CITY OF KALAMAZOO

PERFORMANCE STANDARDS

FOR

GROUNDWATER PROTECTION WITHIN

WELLHEAD PROTECTON CAPTURE ZONES

AND

STORMWATER MANAGEMENT

(REFERENCE ORDINANCES NOS. 1826, 1846, 2056 AND 2057)

REVISED BY THE CITY OF KALAMAZOO
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1.0 INTRODUCTION

This document provides Performance Standards (Standards) for groundwater protection within Wellhead Protection Areas (Capture Zones) and stormwater management throughout the City of Kalamazoo, Michigan (City). The objective of this document is to define technical standards for groundwater and surface water (stormwater) protection during site development and redevelopment activities. These Standards are designed to be consistent with the objectives of the City's Wellhead Protection Program (WHPP) and to maintain compliance with the City's municipal separate storm sewer system (MS4) National Pollutant Discharge Elimination System (NPDES) Permit Certificate of Coverage and the federally mandated Total Maximum Daily Load for phosphorus reduction within the Kalamazoo River Watershed.

These Standards may be applied at all sites within the City but were developed primarily for use during Site Plan Review and/or Building Division plan review. These Standards supplement the City's Wellhead Protection Ordinances 2056 and 2057 (Chapter 39 of the City of Kalamazoo Code of Ordinances), the Stormwater System Ordinance 1846 (Chapter 29 of the City of Kalamazoo Code of Ordinances), and other associated City Ordinances associated with stormwater, wellhead protection and natural features protection.

The intent/purpose of the Wellhead Protection Ordinance (WHP) is to protect the groundwater supplies that serve as drinking water by: 1) defining *non-compatible land uses within Capture Zones,* 2) preventing their creation or establishment, including those that would prevent/limit the City's ability to obtain necessary well permits to replace or add new potable water production wells, and 3) minimizing the risk to drinking water sources posed by both approved and non-conforming land uses by requiring compliance with the Standards established in this document. The objectives of the Stormwater System Ordinance are to provide environmental protection to surface waters by regulating discharges into the City's stormwater system, and to provide the City with specific legal authority to find and eliminate illicit stormwater connections and discharges.

For the purpose of these Standards, the City's Capture Zones have been divided into three groundwater contamination risk areas based on groundwater's Time-of-Travel (TOT) to a municipal wellfield: 1-Year Capture Zone = Area located within a 1-Year Capture Zone to a municipal wellfield; 5-Year Capture Zone = Area located within a 5-Year Capture Zone, but outside the 1-Year Capture Zone to a municipal wellfield; and 10-Year Capture Zone = Area located within a 10-Year, but outside the 1-Year and 5-Year Capture Zones to a municipal wellfield. To determine if a site is located in a Capture Zone area, refer to Figure 1 and/or the City's online Geographic Information System (GIS) (https://www.kalamazoocity.org/Residents/Taxes-Assessing/View-GIS-Maps) under the Wellhead Capture Zones Layer.

In certain cases, more stringent standards have been developed for sites located closer to City wellheads. Consequently, proposed development of sites within the 1-Year Capture Zones is expected to implement greater controls than that within the 5 or 10-Year Capture Zones.

This document includes a variety of Best Management Practices (BMPs) related to groundwater and surface water protection and are considered commonly accepted practices associated with groundwater and/or surface water protection. These BMPs were derived from a variety of sources, including "Low Impact Development Manual for Michigan - A Design Guide for Implementers and Reviewers" (SEMCOG, 2008), and "Michigan Nonpoint Source Best Management Practices Manual" (EGLE, 2017), and various state and federal rules, regulations, manuals, and guidance documents.

Maps showing the Capture Zones are maintained by the Water Programs Manager and the City Planner or their designee(s) and are available for viewing at the Department of Public Services, Water Resources Division, Water Programs Manager, 1415 North Harrison Street. Figure 1: Wellhead Protection Overlay Map (2022) is the official map reference of the WHP Ordinance and includes the 1-Year, 5-Year and 10-Year Time-of-Travel Capture Zones.

The Standards are divided into sections, which follow this Section 1.0 Introduction.

Section 2.0 "Groundwater Contamination Risk Assessment" discusses what risk category to groundwater (i.e., high or low risk) based on the Zoning Districts and various land use designations. Also, supporting rationale for the designations are provided.

Section 3.0 "General Plan and Construction Standards" details standard practices expected of any site, including those sites in possession of regulated substances (defined in the WHP Ordinance).

Section 4.0 "Land-Use Specific Standards" includes more specific standards for several high-risk land uses that are prohibited in one or all of the Capture Zones.

Section 5.0 "Stormwater Management Requirements" establishes technical standards that apply for stormwater management both inside and outside the Capture Zones. These standards are intended to address groundwater vulnerability and land-use risks; prevent or minimize pollutant loadings to surface water to ensure compliance with the City's Stormwater NPDES Permit; and minimize potential adverse impacts to general surface water quality from stormwater runoff.

Section 6.0 "Treatment and Spill Containment" provides guidance regarding BMPs that can meet treatment requirements for stormwater quality and provides specific requirements, for spill containment cells and volumes, water quality swales, and proprietary systems.

Section 7.0 "Non-Conforming Land Uses" specifically addresses sites within the Capture Zones with existing non-conforming land uses pursuant to the WHP Ordinance, including the requirement for the implementation of BMPs and/or Spill Contingency Plans (SCPs).

Section 8.0 "Potentially Applicable Environmental Regulations" discusses the requirement of developers to comply with all local, state, and federal regulations.

Section 9.0 "Contaminated Properties" addresses contaminated sites and special considerations and requirements for these sites.

2.0 GROUNDWATER CONTAMINATION RISK ASSESSMENT

A groundwater contamination risk assessment is required for all sites within Capture Zones. The assessment shall include a review of land uses allowed by the zoning ordinance and the proposed land use(s) with respect to the presumed risk to groundwater. The final risk designation shall be used to determine what land use Standards must be applied to protect groundwater as a condition of plan approval. Refer to the Kalamazoo Code of Ordinances, Chapter § 50-4.1, Table 4.1.1 for the permitted land uses within current zoning districts.

Land-use zoning districts are designated as either high-risk or low-risk for potential groundwater contamination, as shown in Table 1. Generally, high-risk designations were assigned to zoning districts that allow land use activities that are either prohibited or restricted within Capture Zones due to the potential for storage and/or use of regulated substances.

Table 1

Zoning Groundwater Risk Designations

High-Risk Zoning Districts	**Low-Risk Zoning Districts**
Commercial (C) Districts	Residential (R) District
Community (CC)	Single-Dwelling (RS-5, RS-7)
Community-2 (CC2)	Duplex (RD-19)
Downtown 1 (D-1)	Multi-Dwelling (RM-15, RM-15C, RM-24, RM-36)
Downtown 2 (D-2)	Mobile Home Park (RMHP)
Downtown 3 (D-3)	Planned Unit Developments (PUD)
Business, Technology, and Research (CBTR)	
Manufacturing (M) Districts	Commercial
Manufacturing, Limited (M-1)	Neighborhood Node*
General (M-2)	Commercial Node*
	Live Work -1 (LW-1)
Special Purpose Districts	Live Work -2 (LW-2)
Institutional Campus (IC)	

** Node District. Nodes are intended to create walkable, vibrant mixed-use commercial areas in Kalamazoo neighborhoods with a focus on building forms that promotes inviting public places. Nodes allow a wide range of commercial uses on the ground floor with commercial and residential uses allowed on upper floors. Node locations can be found in the Master Plan, Future Land Development Map.*

Table 2 provides a list of high-risk land-use activities that pose potential threats to groundwater. These land-use activities are considered high-risk regardless of zoning designation. Other high-risk land-use activities are identified in the EGLE document “Minimum Isolation Distances (From Contamination Sources and Buildings), Part 127, Act 368, P.A. 1978 And Act 399, P.A. 1976" (Attachment 1). This document specifies required well isolation distances considered for the issuance of Type I well permits. Attachment 1

shall be used when determining if a proposed land-use is allowed and what Standards to apply to protect groundwater as a condition of plan approval. To determine if a site is located in an Isolation area, refer to the City's online GIS (https://www.kalamazoocity.org/Residents/Taxes-Assessing/View-GIS-Maps) under the Wellhead Capture Zones Layer.

Table 2

High-Risk Land-Use Activities that Pose Potential Threats to Groundwater

Commercial

Analytical and clinical laboratories
Animal feedlots
Automotive rental, sales, and service
Auto washes
Boat builders/refinishers
Concrete/asphalt/coal/tar companies
Drum recycling and cleaning
Dry cleaners and laundries
Equipment repair
Establishments with fleets of trucks and cars
Food processors/meat packers/slaughter
Fuel oil distributors/stores
Furniture manufacturing, stripping, or refinishing
Funeral Homes
Gas stations
Impoundment lots
Marihuana grow facilities
Motor vehicle repair/service shops
Pesticide application services/stores/retailers
Petroleum bulk storage/refineries/pipelines
Photographic development
Truck or rail tanker cleaning
Wood preserving and treatment

Manufacturing

Chemical, paint, and plastics manufacturing
Metal manufacturing, machining, or plating)
Mining operations/injection wells
Pharmaceutical Manufacturers
Pulp and paper industry
Other manufacturing (textiles, marihuana, etc.)

Transportation

Airport maintenance/fueling areas
Governmental agencies with truck and car fleets
Salt piles/sand-salt piles
Trucking/bus terminals
Vehicle maintenance operations

Utilities

Electric power generation substations
Battery Energy Storage System (BESS) Facility

Waste Management and Recycling

Landfills/dumps
Transfer Stations
Junk, scrap, recycling and salvage yards

Groundwater Risk Designation Examples:

A site with both high risk zoning and high risk land use shall be considered **High-Risk**

A site that has low risk zoning and high risk land use shall be considered **High-Risk**

A site with high risk zoning and a low risk land use shall be considered **Moderate-Risk**

A site that has low risk zoning and low risk land use shall be considered **Low-Risk**

Disclaimer: There may be other influencing factors to consider.

3.0 GENERAL PLAN AND CONSTRUCTION STANDARDS

The minimum requirements for all plans reviewed for stormwater and wellhead protection compliance are provided below, in addition to some requirements for environmental review/approval. This list is NOT intended to be inclusive of the requirements for all sites and associated plans. The City may have additional requirements. Specific requirements for stormwater storage (detention/retention), treatment, chemical containment, etc.; and definitions for specific words, acronyms, etc. used below are provided in subsequent sections of this document.

- Stormwater Calculations (unless directed otherwise) using the Worksheet 1 - Stormwater Calculations (Attached and available at: https://www.kalamazoocity.org/Business-Development/Project-Review/Apply-for-Site-Plan-Review/Site-Plan-Review-Forms-and-Documents).
- Maps of existing stormwater infrastructure with details (collection, treatment, and discharge strategy(s)).
- Existing infrastructure that will be used/reused shall be cleaned and inspected, and notes shall be provided on the plans to do so (pipes, structures, catch basins, drywells/leaching basins, Manufactured Treatment Devices (MTDs), detention systems, retention systems, containment systems, etc.)
- Environmental Reports, such as: Phase I Environmental Site Assessment (ESA), Phase II ESA, Baseline Environmental Assessment (BEA), Vapor Intrusion Assessment, etc., where available or as required.
- Soil boring logs, geotechnical borings and environmental sampling results for proposed infiltration areas, where required.
- Chemical Storage Inventory (CSI) Form, Safety Data Sheets (SDSs), and other forms, as required.
- Identification of regulated substance storage, generation, use, loading/unloading or other areas; and associated chemical containment strategy(s).
- Spill Contingency Plan (SCP) or other relevant emergency response/environmental contingency plan(s) for all existing and proposed sites that possess regulated substances at or exceeding 55 gallons aggregate for liquid materials or 440 pounds aggregate for dry weights .
- Stormwater discharges shall provide spill containment for sites with a high risk of accidental spills of regulated substances or other polluting materials.
- For sites where stormwater infrastructure will be added, provide engineered and scaled plans of proposed stormwater collection, treatment, and discharge strategy(s), including but not limited to:

- Proposed grades
    - Runoff shall NOT be discharged onto streets or sidewalks; or onto other properties (without a drainage agreement).
    - Runoff from paved or other generally impervious areas shall be collected at intervals not obstructing the flow of vehicular or pedestrian traffic and shall not create standing water or cause unnecessary erosion of soil or other material.
- Invert and rim elevations for all proposed and existing stormwater infrastructure.
- Details for MTDs, structures, detention/retention systems, etc.
- Detention/retention systems shall drain completely between runoff events.
- If a connection to the MS4 is proposed or required, detail for the controlled release/overflow structure shall be provided. Unless directed otherwise, the controlled release/overflow structure shall include a 3-inch diameter orifice at an elevation equal to the lowest elevation of the proposed detention system, and a 12-inch diameter overflow at an elevation equal to the proposed detention system's full elevation or lowest rim elevation. An orifice shall NOT be installed on systems that infiltrate without City approval.
- Containment systems and detention systems that do not infiltrate due to existing contamination or the potential for future contamination shall have a minimum 60 mil thick liner constructed of a material(s) that is chemically compatible with onsite materials (existing contamination, regulated substances, etc.). This does not apply to systems constructed of sealed tanks/vessels or solid walled pipes.
- Storm sewer pipe installed within the public right-of-way (ROW), and any pipe at the point of connection to the City's MS4, shall be Michigan Department of Transportation (MDOT) Class E reinforced concrete pipe (RCP), in accordance with MDOT Standard Specifications for Construction, Section 401, Table 401-1 (Pipe Alternatives for Culvert Classes), unless otherwise approved. Refer to Attachment 2: MDOT Standard Specifications for Construction, Table 401-1 for classifications.
- Pipe materials outside the public right-of-way (ROW) shall comply with MDOT Standard Specifications for Construction, Section 401, Table 401-1, and applicable AASHTO/ASTM standards. Approval may be conditioned on depth of cover, loading conditions, groundwater conditions, and long-term maintenance considerations.
- Record drawings shall be required for all stormwater infrastructure installed, replaced, reconnected, or abandoned within the public right-of-way (ROW). Record drawings shall include, at a minimum: (1) horizontal location of pipes and structures; (2) pipe size, material, class, slope, and length; (3) rim and invert elevations; (4) upstream and downstream inverts for each pipe segment; (5) field deviations from approved plans; and (6) identification of

abandoned facilities and abandonment method. Drawings shall be submitted in PDF and CAD/GIS-compatible format as required by the City.

- A note shall be on the plans indicating that all areas disturbed within the right-of-way (streets, sidewalks, etc.) shall be restored in-kind, to existing or better conditions.
- Reuse existing connections to the MS4, where possible, provided the existing pipe is inspected (televised) and found to be structurally sound with no breaks, leaks, etc. (repair, replacement or lining damaged pipe may be allowed).
- Proposed site improvements shall maintain minimum 10-foot lateral clearance and 18-inch vertical clearance from existing storm sewer, sanitary sewer and municipal water infrastructure, unless otherwise approved.
- Proposed catch basins shall have a minimum 2-foot-deep sump.

- For sites where new buildings roofs, eaves, gutters, and/or downspouts are proposed, runoff storage shall be provided, where applicable and feasible; and runoff shall NOT be directed toward streets, sidewalks, or adjoining properties (without a drainage agreement between Landowners). Connection of roof drains to the MS4 may be permitted, where necessary.
- All sites shall comply with all relevant City Ordinances associated with stormwater, wellhead protection, regulated substances, site plan, etc.
- Required forms, where applicable (attached):
  - Worksheet 1 - Stormwater Calculations
  - Worksheet 2 - Uniform Stormwater Standard 1: Water Quality Treatment Volume and MTD
  - Worksheet 3 - Uniform Stormwater Standard 2: Channel Protection Volume
  - Attachment 3: Stormwater Best Management Practices Operations and Maintenance Agreement

3.1 CONSTRUCTION ACTIVITIES

An appropriate material and equipment maintenance and storage area shall be identified on the site plan. If construction equipment is to be temporarily stored in an open area:

- The storage site shall not be located within the drip line of trees.
- The storage site shall not be within 100 feet of a watercourse, wetland, or storm sewer inlet, unless approved by the City. Runoff shall be diverted away from watercourses and wetlands.
- The construction site shall be designed and operated to prevent excess solids from being discharged into wetlands and surface waters, whether directly or indirectly (e.g., via the MS4).

- Secondary containment is required for regulated substances stored in containers larger than typical household quantities during site construction activities. These substances include, but are not limited to, fuels, oils, and lubricants. All regulated substances must be stored in a manner that diminishes the possibility of a release to the environment (soil, surface water and groundwater).

3.1.1 SOIL EROSION AND SEDIMENTATION CONTROL

Refer to Chapter 30 Ordinance 1826 of the Kalamazoo Code of Ordinances "Soil Erosion and Sedimentation Control" for requirements to control soil erosion and sedimentation with respect to earth change activities within the City. Proper provisions for water disposal and protection of soil surfaces are required during and after construction to promote the safety, public health, and general welfare of the City, as well as to limit the exposed area of any disturbed land for the shortest possible period of time. The Building Division of the City's Community Planning and Economic Development Department (CPED) administers the City's Soil Erosion and Sedimentation Control (SESC) program, and issues associated permits when required.

3.1.2 DEWATERING

Dewatering is the temporary withdrawal and subsequent discharge of groundwater from a construction site to the extent necessary to maintain below grade excavation(s) free from infiltration of groundwater and/or surface water. If dewatering is necessary, conditional approval from the Director of the Department of Public Services or designee must be obtained prior to discharge and a dewatering plan must be submitted to and approved by the following depending on the discharge strategy:

- Surface Water Discharge - City's Water Programs Manager for water quality review and City's Stormwater Engineer for quantity/capacity review (Michigan EGLE approval is required and a copy of the approval/permit shall be provided).
- Storm Sewer Discharge – City's Water Programs Manager for water quality review and City's Stormwater Engineer for quantity/capacity review (EGLE permitting may also be required).
- Sanitary Sewer Discharge - City's Environmental Compliance Supervisor for water quality and City's Sanitary Engineer for quantity/capacity review. Any proposed discharge to the sanitary sewer must be approved by the Wastewater Superintendent or designee.
- County Drain – Written permission shall be obtained from the Kalamazoo County Drain Commissioner.

The plan shall include items such as a map detailing dewatering activities, the proposed dewatering pumping rate, proposed period of dewatering activity, discharge entry point, discharge outfall location, dewatering contingency plan, and emergency contact information, known historic parameters of concern (e.g., hydrocarbons, metals, volatile organic compounds, etc.), identification of known contaminated sites and any associated plumes within a radius of 1,000 feet of the dewatering points, and a dewatering sampling

plan (frequency of sampling, parameters to be analyzed, etc.). At a minimum, Total Suspended Solids (TSS) concentrations shall be less than 80 mg/L and routinely monitored as an indicator of effective sediment control and reported daily to the City's approving personnel or designee. Other requirements may be applicable, dependent upon site conditions and characteristics.

Sediment basins, filters, or other BMPs may be required to filter dewatering fluids prior to being discharged to a surface water, storm sewer, or sanitary sewer. Dewatering must be performed so that the velocity of the discharged water does not cause scouring of the receiving area. If the receiving area is a structural BMP (e.g., basin or sump), the design of the BMP shall be based on the anticipated dewatering flow rate. Sediment-laden water from cofferdams, trenches, and other areas that need to be dewatered shall be pumped through a geotextile material before the water is discharged.

The dewatering site shall be inspected, and its condition documented at least twice daily to ensure the dewatering system is operating in accordance with the approved plan. If any deficiency is identified, immediate action must be taken to correct the deficiency(s) and regain compliance with the approved plan. If a BMP is not functioning properly, appropriate maintenance procedures for the specific BMP(s) must be performed immediately and/or the BMP(s) replaced as appropriate.

