature, rising smoke, odor and/or open flame and by testing such as CO monitoring of emissions.

In the event of structural fire, contact the Fire Department (911).

As a general rule, employees should not fight a fire alone. Staff should contact their Supervisor and jointly assess the situation.

5.8.1 Landfill Fire

A landfill fire is one of the most serious situations that can occur at a waste management facility. The required effort to extinguish a fire can be substantial, including major excavation of wastes, addition of water or fire suppressant, and cover until the fire is isolated.

Although fires are not permitted as part of normal landfill operations at the facility, accidental fires may occur, particularly at the working face. Fires are typically attributable to wastes delivered with hot embers ("hot load"). Fires can also result from reactions within the waste, such as decomposing grass clippings or spontaneous combustion of oily rags, or lightning strikes.

To reduce the possibility of fire, smoking is not permitted at the active landfill area or at the recycling facility or storage sites.

Fire within a landfill cell shall be dealt with as follows:

- Excavate the smoldering or burning wastes with heavy equipment such as the packer, bulldozer or excavator.
- Place smoldering waste in an area away from the working face and other combustible materials.
- Spread and cover the excavated smoldering waste with soil.
- Avoid excessive use of water to extinguish the fire as soil is usually more effective; however, if water is required, the on-site water will be used to wet down the area.
- Care must be taken to avoid equipment catching fire.

In the event that on-site equipment is unable to control a landfill fire quickly, the City Fire Department must be called for assistance.

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5.9 FIRE PREVENTION PLAN

This is intended to establish a course of action dealing with fires which may occur at the facility. Fires have the potential to threaten human health and the environment. Employees shall receive initial and annual training regarding the procedures required for fire prevention.

The following steps shall be taken regularly by designated landfill personnel to prevent fires:

- Burning waste will be prevented from being dumped at the working face. The weighmaster and equipment operators shall be alert for signs of burning waste (e.g., smoke, steam, or heat being released from incoming waste loads).
- Fuel spills will be contained and cleaned up immediately.
- Personnel are forbidden to smoke on the active areas of the landfill.
- Soil of sufficient quantity to cover the working face will be stored beside the working face of the active disposal area for fire suppression.
- All on-site structures and heavy equipment will be fitted with appropriate fire extinguishers.

5.10 FIRE MANAGEMENT

5.10.1 Cautionary Note

At all times, personal safety is to be put ahead of extinguishing a fire. The different dynamics, characteristics, and regulations of landfills and the fires that occur in them require that the firefighting tactics be determined on a case by case basis. Such determinations will depend on the materials buried in the landfill, which materials have ignited, depth of the fire, and the fire's ignition source. Depending on the type of landfill material, the smoke from a landfill fire may contain dangerous chemical compounds, which can cause respiratory disorders and other medical conditions. Even if the smoke is benign, it can still aggravate existing respiratory conditions and reduce visibility around the landfill. In addition, contrary to conventional thinking, the use of large amounts of water to suppress a landfill fire can actually make it worse by increasing the rate of aerobic decomposition, which increases the heat available inside the landfill. It also may increase the amount of smoke produced, reducing visibility and making the work area so wet that earth-moving equipment is not able to move freely throughout the site. Further, the runoff from suppression water can overwhelm a landfill leachate-collection system and contaminate ground or surface water.

5.10.2 Specific Fire-Fighting Procedures

The following procedures will be followed in the event of a fire at the Brady Road Landfill facility.

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5.10.2.1 *Small Surface Fires*

Surface fires involve recently buried or compacted refuse, situated on or close to the landfill face in the aerobic layer, generally 30 to 120 cm in depth. These fires can be intensified by landfill gas (methane), which can cause the fire to spread throughout the landfill.

Surface fires general burn at a relatively low temperature and are characterized by the emission of dense white smoke and the products of incomplete combustion. When surface fires burn materials such as tires or plastics, the temperature in the burning zone can be high. Higher temperature fires can cause the breakdown of volatile compounds, which emit dense black smoke.

Surface fires include the following:

- Dumping of undetected smoldering materials into the landfill. “Hot loads” fires are caused by the disposal of refuse that is still burning on arrival at the landfill.
- Fires associated with the landfill-gas control or venting systems. Excessive gas extraction can also be a fire cause. The vacuum created by excessive extraction can increase the airflow and thereby increase the oxygen level in the landfill, which can cause or accelerate underground fires.
- Fires caused by human error on the part of the landfill users. Landfill operators and users can cause fires through careless smoking on the landfill, which can ignite waste and landfill gas.
- Fires caused by construction or maintenance work. Fires can occur while construction and maintenance take place, including fires caused by sparks from vehicles used in the landfill (dump trucks, bulldozers, compactors, etc.).
- Spontaneous combustion of materials in the landfill. The mixing of certain material in a landfill can result in spontaneous combustion. Even small quantities of some chemicals can ignite if exposed to one another. Also, some materials, such as oily rags, can spontaneously combust under certain conditions.
- Deliberate arson fires, which are set with malicious intent.

The best way to control and extinguish a surface fire is to smother it with large volumes of clay or soil cover material.

5.10.2.2 *Underground Fires*

Underground fires in a landfill occur deep below the landfill surface and involve materials that are months or years old. These fires are generally more difficult to extinguish than a surface fire.

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Underground fires also have the potential to create large voids in the landfill, which can cause cave-ins of the landfill surface.

The most common cause of underground landfill fires is an increase in the oxygen content of the landfill, which increases bacterial activity and raises temperatures (aerobic decomposition). These so-called "hot spots" can come into contact with pockets of methane gas, causing a fire.

Underground fires are often only detected by smoke emanating from some part of the landfill site or by the presence of carbon monoxide (CO). In the event of an underground fire, CO may be present at toxic levels near the landfill's surface.

Extinguishing deep-seated fires is usually beyond the capability of most landfills with the day-to-day equipment available. Attempting to dig them out without the proper resources may make the situation worse by admitting air and exposing previously buried hazardous material. If you suspect an underground fire, advise the Supervisor of Disposal who may contact a fire specialist for assistance.

In the event of a deep-seated fire, the area will be marked out and the area surcharged with large volumes of clay or similar material. This minimizes the number of outlets for the gases to escape and reduces the influx of air in the area, thus containing the problem as far as is possible. This area must be checked daily, for smoke, heat and cracking. Where there is a deep-seated fire and there is landfill gas extraction in the vicinity of the fire, the landfill gas extraction should be stopped. Any nearby landfill-gas vents will be temporarily capped as these will serve as a chimney for combustion products to escape or for air to be drawn in. Plugging all outlets will reduce combustion and assist in extinguishing the fire.

5.10.2.3 Accidental Fires Due to Incoming Refuse

Incoming loads of material known, or suspected to be on fire will be deposited, inspected and dealt with at a Foreman/Technologist-designated "hot load" pad on-site.

Waste that is burning on delivery will be directed to the emergency tipping area at the hot load site and covered progressively with adequate supplies of cover materials or doused with water. Firefighting techniques will be appropriate for the waste type. Burning refuse will not normally be allowed to burn itself out.

5.10.2.4 Buried Landfill Contents

Fires occurring in cells that have hazardous waste (asbestos, sharps, etc.) can pose challenges when fighting a landfill fire. Supervisors, Technologists, Foreman and Operators will maintain an awareness and GPS record of where hazardous waste is buried. If there is any uncertainty as to whether there is hazardous waste buried in the vicinity of a fire, it should be fought as though there is hazardous waste there and proper precautions will be taken.

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5.10.2.5 *Personal Safety*

At all times, personal health and safety of operators and staff involved in fighting a fire will take precedence over extinguishing the fire. The most common injuries that occur during a landfill fire are the effect from smoke, burns and slip and fall accidents. Due care will be taken and personnel will err on the side of caution. Under no circumstances will any individual ever tackle a landfill fire alone due to the potential of personal injury. The Fire Department must attend large landfill fires in case of the need for emergency evacuation of entrapped personnel, first aid assistance or to extinguish any equipment that may catch on fire. Operators will also be certain that the ground they are operating on is solid and hasn't been compromised by a long burning fire. Visibility may become reduced during a landfill fire so good communication (radios, cell phones, hand signals, etc.) between personnel fighting the fire is required. Operators will use the buddy system, where they watch out for each other and take quick action to help others who may get into trouble.

Contact List

The contact list (Table 5-2) of staff and current phone numbers that might be required to fight a landfill fire will be maintained and updated on a regular basis. The current copy of the contact list will be maintained at the Foreman's Office.

Table 5-2: Contact List		
Emergency Contact	Names of Contacts	Phone Number
Fire Department		911
Ambulance		911
Disposal Supervisor	List in Office	
Technologist III/Foreman	List in Office	
Technologist III/Foreman	List in Office	
Technologist III/Foreman	List in Office	
Spare Foreman	List in Office	
City Operators	List in Office	
Contractor	List in Office	
Operators	List in Office	

5.10.2.6 *Operations*

As mentioned earlier, operating during a landfill fire will be different depending on the size and type of fire and the way of fighting them should be decided on a case-by-case basis. Special circumstances (steep slopes, frozen ground, high winds, type and amount of equipment used

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and the amount of cover material available) and working conditions will factor into the strategy to be used in fighting any landfill fire.

5.10.2.7 Hot Loads Arriving at the Landfill

As soon as it is known that a hot load is coming to the landfill, the personnel designated to handle the incoming load will direct the driver to the emergency dumping site at a designated "hot load" pad. Fire extinguishers will be taken down to the site of fire. The operator's will then smother the hot load with cover material, working upwind to avoid any smoke if possible, working from the outside edge and progressively covering the load. The use of mud trucks or cat and scrapers can be used to bring the cover material. In the winter, snow can be used to put out the flames and cool down the fire. The Fire Department is also an option for dousing out the fire. Supervisor of the fire scene shall check if any of the burning refuse is caught on the machine.

5.10.3 Extinguishing a Surface Fire

There is no "one way" of fighting a surface fire. Strategies for fighting a surface fire must take into consideration weather conditions, size of the fire, how long a fire has been burning, wind direction, experience of operators and availability of equipment.