3.1.3 FILL MATERIAL

Use of fill material containing regulated substances at concentrations greater than state and/or federal cleanup criteria is prohibited within Capture Zones and may only be used at sites outside Capture Zones in accordance with state and federal rules and regulations. Throughout the Capture Zones where filling is required, fill that originates from a clean source is required (i.e., not contaminated with regulated substances or other contaminants). The fill source shall be from a non-industrial area and NOT from sites of known or suspected contamination, including, but not limited to: industrial and/or commercial sites where hazardous materials were used, handled, or stored; unpaved parking areas where petroleum hydrocarbons could have been spilled or leaked into the soil; facilities under Michigan Part 201 of NREPA of 1994, Act 451, as amended (Part 201); sites defined under Michigan Part 213 of NREPA of 1994, Act 451, as amended (Part 213); Resource Conservation and Recovery Act (RCRA) sites or Comprehensive Environmental Response, Compensation and Liability Act (CERCLA/Superfund) sites. If the source is from an agricultural area, care shall be taken to ensure the fill does not contain pesticides or agricultural waste byproducts, such as manure. Alternatives to using fill from construction sites, include the use of fill material obtained from a commercial supplier of fill material or from soil pits in rural or suburban areas. However, care should be taken to ensure that these materials are also uncontaminated. For further information regarding the relocation of contaminated soil refer to Section 324.20120c. Relocation of contaminated soil, of the Michigan Natural Resources and Environmental Protection Act (NREPA) of 1994, Act 451, as amended.

3.1.4 CONTAMINATED SITES

Site plans must take into consideration the location and extent of any contaminated soils and/or groundwater on the site and the need to protect human health and the environment. For this purpose, environmental documentation of the site's environmental condition shall be required (Phase I ESA, Phase II ESA, Baseline Environmental Assessment (BEA), Vapor Intrusion Assessment, or other pertinent information available) unless otherwise approved. A depiction of the location and extent of contamination shall be submitted with the site plan. Refer to Section 9.0 for further information regarding contaminated properties.

Any site used to temporarily store contaminated soils (such as during removal of an underground storage tank (UST)) must do so in a designated area indicated on the site plan. This area shall be located indoors whenever possible but may be located outdoors provided that the soil/material are containerized in Michigan Department of Transportation (MDOT)-approved drums, or covered with tarp or plastic sheeting and placed on a paved/impermeable surface with containment (curb, dike, or berm) to prevent stormwater run-on and runoff.

In most situations, due care obligations apply even if the owner/operator is not responsible for the site's contamination. Additional details of the due care obligations are provided in Section 9.1. As part of the due care obligations, vapor intrusion mitigation may need to be employed at contaminated sites due to potential health risks associated with inhaling contaminants. Mitigation is typically required when contaminants are present in soil and/or groundwater at concentrations greater than EGLE Vapor Intrusion Screening Levels. These sites (and potentially other contaminated sites for which sampling data does not exist) require vapor intrusion assessments and mitigation (if warranted) prior to plan approval. This is *consistent with public health, safety, and welfare*, as required by the City's Site Plan Review process outlined in Chapter § 8.3H Review and Approval of Procedures of the Kalamazoo Code of Ordinances.

3.1.5 PARKING AREAS

All parking areas shall be designed and constructed with a minimum 1% cross slope to prevent ponding and shall NOT allow for sheet flow or discharge of stormwater toward streets, sidewalks, or adjoining properties. Parking areas that are designed to accommodate 20 or more vehicles or exceed 6,000 square feet are considered "large parking areas" and shall be paved with concrete, asphalt, or an equivalent smooth, impervious surface with a minimum 1% cross slope to prevent ponding of water. These areas shall be served by an appropriate and approved stormwater treatment system as described in Section 5.0. Large parking areas shall be designed and constructed such that all runoff is directed to an approved onsite stormwater collection and treatment system. Large parking areas intended for limited or short-term use (e.g., churches or similar), with limited potential for contamination, may be granted exceptions or modifications where other controls or solutions will be incorporated. Parking areas that will be reconstructed shall be designed and constructed to meet the minimum requirements provided herein. Section 5.0 provides additional requirements for parking areas.

3.1.6 FLOOR DRAINS AND DRY WELLS / LEACHING BASINS

General purpose floor drains must be connected to a public sanitary sewer system or an onsite holding tank (not the storm sewer or a septic system) in accordance with local, state and federal rules and regulations. General purpose floor drains that discharge to groundwater or to a stormwater collection system are prohibited.

Dry wells (leaching basins) are a type of drainage structure used for the underground disposal/infiltration of stormwater runoff. Dry wells are prohibited within 1-Year Capture Zones and within 200 feet of a Type I Public Water Supply well. The use of dry wells is restricted within 5-Year and 10-Year Capture Zones (refer to Section 5.0). Where allowed, dry wells shall only receive stormwater runoff that has been pretreated or untreated runoff that has a low likeliness of being contaminated including: non-industrial roof runoff, sidewalk runoff, greenspace runoff, and/or runoff from parking areas that are not considered large parking areas. Dry wells may also require a groundwater discharge permit from EGLE. The site plan shall show the location of existing and proposed dry wells.

3.1.7 WELLS

All existing, proposed, and abandoned wells, including potable water wells and monitoring wells, shall be depicted on the site plan.

The WHP Ordinance prohibits within any Capture Zone:

- Installation of a private water well for the purpose of drinking water or irrigation if, in the determination of the City's Department of Public Services, public water service is reasonably available.
- Use of a private well (potable, irrigation or geothermal), if said well is likely to cause an adverse impact to the public water supply.
- Installation or use of a water well not installed for the purpose of drinking water or irrigation unless it is determined by the Department of Public Services that the well owner (or representative) has scientifically demonstrated that the well will not cause an adverse impact to the public water supply.
- Drilling for natural gas or petroleum, whether for exploration, production, or otherwise.
- Presence of an abandoned well, which is defined as any well that has either been discontinued for more than one year, is in such disrepair that its continued use for obtaining groundwater is impractical, has been left uncompleted, is a threat to groundwater resources, or is a health or safety hazard. A well shall not be considered abandoned if it has been properly plugged pursuant to the Groundwater Quality Control Act, Part 127, 1978 PA 368. When a well is plugged, formal well abandonment logs shall be completed and provided to the City's Water Programs Manager, except in cases where wells were abandoned in the past and no well abandonment logs are available.

3.1.8 WELL ISOLATION DISTANCE REQUIREMENTS

Per the WHP Ordinance, “Within a capture zone, no person shall cause or allow uses or activities that would violate the terms and conditions set forth in the document ‘Minimum Well Isolation Distances (From Contamination Sources and Buildings), Part 127, Act 368, P.A. 1978 and Act 399, P.A.1976’, as amended." This document is presented as Attachment 1. These land use restrictions directly relate to the City’s ability to replace or add new wells to its Public Water Supply System, as they are part of the permit criteria used by the EGLE.

3.1.9 SEPTIC SYSTEMS

The construction or replacement of any privy, privy vault, septic tank, cesspool, or other facility intended or used for the disposal of domestic or non-domestic wastewater is prohibited within the 1-Year Capture Zones. Sites within the 1-Year and 10-Year Capture Zones must connect to the municipal sanitary sewer, where available. For sites where the municipal sanitary sewer is not available, all septic systems shall comply with Kalamazoo County sewage disposal system requirements, including the acquisition of necessary permits. Flow restrictors and low-flow faucets for sinks and spray nozzles shall be installed to minimize hydraulic loading to subsurface disposal systems. Floor drains shall not be connected to septic systems. The locations of existing and proposed septic tanks and drain fields shall be indicated on the site plan. Refer to Chapter § 28-02.03 of the Kalamazoo Code of Ordinances “Wastewater Discharge Regulations and Enforcement Procedures” for other specific issues regarding wastewater.

3.1.10 COOLING WATER

Closed-loop cooling systems shall be considered to eliminate cooling water discharges within Capture Zones. Alternatively, non-contact cooling water may be discharged to a storm sewer, sanitary sewer, or stream provided all local, state, and federal discharge requirements are met. Discharge of cooling water to site soils/groundwater is not permitted without City approval. Discharges shall be depicted on the site plan.

3.1.11 ROAD SALT STORAGE AND USE

All salt and associated sand mix piles must be stored on an impermeable surface and covered with a waterproof material. Inside the 1-Year Capture Zone, salt shall be stored in indoor sheds surrounded by impervious paving. Stockpiles shall not be located near surface waters, in flood plains, or areas with steep slopes, and shall be designed to prevent surface water run-on and runoff. Snow containing road salt shall not be brought to sites inside 1-Year Capture Zones for disposal. Alternative deicing chemicals include calcium chloride, magnesium chloride, calcium magnesium acetate (CMA), and products that are mixtures of chlorides and organic compounds. Environmentally friendly snow and ice removal products and procedures are encouraged.

3.1.12 SUMP PUMPS

Sump pumps may only be connected to and/or discharge to the City's storm or sanitary sewer system(s) if approved by the Public Services Director, and the discharge shall only occur if consistent with Kalamazoo Code of Ordinances. Chapter § 29-4 (3)(a) allows for the discharge of water from crawl space pumps, footing drains and basement sump pumps to the storm sewer system (MS4), provided that the discharged water is not identified by the City as a source of pollutants or deemed to be an interference to the proper operation and maintenance of the stormwater system. Where allowed, a Stormwater Best Management Practices Operations and Maintenance Agreement with the City (specific to sump pumps) shall be executed and filed with the Kalamazoo County Register of Deeds to document City approval and Landowner acceptance in perpetuity. The Agreement includes, but is not limited to, the following provisions that the Landowner shall agree to:

(i) Landowner shall hold the City harmless in the event of property damage/flooding resulting from potential backflow of stormwater into the home from the City's storm sewer system resulting from the connection/discharge;

(ii) Landowner shall be fully responsible for installing and maintaining backflow prevention devices to prevent backflow of stormwater into the home;

(iii) Landowner shall properly store potential pollutants/hazardous substances (e.g., solids, debris, sediment, chemicals, cleaners, oils, detergents, etc.) off the basement floor and provide secondary containment for such materials to prevent discharge to the City's storm sewer system; and,

(iv) Landowner shall ensure that the discharge and associated controls serve the intended function in perpetuity.

Sump pumps shall NOT discharge directly or indirectly to sidewalks, roads, sewers, surface water (lakes, rivers, streams, wetlands, ditches, etc.) without City approval and shall only be allowed if in compliance with local codes, ordinances and policies, and state and federal rules and regulations.

3.2 REGULATED SUBSTANCES AND PROCESS ACTIVITIES

The WHP Ordinance defines "**Regulated Substances**" as:

- **Substances** for which there is a safety data sheet, as established by the United States Occupational Safety and Health Administration (OSHA), that cites possible health hazards;

- **A Substance**, as listed in the Consolidated List of Chemicals Subject to the Emergency Planning and Community Right-To-Know Act (EPCRA), Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), Section 112(r)(7) of the Clean Air Act (CAA), and Section 311(j)(5) of the Clean Water Act (CWA).

- **Hazardous Substance**, defined under CERCLA as "(A) any substance designated pursuant to section 1321(b0(2)(A) of Title 33, (B) any element, compound, mixture, solution or substance designated pursuant to section 9602 of this title, (C) any hazardous waste having the characteristics identified in under or listed pursuant to section 3001 of the Solid Waste Disposal Act by the RCRA (but not including any waste the regulation of which the Solid Waste Disposal Act has been suspended by Act or Congress), (D) any toxic pollutant listed under section 1317(a) of Title 33, (E) any imminently hazardous chemical substance or mixture with respect to which the (EPA) Administrator has taken action pursuant to section 2606 of Title 15. The term does **not** (within the context of CERCLA) include petroleum, crude oil or any fraction thereof which is not otherwise specifically listed or designated as a hazardous substance (by CERCLA). The term (hazardous substance) does not include natural gas, natural gas liquids, liquified natural gas, or synthetic natural gas usable for fuel (or mixtures of natural gas and such synthetic gas).

- **Hazardous Substances**, under Michigan Part 201 of NREPA of 1994, Act 451, as amended, are generally based on CERCLA hazardous substances (federal Superfund) listed in 40 Code of Federal Regulations (CFR) 302.4 and 302.6, but they are not identical. Part 201 does not adopt the federal petroleum exclusion found in CERCLA, making petroleum components, such as benzene or gasoline additives, reportable under Michigan law.

- **Hazardous Substances**, under Michigan Part 213 of NREPA of 1994, Act 451, as amended includes hazardous substances that may also be listed under CERCLA, it specifically addresses "Regulated Substances" which include refined petroleum products not always covered by federal CERCLA law.

- **Petroleum** is defined as crude oil or any fraction of crude oil that is liquid at standard conditions of temperature and pressure (60 degrees Fahrenheit and 14.7 pounds per square inch absolute). Petroleum includes but is not limited to mixtures of petroleum with de minimis quantities of other regulated substances, and petroleum-based substances composed of a complex blend of hydrocarbons derived from crude oil through processes of separation, conversion, upgrading, or finishing such as motor fuels, jet fuels, distillate fuel oils, residual fuel oils, lubricants, and petroleum solvents.

- **All contaminants, chemicals, per- and poly-fluoroalkyl substances (PFAS), and radionuclides** regulated by the United States EPA under the National Primary Drinking Water Regulations for which there are established or pending Maximum Contaminant Levels (MCLs) under the federal Safe Drinking Water Act (SDWA) of 1974. The SDWA establishes national standards for tap water and regulating contaminants from surface or underground sources.

- **All Substances, contaminants, PFAS, etc.** regulated by the Michigan SDWA Act (Act 399 of 1976, as amended) with an established or pending MCL. Michigan's SDWA gives the Michigan EGLE primary authority to oversee public water systems in the state.

- **Radiological materials**, as regulated by the U.S. Nuclear Regulatory Commission and defined under Regulations Title, Code of Federal Regulations, Part § 110.2, primarily as byproduct materials, which includes materials made radioactive in a reactor, particle accelerator-produced material, uranium/thorium tailings, and discrete sources of radium-226 to ensure public health and safety.

- **Biohazards**, as regulated by federal, state and local regulations including but not limited to the OSHA, the Centers for Disease Control and Prevention (CDC) and CFR.

Regulated Substances shall NOT include:

- Substances in an amount equal or less than 2,200 pounds that are in an area capable of fully containing a total release of said substance, or an area that would drain the substance to a wastewater treatment system capable of treating the released substance(s) (excluding septic tanks);

- Substances in a parked or stopped vehicle in transit, provided the vehicle is stopped or parked for less than 72 hours;

- Substances, such as gasoline or oil, in operable motor vehicles or boats so long as used solely for the operation of the vehicle, but not the tanker portion of a tank truck;

- Pressurized gases in a chemical storage tank such as chlorine, propane, hydrogen, and nitrogen.

- Refrigerants contained within equipment and used for onsite air cooling or in household appliances;

- Substances contained within electrical utility transformers/switches; or,

- Substances used in construction for which all necessary permits have been obtained, and in accordance with the "Performance Standards."

- Refer to the WHP Ordinance for further information.

The Stormwater Ordinance defines "**Pollutants**" as:

- Any substance which, alone or in combination with other substances, if discharged to waters of the State in sufficient quantities, causes or contributes to, or has the potential to cause or contribute to, a violation of a Federal, State, or local water quality standard, a nuisance, or to render such waters harmful, detrimental or injurious to public health, safety or welfare, or to domestic, industrial, agricultural, recreational, or other legitimate beneficial uses or to any organism, aquatic life, plant or animal. Pollutants may include, but are not limited to: paints, varnishes, and solvents; oil and other automotive fluids; fats, oils and grease (FOG); non-hazardous liquid and solid wastes and

yard wastes; refuse, rubbish, garbage, litter, or other discarded or abandoned objects, ordinances, and accumulations, so that same may cause or contribute to pollution; sediment; floatables; pesticides, herbicides, and fertilizers; hazardous substances and wastes; sewage, fecal coliform and pathogens; dissolved and particulate metals; animal wastes; residues that result from constructing a building or structure; and noxious or offensive matter of any kind.

- Refer to the Stormwater Ordinance for further information.

For stormwater management, a pollutant as defined herein is also considered a Regulated Substance. All regulated substance storage, use, transfer and containment requirements presented herein apply to pollutants. Controls shall be installed to prevent the release of pollutants to a MS4.

3.2.1 REGULATED SUBSTANCES USE AREAS

The possession of regulated substances, including fuel in quantities that exceed 55 gallons aggregate for liquid materials or 440 pounds aggregate for dry weights, unless prepackaged and intended for retail sale or for commercial or household use (such as salt used in water softeners, fertilizers, pesticides, herbicides) is prohibited in the 1-Year Capture Zones and are only allowed in the 5-Year and 10-Year Capture Zones if engineering controls are designed and implemented consistent with the BMPs contained herein, the City's Fire Code, and applicable State of Michigan and federal laws and regulations. Where otherwise permitted (outside Capture Zones), sites where regulated substances are stored, used, or generated shall be designed to prevent spills and discharges of such materials to the environment (e.g., soil, groundwater, surface water, and stormwater). The storage or presence of a regulated substance in a manner in which the substance could reasonably be released to the environment is prohibited. A Spill Contingency Plan and a Chemical Storage Inventory Form (Attachment 4) are required for all sites within the Capture Zones that possess regulated substances in any quantity. Additionally, a SCP and CSI are also required for all sites located outside of capture zones that possess regulated substances in quantities greater than 55 gallons aggregate for liquid materials or 440 pounds aggregate for dry weights.

Floor surfaces in regulated substance work areas, storage areas, and transfer areas shall be impervious to the types of materials that may be used or generated at the facility. The floor shall be pitched to an appropriate floor drain that is connected to sanitary sewer, a sump, or a holding tank; and entrances shall be designed to prevent stormwater runoff from entering the building and spills from leaving the building. Curbing, sills, and internal floor berms shall be used to isolate spill-prone areas, where necessary.

Whenever possible, activities involving regulated substances shall be conducted indoors. If not feasible, activities that could result in a release shall be segregated from other activities and conducted on an impervious surface. The surface shall be graded to minimize run-on of stormwater and runoff of spills, and shall be adequately designed to prevent spilled regulated substances from escaping the area. Drains in these areas shall be connected to a holding tank or the sanitary sewer, with City approval and appropriate pretreatment. The area shall be covered, where possible. If potentially polluting activities cannot be covered

and discharge to the sanitary sewer is proposed and subsequently approved, onsite containment and detention shall be provided prior to discharge to prevent surcharging of the sanitary sewer.

Whenever possible, sites shall select non-hazardous or less-hazardous chemicals, especially for processes such as degreasing, cleaning, and plating that have historically used toxic materials. In addition, when possible, materials such as oils should be standardized throughout a site to reduce the quantity of leftover material and mixed waste. Practices that minimize waste generation are encouraged.

3.2.2 SPILL RESPONSE EQUIPMENT

All sites intending to use, store, transfer or generate regulated substances in quantities meeting or exceeding 55 gallons aggregate for liquid materials or 440 pounds aggregate for dry weights are required to have emergency spill response equipment and must indicate on the site plan the location(s). Spill response equipment shall be located throughout the site so that spills may be contained. The specific type(s) of spill response equipment shall be compatible with and appropriate for the types of regulated substances stored onsite, other engineering controls present, the potential threat to site soils/groundwater/stormwater/surface water, and the site location. A Spill Contingency Plan is required for all sites that are required to have spill response equipment.

3.2.3 LOADING / UNLOADING AREAS

Loading/unloading areas used to transfer regulated substances shall be indicated on the site plan. The areas shall be constructed of materials sufficiently impervious to the materials loaded and unloaded in that area. Loading/unloading docks shall be isolated from storm drains and dry wells to prevent potential spills from contaminating stormwater or discharging to groundwater. If floor drains and/or dry wells already exist, inlets must be appropriately protected during loading/unloading operations to prevent pollutants from entering the storm sewer or infiltrating within pervious surfaces. Loading/unloading areas shall be covered or enclosed and be designed to reduce stormwater run-on. If the loading/unloading area is uncovered (due to infeasibilities), grading and/or berms shall direct runoff to a dead-end sump or another appropriate collection device. Where appropriate, a post indicator valve (PIV) or sump pump shall be installed. The PIV or pump shall be left open/on to drain precipitation, except during loading/unloading. If tanker trucks are used for regulated substance loading or unloading, full containment of the loading/unloading area shall be provided.