5.10.3.1 Small Surface Fire

If the fire is small, it should be handled similar to a hot load. The foreman and traffic director will be made aware of the fire so they can redirect the incoming trucks away from the area of the fire or move them to another dumping site if necessary, so that the equipment can work unobstructed. The operator will push the burning refuse off the open garbage and isolate it away from any other open garbage. Operators must be aware of any hazardous waste buried in the area and ensure that it is not disturbed (if there is hazardous waste buried and the burning refuse can't be removed safely off the open refuse, then a different procedure must be followed and will be dealt with in another section of the plan). Once the refuse has been separated, it would be handled like a hot load and extinguished.

5.10.3.2 Large Surface Fires

Usually large landfill fires start after closing and burn for quite a while before they are noticed and reported. Some large landfill fires pose significant challenges when trying to extinguish them. **As in fighting all fires, the safety of personnel must take precedence over extinguishing the fire. The first person who becomes aware of the situation shall contact the Fire Department for consultation on what actions are to be taken.**

Three major objectives should be achieved, eliminating the ignition source, lowering the temperature and cutting off oxygen supply. The fire department must attend all large fires and commit with managing Fire Fighting until the fire is extinguished.

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- Staff shall undertake safe reconnaissance of the fire to know what to expect before conveying firefighting equipment to the area. After this reconnaissance, the strategic firefighting plan should be refined as needed.
- Proper pre-trip inspection shall be performed on any equipment (fire extinguishers and fire-suppression system) before being taken out to fight the fire.
- When operating equipment, operators must stay off burning refuse with equipment and work off of covered surface and maintain earth in front of the blade of the machine when covering fire in order to stop burning refuse from tracking up onto equipment. Supervisors must do a visual inspection of equipment periodically to ensure that the equipment hasn't caught on fire. If an equipment fire can't be put out with a hand-held extinguisher, the Fire Department should be called to extinguish any major equipment fires.
- Containment shall be the goal when starting to fight a fire. Staff will start by placing a firebreak along the edge of the fire to stop it from spreading, if possible. Bulldozers and cat and scrapers will be used to place a strip of earth onto the open refuse and down the open face that hasn't caught on fire to stop the fire from spreading.
- Once containment has been achieved, earth stockpiled will be used to cover the front edge of the fire upwind from the smoke. It is usually easier to fight a fire from the top and work down but working from the toe of the face can be effective work, depending on which way the wind is blowing the smoke and the ability of equipment to maneuver. Scrapers or trucks should be used to haul earth where needed to extinguish the fire.
- Scrapers or trucks will haul cover material and unload it in front of the dozers, allowing them to continue covering refuse.
- Dozers will continue to work the earth cover from the outside edge working towards the middle. Staff is never to work on burning open refuse and must maintain earth cover in front of equipment blade.
- Once all burning refuse is completely covered with earth, an inspection of the area that was burning is required so that any remaining hot spots that were missed can be covered.

Staff must act in accordance with the following prescriptions:

1. Keep an eye on each other
2. Don't let the fire get behind you.
3. Know where other equipment is working
4. Take quick action where and when needed
5. Don't take unnecessary risks

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6. Never fight a fire alone
7. Maintain an escape route
8. Be alert for explosions (aerosol cans and propane tanks)

5.10.4 Underground Fires

Deep-seated fires will be fought in three ways:

1. Cover the area that is allowing oxygen to seep into the refuse cell that is burning with large volumes of clay material. This will minimize the number of outlets for gases to escape and will reduce the influx of air to the area, thus containing the problem as far as possible. Using cat and scrapers, staff will haul clay cover to the fire where it will be spread over open cracks and holes with a bulldozer.
2. Excavation of burning refuse to be used in extreme circumstances, when this is the only option available. This is beyond the normal operation of the landfill and will be implemented by the Landfill Manager.
3. Staff will use water to fight landfill fires only if it can reach the burn zone in large quantities. The drilling of holes and surcharging area with large amounts of water is an option but consideration of overloading leachate-collection system and availability of water must be taken.

5.10.5 Tire Fires

To prevent the possibility of a severe tire fire, stockpiles of tires shall be small and separated with clean surface between them. Foam suppressants are the most effective in extinguishing tire fires. The fire department must be informed of the fire and that it is a tire fire. Heavy equipment such as dozers or an excavator will be used to separate burning tires into manageable piles. Then staff will cover burning tires with foam suppressant until it is smothered.

Water suppression on tire fire does not work well except on small tire fires. If water is the only available suppressant, then misting the tires rather than a strong steady stream of water will be employed.

When extinguishing burning tires by smothering them with earth, staff will use heavy equipment to separate the burning tires from the pile into manageable piles, place an earthen berm around the tires, and then use the soil to smother the tires, starving the fire of oxygen.

Because tire fires can leave oil residues left behind, resulting in significant soil and water contamination, proper environmental cleanup is required and will be performed on a timely basis.

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5.10.6 Wood-Waste Fire

To prevent the possibility of a significant fire, stockpiles of wood shall be small with a clean space for a fire break between them. Wood-waste fires generate large amount of heat depending on the size of the fire. Small fires of wood will be separated and contained and either allowed to burn themselves out or covered with earth and smothered by heavy equipment. Large wood-waste fires will burn very hot and may not allow for heavy equipment to get close enough to safely fight the fire.

5.10.7 General Rules for Fires

The following rules shall be implemented in the event of a fire at the Brady Road Landfill:

- Contact the Fire Department by calling 911. For any fires except those that within the ability of site staff can easily be extinguished, the Fire Department shall assume the lead in firefighting efforts.
- Alert other facility personnel.
- Assess extent of fire, possibilities for the fire to spread, and alternatives for extinguishing the fire.
- If it appears that the fire can be safely fought with available firefighting devices until the arrival of the Fire Department, attempt to contain or extinguish the fire.
- Do not attempt to fight the fire alone.
- Do not attempt to fight the fire without adequate personal protective equipment.
- Be familiar with the use and limitations of firefighting equipment available on-site.
- Firefighting methods include smothering with soil, separating burning material from other waste, and spraying with water from the water truck or water pumped from nearby ponds. If detected soon enough, a small fire may be fought with a hand-held fire extinguisher.

A common firefighting technique that can be quickly employed to fight a landfill fire is smothering with soil. The faster that soil can be placed over the fire, the more effective this method will be in controlling and extinguishing the fire. The stockpiled daily cover may be used for firefighting purposes.

The site is equipped with fire extinguishers of a type, size, location, and number as recommended by the local fire department. Each fire extinguisher is fully-charged and ready for use. Extinguishers are inspected on an annual basis and recharged as necessary. Inspection and recharging are performed following each use.

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5.10.8 Site Inspections with Fire Department

Semi-annual inspections of the site shall be carried out to identify potential fire risks.

5.10.8.1 Equipment Cleaning

Operating equipment may be cleaned at the working face of combustible waste and caked material that may cause overheating and increase the threat of a fire. This cleaning is limited to equipment used at the working face and must be done with steam or a limited amount of high pressure water. Steam or limited water must be used to prevent the working face from becoming a wash pad, introducing free liquids into the landfill.

5.10.9 Equipment Fire

An equipment fire shall be dealt with as follows:

- Move equipment to isolated area, if possible.
- Shut down equipment.
- Extinguish the fire using a Type ABC fire extinguisher.
- Contact the local fire department, if required.

5.10.10 Building Fire

A fire in a building shall be dealt with as follows:

- Evacuate all unauthorized persons to a designated primary and secondary meeting location.
- Call the Fire Department.
- Clear area if the potential exists for an explosion.
- If available, spray water from a safe distance on any nearby intact fuel tanks to keep cool.
- Do not enter buildings unless authorized by Fire Department personnel.

Portable fire extinguishers are located in the site office, the scale house building, the maintenance building at the fuel tank and on operating equipment. The fire extinguishers shall be checked on a regular basis and serviced by the fire-extinguisher contractor.

Fires shall be followed up with a written incident report within 24 hours.

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5.11 FIRE FOLLOW UP

When a fire in a landfill cell has been extinguished, the cell structural components, including any artificial liner system and leachate-collection piping shall be examined if fire occurs in its vicinity, to ensure their integrity has not been compromised.

5.12 HAZARDOUS MATERIAL SPILLS

Facility staff shall be trained to respond to a hazardous material spill. If a hazardous material spill is suspected, advise the Supervisor of Disposal. The situation will be assessed and the best means of handling it will be determined. Staff will contact the nearest hazardous material response team if deemed necessary by the Supervisor of Disposal. Hazardous material spill incidents will be followed up with a written incident report within 24 hours of the spill.

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6.0 Waste-Reduction Initiatives

6.1 RECYCLING

6.1.1 General

Recovery and recycling of materials destined for burial at the Brady Road Landfill shall be maximized. Recycling is very important at the site for reducing the amount of airspace to be consumed by waste burial. Consistent with provisions and prescriptions of the 2011 CIWMP, new facilities shall be provided on-site for material recovery, composting, material reprocessing, etc., in order to meet increasing public expectations and City Council direction and support of product stewardship initiatives on upstream waste diversion.

6.1.2 Recycling Areas

Staff shall maintain the current recycling efforts to divert certain materials from the burial, including:

- Ferrous and other metals
- Batteries
- Woody materials
- Gypsum/Gyproc
- White goods
- Propane tanks
- Cardboard

Staff shall maintain has contracts with recycling contractors to haul recyclable materials from the facility.

6.1.3 Composting Operations

Staff shall operate the current leaf and yard waste compost area.

6.2 EDUCATION

The City may occasionally utilize Brady to promote responsible waste management practices to the general public, including site tours. Brady has information available to the public at the site office.

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7.0 Waste Acceptance

7.1 WASTE ACCEPTANCE PROCEDURE

It is the responsibility of facility staff to rigorously control materials accepted for disposal. A team approach by the Scale Operator, Spotter and Equipment Operator is required to help to achieve this objective.

Acceptance criteria for wastes are governed by regulatory requirements, landfilling policy and economic or social considerations. These factors may change over time. Specific waste-acceptance procedures will be modified or developed to suit prevailing conditions.

The facility primarily accepts non-hazardous Class I solid waste, primarily from Winnipeg and environs.

Acceptable wastes at the facility for landfilling include:

- Household garbage.
- Construction, renovation and demolition (CRD) waste.
- Industrially or commercially derived non-hazardous, non-putrescible wastes, such as metal stampings, packaging and damaged wares paper and plastics.
- Wood, furniture, metal or acceptable yard wastes from residences.

Control of wastes disposed of at the facility shall be carried out using the following procedures:

- Staff will be provided ongoing training to identify and handle waste in accordance with procedures for unacceptable materials.
- As material is discharged at the tipping face, a "Spotter/Traffic Director" will examine the load to identify any unacceptable material that might be contained in the load.
- As material is spread and compacted at the active area, the Equipment Operator shall also inspect the material for acceptability. If unsuitable material is observed, that material shall be isolated, and the Technologists/Foreman, or the Supervisor of Disposal, the Scale Operator shall be notified and appropriate action determined.
- As landfill development proceeds, the Technologists/Foreman shall record filling areas on a daily basis (depending on waste volumes) to provide long-term documentation of waste locations that can be related to scale records.

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For any questionable wastes, refer to the Special Wastes Control Technician of the Environmental Standards Division for advice on acceptability and/or special handling requirements.

The following wastes accepted at the facility may not be disposed to the landfill active area, subject to management discretion. The destination for certain wastes diverted by management are identified in Table 7-1.

Table 7-1: Waste Placement Locations	
Clean soil	Direct to clean soil stockpile (for use as interim or final cover)
Scrap metal	Direct to waste metal recycle area
White goods (stove, refrigerators, etc.)	Direct to white goods recycle area
Clean lumber and wood waste	Direct to wood product recycle area
Automotive Batteries	Direct to the battery collection area
Bicycles	Direct to be refurbished the bicycle area
Used Tires	Direct to designated to tire-recycling area
Yard Waste	Direct to composting area
Asbestos	Direct to designated asbestos-disposal area
SRM and Animal Wastes	Direct to designated SRM disposal area
Biosolids	Direct to designated Biosolids area

7.2 WASTE DOCUMENTATION

7.2.1 Waste Location

Waste-disposal locations shall be recorded daily using GPS coordinate references and the elevation of the lift(s) for each area where waste was placed that week.

This information will be recorded by the Landfill Supervisor in a log showing date, northing, easting and elevation along with a sketch.

Information from the Weekly Waste Disposal log will be consolidated in the Monthly Operations Report.

7.2.2 Waste Tracking

Waste is placed according to a fill plan approved by the Supervisor of Disposal.

The City utilizes a sophisticated computer program for managing the site and billings. The system also records and compiles waste statistics, and tracks materials by type and source.

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Recorded data includes hauler identification, date received, weigh ticket number, quantity received, type of material and general source.

7.3 PROHIBITED WASTE

7.3.1 Identification

Monitoring of waste directed to the landfill is critical and shall be carried out to protect the environment. Waste disposal at the landfill shall be monitored and routinely inspected.

Every attempt shall be made by the City and facility staff to prevent unacceptable waste from being disposed to the landfill. The City management will make themselves aware of industries in the immediate area that could produce and inappropriately send unacceptable waste to the facility.

Nevertheless, wastes containing hazardous or restricted materials can sometimes be delivered to the site. Although hazardous materials are not accepted at the facility, staff shall have a response and secondary inspection plan in effect in the event such materials do reach the tipping face.

The facility staff shall not accept, and shall notify the Technologists/Foreman, when:

- Waste is in barrels or other sealed containers. Containers or barrels shall be opened by the hauler and the contents verified as an acceptable waste material prior to its acceptance for disposal.
- Waste is a sludge or semi-solid form.
- Waste is a powder.
- Waste has extreme odours.
- Waste hauler does not have proper documentation.
- Waste is hauled by vacuum/tank truck, which shall not be allowed to enter the site.
- Waste has an unusual appearance.
- Waste is in a container, drum, bucket, can, crate or box with warning labels.
- Facility-operating personnel are not familiar with the waste.
- Waste load is leaking fluids of any kind.
- Waste origin is from an oil and gas company or a service station.

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The following are not acceptable for disposal at the cell waste face:

- Hazardous waste
- Biomedical waste
- Liquid waste
- Hydrocarbon-contaminated soils (unless approved by the City's special waste technician)
- PCB waste
- Waste oil, including contaminated soils (unless approved by the City's special waste technician)
- Paints, solvents, etc.
- Vehicle bodies

7.3.2 Discovery of Prohibited Waste at the Tipping Face

Should any waste material be unloaded and found to be suspect, the following procedure must be followed:

- Staff shall immediately direct the vehicle operator to stop unloading the remainder of load.
- Staff shall attempt to identify the waste and isolate it from other waste.
- If a hazardous waste could spread, the waste must be contained immediately and the area where the unacceptable or hazardous waste was disposed shall be immediately isolated and secured (e.g., an earth berm can be constructed, or the material shall be removed to a less sensitive area using landfill equipment).
- Staff shall obtain information from the hauler with respect to name, company name, license number and origin of the waste (address) and a description of the driver and the hauling vehicle.
- The Technologists/Foreman shall be notified when such waste is found. The Technologists/Foreman will arrange for a sample of the waste to be taken and analyzed.
 - If unacceptable for disposal, the costs associated with removal and disposal of the material will be the sole responsibility of the waste generator. This requires that the source be provable. (Information on the load number, time of arrival at the face and hauler can be cross-referenced to scale data to pinpoint the source).

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- Staff shall notify regulatory agencies upon instruction of the Supervisor of Disposal.

The driver shall be turned away and advised to contact the Special Waste Control Technician.

7.4 SPECIAL WASTE HANDLING

The facility may accept some asbestos-containing wastes. These special wastes must be handled in a manner consistent with applicable regulations or City policies, and with prescriptions in the future *Environment Act* licence for the site. Guidance from other jurisdictions can also be considered (e.g., *Guidelines for the Disposal of Asbestos Waste*, published by Alberta Environment).

7.4.1 Asbestos-Containing Material (ACM)

ACM may be accepted provided the waste is buried and covered immediately according to the attached policy (Appendix B) and the location logged using GPS coordinates.

7.4.2 Dead Animals Including Specified Risk Material (SRM)

The site may receive dead animals including SRM or slaughterhouse wastes that are delivered to the site independent of other wastes. Dead animals or slaughterhouse waste will be buried and covered immediately following receipt with cover that is adequate to deter vector (animal) scavenging. The SRM disposal area locations shall be logged with GPS coordinates weekly. All SRM will only be accepted with the proper documentation. Such burials are made consistent with prescriptions provided by Canadian Food Inspection Agency (CFIA).

7.5 SEGREGATED STORAGE AREA

Waste materials that can be recyclable may be diverted to the recycling area. The Scale Operator and other facility staff shall direct vehicles to the appropriate discharge area for the following materials.

7.5.1 Waste Metals / White Goods

This category includes: scrap metal, white goods (stoves, refrigerators, etc.) and batteries.

Waste metal shall be neatly piled and periodically hauled to a scrap-metal dealer. Appliances containing Freon shall be stored in a designated area where a certified contractor removes the Freon storage vessel for off-site removal of Freon.

7.5.2 Used Tires

Used tires will be accepted at the landfill. Tires shall be segregated in a designated recycling area.

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7.5.3 Propane Tanks

The City does encourage empty propane tanks segregation for recycling. These are stored for later pick-up by a recycling contractor. Propane tanks are not left at the landfill working face. A designated contractor regularly collects propane tanks.

7.5.4 Green Waste

Trees, brush, and wood waste will be collected in the Diversion Area and will be shredded and stored for use on-site. Wood materials not used by Wood Anchor can be chipped and can be added to compost.

7.5.5 Street Sweepings / Sand Recycling Area

Street sweepings are directed to an area for stockpiling pending a decision on a new sand recycling program at the landfill.

7.5.6 Composting Area

Yard and garden waste (e.g., leaves, grass, plant debris, small brush) is processed in the designated composting area. This area is located on natural ground capped with a 1 m compacted clay cap. The cap is topped with a granular traffic surface.

Material delivered to the site is trommel screened and/or chipped to remove unacceptable/non-organic material and then placed in windrows for composting. The windrows are turned periodically to maintain optimum temperature, oxygen levels and moisture content.

After composting, the windrowed material is moved to a curing pile to stabilize the compost or placed as a soil amendment, if suitable.

Runoff from the composting process is directed to a holding pond which discharges into a wetlands treatment system.

7.6 HAZARDOUS WASTE

No household, commercial or industrial hazardous waste, radioactive waste, explosives or ammunition shall be accepted at the site.

There is a designated contractor for hazardous waste collection.

7.6.1 Waste Oil

Waste oil shall not be accepted at the site from the general public. However, self-generated waste oil from site operations equipment is collected by Fleet Maintenance Service for recycling.

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7.6.2 Batteries

Batteries delivered to the recycling area are stored there for recycling.

7.7 PROHIBITED WASTES

The Brady Road Landfill excludes prohibited wastes including, but not limited to, liquid wastes, regulated hazardous and PCB wastes, ammunition, explosives, guns, mercury switches, biomedical waste, and radioactive waste. A sign at the entrance will identify common prohibited wastes to the public.

7.8 UNIDENTIFIED WASTE

If any unidentified waste comes in to the landfill the city will contact the Environmental Standards Division to assess the material and recommend disposition.

7.9 SPECIAL WASTE

Any waste requiring special disposal and or handling that is not identified in the SOP shall be assessed for acceptability and disposal requirements.

7.10 BIOSOLIDS DISPOSAL

Dewatered biosolids shall be incorporated with refuse at the working face as determined by the Supervisor of Disposal in consultation with the Waste Water Service Division.

BRADY ROAD RESOURCES MANAGEMENT FACILITY OPERATING PLAN

8.0 Waste Placement and Compaction

8.1 GENERAL

Waste to be landfilled, recycled or sorted shall be weighed on the scale and pertinent information recorded, as described in Section 7.0 (Waste Acceptance) and Section 10.0 (Record Keeping and Reporting).

Directional signs will be installed to assist in directing vehicles to the desired unloading location; however, City staff shall be present when vehicles are being unloaded. Staff shall observe the nature of material being unloaded as a final check to ensure that only acceptable waste is disposed of at the Brady Road Landfill.

Staff shall meet the objectives of active area filling operations, which include:

- Maximize airspace available for waste (compaction/supervision waste stream control).
- Control the size of the working face, place intermediate cover as cell filling advances, and cover working face as necessary to control nuisances (such as blowing material, or when working face is exposed to neighborhood view).
- Maintain grades so as to control surface run-on/run-off to systems provided.
- Placement of interim cover when areas are to be left for lengthy periods (three months in summer and six months in winter), before continuing fill operations. The purpose of the interim cover is to restrict moisture entry into the fill, to limit blowing of wastes, and to provide a neat visual appearance for neighbors.
- Placement of final cover and vegetating after completed areas reach final grades.