Spill response equipment shall be provided in all regulated substance loading/unloading areas. The location(s) of loading/unloading areas and associated spill response equipment shall be depicted on the plans and in the SCP.

3.3 REGULATED SUBSTANCE STORAGE UNITS

A regulated substance storage unit is considered to be any underground storage tank (UST), above ground storage tank (AST), drum, carboy, or other container used for the storage of one or more regulated substance(s) including silo, bag, tank wagon, box, glass, bottle, cylinder, total bin, truck body, rail car, tanker, or tool crib, when used for permanent or temporary storage of regulated substances. The following standards apply to regulated substance storage units. All current and proposed regulated substance storage units/areas shall be indicated on the site plan with stored contents, stored volumes and secondary containment strategy(s).

3.3.1 GENERAL PROVISIONS

Regulated substance storage units containing greater than 55 gallons aggregate for liquid materials or 440 pounds aggregate for dry weights are prohibited within the 1-Year Capture Zones. Within the 5-Year and 10-Year Capture Zones and outside the Capture Zones, regulated substance storage units containing greater than 55 gallons aggregate for liquid materials or 440 pounds aggregate for dry weights shall be indicated on the site plan and are allowed if the following standards are applied.

- Unless other sufficient measures have been implemented at the site, these regulated substance storage units shall be completely contained, isolated from floor and storm drains, have sealed surfaces, comply with fire safety regulations, and shall not be accessible to unauthorized personnel. Whenever possible, regulated substance storage units shall be consolidated into one location for better control of material and waste inventory. All storage units shall be properly labeled as to contents and periodically inspected for evidence of leaks, improper storage, or potential hazards that may result in a release of regulated substances being stored in or transferred into or out of the storage unit. All doors, valves, or other openings through which a release could occur must be locked or otherwise secured when not in use.
- Regulated substances shall be stored inside, whenever feasible. If not feasible, outside storage areas shall be covered (preferably with a roof) and/or designed to prevent release to the environment. A curb, berm, and/or grading shall be provided along the perimeter of outdoor storage areas to prevent the run-on of uncontaminated stormwater from adjacent areas, and offsite runoff of stormwater from the storage area(s). The area inside the curb shall slope to a drain, then to a holding tank or sanitary sewer (if approved) with a positive control such as a lock, valve, or plug. Refer to Section 3.3.2 for secondary containment requirements.
- Regulated substances stored outdoors shall be in product-tight containers that are protected from weather, leakage, accidental damage, and vandalism. Sites storing regulated substances outdoors must implement security measures that are appropriate for the material stored and the nature of the site. Measures to be implemented, as appropriate, include:
    - Development and implementation of an SCP, Spill Prevention Control and Countermeasure Plan (SPCC), and/or Stormwater Pollution Prevention Plan (SWPPP),

where appropriate and as required by state and federal rules and regulations.

- Fencing the regulated substance storage unit or the entire site and locking or guarding entrance gates when the storage unit/facility is not in production or is unattended.
- Ensuring that valves permitting direct outward flow of a container's contents have adequate security measures, so they remain in the closed position when non-operating or standby.
- Preventing unauthorized access to starter controls of pumps.
- Providing facility lighting that will assist in the discovery of releases during hours of darkness and prevention of discharges occurring through acts of vandalism.
- Surveillance cameras and/or audible remote leak detection may be required at some sites.

Article III Fire Prevention Code of Appendix A, Chapter 15 of the Kalamazoo Code of Ordinances (Zoning Ordinance), requiring adherence to the 2021 International Fire Code for fire and explosive materials, specifically the storage and handling of flammable liquids, liquefied petroleum, gases, and explosives which shall comply with the state rules and regulations as established by Public Act No. 207 of 1941, as amended.

3.3.2 SECONDARY CONTAINMENT FOR REGULATED SUBSTANCES

Secondary containment shall be provided for all regulated substance storage units. Secondary-containment facilities shall be designed and constructed such that potential polluting material cannot escape from the unit by gravity through sewers, drains, or other means directly or indirectly into a sewer or stormwater collection system or to the waters of the state, including groundwater. Secondary containment shall include protective measures, such as double walls, dikes, vaults, impervious liners, impervious surfaces, etc. The secondary containment system (including associated pipes, structures, surfaces, etc.) shall be constructed of materials that are compatible with the stored material(s) and shall be impervious to the stored material(s).

Exterior secondary containment shall be constructed of poured concrete or a pre-manufactured containment tub. Concrete-block containment is prohibited in outdoor areas because it can easily crack and does not weather well. Exterior secondary-containment areas shall be capable of containing 110% of the largest vessel in containment, plus freeboard to contain precipitation from a minimum 25-year 24-hour storm. Alternatively, the vessel may be a double-walled tank with interstitial monitoring (Section 3.3.3). Containment must be higher than the 100-year flood level. When possible and as appropriate, exterior storage of regulated substances and their containment structures shall be covered to protect the containers from exposure to precipitation. If not possible, the surface shall be sloped to a collection point or sump and/or curbing shall be provided to allow for controlled removal of accumulated stormwater or spilled regulated substances. If the containment area is penetrated by a drainage or conveyance pipe, the opening shall be sealed on both sides to ensure a liquid-tight seal. Drainage pipes shall have a lockable valve that shall be kept closed and locked under normal conditions. The valve shall only be opened when the determination is made by an EGLE Certified Stormwater Operator that the discharge of stormwater is acceptable (this may require a Stormwater NPDES Permit and monitoring). Discharge of contaminated stormwater from a secondary-containment structure to soils, surface water, or the stormwater collection system is prohibited.

Secondary containment for indoor ASTs may be provided by the building, as long as discharge from the AST cannot escape the building via floor drains, entrances, or any other means, and no specific containment is required by other regulations. Although not permitted for outdoor containment structures, concrete-block containment may be used indoors with City approval. For other specific requirements, refer to Article III Fire Prevention Code of Appendix A, Chapter 15 of the Kalamazoo Code of Ordinances (Zoning Ordinance), requiring adherence to the 2021 International Fire Code for safe storage and handling of hazardous and waste materials.

3.3.3 ASTs

All ASTs shall be certified, installed, operated, maintained, closed, or removed in accordance with local, state and federal regulations, including: EGLE and Michigan Department of Licensing and Regulatory Affairs (LARA) rules and regulations and local fire codes and ordinances. **All current and proposed ASTs shall be depicted on the plans, including volume, contents, and containment strategy(s)**. A copy of any required local or state AST registration document shall be provided to the Water Programs Manager.

No AST shall be located in direct contact with site soils. The tank shall have sufficient ground clearance for visual inspection of the bottom of the AST for deterioration unless the size of the AST prevents raising the tank or if the AST is a concrete-vaulted tank. Any AST subject to vehicle impact must be protected against impact with physical barriers. Objects used as physical barriers shall be depicted on the site plan.

The following minimum requirements apply to all ASTs:

- ASTs containing regulated substances shall have secondary containment that complies with all local, state and federal rules and regulations. If a double-walled AST is selected, primary tank leak detection with an audible alarm shall be provided (interstitial monitoring).
- Tank piping shall be located within secondary containment and/or double walled.
- Piping shall be designed such that liquid will not continue to flow by gravity or siphoning from the storage tank if the piping or fittings break. Fuel filling ports shall have secondary containment beneath the fill area to prevent a release from reaching the pervious ground surface or storm drain/inlet.
- Tanks shall be equipped with a shut-off valve, preferably an automatic shear valve, with the shut-off located inside the tank.
- For flood control, all exterior ASTs shall have a monitoring system and secondary standpipe above the 100-year flood-control level for monitoring and recovery.
- Fill-pipe inlets shall be above the elevation of the top of the storage tank.

- ASTs shall have overfill protection, such as a visual liquid-level-indicator gauge or alarms.

3.3.4 USTs

USTs are prohibited within the 1-Year Capture Zones if 55 gallons aggregate for liquid material or 440 pounds aggregate for dry weights are exceeded and shall not be used in the 5-Year or 10-Year Capture Zones unless the use of ASTs is impractical. All USTs shall be certified, installed, operated, maintained, closed, or removed in accordance with local, state and federal regulations, including: EGLE and LARA rules and regulations and local fire codes and ordinances.

If new tanks are to be installed, a copy of all registration documents shall be provided to the City's Water Programs Manager. If existing USTs have been or will be closed, all EGLE closure procedures shall be followed, and a copy of the closure documents shall be submitted to the City's Water Programs Manager. **All current and proposed USTs shall be depicted on the plans, including volume, contents, and containment strategy(s)**.

For fueling establishments where storage, handling, or use of fuels exceeding 55 gallons aggregate for liquid materials, refer to Section 4.1 Fuel Establishments.

3.3.5 HOLDING TANKS

Holding tanks shall adhere to the Standards listed for ASTs and USTs, including secondary containment, unless otherwise approved by the City.

3.3.6 TRUCKs, TRAILERS, TANKERS, RAIL CARS, AND TOOL CRIBS

The possession of regulated substances for more than 72-hours in trucks, trailers, tanker trucks, rail cars, tool cribs, or similar vehicles is prohibited in 1-Year Capture Zones where the quantity of regulated substance(s) exceeds 55 gallons aggregate for liquid materials or 440 pounds aggregate for dry weights, unless allowed pursuant to the WHP Ordinance.

In the 5-Year and 10-Year Capture Zones, the possession of a regulated substance stored in trucks, trailers, tanker trucks, rail cars, tool cribs, or similar vehicles for more than 72 hours is prohibited, unless secondary containment is provided that is sufficient to contain the entire contents of the largest distinct compartment of the container. Appropriate security measures shall be implemented, such as those in Section 3.3.1.

3.3.7 GENERATORS

Standby generators shall be powered by natural gas or propane fuel, unless technically infeasible for the site and/or application. If a generator must be powered by a regulated substance, such as diesel fuel, storage of the regulated substance shall be consistent with the Standards provided herein and all local, state and federal codes, ordinances, rules and regulations, including but not limited to:

- Storage of regulated substances within 1-Year Capture Zones in excess of 55 gallons is prohibited. If a lesser volume of fuel is proposed and allowed within a 1-Year Capture Zone, containment shall be provided, and an SCP shall be prepared and maintained.
- ASTs and USTs used for fuel storage shall be double walled with interstitial monitoring and leak detection alarm(s).
- Generator and associated equipment shall be placed on an impervious surface with curbing and/or grading that is sufficient to contain incidental fuel spills associated with filling and maintenance operations.
- For all sites with proposed and/or existing generators and associated equipment that contain regulated substances in excess of 55 gallons, an SCP shall be prepared, maintained and submitted to the City for review and approval.
- Spill response equipment shall be provided, and the location(s) shall be depicted on the plans.

All generators powered by regulated substances shall be certified, installed, operated, maintained, closed, or removed in accordance with local, state and federal regulations, including: EGLE and LARA rules and regulations and local fire codes and ordinances.

If new generators powered by regulated substances are to be installed, a copy of all registration documents shall be provided to the City's Water Programs Manager. All current and proposed generators shall be depicted on the plans, including volume, contents, and containment strategy(s). For more information, refer to Attachment 5 Guidance: When a Battery Cabinet or Diesel Generator is Proposed.

For all generators powered by regulated substances refer to Section 3.3.1 General Provisions for all regulated substance storage units and Sections 3.3.3 ASTs and 3.3.4 USTs. For sites above regulated substance thresholds, refer to Section 3.3.2 for secondary containment requirements, and Section 7.2 for the Spill Contingency Planning.

3.3.8 STATIONARY STORAGE BATTERY SYSTEMS (CABINETS and BESS)

Battery cabinets and Battery Energy Storage Systems (BESS) are prohibited within the 1-Year Capture Zones if regulated substance of 55 gallons aggregate for liquid material or 440 pounds aggregate for dry weights are exceeded, and shall NOT be allowed in the 5-Year or 10-Year Capture Zones unless the use of alternative energy sources is impractical and secondary containment is provided. In areas where a release could enter the MS4 or contaminate public or private property, secondary containment and an SCP shall be provided. Refer to Section 3.3.1 General Provisions for all regulated substance storage units. All battery cabinets and BESS shall be certified, installed, operated, maintained, closed, or removed in accordance with local, state and federal regulations, including: EGLE and LARA rules and regulations and local fire codes and ordinances.

Types of batteries:

- Wet cell battery - Also known as a flooded-cell or wet-cell battery, is a traditional type of rechargeable battery that uses a liquid electrolyte solution, such as sulfuric acid and water. They are commonly found in electric utilities, energy storage and cellphone towers. These batteries require maintenance.
- Dry cell battery - Does not contain a liquid and instead uses Absorbed Glass Mat (AGM) technology. They are a type of sealed, valve-regulated lead-acid (VRLA) battery, which means they do not contain free-flowing liquid electrolyte like traditional "wet cell" (flooded) batteries. They include Lithium batteries and are typically used in portable electronics, such as toys, phones and laptops.
- Gel battery - A dry battery not containing a liquid electrolyte. In a gel battery, the electrolyte is frozen with silica gel and keeps the electrolyte inside the battery.

For existing and proposed battery systems, a copy of all registration documents shall be provided to the City's Water Programs Manager. If existing battery cabinets have been or will be closed, all EGLE closure procedures shall be followed, and a copy of the closure documents shall be submitted to the City's Water Programs Manager. **All current and proposed battery cabinets and BESS shall be depicted on the plans, including the type of batteries, total volume, contents, and containment strategy(s)**. For more information, refer to Attachment 5 Guidance: When a Battery Cabinet or Diesel Generator is Proposed.

The following minimum requirements apply to all battery systems:

- Provide secondary containment and spill kits in all regulated substance storage, use, transfer and handling areas, including associated equipment,
- Provide a SCP, and
- Provide a CSI form (Attachment 4) completed including total chemicals/additives and Safety Data Sheets for regulated substances on the site.

For sites above regulated substance thresholds, refer to Section 3.0 General Plan and Construction Standards, Section 3.3.2 for Secondary Containment for Regulated Substances, and Section 7.2 for the Spill Contingency Planning.

3.3.9 HEATING, VENTILATION, AIR CONDITIONING (HVAC) SYSTEMS

HVAC systems within any Capture Zone or in areas that could impact the MS4 storm sewer system that contain regulated substances of 55 gallons aggregate for liquid material or 440 pounds aggregate for dry weights shall:

- Limit the storage and use of regulated substances,
- Provide secondary containment and spill kits in all regulated substance storage, use, transfer and handling areas, including associated equipment,

- Provide a SCP, and
- Provide a CSI form (Attachment 4 of this document) completed including total chemicals/additives and Safety Data Sheets for regulated substances on the site.

Refer to Section 3.3.1 General Provisions for all regulated substance storage units. All HVAC systems shall be certified, installed, operated, maintained, closed, or removed in accordance with local, state and federal regulations, including: EGLE and LARA rules and regulations and local fire codes and ordinances.

If new HVAC systems are to be installed, a copy of all registration documents shall be provided to the City's Water Programs Manager. **All current and proposed HVAC systems shall be depicted on the plans, including the, total volume, contents, and containment strategy(s)**.

For sites above regulated substance thresholds, refer to Section 3.0 General Plan and Construction Standards, Section 3.3.2 for Secondary Containment for Regulated Substances, and Section 7.2 for the Spill Contingency Planning.

3.3.10 SNOW MELT AND GEOTHERMAL SYSTEMS

Snow melt systems and geothermal systems are prohibited within the 1-Year Capture Zones. In other locations served by City of Kalamazoo municipal water or storm sewer systems, geothermal systems with regulated substances exceeding 55 gallons aggregate for liquid material or 440 pounds aggregate for dry weights, shall comply with the City's Snow Melt and Geothermal System Policy (Attachment 5). Refer to Section 3.3.1 General Provisions for all regulated substance storage units. All geothermal systems shall be certified, installed, operated, maintained, closed, or removed in accordance with local, state and federal regulations, including: EGLE and LARA rules and regulations, the local health department, and local fire codes and ordinances.

The following minimum requirements apply to all geothermal systems based on the City's Snow Melt and Geothermal System Policy (Attachment 5):

- Wells containing chemicals/additives (glycol, biocides, corrosion inhibitors, etc.) shall be encased in casing pipe from ground surface through all aquifers and shall extend 20 feet into bedrock, or blue clay if it exists immediately above the bedrock (whichever is shallower). Casing pipe shall be SCH80 PVC, SDR-11 HDPE or epoxy coated steel pipe. Annular space shall be sealed with grout.
- Below grade header piping and mains that contain chemicals/additives shall be encased in concrete or casing pipe with end seals. At utility crossings, system mains shall be installed 24 inches below other utilities.
- In ground header and main shutoff valves with purge valves, drains and pressure testing ports shall be provided.
- Zone control with zone isolation, purge valves, drains and pressure testing ports in all utility areas

shall be provided to allow digging to occur in the area without causing a release of system fluids.

- Signage clearly marking the system area, especially in areas containing other underground utilities shall be provided. Signage includes signs on posts, signs on buildings, concrete stamping, plaques or castings in concrete, etc.
- All systems shall include audible low-pressure alarms, an automatic pump shutoff, an automatic system supply and return valve closure. Upon loss of pressure, the system shall alarm, the pumps shut off, and valves close inside buildings.

- Stormwater containment shall be provided to prevent discharge of system additives/chemicals to the environment. Containment shall be consistent with the requirements in Section 3.3.2 for secondary containment requirements.
- In-building containment shall be provided in equipment and chemical storage/handling areas to prevent releases from escaping the building and entering the environment.
- Participation in the MISS DIG 811 system is required for all systems in the ROW and in areas with City utilities. System owners are responsible for marking system locations prior to subsurface activities occurring.
- Extraction or pumping of groundwater for geothermal purposes is not allowed if there is potential to exacerbate or cause migration of contaminant plumes or cause cross-contamination between aquifers.
- A SCP containing as-builts schematics of the system(s) is required and shall meet all the requirements of Section 7.2 Spill Contingency Planning.
- Provide secondary containment and spill kits adjacent to the system, and in all regulated substance storage, use, transfer and handling areas, including associated equipment, and depicted in the SCP.
- CSI form (Attachment 4) completed including total chemicals/additives and Safety Data Sheets for regulated substances on the site.

All current and proposed geothermal systems shall be depicted on the plans, including the system plans and specifications, system fluid capacity, flow rate(s), operating pressure(s) and temperature(s), total volume, contents, and containment strategy(s).

A copy of all registration documents shall be provided to the City's Water Programs Manager. If existing geothermal systems have been or will be closed, all EGLE closure procedures shall be followed, and a copy of the closure documents shall be submitted to the City's Water Programs Manager.

For sites above regulated substance thresholds, refer to Section 3.0 General Plan and Construction Standards, Section 3.3.2 for Secondary Containment for Regulated Substances, and Section 7.2 for the Spill Contingency Planning.

3.4 WASTE

3.4.1 SOLID WASTE

Solid-waste dumpsters must have lids and be stored on a paved surface, unless otherwise approved by the City. All dumpsters shall be indicated on the site plan. Refer to the Kalamazoo Code of Ordinances, Chapters § 15A-4 and 31, for other requirements.

3.4.2 SCRAP METAL

Dumpsters and drums containing scrap metal that may contain residual chemicals or oils shall be stored on an impervious surface in an enclosed area or covered with an impervious liner to prevent accumulation of stormwater. Where stormwater may otherwise accumulate in the scrap metal collection units, drain plugs shall be left in place to prevent discharge onto the ground, and collection units shall be located on an impervious surface with a separate collection catch basin containing an oil/grit separator that discharges to the municipal sanitary sewer (with prior approval and pretreatment) or a holding tank.