8.2 VEHICLE CONTROL

Access for waste filling is via the site access roads. The access road system shall be maintained throughout filling operations. Maintenance procedures for the road shall include grading, gravel surfacing and cleaning of spilled material, or snow removal following snowfalls, on an as-needed basis. The road shall be graded so that it will slope slightly inwards towards the cell, so that potentially contaminated runoff is contained in the cell and other on-site drainage facilities

Incoming vehicles shall be weighed on the scale and proceed along the active access road, as per directional signs, to the working face. The waste hauler shall then move to the disposal area for off-loading, as directed by the Traffic Director, then return along the same access road to the scale or site exit.

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The majority of haulers do not require weighing out at the scale after waste has been unloaded in the cell, since their tare weights are automatically recorded. If necessary, the vehicle can be weighed out at the scale upon exit for immediate payment, or for billing to established customers.

The City staff shall supervise all waste placement operations to ensure safety and the appropriate handling of the waste.

8.3 WORKING FACE PRACTICES

8.3.1 General

The following main factors will be addressed in carrying out ongoing filling operations:

- Lift thickness
- Compaction effort
- Cover
- Fire Prevention
- Litter Control

The Brady Landfill operating cell concept shall proceed in accordance with Figure 8-1.

8.3.2 Waste Placement

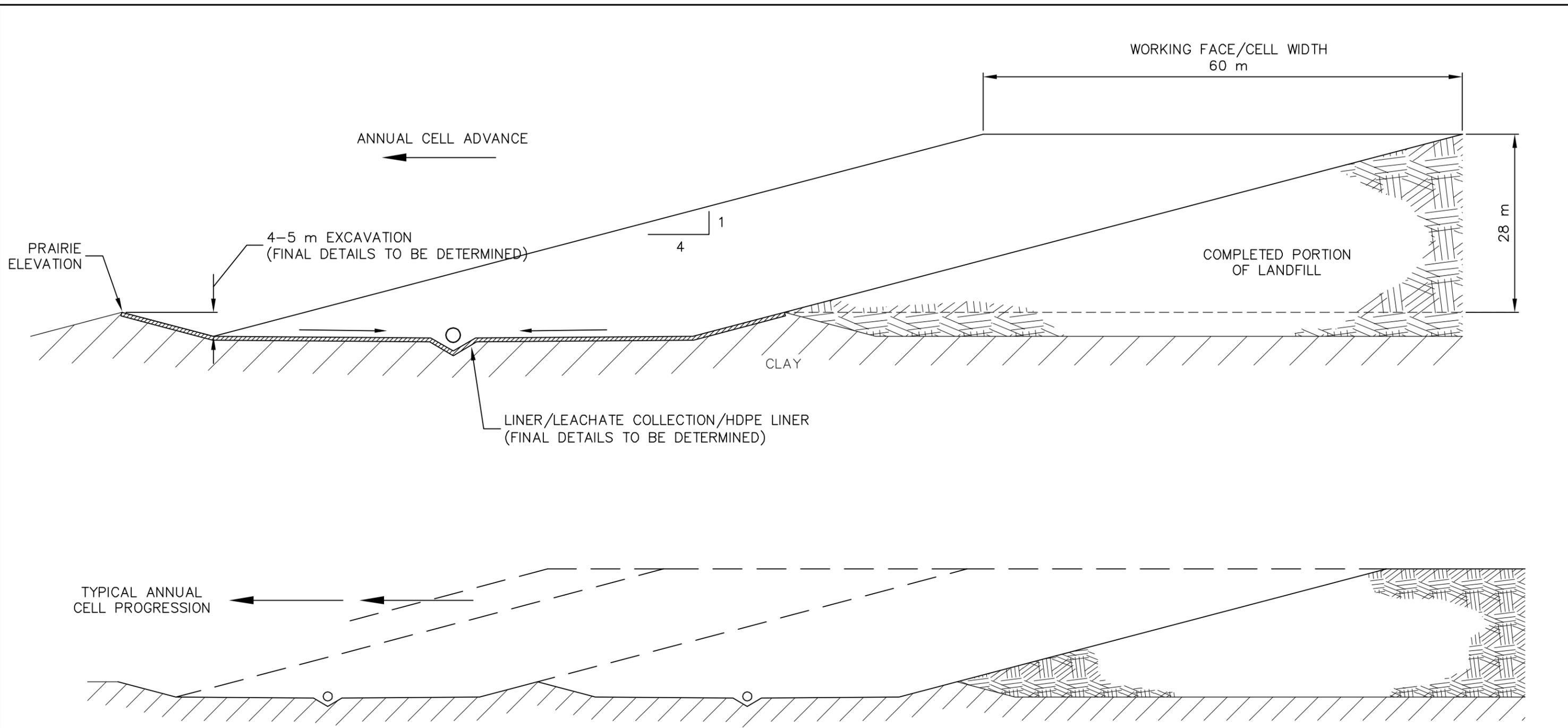
Initial lifts on the base of the landfill cells will be to a thickness of approximately 4.0 m to protect the liner and leachate collection system. The objective of this initial lift is to both protect the collection piping and to provide an insulating layer prior to freeze up. Once the base of the cell has been covered the cell construction shall proceed as follows: see Figure 8-1. Final cover will then be placed over completed areas.

The Equipment Operator shall check for prohibited or special waste during waste placement, moving, and compaction. Refer to Sections 7.3 and 7.4 for procedures related to these wastes.

In order to achieve optimum densities of the waste (thereby minimizing landfill volume) and also providing a good working base, waste shall be spread in 300- to 600-mm-thick lifts.

Normally, each working face shall be constructed to a height of 3 to 5 m and a length of 15 to 20 m, with a 4:1 slope.

The City's Annual Reports will include as-built records for estimated landfill life, survey and as-built records for the landfill. Between annual surveys, landfill staff shall control filling to comply



THE CITY OF WINNIPEG
 WATER AND WASTE DEPARTMENT
 ENGINEERING DIVISION

BRADY ROAD LANDFILL

OPERATING CELL CONCEPT

SHEET 1 OF 1

CITY DRAWING NUMBER

FIGURE 8-1

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with maximum/minimum slopes and final grades as described in the operational figures and development plans. This can be accomplished with the aid of site survey equipment described in Section 18.0, Equipment, or by hired surveyors. Grade stakes will be placed to guide the operator in reaching final elevations and slopes.

Placement of the waste shall proceed in accordance with Figure 8-1.

8.3.3 Compaction Effort

Waste compaction is a significant factor in many aspects of landfill operations and development:

- Proper compaction shall be sought as this maximizes air space utilization and provides a good working surface and stable fill mass as development progresses, hence less potential for long-term settlement.
- Inadequate compaction shall be avoided as this results in a loss of cover material into the waste voids.
 - Inadequate compaction can also increase differential settlement, resulting in increased use of soil to maintain final cover.
- Larger void space shall be avoided as they can contribute to landfill fires.

Waste must be spread and compacted in layers not exceeding a thickness of 600 mm. Landfill equipment shall make three to five passes to achieve optimum density. Maximum compaction effort is achieved by working the waste on a 4:1 slope.

Compactors shall be used to achieve higher densities by grinding and shredding the refuse into smaller pieces while climbing the slope during compaction passes. Slopes shall be maintained as to achieve maximum compaction.

8.3.4 Cover

The site shall be operated as a Class I landfill, with soil or alternative cover placed as required:

- To minimize the habitat for disease vectors.
- To minimize the opportunity to generate windblown litter.
- To provide odour control
- To provide a better site appearance for neighbours.
- To minimize infiltration.

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Waste Placement and Compaction

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- To limit the potential for the spread of fires in the event they occur.

Proper utilization of cover material is important. By maintaining a small working face and achieving proper compaction, maximum utilization of cover material can be achieved.

Effort shall be made to divert clean fill brought to the landfill for stockpiling for future use. Placed on top of existing fill, it will also add a loading surcharge to increase the consolidation and compaction of previously placed wastes, gaining better density of the wastes, and maximizing airspace. In so doing, it can also provide additional travel surfaces. If necessary, additional material may be required from borrow sources on-site or in the area for interim or final cover.

Efforts shall be made to properly manage and conserve available soil and to investigate other potential sources of soil. Wise stockpiling to minimize future transport costs is also important in efficient use of landfill cover material.

Refer to Section 9.0 (Cover Operations).

8.3.5 Litter and Fire Control at Working Face

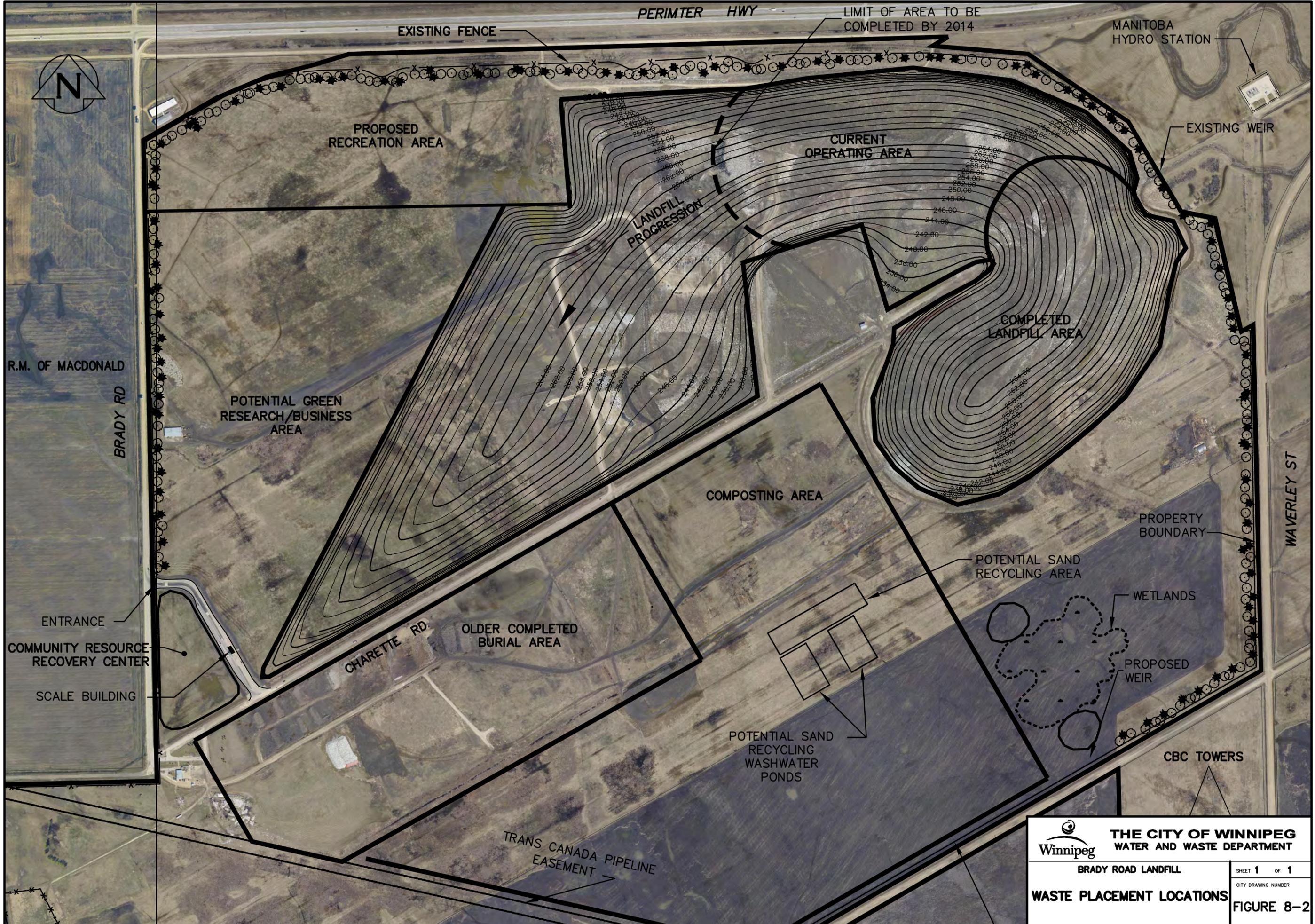
Litter shall be controlled at the working face. Refer to Section 11.0 (Nuisance Management).