3.4.3 HAZARDOUS WASTES

A hazardous substance is inherently dangerous (toxic, flammable, etc.). If site activities involve generating, transporting, storing, recycling, or treating hazardous waste, this shall be indicated on the Chemical Storage Inventory Form (Attachment 4) along with the site's waste generator status (e.g., small-quantity generator). Existing and proposed hazardous waste accumulation areas shall be indicated on the plans. Hazardous waste management techniques shall comply with all applicable local, state, and federal requirements.

Site operations involving hazardous waste shall be physically segregated from other operations, where possible. Work areas and all hazardous waste storage areas shall be located within a containment area with appropriately sealed floors and no direct access outside the facility.

A marihuana business is required to institute and employ waste management protocols and practices that comply with applicable rules and regulations that includes a plan for disposal of any marihuana or marihuana-infused product that is not sold, and any portion of a plant or the residue from any grow, production or testing process that precludes any portion being disposed of from being possessed or ingested by any person or animal.

Refer to the City of Kalamazoo Code of Ordinances, including Chapter 15 (Zoning Ordinance), Chapter 20 § 20B-25, and Article III Fire Prevention Code of Appendix A, for other specific requirements.

3.4.4 LIQUID WASTE PONDS

Open liquid-waste ponds are not permitted without City approval. Any such ponds must be engineered to be protective of the environment, particularly groundwater, and shall comply with all applicable local, state and federal rules and regulations.

4.0 LAND USE SPECIFIC STANDARDS

This section highlights specific standards for certain land-use types identified in the City's Wellhead Protection Ordinance as being prohibited in specific Capture Zones or requiring site-specific review. All land uses should incorporate the general standards detailed in Section 3.0 General Plan and Construction Standards. Other use-specific standards not contained herein may be required. The standards apply to all sites within the City.

4.1 FUELING ESTABLISHMENTS

Fueling establishments where storage, handling, or use of fuels exceed 55 gallons aggregate including, but not limited to, gasoline, diesel, kerosene, and jet fuel are prohibited in the 1-Year Capture Zones. ASTs and USTs are prohibited in 5-Year and 10-Year Capture Zones, unless such tanks meet the minimum requirements provided herein.

The fuel dispensing area shall be paved with concrete or an equivalent smooth impervious surface (not asphalt) with a 1 to 4% slope to prevent ponding of stormwater. The fuel dispensing area shall be covered to at least one foot beyond the maximum reach of the hose and nozzle assembly. The cover/canopy shall not drain onto the fuel dispensing area. The covered fuel dispensing area shall be separated from the rest of the site by a grade break that prevents run-on of stormwater and runoff of fuel to the maximum extent practicable. Drains at the site shall be labeled to indicate whether they flow directly to the sanitary sewer or storm sewer or if they flow through an oil/water separator. All stormwater shall be managed in accordance with the Standards presented herein.

All fuel dispensing nozzles shall have automatic shut-off mechanisms to prevent overfilling. Spill response equipment shall be stored in the fuel dispensing area. The proposed location of this equipment shall be indicated on the plans.

ASTs and USTs at fueling areas shall be in compliance with local, state, and federal regulations and comply with the Standards detailed in this document. In addition, when fueling is not the primary land use, fueling should be conducted at a location equipped to handle fuel spills properly. If equipment/vehicle fueling is conducted onsite, fueling shall be conducted in properly designed, designated areas, and indicated on the plans.

The Standards detailed in this section also apply to existing, non-conforming fueling establishments within Capture Zones. Refer to Kalamazoo Code of Ordinances Chapter § 39-4 Prohibitions with ten-year time-of-travel capture zones, Chapter § 39-5 Prohibitions within one-year time of travel (TOT) capture zone, and Chapter § 14-2 Same – Application; grounds for denial, for general use-specific standards for gasoline and fuel sites, with and without vehicle service or repair.

4.2 VEHICLE WASHING

Commercial vehicle washes (car washes, truck washes, etc.) shall be covered by a roof, have an impervious surface, and be bermed or curbed to prevent stormwater run-on and wash water runoff. The wash area shall be sloped for wash water collection, which may be discharged to a wash water recycling system, directly to the sanitary sewer (with approval and appropriate pretreatment), or to a holding tank (from which the material may be pumped to the sanitary sewer or to an offsite treatment facility). Because wastewater from vehicle washing represents significant flows that can hydraulically overload an oil/grit separator, any such treatment device must be sufficiently sized to accept these volumes.

4.3 PRESSURE WASHING/STEAM CLEANING

Pressure washing and steam cleaning activities are permitted within covered, completely contained areas, particularly where these methods replace cleaning/degreasing operations that would otherwise use solvents. Pressure washing and steam cleaning may be conducted on a sealed impervious surface that is completely contained and graded toward a drain that discharges either to the sanitary sewer (with approval and appropriate pretreatment), or a holding tank (not into the storm sewer or directly to site soils or groundwater). Alternatively, steam cleaning or pressure washing facilities may have zero-discharge recycling systems equipped with oil/water separators or other treatment devices.

4.4 AGRICULTURE AND BULK MIXING OF FERTILIZERS AND PESTICIDES

Only the application of agricultural chemicals, fertilizers, mineral acids, organic sulfur compounds, etc., as used in routine agricultural operations and applied under the “Generally Accepted Agricultural Management Practices” (GAAMPs) and consistent with label directions approved by the EPA or the Michigan Department of Agriculture & Rural Development are allowed. Lawn, garden, pesticide, and agricultural services with onsite bulk mixing or blending of fertilizers, pesticides, and other industry-related chemicals for commercial application are prohibited in the 1-Year Capture Zones when onsite quantities of these chemicals exceed 55 gallons aggregate for liquid materials or 440 pounds aggregate for dry weights.

The following standards apply to all facilities conducting bulk mixing of fertilizers, pesticides, and related materials within Capture Zones, including existing non-conforming sites in the 1-Year Capture Zones:

- Storage areas shall be designed to protect these chemicals from release to the environment, possible theft, unauthorized use by untrained personnel, and temperature extremes. Outdoor storage areas shall be located within a permanently fenced area and shall have a permanent roof to prevent precipitation and sunlight from entering the storage area. All storage areas shall have an impervious surface and secondary containment. Floor drains shall not be located in storage areas without City approval.

- Pesticides, fertilizers, and similar chemicals shall be stored separately to minimize the possibility of cross-contamination in case of fire or other disaster. Smaller facilities may choose to construct a containment area with multiple storage compartments for pesticides and fertilizers.
- Mixing areas for pesticides shall be located indoors or mixing shall be done at the application site. Onsite mixing and loading areas shall have spill containment. For liquids, this area shall be curbed, bermed, or sloped to contain spillage and drain into an impermeable liquid-tight containment structure. For non-liquid materials, this area shall be constructed to prevent water from flowing into the containment area.
- Facility piping from bulk storage tanks shall be installed aboveground to facilitate leak inspections.
- Truck rinse/cleaning areas shall be conducted within a containment area. The floor must be sealed with a suitable impermeable material. Washing areas shall drain into a watertight containment structure.

4.5 DRY CLEANING FACILITIES

Dry cleaning facilities are prohibited in the 1-Year Capture Zones where possession or control of a regulated substance exceeds 55 gallons aggregate for liquid materials or 440 pounds aggregate for dry weights. The following standards apply to all dry cleaning facilities within the Capture Zones, including existing non-conforming sites in the 1-Year Capture Zones:

- Documentation of compliance with EGLE dry cleaning program regulations shall be provided to the City upon request.
- The dry cleaning area shall be isolated from other site operations.
- Dry cleaners shall provide secondary containment for dry cleaning chemicals and machines containing dry cleaning chemicals. The containment area shall be impermeable and capable of holding 110% of the largest possible spill and shall prevent the spill from reaching the sanitary sewer, storm drains, surface water, groundwater, or soil.
- Air and vapors associated with dry cleaning operations shall not be discharged without treatment that removes associated dry cleaning chemicals.

The following BMPs shall be implemented whenever possible:

- Traditional dry cleaning solvents shall be replaced with petroleum solvents with a specific gravity less than 1.0. These solvents present a lower fire hazard and are typically less mobile if released to the environment.
- Dry-to-dry machines are preferred to transfer machines because of the elimination of the need to transfer solvent-laden garments from a washer unit to a dryer unit, which reduces solvent vapor loss.

- A hamper enclosure or a room enclosure of impermeable construction shall be installed to reduce solvent release during transfer. Distillation equipment designed to allow still bottoms to be removed without opening the still is preferred.

4.6 FURNITURE STRIPPING OR REFINISHING

The use of a site for furniture stripping or refinishing is prohibited in a 1-Year Capture Zone, if the site possesses a regulated substance exceeding 55 gallons aggregate for liquids or 440 pounds aggregate for dry weight. If the use is allowed consistent with the WHP Ordinance, all applicable standards contained in this document shall be met.

4.7 RECYCLING, SCRAP AND SALVAGE OPERATIONS

Scrap and salvage operations including, but not limited to, those related to auto, appliance, and machine parts are prohibited in the 1-Year, 5-Year and 10-Year Capture Zones. The following Standards apply to all scrap and salvage operations, including existing non-conforming sites within the Capture Zones:

- The site shall be designed to consolidate, contain, and collect differing sources of hazardous substances into manageable point sources. For efficiency, and to prevent contamination of areas not specifically designed for certain activities, the site shall be segregated into specific areas especially equipped for receiving, holding, dismantling, cleaning, inventory, parts storage, core storage, fuel storage, special waste storage, crushing, sales, shipping, receiving, and the office (as applicable to the proposed use). There shall be a logical relationship between these areas so that salvaged materials flow smoothly from area to area and eventually offsite.
- The receiving area shall be designed for temporary storage prior to any dismantling or transfer to a longer-term storage area. This area shall have an impervious surface and be able to sufficiently contain damaged, leaking items. Fluid-containing items, including vehicles, shall be inspected for leaks or unwanted contents at the time of receiving.
- Any fluid removal from salvaged items shall be conducted as soon as possible after receiving the item and shall be performed in an area equipped to drain fluids into appropriate collection containers. Any dismantling of fluid-containing items shall be conducted in an area equipped to drain fluids into appropriate collection containers. The area shall be able to fully contain spills from these containers and the work area.
- Steam cleaning of parts shall be conducted only when absolutely necessary and only in an area capable of fully containing associated wastewater for appropriate disposal.
- The site shall have an established secure area to store certain components of vehicles and other materials that pose special hazards, such as mercury switches, airbags containing sodium azide propellants, lead-acid or lithium batteries, electronic devices, tires, and oily rags. The site shall be able to accommodate storage of various fluids, which, depending on items received and processed,

could include gasoline, diesel fuel, motor oil, transmission oil, power steering fluid, brake fluid, hydraulic fluid, differential fluid, antifreeze, windshield washer fluid, refrigerants, battery acid, cleaning solvents, and contaminated water. Waste fluid storage areas and containers shall conform to the Standards (Section 3.4).

- Once all fluids have been drained and there is no possibility of regulated substances being released to the environment, salvaged items may be stored in a long-term storage area until the item is sold or otherwise disposed.
- Scrap vehicles or other units brought into a commercial junk yard shall have all fluids removed in accordance with current local, state, and federal regulations before onsite crushing. The crushing area shall be adequately contained to capture any residual fluids.
- Certain parts that can be remanufactured or rebuilt have intrinsic value, unless seriously damaged. These parts are removed and stored prior to being sold and will usually contain fluids and lubricants. Such parts shall be stored on an impervious, contained surface.
- Concrete or asphalt surfaces at junk and salvage yards shall be properly designed to minimize cracking as they age. These surfaces are required to be sealed with epoxy or another chemical resistant material, as necessary.

4.8 MOTOR VEHICLE REPAIR/SERVICE SHOPS AND/OR BODY REPAIR

Motor vehicle repair/service shops and body repair shops are prohibited in the 1-Year Capture Zones where the possession or control of a regulated substance exceeds 55 gallons aggregate for liquid materials or 440 pounds aggregate for dry weights. Refer to the WHP Ordinance for relevant Use-Specific Standards and other conditions of use.

The following Standards apply to all existing and proposed motor vehicle repair/service shops and/or body repair shops:

- Vehicle repair and service shall be performed indoors, and appropriate containment shall be provided.
- Floor drains in service bays and vehicle washing areas shall either be connected to a holding tank with a gravity discharge pipe, to a sump that pumps to a holding tank, or to an appropriately designed oil/grit separator that discharges to a municipal sanitary sewer.
- Vehicle washing shall be conducted at a commercial car wash, especially when cars only need to be washed occasionally. Onsite vehicle washing shall be performed in accordance with these Standards (Section 4.2).
- Service bay floors and service pits shall be constructed of concrete and sealed with an impervious material to facilitate clean-up without using solvents.

- Areas where vehicles are stored or repaired shall have provisions for containment of vehicle leaks and shall be paved with impervious material.
- Parts cleaning and degreasing shall be isolated from other operations, located within a containment area with no direct access outside the facility, and the floor shall be sealed with a suitable impermeable material.
- Auto body painting shall be done in a separate, ventilated secure area with no floor drains.

4.9 PLATING AND ANODIZING

Metal plating, polishing, etching, engraving, anodizing, and similar processes are prohibited in the 1-Year Capture Zones where the possession or control of a regulated substance exceeds 55 gallons aggregate for liquid materials or 440 pounds aggregate for dry weights. The following Standards apply to all existing and proposed plating, polishing, etching, engraving, anodizing, and similar facilities, and the existing non-conforming sites in the 1-Year Capture Zones:

- Facilities shall minimize or eliminate the use of particularly hazardous plating chemicals.
- Plating operations and regulated substance storage and use shall be performed consistent with these Standards, impervious surfaces and containment shall be provided (Section 3.3).
- All plating operations and storage of regulated substances shall be performed indoors.

4.10 TRUCKING AND BUS TERMINALS

Trucking and bus terminals are prohibited in 1-Year Capture Zones where the possession or control of a regulated substance exceeds 55 gallons aggregate for liquid materials or 440 pounds aggregate for dry weights. The following standards apply to all existing and proposed trucking and bus terminals, including existing non-conforming sites in the 1-Year Capture Zones:

- All parking at terminals shall occur on impermeable surfaces, except where otherwise approved by the City. In Capture Zones, grading to a containment area (holding tank, curbing, etc.) may be required. Large parking areas shall meet the requirements of the Standards presented in this document (Section 5.0).
- If fueling takes place at the terminal, all requirements in Section 3.0 and 4.0 shall be followed.
- Vehicle maintenance shall be conducted indoors in a contained area or offsite (Section 4.8).
- If onsite cleaning of trucks or buses is proposed to be conducted, full containment of wash water is required (Section 4.2).
- Onsite painting of trucks/buses is not permitted without City approval.
- Regulated substances loading/unloading areas shall meet the requirements of Section 3.2.3.

5.0 STORMWATER MANAGEMENT REQUIREMENTS

The primary objectives of stormwater management in the City are to: 1) achieve pre-development conditions with respect to stormwater runoff rates and volumes in an effort to reduce and control infrastructure surcharging; 2) maintain or increase the quality of surface water and groundwater resources; 3) provide source water protection within Capture Zones; and, 4) maintain compliance with the City's Municipal Separate Storm Sewer System (MS4) Stormwater Program National Pollutant Discharge Elimination System (NPDES) Permit and associated Certificate of Coverage (COC). The quality and sustainability of the City's drinking water (groundwater) and surface water resources depend on the management of stormwater runoff.

The following general strategies for minimizing stormwater volume and improving stormwater quality shall be evaluated for all sites and used at all site plans, where appropriate:

- Accommodate stormwater that complements the natural drainage patterns, maintains the integrity of stream channels for both their drainage and biological functions, and protects wetlands.
- Reduce or maintain impervious surface area.
- Prevent erosion and sedimentation.
- Provide naturalized stormwater treatment for parking lot runoff using bioretention basins, rain gardens, vegetative filter strips, and/or other BMPs that can be integrated into landscaped areas and traffic islands, where allowed and appropriate.
- Direct rooftop runoff to pervious areas such as yards, open areas, or vegetated areas (e.g., rain gardens), thus avoiding rooftop runoff to the roadway and stormwater collection system.
- Use native vegetation, where practical, to reduce the need for chemical applications and enhance plant root absorption of infiltrated stormwater. Non-vegetative stormwater treatment structures will be incorporated if naturalized treatment systems are not practical or consistent with these Standards.
- Maintain or increase onsite storage of stormwater and subsequently groundwater recharge by allowing non-polluted stormwater infiltration in designated areas.

5.1 UNIFORM STORMWATER STANDARDS

Project Site Size - For the purposes of these Standards, a site:

- < ½ acre (21,780 square feet) is considered a "**small site**".
- ≥ ½ acre (21,780 square feet) up to 1 acre is a "**medium site**".
- > 1 acre is considered a "**large site**"; and,
- Parking lot(s) with a cumulative total of ≥ 20 parking places and/or exceeding 6,000 square foot area is considered a "**large parking area**."

Stormwater Runoff Calculations and Associated Information

For all projects/sites, pre- and post-development stormwater runoff calculations shall be determined using the Worksheet 1 - Stormwater Calculations available at the following website and the completed form shall be submitted with the site plan: https://www.kalamazoocity.org/Business-Development/Project-Review/Apply-for-Site-Plan-Review/Site-Plan-Review-Forms-and-Documents. At the City's discretion this requirement may be waived for the following types of projects/sites, but only when no impacts to stormwater runoff are anticipated: cell tower antenna and equipment mounting/replacement, interior renovations, and sites ≤ 0.25 acres in area.

STANDARD 1: A water quality treatment runoff volume of 1-inch generated from the entire site that contributes to runoff is required for medium sized sites, large sites, and those with large parking areas. The Worksheet 1 - Stormwater Calculations calculates this volume in cubic feet by, multiplying the site area (square feet) by 1/12 feet (0.083).

For the purpose of selecting the appropriate size of a stormwater Manufactured Treatment Device or other acceptable BMP, the Water Quality Treatment Flow Rate (Q) shall be calculated using the Worksheet 1 - Stormwater Calculations which uses the Rational Method Equation: Q = CIA, where

Q = Discharge rate in cubic feet per second (cfs)
C = Runoff coefficient depending on the characteristics of the drainage area
I = Rainfall intensity in inches/hour
A = Drainage area in acres (ac)

The runoff coefficient (C) shall be the weighted average that is based on the percentage of different surface types shown on the Worksheet 1 - Stormwater Calculations.

The rainfall intensity (I) shall be equal to a 1-year 30-minute storm (1.65 inches/hour) or the 90% annual non-exceedance storm, whichever is greater, using current data from the nearest National Oceanic and Atmospheric Administration (NOAA) weather station (Kalamazoo State Hosp – Site ID: 20-4244). Estimates for the precipitation values are referenced in Attachment 7: Precipitation Intensity, Duration and Frequency Table.

The drainage area (A) means the entire upstream land area which drains to and from that location.

In addition:

- The BMP shall be designed to treat 100% of the flow without bypass at the calculated water quality treatment flow rate; and,
- The BMP shall have the capacity to retain floatables and sediment without loss.

Small sites do not require a water quality treatment volume unless water quality discharge is a concern due to land use characteristics that pose a high risk to water quality. City-approved catch basin inserts may only be used on small sites as a water quality treatment BMP and when hydrodynamic separators and other BMPs are not physically practical due to site characteristics, such as depth to groundwater, hydraulics, etc.

To meet the objective of Standard 1, the BMP selected to treat the water quality volume shall be designed on a site-specific basis to achieve a minimum of 80% removal of Total Suspended Solids (TSS), as compared with uncontrolled runoff, or a discharge concentration of TSS that does not exceed 80 mg/L. Many BMPs are sufficient individually to achieve the required removal of TSS. Compliance can also be achieved through use of a system of BMPs that cumulatively reach the 80% reduction factor. If MTDs are selected as BMPs, they shall be NJCAT verified and NJDEP certified (or better) to satisfy the Water Quality Treatment Volume Standard, unless otherwise approved by the City. The model/size of the certified unit shall be selected on the basis of effectively pre-treating stormwater at the calculated water quality flow rate. The NJDEP 50% Certified TSS Removal Rate approximates 80% net TSS reduction for the Kalamazoo region.

The effective removal of TSS and implementation of other stormwater control strategies by other proposed BMPs will be estimated by reference sources such as: “Low Impact Development Manual for Michigan," SEMCOG, 2008; "Non-Point Source Best Management Practices Manual,” EGLE, 2017; and/or other City of Kalamazoo acceptable industry standard technical manuals used for estimating stormwater pollutant load reductions by BMPs. Worksheet 2 - Uniform Stormwater Standard 1: Water Quality Treatment Volume and MTD shall be prepared and submitted to demonstrate compliance with this Standard.

STANDARD 2: A Channel Protection Performance Standard is required to maintain the post-development project site runoff volume and peak flow rate at or below pre-development levels for all storms up to the 2-year 24-hour storm or 2.59 inches (whichever is greater), using current data from the nearest NOAA weather station (Kalamazoo State Hosp – Site ID: 20-4244). This standard is required for all sites ≥ 0.5 acre (medium and large sites). If the post-development runoff volume is equal to or less than the pre-development runoff volume, the channel protection performance standard is met. The intent of the Channel Protection Performance Standard is to prevent excess sediment and channel instability caused by the increased rate and volume of stormwater runoff that can result from development. Refer to Section 5.3 for requirements.

STANDARD 3: Stormwater runoff shall be captured and retained/detained properly to protect neighboring properties. The City Engineer or designee will review each site plan for approval on a case-by-case basis to determine if the proposed strategy meets industry standards and is appropriate for the specific site. Specific requirements include grading the site such that stormwater is captured onsite and not allowed to flow onto adjoining properties, into streets, across sidewalks, etc.; designing detention and retention systems to drain completely between runoff events; and providing stormwater storage (detention/retention).

STANDARD 4: On large sites, a minimum 25-foot naturally vegetated buffer system shall be incorporated along all perennial streams, wetlands, and other surface water features to protect water quality, reduce erosion and sedimentation, reduce the potential for flooding, and enhance aesthetics and wildlife habitat. On medium sites, a 20-foot buffer is required; on small sites, a 15-foot naturally vegetated buffer is required.

STANDARD 5: All reasonable efforts shall be made to maintain and protect wetlands. If loss cannot be avoided, wetland mitigation shall be accomplished on the same site and be approved by the City and EGLE. Mitigation shall adhere to the standards provided in the Wetland Mitigation Section under Part 303, Wetlands Protection, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended — regardless of the size of the wetland. The EGLE permit shall be submitted to the City prior to plan approval.

STANDARD 6: All reasonable efforts shall be made to maintain and protect floodplains. If a loss cannot be avoided, floodplain mitigation at a 1:1 ratio of new floodplain volume to former floodplain volume shall be accomplished within the same stormwater system sub-drainage basin (the land area that drains to a single City outfall) and approved by the City and EGLE. All proposed site work within floodplains shall be approved by EGLE. Permits or other associated correspondence shall be provided to the City prior to plan approval.

STANDARD 7: In all areas, the maximum design flow rate or volume of stormwater discharged from the site shall not impair or exceed the capacity of the downstream stormwater collection system, open channel, watercourse, wetland, or overland flow path. Onsite detention/retention for up to a 100-year 24-hour storm may be required (depending on site location).

STANDARD 8: A Stormwater Management Practices Operations and Maintenance Agreement (Attachment 3) is required by and between the City of Kalamazoo and the owner of the property that has incorporated stormwater BMPs including: manufactured treatment devices, retention or detention basins/systems, subsurface infiltration beds, bioretention, vegetated swales, porous pavement, etc.

All treatment and storage BMPs are required to be listed and shown in the Agreement in Attachment 3. When a Landowner is making improvements to the Property that require approval under the City's Site Plan Review process, or is modifying the existing stormwater discharge system on the property that either impacts the City's system or the retention of stormwater on the property, an Agreement is required. As a result of those uses, improvements or modifications, the Landowner agrees: (i) to install and maintain stormwater BMPs on the Property in accordance with approved plans and conditions; and (ii) to ensure that the BMPs continue serving the intended function in perpetuity. The Landowner shall annually submit a report to the City regarding the inspection, operation, and maintenance for each of the stormwater MTDs and other BMPs. The Landowner shall submit one or more of the Stormwater Treatment Inspection Report forms provided in Attachment 8, or a comparable form for a site-specific MTD or BMP.

Table 3

Site Size Applicability to Stormwater Standards

Site Size	Standard 1	Standard 2	Standard 3	Standard 4	Standard 5	Standard 6	Standard 7	Standard 8
Small	-	-	X	15 ft Buffer	X	X	X	X
Medium	X	X	X	20 ft Buffer	X	X	X	X
Large	X	X	X	25 ft Buffer	X	X	X	X

**Small Site < 1/2 acre; Medium Site ≥ 1/2 acre up to 1 acre; Large Site > 1 acre

5.2 STORMWATER DISCHARGE STANDARDS

Stormwater discharge strategies shall be dependent on the sites location relative to Capture Zones, previous and proposed land uses, site zoning designation(s), groundwater contamination risk assessment, potential for onsite soil and/or groundwater contamination; potential impacts to the MS4 and surface water features; and all other relevant physical characteristics of the site. Stormwater discharge strategies have been incorporated into the following City-adopted Stormwater Discharge Standards that shall be used during site development and redevelopment, or as otherwise deemed necessary to maintain regulatory compliance with the City's MS4 NPDES Permit or objectives of the EGLE-approved WHPP. Table 4 (below) summarizes the discharge strategy for different land-use risk designations. Refer to Section 2 for land-use risk designations based on land use and zoning.

STANDARD A: Within 1-Year Capture Zones, sites with high-risk land uses and/or those exceeding 55 gallons aggregate for liquid materials or 440 pounds aggregate for dry weights, shall discharge to surface water with pretreatment and shall have the required spill containment volume (Section 6.0).

STANDARD B: Within 1-Year Capture Zones, sites with low-risk land uses, shall discharge to surface water with pretreatment. Groundwater infiltration may be allowed if pretreatment is provided, and the site is not contaminated. Large parking areas (refer to Standard E) and regulated substance storage areas are required to have pretreatment and the required spill containment volume (Section 6.0).

STANDARD C: Within 5-Year and 10-Year Capture Zones associated with high-risk land uses and/or those exceeding the 55 gallon/440 pound aggregate thresholds for regulated substances, stormwater infiltration may be allowed with pretreatment and the required spill containment volume; provided the site is not contaminated and adequate containment is provided if regulated substances are stored or used onsite.

STANDARD D: In low-risk land use areas within 5-Year Capture Zones, infiltration is allowed with pretreatment, provided the site is not contaminated and adequate containment is provided if regulated substances are stored or used onsite.

STANDARD E: Parking areas designed to accommodate 20 or more vehicles or exceed 6,000 square feet (large parking areas) shall be paved with concrete, asphalt, or an equivalent smooth impervious surface with a minimum 1% cross slope to prevent ponding of water. These parking areas shall be graded such that all runoff is directed to a collection system with pretreatment, to minimize the potential for pollutants to migrate offsite or into groundwater.

Parking areas located outside Capture Zones with limited or short-term use (e.g., churches or similar) that exhibit limited potential for release of regulated substances, may be granted exceptions or modifications to the above requirements.

<u>The following applies to existing parking areas:</u>

- If parking lot resurfacing (i.e., mill and fill) is proposed, the parking lot does not typically need to be brought up to current standards unless major issues are identified during plan review.
- If a portion of a parking lot will be reconstructed (full depth Hot Mix Asphalt (HMA)/concrete removal, full depth HMA milling or pulverizing, etc.), that portion of the parking lot shall be constructed to current standards (treatment, detention, grading, etc.), and treatment shall be sized appropriately for the entire area contributing to runoff.
- If the entire parking lot will be reconstructed (full depth Hot Mix Asphalt (HMA)/concrete removal, full depth HMA milling or pulverizing, etc.), the entire parking lot shall be constructed to current standards.
- When determining the required stormwater storage volume (detention/retention) for an existing asphalt, concrete, or other parking lot refer to Section 5.3.

STANDARD F: Within 10-Year Capture Zones, stormwater infiltration is preferred with low-risk land uses. Large parking areas require pretreatment.

STANDARD G: In areas outside the Capture Zones, infiltration of stormwater is preferred to promote groundwater recharge. All lots or parcels shall retain and infiltrate stormwater onsite, unless the site is limited to only surface water discharge due to contamination or a shallow groundwater table. Sites with high-risk land uses and those with large parking lots require pretreatment and/or spill containment. Table 4 summarizes the discharge strategies for different land-use risk designations.

Table 4: Stormwater Discharge Strategy

Infiltration to Groundwater and MS4 Connection

Capture Zone	Applicable Standards	High-Risk Land Use[1] and/or Above Quantity Thresholds[1]	Low-Risk Land Use
1-Year Capture Zones	A, B, E	• No stormwater infiltration. • Pretreatment with spill containment volume[3] is required.	• Pretreatment is required for stormwater infiltration[4]. • Certain parking areas[2] and all regulated substance areas require pretreatment with spill containment volume[3].
5-Year Capture Zones	C, D, E	• Pretreatment with spill containment volume[3] is required for stormwater infiltration[4]. • Certain parking areas[2] and all regulated substance areas require pretreatment with spill containment volume[3].	• Stormwater infiltration allowed pending site-specific evaluation[4]. • Pretreatment is required for stormwater infiltration. • Certain parking areas[2] and all regulated substance areas require pretreatment with spill containment volume[3].
10-Year Capture Zones	C, E, F	• Stormwater infiltration allowed pending site-specific evaluation[4]. • Certain parking areas[2] and all regulated substance areas require pretreatment with spill containment volume[3].	• Stormwater infiltration preferred pending site-specific evaluation[4]. • Certain parking areas[2] and all regulated substance areas require pretreatment and/or containment.
Outside Capture Zones	E, G	• Stormwater infiltration preferred pending site-specific evaluation[4]. • Certain parking areas[2] and all regulated substance areas require pretreatment and/or spill containment volume[3].	• Stormwater infiltration preferred pending site-specific evaluation[4]. • Certain parking areas[2] require pretreatment.

[1] Refer to Tables 1 and 2 for High-Risk Land Use designations. Sites with "Moderate Risk" shall be evaluated on a case-by-case basis.

Regulated Substance Thresholds: 55 gallons aggregate for liquid materials and 440 pounds aggregate for dry weights.

[2] 20 or more parking spaces or >6,000-square-foot paved area.

[3] Refer to Section 6.0 for requirements.

[4] Refer to Section 5.4 for Infiltration Requirements.

5.3 DETENTION / RETENTION

Onsite storage (retention and/or detention) of stormwater is required at all sites ≥ 0.5 acre and may be required at small sites (< 0.5 acre), consistent with Standards 3 and 7. All detention and retention systems shall be designed to fully drain between runoff events; and if connected to the City's storm sewer system (MS4), shall have a controlled release structure with an appropriately sized orifice at an elevation corresponding to the lowest elevation of the storage system (if the system does not infiltrate) and an overflow with an elevation corresponding to the top of the storage system. If pretreatment and underground storage are proposed, pretreatment shall be upstream to the storage system. Where controlled release is required (only systems that do not infiltrate), the orifice diameter shall not be less than 3-inches in diameter.

The required storage volume shall be determined by calculating the difference between the pre-development and post-development runoff volume and rate using the Rational Method for the 2-year, 24-hour storm (unless the City requires a higher volume or intensity design storm, such as, Natural Features Protection areas, and Standard 3 and 7 areas). If the post-development volume or rate exceeds the existing volume or rate, then appropriate controls shall be implemented to make post-development runoff volume and rate equal to or less than pre-development conditions for all storms up to the required design storm.

When determining required detention or retention volumes, (i) "pre-development" conditions shall be 100% forested for all sites; and (ii) developed sites with existing impervious coverage (or impervious coverage that existed within 5 years of plan submittal) may apply up to a 50% credit (allowance) for existing impervious coverage, where allowed (example: if a site is 100% impervious, existing conditions shall be 50% forested and 50% impervious). Stormwater calculations shall be submitted with the plans to demonstrate compliance with this requirement.

<u>General Detention/Retention Requirements:</u>

- Existing ("pre-development") conditions shall be 100% forested with a maximum 50% credit for existing impervious coverage when calculating the pre-development runoff conditions for sites with existing impervious coverage.
- Storage (detention/retention) systems shall fully drain between runoff events.
- Orifices shall only be installed on systems that do NOT infiltrate and the orifice diameter shall NOT be less than 3-inches in diameter.
- Sites where connection of a controlled release structure/overflow to the MS4 is not feasible shall provide onsite detention and infiltration for a minimum 10-year, 24-hour storm, where feasible.
- For sites where new roofs, eaves, gutters, and/or downspouts are proposed, storage shall be provided, where feasible; and runoff shall NOT be directed toward streets, sidewalks, or adjoining properties (without a drainage agreement between Landowners).

5.4 INFILTRATION

Infiltration of stormwater is preferred at all sites; but is dependent on previous and proposed land use(s), zoning designation, site location relative to capture zones, and whether the site is contaminated. Infiltration shall be allowed at sites on a case-by-case basis following City review of site-specific data. If infiltration is proposed, the following shall be provided to the City for review to determine if infiltration will be allowed:

- **For all sites**:
    - Soil borings shall be advanced in proposed infiltration areas at the proposed infiltration depth(s) and soil boring logs shall be submitted to the City for review;
    - Site soil(s) shall be conducive to infiltration;
    - Infiltration through potentially contaminated fill materials/soil or contaminated soil and/or groundwater is NOT allowed.
    - Contaminated or potentially contaminated soils may be removed and properly disposed to facilitate site infiltration, provided that groundwater beneath the site is not contaminated; and,
    - If available or the City determines it relevant, environmental reports (Phase I ESA, Phase II ESA, BEA, etc.) shall be provided to the City for review.
- **For sites within Capture Zones** (where infiltration is allowed, pending site review):
    - Soil and groundwater samples shall be collected from proposed infiltration areas (at the proposed infiltration depth(s)) and analyzed for any potential chemicals of concern (typically volatile organic compounds (VOCs), polynuclear aromatics compounds (PNAs) and Michigan 10 Metals) to ensure that the proposed infiltration will not exacerbate existing onsite contamination.

5.5 NATURAL FEATURES PROTECTION AREAS

Natural Features Protection (NFP) Areas exist throughout the City. These areas have additional stormwater management requirements. These requirements are outlined in Chapter 50 of the City of Kalamazoo Code of Ordinances, NFP Overlay Standards Ordinance (NFPO) Chapter § 50-6.2.

To determine if a site is located in an NFP area, refer to the City's online GIS (https://www.kalamazoocity.org/Residents/Taxes-Assessing/View-GIS-Maps) under the Planning & Zoning Layer.

The NFP Overlay District is intended to protect natural features in the City, specifically wetlands, water resources, trees, woodlands, floodplains, slopes, natural heritage areas, and habitat corridors.

The following are general stormwater management requirements for all developed and undeveloped sites within NFP Areas with citations from the NFPO:

- Wellhead Protection Overlay Map 10-Year use restrictions apply in all NFP areas (NFPO § 50-6.2J(2)(a) for sites within 300 feet of a wetland or water resource);
- Wellhead Protection Overlay Map 1-Year and 10-year use restrictions apply within 500 feet of a water resource or wetland (NFPO § 50-6.2J(2)(b)).
- Stormwater BMP installation is prohibited within specified setbacks for wetlands, slopes, etc. (NFPO § 50-6.2C(3)(b)[2], § 50-6.2D(2)(b)[2], § 50-6.2G(4)(b), § 50-6.2H(3)(d)[2], and § 50-6.2H(3)(d)[3]);
- Parcels 1/2 acre or greater shall maintain the post-development project site runoff volume and peak flow rate at or below pre-development levels for all storms up to the 10-year, 24-hour storm (NFPO § 50-6.2J(6)(a));
- Water quality treatment runoff volume standard. The first 1-inch runoff generated from the entire parcel must be treated using one of the following:
    - Multiple methods. Two or more BMPs shall be utilized with at least 25% of the required runoff volume treated by BMPs from the Low Impact Development Manual for Michigan (SEMCOG, 2008), Table 7.1 BMP Matrix Table from Runoff Volume/Infiltration and Runoff Volume/Non-infiltration Categories (NFPO § 50-6.2J(6)(b)[1]).
    - Underground methods. All required runoff shall be treated by underground detention or infiltration BMPs (NFPO § 50-6.2J(6)(b)[2]).
    - Non-infiltration methods. Sites requiring non-infiltration BMPs, such as those with contamination or within Wellhead Protection Overlay areas, use BMPs from Low Impact Development Manual for Michigan (SEMCOG, 2008), Table 7.1 BMP Matrix Table, Runoff Quality/Non-infiltration Category (NFPO § 50-6.2J(6)(b)[3]).

This list is not intended to be all inclusive and the ordinance should be reviewed and implemented during plan development.

5.6 STORM SEWER CAPACITY DESIGN

The storm sewer capacity design shall meet the following requirements:

- **Minimum 12-Inch Requirement:** All storm sewer piping shall be a minimum of 12 inches in diameter, including but not limited to:
    - Storm sewer within the public right-of-way (ROW),
    - Storm sewer connecting to the City's MS4,
    - Piping serving parking lot catch basins,
    - Piping serving curb inlets,
    - Piping serving ditch inlets, and
    - Piping serving any structure with a vertical outlet throat diameter of 12 inches or greater.

- **Pipe Sizing Based on Hydraulic Capacity:** Storm sewer pipe diameters shall be increased beyond the 12-inch minimum where required to convey the design storm. All storm sewer systems shall be hydraulically sized to convey the 10-year, 24-hour storm event without the hydraulic grade line exceeding structure rim elevations.
- **Exceptions for Small-Diameter Inlets:** The following exception applies only to small-diameter inlets:
    - Storm piping connected to an inlet with a vertical outlet throat diameter less than 12 inches may match the diameter of that outlet, provided:
        1. The horizontal pipe is not less than 6 inches in diameter, and
        2. The inlet does not serve paved vehicular areas, and
        3. The horizontal pipe provides required hydraulic capacity.
    - Multiple small-diameter inlets may connect to a common lateral prior to transitioning to a pipe 12 inches or greater in diameter.
    - Exception for small-diameter inlets shall not supersede hydraulic capacity requirements.

6.0 TREATMENT AND SPILL CONTAINMENT

Acceptable types of BMPs that can meet treatment, storage, and spill containment requirements for stormwater quality can be found in the following documents: Low Impact Development Manual for Michigan (SEMCOG, 2008), Michigan Nonpoint Source Best Management Practices Manual (EGLE, 2017), and other available reference materials and manuals. A Stormwater Operations and Maintenance Agreement (Attachment 3) between the City and the Landowner or designee is required for all treatment and spill containment BMPs.

Maintenance responsibility shall be vested with the owner or authorized operator. At a minimum, a maintenance plan shall include the following components:

- Annual inspection of all onsite treatment, storage and spill containment BMPs, including catch basins, underdrains and outlets.
- Sediment shall be removed when it reaches a depth equal to 10% of the required detention/retention/containment volume or 30% of the sump volume for catch basins and MTDs.
- Maintenance, repair or filter media replacement shall occur when the BMP is not functioning properly (i.e., water not infiltrating, inadequate contaminant removal, plugged/broken piping, etc.).
- If a pollutant spill occurs, spilled materials and all impacted surfaces and media shall be properly cleaned, removed, disposed and/or replaced.
- Eroded and barren areas shall be re-vegetated as soon as possible. Trash and debris shall be removed on a regular schedule.

Spill Containment Volume

Stormwater spill containment may be required as an additional component of pretreatment to protect both surface water and groundwater from pollutant spills/discharges. Spill containment is required to protect both groundwater and surface water from pollutant spills at the following:

- All sites within 1-Year Capture Zones with high-risk land use(s), large parking areas, or regulated substances;
- Certain sites within 5-Year and 10-Year Capture Zones with high-risk land use(s);
- Sites above regulated substance thresholds within all Capture Zones; and,
- Sites with high-risk land use(s) or above regulated substance thresholds, regardless of proximity to Capture Zones, if deemed appropriate to safeguard environmentally sensitive areas, including but not limited to surface water.