Landfill fires are one of the biggest problems that can occur at a site. If fires are not extinguished before a significant amount of waste is placed over them, the required effort to extinguish can be extreme. Refer to Section 5.0 (Safety and Emergency Response) for specific details and methods to avoid and/or control fires.

8.4 FINAL GRADES

8.4.1 General

Final grades shall be as per the site fill plan (Figure 8-2).



 THE CITY OF WINNIPEG WATER AND WASTE DEPARTMENT	SHEET 1 OF 1
	CITY DRAWING NUMBER
BRADY ROAD LANDFILL WASTE PLACEMENT LOCATIONS	
FIGURE 8-2	

BRADY ROAD RESOURCES MANAGEMENT FACILITY OPERATING PLAN

9.0 Cover Operations

9.1 GENERAL COVER PLACEMENT

Ongoing cover operations at the Brady Road Landfill will serve operational needs for maintaining access to the tipping face(s); for minimizing the occurrence of windblown waste; and to present a clean and neat site appearance for neighbors and odours, vectors. From a safety perspective, intermediate cover limits the exposure of flammable wastes as fuel in the event a fire occurs.

Prior to placement of cover material, the waste shall be graded and compacted to a generally even surface.

9.2 COVER

9.2.1 Daily Cover

Cover of waste is necessary to control disease vectors, windblown waste, odours, flies, scavenging, and to promote surface-water runoff from the fill area. At the end of each working day (or at least once every 24 hours), cover material that has not previously mixed with garbage, rubbish, or other solid waste, or an approved Alternate Daily Cover (ADC) material, will be placed over exposed solid waste.

Daily cover may be removed as much as practical before subsequent waste placement the next working day.

Where soil is used as daily cover, the minimum thickness is 150 mm. To ensure that the daily cover soil is effective, the following procedures shall be followed:

- The daily cover will be placed, spread and sloped to promote surface water drainage and prevent infiltration storm water.
- On a regular basis, the landfill Foreman (or designate) will inspect covered areas for erosion, exposed waste or other damage, and repairs shall be made as needed.

Daily cover must be placed at the end of each working day.

Trial uses of synthetic (or other alternative) daily cover for example, blown straw may be undertaken to evaluate the potential for reducing the volume of soil required while still meeting Class I landfill cover requirements.

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9.2.2 Fire Break Cover

Approximately every 50 m of tipping face advancement the face will be covered with 150 mm to 200 mm of clay to act as a fire break.

9.2.3 Intermediate Cover

Intermediate cover must facilitate drainage control, allow for equipment travel over completed areas, prevent exposure of wastes, and minimize the potential for wind-borne debris and water infiltration. Intermediate cover shall be maintained to repair erosion or cracking of the soil. The thickness of the intermediate cover shall be a minimum of 300 mm.

9.2.4 Final Cover

Requirements for final cover are detailed as follows:

- The barrier layer (1.0 m) shall be clay or suitable soil or an equivalent functional alternative barrier layer. If an alternative barrier layer is utilized, a growth zone must be included.
- The barrier layer shall be vegetated, preferably using native species.
- Additional maintenance time and soil will be required to remediate differential settlement.

The final surface of the landfill shall be graded such that water does not pool over the landfill area.

The vegetated surface will be managed throughout the active life of the site to minimize infiltration of water into the filled areas and to minimize contact with solid waste.

Prior to the time of cell completion, final cover areas will be inspected and repaired as required.

9.2.5 Final Cover Maintenance

After final closure, site inspections and repairs will be conducted on a minimum annual basis. Final cover shall be surveyed to document elevation and thickness. Erosion of cover or settlement of the waste will likely result in a need to apply additional soil and regrade, as required to avoid formation of low spots which would trap rain and runoff water, potentially promoting leachate generation.

9.3 SOURCES OF COVER MATERIAL

Every effort shall be made to divert clean fill that is delivered to the Brady Road Landfill and efficiently stockpiling it for future use. As well, additional material may be required from other borrow sources in the area.

9.4 CONSERVATION OF TOPSOIL/SUBSOIL AND OTHER SOIL COVER MATERIAL

Careful use and conservation of cover soil and topsoil is important in order to minimize the need to access cover soil which will be needed to properly close the site and to maintain the cover following site closure.

Soil shall be properly managed and conserved and investigations to identify other potential sources of soil shall be periodically conducted. Proper stockpiling shall be undertaken to aid efficient use of landfill cover material. A stockpiling strategy will be agreed between the Landfill Supervisor and the Site Manager.

Where practical, topsoil and subsoil shall be salvaged and stockpiled separately. Topsoil stockpiles shall be located on stable foundations in an area unaffected by landfilling operation. Stockpiles shall be separated from other stockpiles by a minimum of 3 m.

Subsoil and clean fill shall be stockpiled, when practical, on top of fill, to promote early fill consolidation, to maximize fill airspace and to minimize future settlement.

The topsoil stockpiles shall be contoured and stabilized to prevent soil loss due to wind and water erosion.

Steps shall be taken if necessary to prevent erosion at the site including, but not limited to, spraying or wetting the stockpiles and revegetating the stockpiles.

Topsoil and subsoil salvage shall be suspended immediately at the Brady site when:

- Wet or frozen field conditions may result in the admixing, degradation or compaction of topsoil or subsoil.
- High wind velocities create the potential for the loss of topsoil or subsoil.
- Any other field conditions that may result in the admixing, degradation or loss of topsoil or subsoil.

BRADY ROAD RESOURCES MANAGEMENT FACILITY OPERATING PLAN

10.0 Recordkeeping and Reporting

10.1 GENERAL RECORD KEEPING

Record keeping is an integral part of Brady Road Landfill operations. Accurate maintenance of records is key to the success and protection of the landfill through its ability to locate information readily. An effective, functional record keeping system at the facility will be developed and maintained to provide access to crucial information for its daily operation and customer service.

All visitors shall report to the Scale Operator. A sign-in/out book will be kept to record all visitors to the site. The book will document the name, company/organization, date and time-in/time-out for visitors and vehicles.

Record keeping and data management shall be automated so far as possible, and shall include retention of the original handling documents as backup information. Full-time office and backup staff shall be trained in the operational procedure of the waste systems records control and management systems.

10.2 SCALE HOUSE RECORDS

All vehicles shall report to the weigh-scale facility. All vehicles delivering waste to the Brady Road Landfill shall have data recorded in the weigh-scale data system. These data shall be backed up each day and stored at a location away from the scale house.

Vehicles that are not delivering either waste or clean fill to the site, but are at the site for the purpose of site inspection, or are approved visitors shall, as a minimum, record their license number, number of persons and time and date in the log maintained in the scale house.

In order to gather accurate data for disposal charges and planning purposes, an annual inspection and certification of the weigh scale shall be undertaken. Recording of data shall be accomplished through the use of the computerized weight-recording-billing system, specifically designed for the weigh scale and stored in digital files. An advantage of the system is that codes are assigned to customer vehicles, amount and type of waste recorded, and time of arrivals and departures of vehicles registered on individual numbered weigh scale tickets.

The following records shall be maintained until the end of the post-closure period:

- Waste generator identification.
- Type of major waste stream.
- Volume and approximate (or GPS'd) location where the material was landfilled.

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- Copies of tickets for waste materials received and shipped shall be retained for a minimum of seven (7) years.

Systems shall be in place to record additional items such as estimated total volumes received, types of material accepted and customers serviced (by name and number) on a daily basis, followed by month-end totals for all daily categories. This will facilitate effective operational control and, with cumulative weight records, provide a basis to determine ongoing landfill capacity requirements and estimates of fill density in the closed cells.

These records, along with those detailing the amount of waste landfilled, shall be used to plan future excavations, liner requirements, stockpile and final cover needs. In addition, these records shall allow accurate budgeting of capital requirements with respect to equipment and future site work.

Records of the Scale Operator shall be placed in the Facility Operating Record files located in the site office and later in the Brady Road Landfill's off-site long-term storage files.

10.3 WASTE MANAGEMENT FACILITY FILING SYSTEM

A facility filing system shall be maintained at the site for all written records and information pertaining to all aspects of the facility operations. This record-keeping system may be modified from time to time to accommodate specific needs of the facility.