The minimum required Spill Containment Volume is equivalent to 30% of 0.5 inch of runoff per impervious acre (30% of 1,815 cubic feet (ft^3). The spill containment volume is given by the following equation:

V = Spill Containment Volume
V = 0.3 (1,815 ft^3 per impervious ac.) = 544.5 ft^3 per impervious ac. = 4,073 gallons per impervious ac.

A minimum spill containment volume of 400 gallons shall be provided. The minimum volume is allowable only on small sites without large parking areas. The minimum required spill containment volume for existing developed sites shall be calculated using the proposed development/redevelopment area of the site, unless the City determines that greater containment volume is required.

In general, measures meeting spill containment standards shall have an impermeable barrier between the contained material and underlying soil/groundwater; have provisions for the capture of oil, grease, and sediments; and meet the volume requirement. Spill containment may be provided by one or more of the following BMPs:

- Spill containment cell,
- Water quality swale,
- Proprietary stormwater treatment system,
- Interceptor tank (where allowed), or
- Other devices, as approved by the City.

6.1 SPILL CONTAINMENT CELL

A spill containment cell may be used to trap and localize incoming sediments and to capture slug pollutant loads from accidental spills of regulated substances. A spill containment cell (Figure 3) shall have the following characteristics, unless otherwise approved by the City:

- The spill containment cell shall be a wet basin with an impermeable bottom and sides to the design high-water level.
- The minimum surface area shall be 25% of the required volume.
- The length-to-width ratio shall be a minimum of 3:1 and a maximum of 4:1 to allow for adequate hydraulic length yet minimize scour velocities.
- The minimum hydraulic length shall be equal to the length specified in the length-to-width ratio.
- The minimum diameter of the transfer pipe, between the spill containment cell and downstream infrastructure, shall be 12 inches or sized for the highest intensity 10-year storm (minimum),

whichever is greater.

- The overflow structure from the spill containment cell shall be sized for the peak inflow from the highest intensity 10-year storm (minimum).
- The spill containment cell shall have a minimum 1-foot-deep sump below the inlet pipe for sediment accumulation.
- The outlet pipe shall be designed to draw water from the central portion of the water column within the cell, to trap floatables, and to contain sediment. The crown of the outlet pipe shall be located vertically, a minimum of 1 foot below the normal water level and a minimum of 1.5 feet from the bottom of the spill containment cell (minimum depth of the permanent pool is 2.5 feet if a snout style outlet pipe is used).
- The bottom and sides shall be lined with a minimum 60 mil thick impermeable liner or minimum 18-inch thick clay liner with maximum hydraulic conductivity less than or equal to 10^{-7} cm/sec.
- The liner material and all other construction materials shall be chemically compatible with regulated substances that are stored, used, transferred or manufactured onsite.

6.2 WATER QUALITY SWALES

Figure 4 depicts a dimensioned water quality swale. Water quality swales may be used for treatment and/or spill containment. If used for spill containment, the water quality swale shall be designed to contain the spill containment volume without release. If the water quality swale receives runoff from a high-risk land use or zoning district, the owner/operator shall indicate in the site's SCP actions to be taken to contain the spill prior to it leaving the downstream manhole/catch basin.

The following is a summary of required characteristics of a water quality swale:

- A minimum 25-foot vegetated buffer is required between directly contributing impervious surfaces and the water quality swale.
- The swale and outlet shall be sized for the highest intensity 10-year storm (minimum).
- Perforated underdrain pipe(s) shall be bedded in coarse aggregate (river rock or similar – MDOT 4A, 6A, etc.).
- Inlets shall have a riprap apron to dissipate the velocity of incoming stormwater runoff.
- The swale shall have a minimum bottom width of 2 feet.
- Side slopes shall be 3:1 (horizontal **:** vertical) or flatter.
- The sand filter shall be minimum 24 inches thick, and the sand filter media shall meet MDOT Class II or III requirements for granular materials.
- Filter fabric shall be nonwoven geotextile.

- The bottom and sides of the swale shall be lined with a minimum 60 mil thick impermeable liner or minimum 18-inch-thick clay liner with maximum hydraulic conductivity less than or equal to 10^{-7} cm/sec.

6.3 STORMWATER MANUFACTURED TREATMENT DEVICES

Manufactured Treatment Devices (MTD) shall be identified on the plans and manufacturer's documentation shall be provided which verifies the MTD will function as required. Acceptable proprietary stormwater treatment systems shall be NJCAT verified and NJDEP certified, or better, and shall be approved by the City. Proprietary stormwater treatment systems can be used alone or in combination with other BMPs to meet treatment and spill containment requirements.

Catch Basin / Inlet Inserts

Only small sites are allowed to use City-approved catch basin/inlet inserts that provide treatment through vertical (gravity-based) flow only. These systems require a suitable treatment media (filter) for the subject contaminants of concern at the subject site. Typically, these systems are used on small high-risk sites (e.g., gasoline stations or large parking lots) where larger devices are not practical. The inserts shall be capable of treating the first 1-inch of rainfall (the first flush) and shall have the capacity to allow flows from the highest intensity 10-year storm to pass without causing surface ponding.

Other Devices

Other devices may be approved for treatment and/or spill containment on a case-by-case basis, provided they meet the minimum requirements presented in these Standards, including but not limited to, the required minimum: TSS removal, treatment volume, spill containment volume, and/or flow rate(s). A device with a snout style outlet designed to contain sediment, floatables, and substances with a specific gravity less than 1.0 is an example of a device that may be approvable, provided the minimum requirements are met for the application. Test results and/or detailed calculations for the proposed device that demonstrate compliance with these Standards shall be provided.

7.0 NON-CONFORMING LAND USES

A non-conforming use is defined as any existing use that, as of the effective date of the City's original WHP Ordinance (May 21, 2007), would otherwise be prohibited within a designated Capture Zone. Refer to the Kalamazoo Code of Ordinances Chapter § 39-8 Continuation of existing nonconforming facilities and land uses.

7.1 CONFORMANCE WITH STANDARDS

Existing non-conformities will be allowed within a Capture Zone only if in accordance with the Kalamazoo Code of Ordinances Chapter § 39-8 Continuation of existing nonconforming facilities and land uses.. Non-conforming land uses pursuant to the WHP Ordinance shall meet the requirements of the Standards established in this document and/or shall prepare a Spill Contingency Plan for the Public Service Director's approval. The City reserves the right to approve/determine which option(s) is to be implemented for the specific circumstance.

Proposed development/redevelopment at existing non-conforming sites shall at a minimum meet or exceed the Standards presented herein, to bring the redeveloped portion of the site into compliance with current Standards. The City encourages all portions of the site to be brought into compliance during redevelopment activities and may require deficiencies beyond proposed project boundaries (redeveloped areas) to be brought into compliance prior to plan approval, depending on the severity of the deficiency(s) and associated risk(s).

7.2 SPILL CONTINGENCY PLANNING

A Spill Contingency Plan or equivalent environmental contingency plan shall be prepared and provided to the City for all existing and proposed sites that generate, store, use, transfer, or manufacturer regulated substances in quantities exceeding 55 gallons aggregate for liquid materials or 440 pounds aggregate for dry weights ; and an SCP may be required if the proposed land use poses a direct or potential significant adverse impact to a wellfield or surface water feature. SCPs or equivalent plans for the site may be submitted to the Water Programs Manager for review to meet these requirements for the Public Services Director's approval.

7.2.1 REGULATED SUBSTANCE INVENTORY

The City's Department of Public Services and Department of Public Safety collaborate in the collection of chemical storage information for the purposes of the Wellhead Protection Program, Stormwater Management Program, and the Fire Fighters Right-to-Know Program. For this purpose, a Chemical Inventory and Storage Form is required to be completed and submitted for review prior to site plan approval. Refer to Attachment 4 for a copy of the form or download at https://www.kalamazoocity.org/Business-Development/Project-Review/Apply-for-Site-Plan-Review/Site-Plan-Review-Forms-and-Documents.

The completed document may be submitted to the Water Programs Manager at:

Water Resources Division - Department of Public Services
ATTN: Water Programs Manager
1415 N. Harrison Street, Kalamazoo, MI 49007

An inventory of all regulated substances stored at the site shall be provided to the City and maintained by the Landowner or their designee. For each regulated substance, the inventory shall identify the type of storage container, storage location(s), and typical and maximum storage quantities in each storage location. The site shall maintain a file of current Safety Data Sheets (SDS) that includes the hazardous components and percentage by weight of each regulated substance. This SDS file shall be readily accessible in the event of an emergency.

Whenever possible, sites shall select non-hazardous or less-hazardous chemicals. Materials such as oils should be standardized throughout a site to reduce the quantity of leftover material and mixed waste. Practices that minimize waste generation are encouraged.

7.2.2 RELEASE POTENTIAL ANALYSIS

The site shall develop a written analysis of the potential for a release of each regulated substance stored at the site. This analysis shall consider the potential for release during transfer of the regulated substance to and from the storage area, during storage of the regulated substance, and during use of the regulated substance. In addition, the site plan shall evaluate the likely size of a release for each scenario, as well as the likely destination of the release (e.g., to a floor drain, sump, storm drain, etc.). This information shall be compiled in table form for ease of data compilation and use.

7.2.3 RELEASE PREVENTION MEASURES

Considering each potential release scenario, the SCP shall identify release prevention measures that will minimize the likelihood and/or reduce the impact of a release. These measures could include work practices, housekeeping practices, inspection practices, and/or structural controls (e.g., secondary containment). Prevention measures shall be included in the SCP.

7.2.4 RELEASE RESPONSE PROCEDURES

The SCP shall identify procedures to be followed in the event of a release of a regulated substance. Written procedures shall be established both for minor releases, which pose no danger to human health or the environment and can be handled by trained employees in the immediate vicinity of the release, and for releases that have one or more of the following characteristics:

- The spill cannot be contained safely by site personnel,
- The spilled material has entered site soils or a vegetated area, and/or
- The spilled material has left the site and has entered the site's drain system, sanitary sewer, storm sewer, surface water, etc.

In addition, the SCP shall include the following:

- Identification of various site personnel's responsibilities in the event of an emergency.
- Internal site emergency notification procedures (chain-of-command reporting).
- Emergency contact information, including, at a minimum:
    - Key site personnel and emergency coordinators, including at least one 24-hour emergency contact.
    - Local emergency response agencies (e.g., police department, fire department, ambulance).
    - Local, state, and federal agencies, including the City of Kalamazoo's "311 Call Center", EGLE, EPA, and National Response Center.
    - Local spill response contractor(s) able to respond in the event of a significant spill.
- An inventory of onsite spill response equipment and locations.
- Facility maps, evacuation routes, muster points, etc.
- Routine personnel safety and spill response training.

The SCP shall also include procedures for characterization and disposal of waste generated by a release.

7.2.5 USE OF OTHER EMERGENCY RESPONSE PLANS

Many sites using or storing regulated substances are required under state and/or federal law to develop a written spill response plan, such as a Pollution Incident Prevention Plan (PIPP), Spill Prevention Control and Countermeasure (SPCC) Plan, RCRA Contingency Plan and/or Stormwater Pollution Prevention Plan (SWPPP). Provided that all of the elements described above are included in one or more existing emergency response plan, the site may substitute the existing plan(s) for the SCP. If the existing plan(s) addresses part, but not all, of the requirements, the site may prepare an addendum to the existing plan(s) so that all requirements are met.

8.0 POTENTIALLY APPLICABLE ENVIRONMENTAL REGULATIONS

Facility operators subject to regulation under the WHP Ordinance and these Performance Standards shall comply fully with all existing applicable local, state, and federal regulations in addition to any of the requirements herein. These other requirements may include, but are not limited to, material storage, spill prevention, recordkeeping, emergency response, due care obligations, transport, and disposal of hazardous substances, hazardous wastes, liquid industrial waste, or other potentially polluting materials. No discharge to surface water or groundwater, including direct or indirect discharges of waste, waste effluent, wastewater, pollutants, or cooling water, shall be allowed without approval from local county, state and federal agencies. The project and related improvements shall be designed to protect land and water resources from pollution, including pollution of air, soils, groundwater, rivers, streams, lakes, ponds, and wetlands.

The State of Michigan regulates specific items as part of their environmental regulations pertaining to proper management of regulated substances. These include but are not limited to: underground and above-ground storage tanks; oil and other polluting materials; material storage above state-specified thresholds; spill response plans; solid and liquid waste discharges and disposal; hazardous waste generation, handling, storage and disposal; groundwater discharge; surface water discharge; stormwater discharges into waters of the state; management of contaminated properties; and response and reporting upon discovery of contamination.

9.0 CONTAMINATED PROPERTIES

If the subject property contains soil and/or groundwater contamination, site-specific requirements may apply. Refer to the EGLE Post-Construction Storm Water Runoff Controls Program Compliance Assistance Document (EGLE, 2014) for specifics regarding stormwater: https://www.michigan.gov/documents/deq/wrd-storm-MS4-ComplianceAssistance_470350_7.pdf.

Contact the Kalamazoo District EGLE Office for answers to questions regarding state environmental regulations pertaining to contaminated sites:

6938 Elm Valley Drive , Kalamazoo, MI 49009
Phone: (269) 567-3500
Fax: (269) 567-9440

9.1 PART 201, ENVIRONMENTAL REMEDIATION (EXCERPT)

Part 201 of Michigan NREPA, 1994, PA 451, as amended, regulates sites of environmental contamination. Part 201 of Michigan's NREPA defines **Regulated Hazardous Substances** that pose unacceptable risks to public health or the environment, including CERCLA hazardous substances and Part 111 hazardous wastes. Managed by EGLE, it mandates cleanup criteria for contaminated sites, Under Part 201, the owner or operator of a contaminated property is responsible for taking certain actions to address the contamination if they have caused said contamination. The discovery of a release from a regulated or hazardous substance triggers several critical reporting requirements of Part 201 NREPA, 1994, PA 451, as amended. EGLE's RRD response activities for a Part 201 site require the owner/operator of the site notify EGLE of the release within 24 hours by calling the Pollution Emergency Alerting System (PEAS) at **(800) 292-4706**. If you are unsure where and whom to report to, immediately call PEAS.

EGLE's RRD response activities for a Part 201 site are identified on the EGLE website: lhttps://www.michigan.gov/egle/about/organization/remediation-and-redevelopment/remediation-and-investigation. Additionally, Part 201 requires persons (liable or non-liable) who own or operate contaminated property to exercise "due care" with respect to the property's contamination to ensure that the contamination does not cause unacceptable exposures, and the contamination is not exacerbated or worsened. The law requiring due care is located in Section 20107a of Part 201 (Environmental Remediation) of the NREPA, 1994 PA 451, as amended (https://www.michigan.gov/en/egle/about/Organization/Remediation-and-Redevelopment/due-care).

The due care obligations includes maintaining Isolation and Engineering Controls, Deed Restrictions such as Restrictive Covenants (e.g., groundwater use restrictions, direct contact restrictions, vapor mitigation systems), and other protective due care obligations established under Part 201. These due care obligations ensure that a property is used in a way that protects public health and safety and does not exacerbate the

contamination. EGLE's RRD response actions for a Part 201 site are identified on their website: https://www.michigan.gov/egle/0,9429,7-135-3311_4109_59851---,00.html. In most situations, due care obligations apply even if the owner, operator and/or lessee are not responsible for the site's contamination. Due care obligations for owners and operators of contaminated properties include:

- Preventing exacerbation of the contamination by causing the contamination to migrate beyond the boundaries of the property or increasing response costs at the property.
- Preventing human exposure to regulated and hazardous substances, if existing conditions at the property will result in unacceptable exposure levels (e.g., direct contact or vapor intrusion/inhalation).
- Notifying the fire department of fire and explosion hazards, as well as mitigating these hazards.
- Taking reasonable precautions against the foreseeable actions of other people that could exacerbate the contamination or cause them to be exposed to contamination.
- Reporting discarded or abandoned containers to the EGLE.
- Providing Notice of Offsite Migration of contamination to downgradient Landowners and EGLE.
- Providing notice to utility holders at the property of the presence of the contamination.
- Preparing documentation of compliance with due care obligations, such as a Due Care Plan.

Part 201 also establishes liability protection for buyers of contaminated property who prepare and file a Baseline Environmental Assessment (BEA) with EGLE. A BEA is an evaluation of environmental conditions at the property at the time of purchase, occupancy, or foreclosure. BEAs include sufficient information about the property such that a new release at the property can be distinguished from an old release. A buyer is required to conduct a BEA prior to or within 45 days after becoming the owner or operator of a contaminated facility. For BEAs, refer to: https://www.michigan.gov/egle/0,9429,7-135-3311_4109_4212---,00.html.

9.2 PART 213, ENVIRONMENTAL REMEDIATION (EXCERPT)

The discovery of a release from an underground storage tank (UST) triggers several critical reporting requirements of Part 213 Michigan NREPA, 1994, PA 451, as amended. EGLE's RRD response activities for a Part 213 site are identified on their website: https://www.michigan.gov/egle/0,9429,7-135-3311_4109_4215---,00.html. The owner/operator of the offending tank must:

- Notify EGLE of the release within 24 hours by calling the PEAS at **(800) 292-4706**. If you are unsure where and whom to report to, immediately call PEAS.
- Owners/operators are required to hire consultants that meet the qualifications provided in Part 213 to perform corrective actions, and to submit specific reports required by the statute in accordance

with the use of Risk-Based Corrective Action (RBCA).

- Submit an initial assessment report to EGLE, within 90 days, which describes all initial abatement steps taken at the site.
- Submit to EGLE, a Final Assessment Report and Corrective Action Plan, which must describe the extent of contamination and action(s) that will be undertaken to remediate the site, including a schedule for the remediation.

The due care obligation under Part 213 are the same as for Part 201 (Section 9.1).

Initial Response Actions

After a release has been reported under the 24-hour PEAS notice requirement, the UST owner or operator must "immediately and expeditiously" perform certain initial abatement activities. Specifically, UST owner/operators are expressly required to:

- Identify and mitigate fire, explosion, and vapor hazards.
- Prevent further releases, including removal of product from the leaking UST system.
- Identify and recover light non-aqueous phase liquid (LNAPL) (e.g., gasoline or diesel fuel product). If LNAPL is first discovered after the initial 24-hour release report, the discovery of LNAPL must be reported to the EGLE within 24 hours of discovery.
- Excavate and either contain, treat, or dispose any visibly contaminated soil that is likely to cause a fire hazard, spread or increase the cost of corrective action.
- Take any other action necessary to abate any immediate threat.

9.3 PUBLIC INFORMATION REPORTING – ILLICIT DISCHARGES OR SPILL RELEASES

If hazardous substances, LNAPL or any other contamination is known or suspected to have migrated or discharged to a City-owned utility or corridor, or caused an illicit stormwater discharge, the City shall be immediately contacted to abate or remedy any potential public health and safety risks including but not limited to, vapor inhalation, fire, explosion, direct contact, discharge to a surface water body and/or impact to groundwater drinking water supplies. A person shall not discharge, directly or indirectly, any pollutant in the City's stormwater system including, but not limited to:

- Improperly stored, handled, or application of any pollutant in a manner that will cause its exposure to rainfall or runoff or otherwise cause it to discharge into the stormwater system,
- Improperly stored, handled, or application of any pollutant in quantities unauthorized by an approved NPDES permit, and
- Placement of any material in or around any stormwater system component, including catch basins, inlets, manholes, culverts, pipes, or natural watercourse, if such material acts to significantly

obstruct or clog the stormwater system, or stormwater flow.

Prohibited discharges which are illicit can be found in the Kalamazoo Code of Ordinances, Chapter 29-3 Responsibility for administration.