The filing system is divided categorically as follows:

- Section 1 Corporate*
- Section 2 Brady Road Landfill Site*
- Section 3 Studies and Monitoring*

The Brady Road Landfill Site section, numerically referenced with the initial number "2" in the filing system, contains all technical and relevant operational information pertaining to the Landfill Operations. It is further divided into the following sub-headings:

- 2.1 Property
- 2.2 Licences, Approvals and Permits
- 2.3 Development Plans
- 2.4 Personnel
- 2.5 Equipment

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- 2.6 Health, Safety and Security Issues and Reports
- 2.7 Communications (internal)
- 2.8 Client Communications (external)
- 2.9 Supplier Communications
- 2.10 Site Activity Reports
- 2.11 Annual Reports
- 2.12 Physical Site Issues
- 2.13 SWANA
- 2.14 Gravel and Soil
- 2.15 Surveys
- 2.16 Consulting Engineering Services
- 2.17 Maintenance Building

Individual files will be established within these (or other) categories as is needed to contain relevant records.

10.4 SITE OPERATIONS LOG

The Technologists/Foreman shall maintain a record of significant events that occur while he/she is on duty. A log of these "events" may show:

- Weather conditions (daily), including data from the weather station.
- Visitors who enter (regulators, public, press, customers), including a summary of discussions.
- Mishaps, accidents, power outages, break-ins, vandalism, etc.
- Potential customer calls for information.
- List of personnel on duty.
- Contractors on-site and description of work undertaken.
- Relevant newspaper articles and web related material.

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- Any other miscellaneous information deemed noteworthy.
- Odour monitoring records.

The City shall maintain a log of activities at the facility that includes:

- A record of inspections conducted, including daily environmental inspection of the Brady landfill, with the inspection dates and findings recorded.
- A record of operational problems.
- A record of public complaints and the responses.

Entries shall be made each day to ensure completeness and accuracy.

10.5 REGULATORY REQUIREMENTS

10.5.1 Operating Record

The Operating Record shall contain:

- A copy of the approval for the facility as well as any other approvals for the site.
- A legal description of the site and a map illustrating the facility boundaries.
- A topographic map of the site.
- Survey records and as-built records for the facility showing the location and development of excavations, fill areas, final grades and structural components.
- The current version of the design and Operations Plan for the Facility.
- Records of waste handling accepted at the facility including amounts accepted and disposal locations.
- Daily records of the Landfill Supervisor.
- Annual groundwater monitoring reports.
- Annual reports for the facility in accordance with Section 10.5.2.

In respect of Section 3 of the Facility Filing System (Studies and Monitoring), the following information (e.g., leachate, surface runoff) shall be recorded:

- The place, date and time of sampling.

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- The dates the analyses were performed.
- The analytical techniques, methods or procedures used in the analysis.
- The names of the persons who collected and analyzed each sample.
- The results of the analyses.

Monitoring results and waste placement records shall be maintained indefinitely, in summary tables and reports as applicable.

10.5.2 Annual Brady Road Landfill Report

An Annual Brady Road Landfill Report covering the calendar year from January 1 to December 31, shall be submitted to Manitoba Conservation by March 31 of the following year for the previous year's operations. It shall include:

- The types and volume of wastes disposed of at the site in the preceding year and the locations of disposal of any wastes requiring special handling.
- Summary of all of the information collected as prescribed in the site's future *Environment Act* licence.
- Revisions to the Operations Plan from the previous year, including any site-layout revisions.
- Record of public complaints and the City's responses.
- Results of environmental or compliance audits.
- Monitoring results of independent consultants.
- Problems experienced with the run-on and/or run-off drainage systems.
- Operational problems.
- Names of the management and supervisory staff responsible for the operation of the site.
- Annual reporting requirements on other aspects of the site including:
 - Surface water management
 - Leachate monitoring and management
 - Gas monitoring and management
 - Groundwater monitoring

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- Estimate of remaining air space based on survey reports and amount of waste received.
- Records of personnel training implemented.
- Proposed expansion plans.

10.5.3 Groundwater Monitoring Summary Report

The Groundwater Monitoring Program Summary Report shall satisfy all relevant prescriptions in the site's future *Environment Act* licence, including the following information:

- A legal description of the site and a map illustrating the site boundaries.
- A topographic map of the site.
- An updated hydrogeological characterization of the site.
- A detailed hydrogeological characterization of the facility.
- Geological cross-sections of the facility.
- A map of surface-drainage patterns located within the site.
- A map of groundwater monitoring well locations relative to the facility components and a description of the existing groundwater-monitoring program for the facility.
- A summary of any changes to the facility groundwater-monitoring program made since the last annual report.
- Analytical data recorded as required in the facility groundwater-monitoring program.
- A summary of fluid-phase elevations recorded and an interpretation of changes in fluid-phase elevations.
- An interpretation of groundwater-flow patterns in the facility area.
- A summary and interpretation of the data collected since the facility groundwater-monitoring program began, including:
 - Charts which indicate trends in contaminant concentrations
 - Probable source(s) of any contamination
 - Any migration of contaminants

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- A description of the following:
 - Contaminated groundwater-remediation techniques employed
 - Source-elimination measures employed
 - Risk-assessment studies undertaken
 - Risk management studies undertaken
- A sampling schedule for the following year.
- Recommendations, as follows:
 - Changes to the facility groundwater monitoring program to make it more effective.
 - Remediation, risk assessment or risk management of contamination identified.

10.5.4 Surface Water Monitoring Report

An annual surface water monitoring report (in accordance with the site's future environmental licences) shall be prepared and included in the Operating Record that includes:

- A map showing surface-drainage systems and retention ponds.
- A record of the quantity and quality of surface water that is discharged.
- Tabulation of the monitoring results report and an interpretation of the results in comparison with the Manitoba Surface Water Quality Standards, Objectives and Guidelines (MSWQSOG), noting any apparent trends or changes in water quality.
- Records of alternative treatment or disposal of surface water.

10.5.5 Leachate Monitoring Report

An annual report for leachate management shall be prepared and included in the Operating Record, and shall include:

- The quantity of leachate removed and the location or facility where it was discharged.
- Leachate-quality data.
- Leachate levels measured.

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10.5.6 Landfill Gas Monitoring Report

An annual report on landfill-gas monitoring shall be prepared and included in the Operating Record, and shall include:

- A record of site observations and condition of vegetation.
- Gas detection monitoring results.
- Soil gas pressures, where applicable.
- Measures implemented upon detection of a lateral migration of landfill gas.

10.5.7 Corrective Action Report

An annual report on corrective actions that have been undertaken on the site shall be prepared and included in the Operating Record, and shall include:

- A description of the problem.
- Activities, results and recommendations for confirmation and verification of the problem.
- A description and the results of assessments of any problem and the proposed corrective action plan.
- A description of the corrective action plan implemented.
- The results of monitoring of the effectiveness of the corrective action.

10.5.8 Contraventions

The City staff shall report any actual contraventions of its future licence or the *Waste Disposal Grounds Regulation* and other relevant regulations to the Supervisor of Disposal who must immediately report by telephone, if it is determined a contravention may have occurred, to the Manager of Solid Waste Services Division. If a contravention has occurred, a written report shall be submitted to the relevant regulator within 24 hours.

10.6 AUDITING/ENVIRONMENTAL REVIEW

An independent third-party audit of the facility shall be conducted every three to five years, and coordinated with facility expansion.

The following procedures for the audit can be followed:

- Self-Auditing Protocol for Landfills (e.g., such as those published by Alberta Environment).
- Western Canada Auditing Roundtable (WCAR).

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- An industry-accepted alternative.

Completion of any such audit shall be such as to provide the City another means of exercising its “due diligence” for the disposition of wastes.

All audit documents will be available on-site in the office filing system. The audit documents are for internal use only. Permission from the Supervisor of Disposal is required prior to distribution to any interested third parties. Distribution of the Audit shall be documented to whom it was distributed, when, and for what purpose.

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11.0 Nuisance Management

11.1 LITTER CONTROL

11.1.1 Introduction

Litter does not represent a significant direct threat to either human health or the environment. However, litter is unsightly, creates a nuisance and may contribute to a fire hazard. Litter escape is one of the most commonly voiced complaints about landfills. Prudent litter control shall assist the City to develop and maintain a good relationship with neighbours of the Brady Road Landfill. The Supervisor of Disposal shall establish and maintain litter controls to minimize the escape of windblown litter from the Brady site and must retrieve litter that is blown onto adjacent properties or accumulates on the Brady Road site.

Staff will manage the site proactively for optimum litter control to adhere to Best Practices in this area (e.g., as set out in guidance documents for progressive jurisdictions [e.g., The Standards and Guidelines for Landfills in Alberta]), which states the following:

“Appropriate techniques and approaches to manage and control nuisances at a landfill site should be applied to specific site conditions, such as climate and the surrounding environment in which the site is located. Techniques and approaches other than those suggested in the guidelines may be applied where they can be shown to be effective.”]

11.1.2 Responsible Party

The person responsible at the Brady Road Landfill site is the Supervisor of Disposal.

11.1.3 Litter Control Program

Litter shall be controlled at the working face by means of placing temporary screens around the working face, and tall permanent screens at the site periphery. Site landscaping and daily to weekly litter clean-up patrols shall contribute to near-real-time management of litter on-site.

The City will continue to make itself familiar with the latest relevant Best Practices regarding litter control. Windblown wastes will be controlled by the following methods:

- To add to current plantings, the site perimeter shall be planted, especially along the north, east and west boundaries, with concentric rings of deciduous and evergreen trees and shrubs to provide a botanical interception barrier for windblown litter that escapes screens.
- Waste-transportation vehicles using this facility will be required to use adequate load covers or other means of containment. The adequacy of covers or containment of incoming wastes will be checked at the facility entrance.

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- Daily cover shall be applied as frequently as needed to assist with the control of windblown waste.
- Litter control screens shall be cleaned on a regular basis (e.g., when area is ~50% blinded) to retain effectiveness. This will prevent airflow from traveling over the fence causing litter to escape.
- As part of the overall site-maintenance program, facility personnel will regularly collect windblown waste materials that have accumulated throughout the-site; at fences and gates, and alongside on-site access roads, especially on an as required basis (e.g., immediately after storms).
- Adjacent filled areas will provide protection from prevailing winds. Due to the variability of wind direction, the site operators will use their discretion in using any additional wind breaks.