Discharges NOT prohibited include, but are not limited to:

- Quantities expressly authorized by an approved NPDES permit or by a plan for compliance,
- Discharges consistent with the utilization of best management practices,
- Temporary placement of material as acceptable and consistent with official City material collection programs and policies (such as leaf or brush pickups), and
- Water supply line flushing, landscape irrigation runoff, diverted stream flows, rising groundwaters, uncontaminated groundwater infiltration [as defined by 40 CFR 35.2005 (20)], pumped groundwater (except for groundwater cleanups not specifically authorized by NPDES permits), discharges from potable water sources, foundation drains, air conditioning condensate, irrigation water, springs, water from crawl space pumps, footing drains and basement sump pumps, lawn watering runoff, waters from noncommercial car washing, flows from riparian habitats and wetlands, and residual street wash waters, discharges or flows from emergency firefighting activities, etc.

Reporting Requirements

- If hazardous substances, LNAPL or any other contamination is known or suspected to have migrated or discharged to a to a surface water body (e.g., lake, river, creek or wetland) in a quantity equal to or greater than its corresponding reportable quantity, OR
- To report contaminant spills, illicit discharges and connections, **contact the following**:
  - **In an emergency, call 911** or contact the Kalamazoo Public Safety Central Dispatch (269) 337-8994 immediately.
  - Pollution Emergency Alerting System (PEAS) at (800) 292-4706, National Response Center (NRC) at (800) 424-8802 or http://www.nrc.uscg.mil/, and/or
  - MDARD Agriculture Pollution Emergency Hotline at (800) 405-0101.
  - Call the City's Call Center at 311 (within City boundaries) or (269) 337-8000.

The Water Programs Manager can also be contacted for support at:

Water Resources Division – Department of Public Services
ATTN: Water Programs Manager
1415 N. Harrison Street, Kalamazoo, MI 49007

Additional EGLE Release Reporting information is available on their website at https://www.michigan.gov/-/media/Project/Websites/egle/Documents/Programs/ESD/Spill-Release-Reporting/Release-Reporting-Requirements.pdf?rev=89e45df8028d428db88f203b2b100f02.

10.0 DEFINITIONS

Best Management Practice (BMP): The best available methods, activities, maintenance procedures, technologies, operating methods or management practices for preventing or reducing the quantity of Regulated Substances entering groundwater and surface water from a particular land use activity.

Bioretention (Rain Gardens): Shallow surface depressions planted with specially selected native vegetation to capture and treat stormwater runoff from rooftops, parking lots, and streets.

Buffer Strip: A permanent, maintained strip of vegetation designed to slow runoff velocities and filter out sediment and other pollutants from stormwater.

Capture Zone: That area through which water travels below the surface and reaches a City well or wellfield within a specified period of time (under specified conditions set by the EGLE). The Wellhead Protection Ordinance addresses both a one-year and ten-year time-of-travel capture zone.

Catch Basin: A solid-walled stormwater inlet to the stormwater collection system that includes a sump to capture coarse sediments. Catch basin sumps shall be at least two feet deep.

Channel Protection Performance Standard: Criteria that requires maintaining post-development project site runoff volume and peak flow rate at or below pre-development levels for all storms up to the 2-year 24-hour event.

Contaminated Site (or Contamination): A site that exhibits contaminant concentrations that are greater than State and/or Federal clean-up standards (e.g., Michigan Part 201 Criteria, Part 213 Risk-Based Screening Levels, etc.).

Detention (Basin/Pond/ System): A stormwater management practice that provides temporary storage for stormwater runoff before discharging into a surface water body.

EGLE: Michigan Department of Environment, Great Lakes, and Energy; formerly Michigan Department of Environmental Quality (MDEQ).

EPA: United States Environmental Protection Agency

First Flush: Typically, the first one inch of runoff generated from a site. The “first flush” typically contains higher pollutant concentrations than subsequent runoff from the same runoff event.

Generator: A machine that produces power using an energy source such as gasoline, diesel, natural gas, or propane.

Geothermal Energy: The continuous generation of heat extracted from the subsurface of the earth.

Green Roof: Rooftop that includes a vegetative surface that allows the roof to function more like a vegetated surface.

Groundwater: The water below the land surface in a zone of saturation, excluding those waters in underground piping for water, wastewater, or stormwater distribution/collection systems.

Groundwater Recharge: The replenishment of existing natural water bearing subsurface layers of porous stone, sand, gravel, silt or clay via infiltration.

Illicit Discharge: Any direct or indirect non-stormwater discharge (or seepage) to the stormwater system that is not composed entirely of stormwater or uncontaminated groundwater.

Impervious Surface: A surface that prevents the infiltration of water into the ground such as roofs, streets, sidewalks, driveways, parking lots, and highly compacted soils.

Infiltration Practices: Natural or constructed land areas using permeable soils that capture, store, and infiltrate the volume of stormwater runoff into surrounding soil. Examples include, but are not limited, to dry wells/leaching basins, retention basins, detention basins, infiltration trenches, and subsurface infiltration beds.

LARA: Michigan Department of Licensing and Regulatory Affairs

Manufactured Treatment Devices (MTDs): A prefabricated stormwater treatment structure utilizing settling, filtration, adsorptive/absorptive materials, vortex separation (hydrodynamic separator), vegetative components, and/or other appropriate technology to remove pollutants from stormwater runoff.
Michigan 10 Metals: arsenic, barium, cadmium, chromium, copper, lead, mercury, selenium, silver, and zinc

Maximum Contaminant Level (MCL): The highest level of a contaminant allowed in drinking water, defined by the U.S. EPA. MCLs are legally binding standards under the Safe Drinking Water Act (SDWA).

MDOT: Michigan Department of Transportation

MS4: Municipal Separate Storm Sewer System, as defined by federal and state laws.

NPDES: National Pollution Discharge Elimination System, as addressed in 33 USC § 1342 (b) and the Federal Clean Water Act, as amended.

NPDES Stormwater Discharge Permit: A permit issued by the U.S. EPA (or a state under authority delegated pursuant to 33 USC section 1342(b)) that authorizes the discharge of pollutants to waters of the United States, whether the permit is applicable on an individual, group, or general area-wide basis. For the purposes of this document, the subject NPDES Permit is issued to the City by the EGLE.

New Jersey Corporation for Advanced Technology (NJCAT) Program: A private/public partnership that promotes the development and commercialization of new energy and environmental technologies, including the verification of stormwater MTDs.

New Jersey Department of Environmental Protection (NJDEP) Standard for Manufactured Treatment Devices: A list of third-party certified Manufactured Treatment Devices (MTDs) that were laboratory and/or field tested by the NJCAT Program and approved by the NJDEP to serve as acceptable BMPs. The most current listing available will be used as the list of acceptable MTDs for use in the City of Kalamazoo for removing pollutants from stormwater runoff (https://www.nj.gov/dep/stormwater/treatment.html).

Peak Discharge Rate: The maximum instantaneous rate of flow during a storm, usually in reference to a specific design storm event.

Pervious Pavement: Infiltration technique that combines stormwater infiltration, storage, and structural pavement consisting of a permeable surface underlain by a storage reservoir.

Pollutant: Any substance which, alone or in combination with other substances, if discharged to waters of the State in sufficient quantities, causes or contributes to, or has the potential to cause or contribute to, a violation of a Federal, State, or local water quality standard, a nuisance, or to render such waters harmful, detrimental or injurious to public health, safety or welfare, or to domestic, industrial, agricultural, recreational, or other legitimate beneficial uses or to any organism, aquatic life, plant or animal. Pollutants may include, but are not limited to: paints, varnishes, and solvents; oil and other automotive fluids; fats, oils and grease (FOG); non-hazardous liquid and solid wastes and yard wastes; refuse, rubbish, garbage, litter, or other discarded or abandoned objects, ordinances, and accumulations, so that same may cause or contribute to pollution; sediment; floatables; pesticides, herbicides, and fertilizers; hazardous substances and wastes; sewage, fecal coliform and pathogens; dissolved and particulate metals; animal wastes; residues that result from constructing a building or structure; and noxious or offensive matter of any kind.

PNAs: Polynuclear Aromatic Compounds

Pre-development Conditions: The natural state of a site prior to any human development activities. For most sites in the City, pre-development conditions shall be 100% forested.

Pretreatment: The additional measures taken to protect groundwater and/or surface water quality by removing pollutants from collected stormwater. Typically, pretreatment is accomplished by a BMP designed to provide controlled removal of oils and grease, course to fine sediments, and may provide containment in the case of an accidental spill or other release.

Regulated Substance (Hazardous Substance): Refer to Section 3.2 REGULATED SUBSTANCES AND PROCESS ACTIVITIES for a complete list of definitions.

- Substance for which there is a Safety Data Sheet (SDS), as established by the United States Occupational Safety and Health Administration (OSHA), and the SDS cites possible health hazards for said substance;
- A Substance, as listed in the Consolidated List of Chemicals Subject to the Emergency Planning and Community Right-To-Know Act (EPCRA), Comprehensive Environmental Response, Compensation and Liability Act (CERCLA);
- Hazardous waste as defined by the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act (RCRA) of 1976, as amended; Hazardous substances as defined by the CERCLA;
- Hazardous Substances, under Michigan Part 201 of NREPA of 1994, Act 451, as amended;
- Hazardous Substances, under Michigan Part 213 of NREPA of 1994, Act 451, as amended;
- Petroleum is defined as crude oil or any fraction of crude oil that is liquid at standard conditions of temperature and pressure (60 degrees Fahrenheit and 14.7 pounds per square inch absolute);
- All contaminants, chemicals, per- and poly-fluoroalkyl substances (PFAS), and radionuclides regulated by the United States EPA under the National Primary Drinking Water Regulations for which there are established or pending Maximum Contaminant Levels (MCLs);
- All Substances, contaminants, PFAS, etc. regulated by the Michigan Safe Drinking Water Act (SDWA) Act (Act 399 of 1976, as amended);
- Radiological materials; and
- Biohazards.

Release: As defined in the WHPO, the spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, or disposing of one or more regulated substances upon or into any land or water within a capture zone. Release includes, without limitation, leakage of such materials from failed or discarded containers or storage systems and disposal of such materials into any on-site sewage disposal system, dry-well, catch basin, or landfill.

Retention (Basin, Pond, System): A stormwater management practice that provides temporary storage of stormwater runoff and does not discharge directly to a surface water body. The water is discharged via infiltration and/or evaporation.

Runoff: That portion of precipitation that does not infiltrate or evaporate but runs off to a surface water feature or stormwater collection system.

Sediment Basin: A man-made depression in the ground surface where runoff is collected and stored to allow solids to settle out. Sediment basins may be wet or dry.

Snow Melt System: An embedded heating solution that uses radiant heat from electric cables or circulating warm fluid (hydronic, i.e. water, glycol, methanol) to keep outdoor surfaces like driveways, walkways, and patios clear of snow and ice.

Spill Containment Cell: A BMP designed to provide controlled removal of oils and grease, course to fine sediments, and other subject pollutants to protect groundwater and surface water resources, and to provide for a containment area in the case of a spill or other pollutant release.

Spill Containment Plan: A written site-specific plan conforming to the specifications contained in the "Performance Standards," including the documentation of general site operations; Regulated Substance storage areas; potential for releases of Regulated Substances and an analysis of the potential destination of such releases; and procedures to be followed in the event of a release.

Spill Containment Volume: The containment volume of stormwater required to protect groundwater and surface water from a release of regulated substances.

Stationary Storage Battery Systems (Cabinet) or Battery Energy Storage System (BESS) Facility: Large, fixed-location rechargeable battery setups that store electricity for later use.

Stormwater: Runoff from natural precipitation, including snow melt, as well as other surface runoff and drainage that flow via natural or manmade drainage ways.

Sump: An area or space where liquids are allowed or encouraged to accumulate. Sump pumping is the process of evacuating that liquid using pumps.

Vegetated Filter Strip: A permanent, maintained strip of vegetation designed to slow runoff velocities and filter out sediment and other pollutants from stormwater.

VOCs: Volatile Organic Compounds

Water Quality Swale: An open drainage channel or depression, explicitly designed to filter runoff through a self-contained bed of sand to provide water quality treatment and/or spill containment.

Water Quality Treatment Volume Standard: Criteria that requires a stormwater treatment volume that is intended to reduce or prevent water quality impacts of stormwater runoff by capturing and treating the initial "first flush" volume expected to contain the majority of pollutants.

Wellfield: The surface or subsurface area surrounding one or more permitted wells where potable water is pumped out of the ground to supply a public water system. They are further categorized into wellfield zones based on the time it takes water in the aquifer to travel to the wellhead where it is pumped out.

Wellhead: Any individual well used for supplying water.

Wellhead Protection Area: The surface or subsurface area supplying water to wells or wellfields through which contaminants are reasonably likely to move toward and reach the well(s); The area defined by the Capture Zone.

11.0 REFERENCES

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Michigan Department of EGLE, Remediation and Investigation Website: https://www.michigan.gov/egle/about/organization/remediation-and-redevelopment/remediation-and-investigation

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U.S. Environmental Protection Agency Website: document “Developing Your Stormwater Pollution Prevention Plan”, 2012:
https://www.epa.gov/npdes/developing-stormwater-pollution-prevention-plan-swppp.

FIGURES

Figure 1: Wellhead Protection Overlay Map (2022)