Litter control at the Brady Road Landfill site will include the following activities:

- Weekly (daily when required) pickup of windblown litter shall be carried out as necessary. Following spring snowmelt and periods of high winds, additional effort will be allocated to retrieve windblown litter.
- Effective litter fencing systems, various forms of wind screening, an appropriately minimized working face (for the volume of wastes being received for disposal), the procedure of working the wastes up-slope, and machine compaction are measures that will assist in reducing litter problems and resulting need for litter cleanup.
- In addition to outer rings of litter fencing and botanical litter interception, temporary litter-control fences of Best Practices design shall be placed near the working face and downwind of the cell to minimize the spread of litter. These fences shall be cleaned on a regular basis (e.g., when area of fence is ~50% blinded) to retain effectiveness.
- Regular pickup of windblown litter will be undertaken around the landfill properly as well as along Brady Road and the Perimeter Highway leading to the site and on adjacent properties.
- Litter-control fences shall be regularly cleaned of litter, which shall be disposed of at the working face, by site personnel. This will prevent airflow from traveling over the fence causing litter to escape.
- Lightweight wastes may become windblown litter during high winds and must be covered immediately with other waste or soil. If lightweight wastes from a particular generator or hauler continually become problematic, it may be requested that the waste must be bundled prior to disposal at the site.

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- Loads not covered as required by the Solid Waste Bylaw will be enforced according to the Bylaw.

The Supervisor of Disposal shall respond to neighbour complaints in a prompt and thorough fashion. Litter complaints shall be documented in the Operations Log. Reasonable and timely action shall be taken to address complaints.

The Technologists/Foreman shall assign responsibilities relating to litter management and will be cognizant of wind speeds and direction to ensure appropriate steps are taken to contend with prevailing conditions (Guidance for staff regarding wind-blown litter is presented in the SWANA On-site Training Module, Lesson F, 1998).

11.1.3.1 Wind Speeds

SWANA (On-site Training Module, Lesson F, 1998) shows the following with respect to wind speed vs. blown litter:

- Calm to 16 kph only very light objects such as dusts and powders
- 16 to 24 kph dry, wrinkled paper
- 24 to 32 kph empty plastic bags
- 32 to 48 kph flat sheets of cardboard
- 48 to 64 kph lightweight, empty boxes
- 64 to 96 kph aluminum cans
- Over 96 kph almost anything

The Technologists/Foreman shall be cognizant of wind speeds and directions during operations to effectively mitigate windblown litter.

11.2 VECTOR AND VERMIN CONTROL

The need for vector control (e.g., control of deer, canines, rodents, flies, birds, mosquitoes, etc.) shall be minimized through site operations, which include the application of daily, intermediate, and final cover. The extent of the working face will also be minimized to control vectors. As well the entire Landfill shall be securely fenced. Non-bird vector control (i.e., insects and vermin) will be achieved by proper compaction and covering practices. Site operators will make daily checks for problems and advise the Supervisor of Disposal. If necessary, a licensed professional will apply vector control products to ensure that proper chemicals are used and that they are properly handled.

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From time to time and as appropriate, staff will retain the services of professional falconers using trained birds of prey to scare and remove unwanted bird species from the site, relying on the natural predator-prey relationship that exists between raptors and other bird species.

The presence of trained dogs can be utilized, as required, to discourage bird nesting at the site. Active nest destruction by operations staff is prohibited in compliance with the provisions of the *Migratory Birds Convention Act*.

The Vector and Wildlife Control Record (Form No. 1, Appendix C) must be maintained.

11.3 OTHER NUISANCE CONTROLS

11.3.1 Odour Control

Emissions from the working face are distinctive odour and unpleasant. The greatest sources of these emissions are organics in the waste mass. Wastes with strong odours shall be placed at the toe of the working face and immediately covered with other garbage or daily cover. The application of daily cover at the end of the working day shall occur to help control odour.

Special attention shall be given to wastes which are known to be likely sources of odour problems. Such wastes include, but are not limited to: dead animals, waste from food processing facilities, dewatered biosolids and treatment plant grit screenings. Odour management shall be sought by adherence to the following prescriptions:

- Weighmaster's identification of loads with significant odours and immediate advice to workface personnel to allow the waste's prompt disposal at the working face and its immediate cover with other waste (or earthen material). More than 150 mm of cover can be applied if necessary.
- Prompt landfilling of incoming waste.
- Minimizing the size of the working face.
- Control of ponded water at the site.
- Regular inspection and repair of damaged leachate-system components.
- Prompt repair of damaged or eroded daily, intermediate, or final covers.
- Landfill gas-system.

11.3.2 Odour Monitoring

Regular odour monitoring around the entire periphery of the site shall be carried out and the data recorded in the Site Operations Log. All 311 odour complaints shall be responded to as

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quickly as possible and the response shall be noted in the log. Regular inspections shall occur to identify cracks and fissures in the landfill cover. Cracks and fissures will be repaired with soil to prevent the release of odours.

11.3.3 Noise Control

Noise is not a significant issue largely because of separation distance from adjoining homes. Operations will be conducted during posted open hours to minimize noise. Proper maintenance of equipment shall occur to also help limit noise levels. Continuous and other on-site tree screens and berms shall also minimize the potential for site noise to trouble neighbours. Road maintenance and enforcement of on-site speed limits will limit traffic noise.

11.3.4 Mud and Dust Control

Accumulation of mud during inclement weather is limited to the vicinity of the active fill area. On-site roads shall be constructed of a crushed/recycled glass or crushed rock base and a gravel surface. Accumulated mud is typically thrown from tires before vehicles reach public roadways. On days in which mud from tires extends outside of the gate house, the Foreman will inspect public access roads for tracked mud.

Fugitive dust emissions shall be minimized through proper operating procedures which will include spraying site roads with uncontaminated surface water.

Dust emissions from the facility shall be minimized by proper maintenance of all-weather access roads. Proper road maintenance shall include dust control by spraying of water, or other acceptable dust suppression, such as oiling roads and entrance area, covering sawdust (or equivalent material) stored for wet-weather mud control, and use of wind screening and vegetation, a limited working face, proper waste placement procedures, and progressive closure of completed landfill areas. Vehicles entering the site will be restricted to a maximum speed of 30 km/hr to avoid producing excess amounts of airborne dust or suspended particulate matter.

Landfill equipment shall be operated in a manner to create the minimum amount of dust during operations.

The access route from disposal areas to the landfill entrance shall be long to minimize the amount of mud tracked from the site onto public roads.

Wastes that can be dispersed in air shall not be deposited during periods of high wind. Wastes prone to dispersion shall be covered immediately with other waste not prone to dispersion in wind. Dust complaints shall be documented and reasonable action taken.

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12.0 Surface-Water Management

12.1 SURFACE-WATER AND EROSION CONTROL

The Brady Road Landfill surface-water-control system makes use of the natural drainage topography, a perimeter berm and a series of ditches and culverts. The site also includes two stormwater-retention pond to support a proposed sand-washing and salvage operation. In the future it will include an engineered wetland for polishing of runoff before off-site drainage. The facility shall continue to be developed to promote drainage and to control both run-off and run-on.

Erosion shall be minimized by adherence to the following prescriptions:

- Ditches and berms shall be vegetated (preferable native).
- Ditches and culverts shall be kept free of debris.
- Stockpiles shall be contoured and stabilized (and vegetated if appropriate).
- Areas not being landfilled shall be vegetated as appropriate.

Drainage arising on-site will be conducted overland through topographic shaping and grading to temporary or permanent ditches graded to convey water to the east and/or south ends of the site. Selected swales, ditches and culverts will terminate at the Stormwater Management Pond. These swales, ditches and their berms or banks will be completed with vegetation to control erosion.

Temporary swales and ditches shall be built with sumps, if needed, so that site drainage can be pumped to the Stormwater Management Pond until final grading allows gravity systems to be completed.

The Technologists/Foreman shall inspect the surface-water-control system on a regular basis and arrange for repairs when erosion is noticed. Repairs shall be recorded and records located in the Brady Landfill Operating Record.

12.2 SURFACE WATER MONITORING AND TREATMENT

Surface water monitoring shall be undertaken semi-annually (spring and fall) at the established locations (upstream, discharge, downstream, La Salle River, Red River). Monitoring of any accumulated/ponded surface waters in designated areas/structures shall be periodically monitored and sampled prior to discharge.

The monitoring program for routine surface water monitoring, including the release of stored surface water from the site, shall include, as a minimum, the parameters, tests and limits as

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provided in Table 12-1. Any stored surface water release shall be documented in the Operations Log.

The City shall treat, if necessary, any stored contaminated surface water prior to discharge to meet the most applicable of the following guidelines:

- Surface water background quality.
- Manitoba Water Quality Standards, Objectives and Guidelines.
- The latest edition of *Canadian Drinking Water Quality Guidelines*, published by the Canadian Council of Resource and Environment Ministers (CCME).

12.3 SURFACE WATER CONTAMINATION

In the event that surface water quality becomes adversely impacted as a result of the landfill operations, the monitoring results shall be confirmed and verified by:

- Review of the sampling and laboratory methods and procedures and the laboratory results.
- Review of the facility operations and Operating Record for apparent probable cause.
- Resampling the surface water.

When confirmation and verification of the monitoring data, or tests, indicate a sampling, testing, or analytical error, the error shall be documented in the operating record with a report that includes:

- A clear indication that an error existed.
- A clear indication of the source and reason for the error.
- The re-sampling, testing and analytical results.
- Corrective measures taken to prevent a recurrence of the error.

If the test results confirm that there is a surface water contamination, the Site Manager shall be notified immediately and the Corrective Action procedures discussed in Section 20.0 followed.

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13.0 Leachate Management

13.1 LEACHATE COLLECTION AND REMOVAL SYSTEM

Precipitation at the Brady Road Landfill site, and the absence of final cover, creates the likelihood of leachate generation. A leachate-collection and removal system has been retrofitted into selected portions of the landfill. New cells shall be designed to incorporate leachate-collection and removal.

13.1.1 Landfill Cells

The Leachate Collection and Removal System consists of gravel-filled trenches containing perforated pipe conduits and slotted pipes driven into the base of existing cells. The pipes slope to manholes at the end of each run of collector pipe.

Leachate generation in landfill cells shall be limited by prohibiting the disposal of liquid wastes into the landfill cell and with proper management of surface water (progressive closure and no ponding). The maximum allowable level of leachate in the leachate sump will be determined by the Supervisor of Disposal, in order to limit the head on the liner. Refer to Section 15.5 for details on leachate monitoring.

Leachate shall be removed as necessary, especially to avoid developing a hydraulic head on the underlying clay soils. The liquid will be transferred directly to the North End Water Pollution Control Centre for treatment.

13.1.2 Safety

Entry into Leachate Manholes is generally not acceptable practice due to the hazards present. The leachate sump-access manhole is considered to be a confined space, requiring use of confined space entry practices under the *Workplace Health and Safety Act*.

13.1.3 Initial Run-Off

Run-off will be tested to confirm acceptability for release and test results and quantity records shall be kept.

13.1.4 Snow Removal

Snow which has accumulated within the fill area but that has not been in contact with the waste shall be removed from the cell to reduce the potential for leachate generation.

13.2 DAMAGE TO LEACHATE COLLECTION AND REMOVAL SYSTEM

The Landfill Operator must precisely locate and document damages and repairs to the leachate collection and removal system. Documentation and photographs must be taken and retained on file at the landfill office.

Documentation and photographs must be taken and retained in the Brady Operating Record.

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14.0 Liner System

14.1 ORIGINAL SITE LINER CONSTRUCTION

Historically, a natural in-situ was utilized clay liner at the Brady Road Landfill. The brown and gray clay layers overlying the silty clay layer blanketing the bedrock were reported (KGS 2009) to have average hydraulic conductivities of 3.6×10^{-9} and 3.4×10^{-10} m/sec (relative to values reported two decades earlier for the gray clay layer of 5×10^{-10} m/sec [UMA 1987]). The clay that underlies much of the site has the following attributes (KGS 1991):

<i>Silt and clay content:</i>	<i>>98 % (average)</i>
<i>Silt content</i>	<i>8% (average; range is 4-13%)</i>
<i>Clay content</i>	<i>90% (average; range is 87-95%)</i>
<i>Plasticity Index</i>	<i>>52 % (average; range is 38-64%)</i>
<i>Moisture content</i>	<i>40-50%</i>

The base grade was established so as to ensure a slope to facilitate leachate drainage in contemplation of future installation of leachate-recovery pipes, sumps and manholes.

14.2 CELL LINER

The liner of all new cells developed will consist of clay overlain by a 60-mil HDPE liner, or equivalent. Liner integrity shall be protected following installation by placement of a compacted one meter thick layer of waste over progressively prepared liner surfaces.

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15.0 Monitoring

Monitoring of landfill operations, and environmental monitoring, are important components of the City's due diligence at the Brady Road Landfill.

15.1 GENERAL

15.2 ANALYTICAL

Collection and analysis of samples and reporting shall be conducted in the following manner or as specified in any current or future licences:

- For run-off:
 - *Standard Methods for the Examination of Water and Wastewater*, American Public Health Association, American Water Works Association, and Water Environment Federation, as amended.
 - *The Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Rainbow Trout*, Environment Canada, Environmental Protection Series, I/RM/13, July 1990, as amended.
 - *The Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Daphnia Magna*, Environment Canada, Environmental Protection Series, I/RM/14, July 1990, as amended.
 - An equivalent method, which has been approved in writing by the Director of Environmental Approvals, Manitoba Conservation.
- For waste analysis as required:
 - *Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods*, SW-846, U.S. EPA September, 1986, as amended.
 - *The Interim Compilation of Test Methods under the Transportation of Dangerous Goods Regulations*, prepared by Environment Canada.
 - *The Toxicity Characteristic Leaching Procedure (TCLP)*, USEPA, Regulation 40 CFR261, Appendix II, Method No. 1311, as amended.
 - An equivalent method, which has been approved in writing by the Director of Environmental Approvals.

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The preservation, storage and handling of all samples collected at the sampling location identified in the Operations Plan shall be such that the validity of the samples is not compromised. Analysis of samples shall occur in a certified laboratory with documented quality assurance and quality control programs, including participation in inter-laboratory studies and appropriate chain-of-custody.

15.2.1 Reporting

In accordance with any current and future licences, the City shall complete and submit an Annual Groundwater Monitoring Summary Report to Manitoba Conservation on or before March 31 of the year following the year in which the information was collected. Summaries of other monitoring records (surface water, leachate, landfill gas, groundwater, etc.) shall be included in the Annual Report to Manitoba Conservation. Refer to Section 10.0 for reporting requirements.

15.3 GROUNDWATER

15.3.1 General

The City shall monitor groundwater to ensure that it is not contaminated by the site operations. If contamination is detected, and traceable to the site operations, the City may be required to intercept and treat any such contaminated groundwater prior to discharging it to the surrounding environment, to meet the most applicable of the:

- MOE 2004 - Ontario Ministry of Environment. Soil, Ground Water and Sediment Standards for Use in Non-potable Groundwater.
- The latest edition of *Canadian Water Quality Guidelines*, published by the Canadian Council of Resource and Environment Ministers.

This requires that groundwater chemistry and levels shall be monitored up-gradient and down-gradient from the site, using monitoring wells. New monitoring wells if required shall be properly installed as needed, to ensure capacity to thoroughly track groundwater chemistry beneath and down-gradient from the site.

15.3.2 Installation

The groundwater-monitoring network at the Brady Road landfill consist of eight piezometer (i.e., monitoring well) nests containing from five to six wells in each well nest, screened in the overburden, and nine individual bedrock wells (Figure 15-1). Its layout is considered appropriate in consideration of the reported flow direction. This network corresponds well with system requirements in other jurisdictions in Canada and is considered able to satisfy Ontario and CCME guidelines.

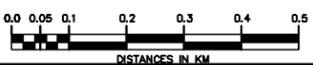
The monitoring wells were installed in accordance with standard industry practice.

BRADY ROAD LANDFILL



LEGEND

- ▲ OVERBURDEN PIEZOMETER NEST
- GROUNDWATER WELL



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WATER AND WASTE DEPARTMENT

BRADY ROAD LANDFILL

WELL LOCATIONS

SHEET 1 OF 1

FIGURE 15-1

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Any additional monitoring wells that may be need shall be placed strategically and installed as required with expansion of the facility as approved or required by Manitoba Conservation.

The groundwater monitoring wells shall be protected from damage and locked. Copies of the keys for the locks shall be located in the facility office. Keys shall not be given to other people (regulators, clients, other staff, etc.) unless permission, given on a single-use basis only, is received from the Supervisor of Disposal. In the event that a key is given out the Supervisor of Disposal shall record this in the Operations Log.

15.3.3 Sampling and Measurements

Division staff shall carry out periodic groundwater sampling and analysis. Monitoring, analysis and reporting shall be conducted according to the terms, conditions and requirements in the future *Environment Act* licence.

Monitoring of groundwater will be conducted at least twice per year (preferably in late spring, when the groundwater table is highest, and again in fall, when the water table has dropped).

Landfill staff will not normally be directly involved with the groundwater monitoring program. There may, however, be a need for site staff to coordinate with and assist those directly carrying out the program.

15.3.4 Analytical Program

The parameters for the Groundwater Monitoring Program are located in (Table 15-1 in Appendix D).

15.3.5 Groundwater Monitoring Well Damage

Groundwater monitoring wells that become damaged shall be cleaned, repaired and/or replaced under the direction of the Landfill Environmental Staff prior to the next sampling date.

The Site Manager shall precisely document the well that was damaged and subsequent repairs or replacement of the wells. Documentation and photographs shall be taken and retained on file at the site office.

In the event damage to a groundwater-monitoring well is discovered, the following steps must be taken:

- Cease operations in the area where well damage has been identified.
- Cordon off the area.
- Contact the Technologists/Foreman.

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- Technologists/Foreman shall notify Compliance and Reporting Branch.
- Technologists/Foreman shall assess whether damage occurred as a result of operations, or whether the defect could have been a result of the original installation. An incident report shall be filled out (attached in Appendix F).
- Facility staff shall use hand equipment (shovels) to carefully clear any material away from immediate area of well damage.

15.4 SURFACE / STORM WATER

15.4.1 General

The City will ensure that any surface water discharged to the surrounding environment meets the most applicable of the following guidelines:

- Background surface-water quality.
- The latest edition of *Canadian Water Quality Guidelines*, published by the Canadian Council of Resource and Environment Ministers.
- The City of Winnipeg Sewer By-law for discharge to the land drainage system.

15.4.2 Sampling and Measurements

Surface-water quality has been monitored at locations upstream and downstream of the Brady Road Landfill. According to CCME guidelines, surface-water samples should include locations:

- Upstream of the discharge.
- At the final discharge from the site at a weir Downstream of the discharge.

Surface-water monitoring shall be undertaken at least twice per year (spring and fall).

A composite sample from the each surface-water pond shall be analyzed for the same parameters listed in Table 12-1 in Appendix D. The same procedures shall be adhered to for groundwater monitoring (except purging).

The water level of any ponds shall be monitored and recorded on a regular basis and after a significant rainfall or a snowmelt event.

Table 12-1 (Appendix D) provides the monitoring parameters for any water to be discharged from the stormwater retention pond.

15.5 LEACHATE

Representative samples of leachate shall be obtained from the leachate sumps annually and analyzed for the same parameters as groundwater samples. The same procedures shall be adhered to for groundwater monitoring. Refer to Section 13.0, Leachate Management, for additional information on the Leachate Collection and Removal System.

Leachate level in the sump shall be monitored monthly, or less frequently as indicated by conditions. The objective of the level monitoring is to demonstrate that leachate does not create a significant hydraulic head (e.g., greater than 0.3 m) and to inform the leachate pumping program. ***The allowable maximum depth from the cover of each leachate sump manhole determined for ease of measurement, shall periodically be reviewed.***

15.6 LANDFILL GAS

As the landfill-gas project progresses, additional landfill-gas monitoring wells will be installed to facilitate better monitoring of gas composition from the completed and capped portion of the landfill.

Landfill-gas monitoring shall occur annually, but will soon occur on a quarterly basis, at minimum. Methane concentration levels shall be measured in the subsurface at the property boundary, in any on-site buildings and in off-site buildings close to the property boundary shall be monitored. Vegetation in final and intermediate cover and surrounding areas shall be inspected for signs of stress due to gas emissions from cracks in the underlying cover. Monitoring records shall be included in the Operations Log.

A portable Photo Ionization Detection (PID) unit is used to test for methane concentrations in methane probes, and other locations. Lightweight portable PID units are available and are simple to operate and could be used to City staff with relatively little training required. Test results are periodically verified using gas chromatograph analysis of collected samples.

Testing can also be carried out to detect NMOC emissions using sample gathering devices such as Tedlar air bags.