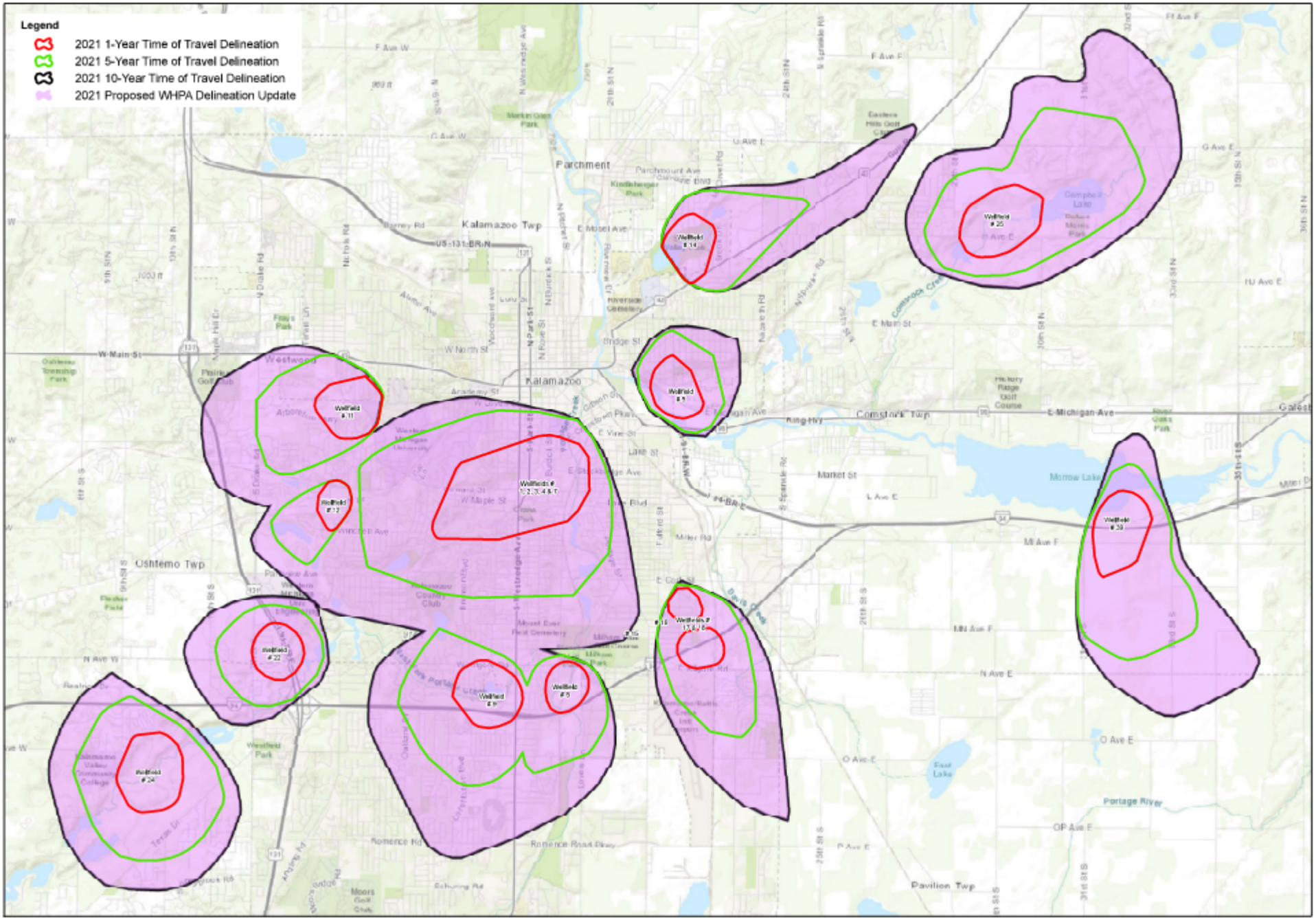


Figure 2: Spill Containment Cell

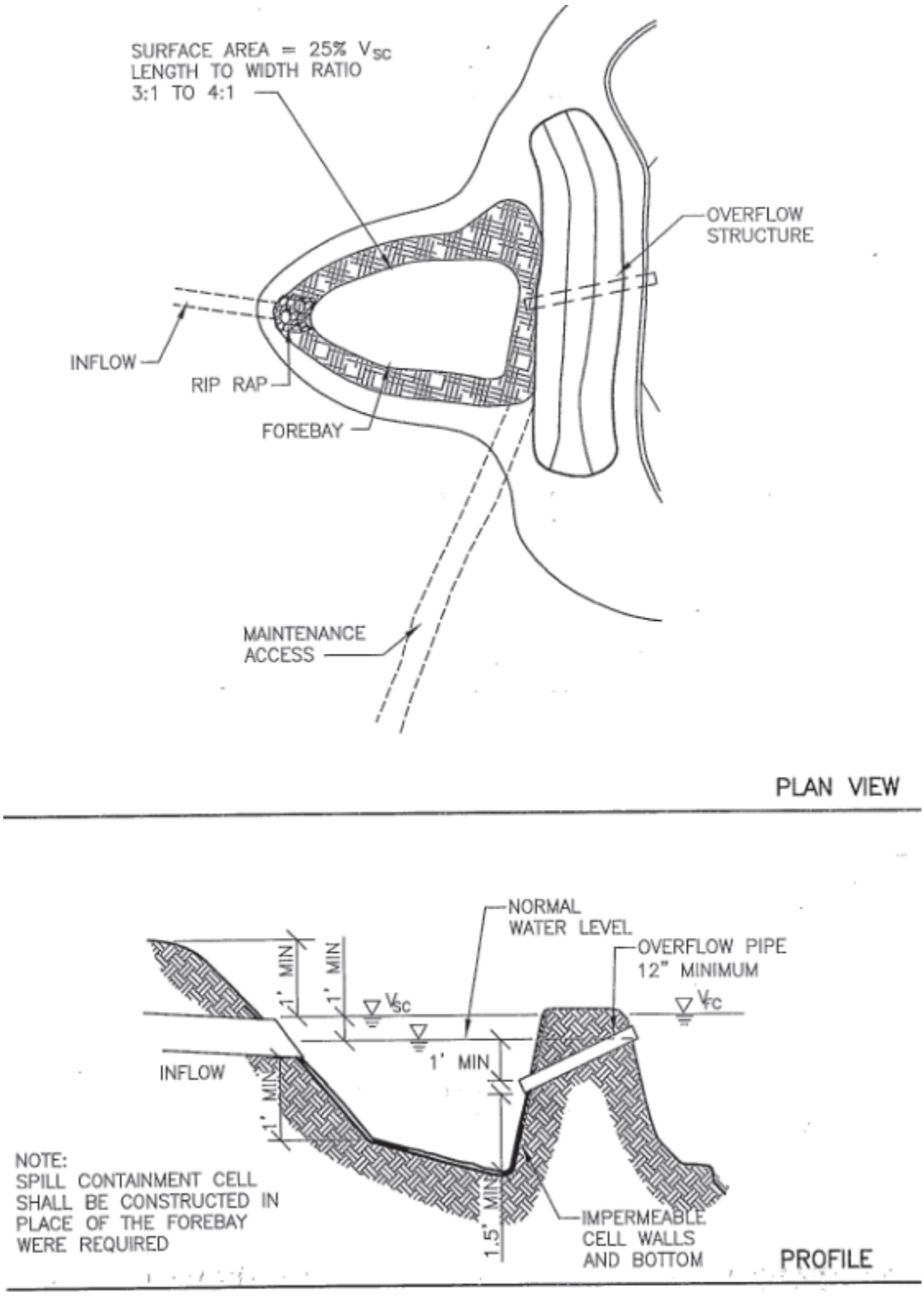
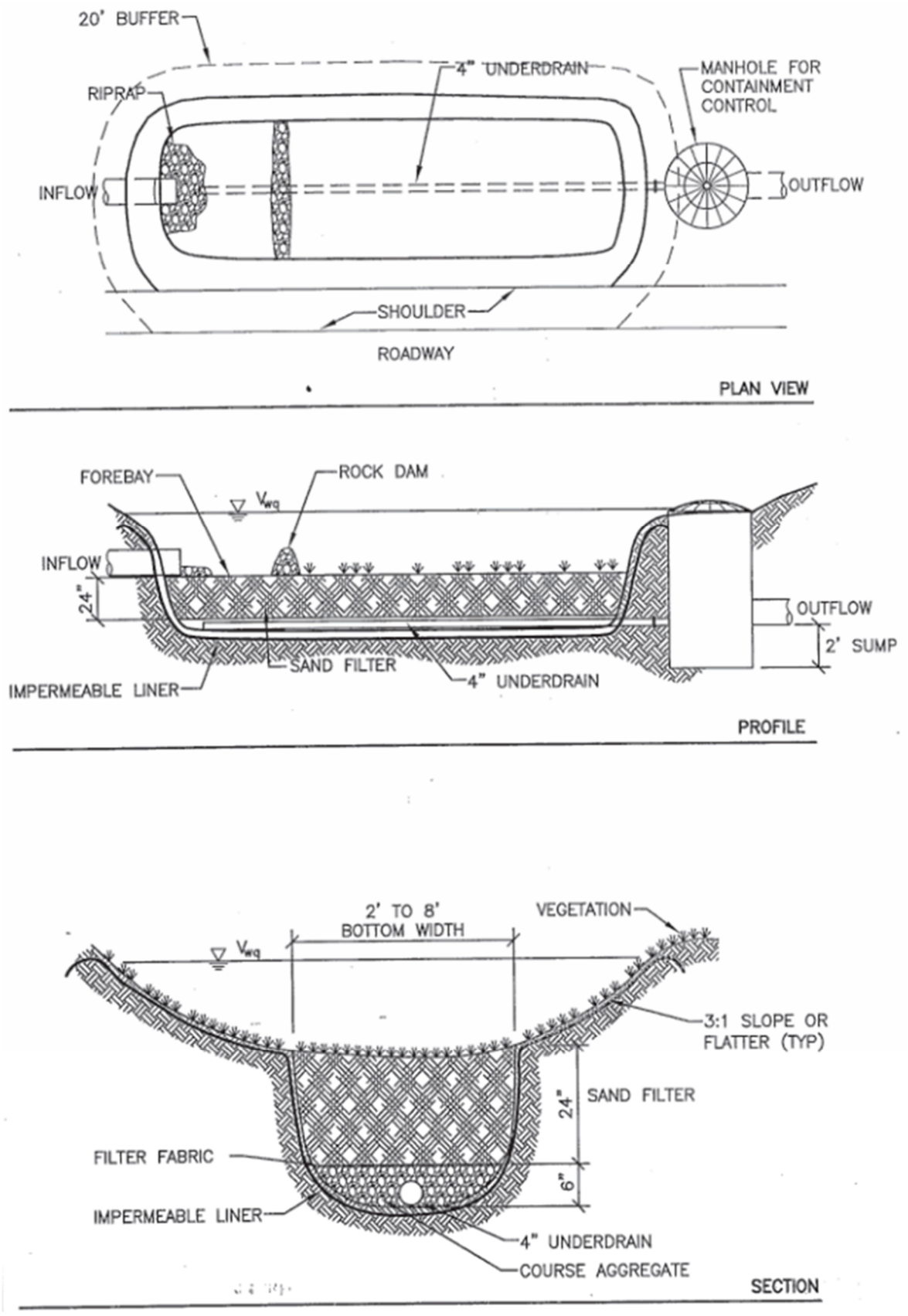


Figure 3: Water Quality Swale



STORMWATER WORKSHEETS

Worksheet 1 - Stormwater Calculations

Worksheet 2 - Uniform Stormwater Standard 1: Water Quality Treatment Volume & MTD

Worksheet 3 - Uniform Stormwater Standard 2: Channel Protection Volume

Stormwater Calculations Worksheet

PRE-DEVELOPMENT CONDITIONS

Surface Cover	Runoff Coefficient, C	Area of Surface Cover (ft^2)
Lawns	0.1	
Forest	0.15	
Gardens	0.25	
Meadow	0.3	
Gravel	0.6	
Brick/Pavers	0.8	
Asphalt/Concrete	0.9	
Roofs	0.9	
Total Site Size (ft^2)		
Total Site Size (acres)		
Runoff Coefficient (weighted average)		
Flow Rate (ft^3/s): 1 year - 30 minute event		
Runoff Volume (ft^3): 2 year - 24 hour event		
Runoff Volume (ft^3): 10 year - 24 hour event		
Treatment Volume = Site Area x 0.083 ft	Standard 1	
i = 1.65 inches/hour for Treatment (1 year - 0.5 hour)	Standard 1	
i = 0.108 inches/hour for Storage (2 year - 24 hour)	Standard 2, 3, 7	
i = 0.153 inches/hour for Storage (10 year - 24 hour)	Standard 3, 7 NFP	

POST-DEVELOPMENT CONDITIONS

Surface Cover	Runoff Coefficient, C	Area of Surface Cover (ft^2)
Lawns	0.1	
Forest	0.15	
Gardens	0.25	
Meadow	0.3	
Gravel	0.6	
Brick/Pavers	0.8	
Asphalt/Concrete	0.9	
Roofs	0.9	
Total Site Size (ft^2)		
Total Site Size (acres)		
Runoff Coefficient (weighted average)		
Flow Rate (ft^3/s): 1 year - 30 minute event		
Runoff Volume (ft^3): 2 year - 24 hour event		
Runoff Volume (ft^3): 10 year - 24 hour event		
Required Treatment Volume (ft^3)		
Required Treatment Flow Rate (ft^3/s)		
Required Storage Volume (ft^3): 2 year - 24 hour		
Required Storage Volume (ft^3): 10 year - 24 hour		

***Rational Method Used for All Calculations, where Q = CiA (unless stated otherwise)**

***Instructions: Input the areas (ft^2) of the site for each type of surface cover**

***For determining required detention/retention volumes, Pre-Development Conditions shall be 100% forested with a 50% allowance for existing impervious coverage (example: if a site is 100% impervious, existing conditions shall be 50% forested and 50% impervious).**

UNIFORM STORMWATER STANDARD 1: WATER QUALITY TREATMENT VOLUME & MTD WORKSHEET

**Applies to Sites ≥ 0.5 Acres and Large Parking Lots with ≥ 20 Spaces and/or > 6,000 ft^2

*** If not NJCAT Verified and NJDEP Certified, provide further documentation for the proposed BMPs

List All Proposed Treatment BMPs below and Show Locations on the Plans				
Proposed Treatment BMP	**NJCAT Verified?**	**NJDEP Certified?**	**Maximum Treatment Volume, ft^3**	**Maximum Treatment Flow Rate, ft^3/s**
Proposed Total Treatment Volume and Flow Rate				
Required Treatment Volume and Flow Rate from Stormwater Calculations Worksheet				
Difference Between Required and Proposed Treatment Volume and Flow Rate				
Are Volume and Flow Rate Requirements Met? If difference is greater than zero, NO				

*****Attach this form and supporting documentation for selected BMPs to the Storm Water Calculations Worksheet*****

UNIFORM STORMWATER STANDARD 2: CHANNEL PROTECTION VOLUME WORKSHEET

**Applies to Sites where Standard 2, 3 and 7 apply **10-year 24 hour is for Standard 3, 7 and NFP Sites

***Detention and Retention BMPs shall drain between runoff events

List All Proposed Detention/Retention BMPs below and Show Locations on the Plans	
Proposed Detention/Retention BMP	**Volume Detained/Retained, ft^3**
Proposed Total Volume	
Required Storage Volume (ft^3): 2 year - 24 hour	
Difference Between Required and Proposed Volume	
Is Sufficient Volume Retained/Detained? If difference is greater than zero, NO	
Required Storage Volume (ft^3): 10 year - 24 hour	
Difference Between Required and Proposed Volume	
Is Sufficient Volume Retained/Detained? If difference is greater than zero, NO	

*****Attach this form and supporting documentation for selected BMPs to the Storm Water Calculations Worksheet*****

ATTACHMENTS

Attachment 1: Minimum Isolation Distances

Attachment 2: MDOT Standard Specifications for Construction, Table 401-1

Attachment 3: Stormwater Best Management Practices
Operations and Maintenance Agreement

Attachment 4: Chemical Inventory and Storage Form

Attachment 5: Guidance: When a Battery Cabinet or Diesel Generator is Proposed

Attachment 6: Snow Melt and Geothermal System Policy

Attachment 7: Precipitation Intensity, Duration and Frequency Table

Attachment 8: Stormwater Treatment Inspection Report

Attachment 1

Minimum Well Isolation Distances

DEQ

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY

MINIMUM WELL ISOLATION DISTANCES

(From Contamination Sources and Buildings)
Part 127, Act 368, P.A. 1978 and Act 399, P.A. 1976

The following lists sources of contamination and the well isolation distances required from those sources by state codes. The Michigan Department of Environmental Quality and local health departments have authority to issue deviations from these minimum isolation distances on a case by case basis. Criteria for issuance of deviations are set forth in R 325.1613 of the Rules for Part 127, and R 325.10809 of the Rules for Act 399.

* = For the isolation distances marked with a single asterisk, the isolation distance is for a source of contamination which is not specifically listed in the rules. However, the source of contamination is interpreted as belonging in a general contamination source group (example - a sewage holding tank is the same as a septic tank) which is listed in the rules, and therefore, the isolation distance listed in this document is required.

** = For the isolation distances marked with a double asterisk, the isolation distance is from a source of contamination which is not specifically named in the rules. However, the Michigan Department of Environmental Quality has established a recommended isolation distance based on the contaminant involved, the risk to public health, and other factors. Under the general authority of a health officer's responsibility to protect the public health, health officers may modify this recommended isolation distance, either increasing or decreasing it, on a case by case basis.

CONTAMINATION SOURCE	Required MINIMUM Isolation Distance (Feet)		
	Part 127, Act 368 PA 1978	**Act 399, PA 1976**	
		IIb and III	I and IIa
Agricultural chemical or fertilizer storage or preparation area	150	800	2000
Animal waste lagoon or manure storage	*150	800	2000
Animal or poultry yard	50	75	200
Brine wells or injection well	**150	**800	**2000
Building or projection thereof	3	3	3
Cemetery and graves	**50	*75	*200
Cesspool	50	75	200
Chemical Storage	150	800	2000
Contaminant plumes, known (Part 201, LUST sites, etc.)	**300	**800	**2000
Drainfield	50	75	200
Drywell	50	75	200
Footing drain	10	10	10
Fuel/chemical storage tanks – Underground or abovegrade and associated piping			
depot/tank farm	300	800	2000
1,100 gal. or larger, without secondary containment	300	800	2000
1,100 gal. or larger with secondary containment	50	800	2000
less than 1,100 gal. that store motor or heating fuel for noncommercial purpose or consumptive use on premises where fuel is stored	50	800	2000
less than 1,100 gal. that store motor fuel for commercial purpose	*50	800	2000
located in a basement, regardless of size	*50	800	2000
Grease trap	50	*75	*200
Kennel	50	*75	*200
Landfill or dump sites (Active or Inactive)	800	800	2000

Liquid waste draining into the soil	50	*75	200
Metering station for pipeline	*300	*300	*300
Municipal wastewater effluent or sludge disposal area (land surface application or subsurface injection)	300	800	2000
Municipal wastewater lagoon	*300	800	2000
Oil or gas well	300	300	300
Other wastewater handling or disposal unit	50	*75	*200
Petroleum product processing or bulk storage	300	800	2000
Pipeline for gas, oil	*300	*300	*300
Privy/outhouse	50	75	200
Seepage pit	50	75	200
Septic tank	50	75	200
Septage waste (land application area)	800	800	2000
Sewage holding tank	50	*75	*200
Sewage lagoon serving a single family dwelling	50	75	200
Sewage lagoon effluent – land application area	50	800	2000
Sewage or liquid waste draining into soil	50	*75	*200
Sewage pump chamber, transfer station, or lift station	50	75	200
Sewers Buried gravity sewer (sanitary or storm) - Service weight or heavier ductile-iron or cast iron, or schedule 40 PVC, all with watertight joints	10	75	200
Buried pressure sewer (sanitary or storm) Watertight joints (pressure tested after installation to 100 psi), equivalent to Schedule 40 or SDR 21, and meets or exceeds ASTM Specifications D1785-91 or D2241-89	10 (by written deviation only)	75	200
Buried gravity or pressure sewer (sanitary or storm), constructed of materials not meeting the specifications listed in the two categories above, or the materials are unknown	50	75	200
Sump pit Receiving other than household waste (footing drain, roof drain, etc.)	10	10	10
Receiving household waste (laundry, softener backwash, sink waste, etc.)	50	75	200
Surface water (lake, river, stream, pond, ditch, etc.)	10	75	200
Unfilled space below ground surface (except an approved basement, basement offset, or crawl space beneath single family dwelling)	10	10	10

Note: The above listed isolation distances are minimum distances. The regulatory agency has the authority to increase the minimum isolation distance based on factors such as: geology, groundwater flow direction, well construction, type of contaminant, etc.

Attachment 2

MDOT Standard Specifications for Construction, Table 401-1

MDOT Standard Specifications for Construction – Section 401

Table 401-1: Pipe Alternatives for Culvert Classes

Type of Pipe	Culvert Class (depth of cover, feet[a])					
	Class A Culvert (1–10)[b][c]	**Class B Culvert (>10–16)**	**Class C Culvert (>16–23)**	**Class D Culvert (>23–33)[c]**	**Class E Culvert (1–3)[c][d]**	**Class F Drive Culvert[e]**
Reinforced concrete[f]	II	III	IV	V	IV	II
Non-reinforced concrete[g]	1	3	No	No	No	1, 3[h]
Corrugated and spiral ribbed al-alloy	Yes	Yes	Yes	Yes	No	Yes
Corrugated and spiral ribbed steel	Yes	Yes	Yes	Yes	No	Yes
Dual-wall polymer-precoated galvanized steel	Yes	Yes	Yes	Yes	No	Yes
Smooth-lined corrugated plastic (CPE)[i][j]	Yes[k][l]	Yes[l][m]	No	No	No	Yes[k][l]
Corrugated polyvinyl chloride (CPV)[n]	Yes[k][l]	Yes[l][m]	No	No	No	Yes[l]

(a) Cover, including the pavement structure, is defined as the height of fill above the top of the pipe measured to final grade.

(b) Class A culvert applies when the culvert is outside the influence of proposed pavement or is beneath the influence of proposed pavement and the depth of cover is >3 feet but ≤10 feet.

(c) Special design is required for fill heights <1 foot and >33 feet.

(d) Class E culvert applies when the culvert is beneath the influence of proposed pavement and the depth of cover is 3 feet or less.

(e) Class F culvert applies for driveway culverts (residential and commercial).

(f) Roman numerals refer to the class of reinforced concrete pipe in accordance with AASHTO M170.

(g) Arabic numerals refer to the class of nonreinforced concrete pipe in accordance with AASHTO M86.

(h) Nonreinforced concrete pipe Class 1 is allowed for Class F culverts with a depth of cover of up to 10 feet. Nonreinforced concrete pipe Class 3 is allowed for Class F culverts with a depth of cover from 10 to 16 feet.

(i) Provide CPE in accordance with AASHTO M294, Type S polyethylene pipe.

(j) At least 2-foot cover if the culvert is outside the influence of proposed pavement (measured from top of pipe to final grade)

(k) Allowed only for 36-inch-diameter pipe and under for CPE and CPV pipes. At least 3 feet of cover.

(l) Refer to the Class A, B and F Bury Plastic Pipe Qualified Products List for approved manufacturers and products.

(m) Allowed only for 12- to 24-inch-diameter CPE and CPV pipes.

(n) CPV must conform to AASHTO M304.

Attachment 3

Stormwater Best Management Practices Operations and Maintenance Agreement

STORMWATER AGREEMENT

THIS AGREEMENT, effective _____, 20__, between the City of Kalamazoo, a Michigan municipal corporation, whose address is 241 West South Street, Kalamazoo, Michigan, Kalamazoo, Michigan 49007 (City) and_____
_____ whose address is_____ (Landowner).

Recitals:

A. The City is regulated under the U.S. Environmental Protection Agency's (EPA) Phase II Stormwater Program since it has a municipal separate storm sewer system (identified in the Performance Standards as MS4). Therefore, the City is required to have a National Pollutant Discharge Elimination System (NPDES) Permit for its discharge of stormwater. The Michigan Department of Environment, Great Lakes, and Energy (EGLE) administers the NPDES permit program for the State of Michigan (33 U.S.C. 1251 et seq., P.L. 92-500, 95-217) under Part 31, Water Resources Protection, of Michigan's "Natural Resources and Environmental Protection Act", 1994 PA 451 (NREPA).

B. Landowner owns real estate in the City at _____, Kalamazoo, MI 490___- Parcel _____
- and which is more specifically described in Exhibit A (Property).

C. Landowner uses the Property for multi-family residential, commercial, and industrial purposes, or a combination of those uses. Landowner is making improvements to the Property that require approval under the City's Site Plan Review process, or is modifying the existing stormwater discharge system on the Property that either impacts the City's system or the retention of stormwater on the Property. As a result of those uses, improvements or modifications, Landowner agrees: (i) to install and maintain stormwater best management practices (BMPs) on the Property in accordance with approved plans and conditions; and (ii) to ensure that the BMPs continue serving the intended function in perpetuity.

D. Before signing this Agreement the Landowner, including its representatives, contractors or agents, has reviewed or had the opportunity to review the Performance Standards, work sheets or other documents maintained by the City relating to the City's regulation of its Stormwater Program and this Agreement.

THEREFORE, in consideration of the above recitals and the covenants, conditions, and restrictions stated below, the parties agree as follows:

1. *Recitals.* The above recitals are acknowledged as true and correct, and are incorporated by reference into this paragraph.

2. *Installation and Maintenance.* Landowner is solely responsible for the installation, maintenance and repair of the stormwater BMPs.

3. *Inspections and Repairs.* Landowner shall regularly inspect, maintain, repair or replace the private stormwater BMPs consistent with the Manufactured Treatment Device (identified in the Performance Standards as MTD) as recommended by the manufacturer, and those recommendations provided in the "Low Impact Development Manual for Michigan – A Design Guide for Implementers and Reviewers" (Southeast Michigan Council of Governments and MDEQ, 2008), and "Michigan Nonpoint Source Best Management Practices Manual" (MDEQ, 2017).

4. *Submittal of Reports.* Landowner shall annually submit a report to the City – on the form provided by the City – regarding stormwater BMPs Operation & Maintenance for each of the MTDs and other BMPs. Landowner shall deliver the report to the City's Water Programs Manager either by mail to 1415 N. Harrison Street, Kalamazoo, MI 49007 or via e-mail StormWaterReports@kalamazoocity.org within 30 calendar days of the inspection date.

5. *Modifications to the Stormwater System*. Landowner shall contact the City for approval prior to any design modifications to the stormwater treatment and/or conveyance system on the Property.

6. *City's Access to the Property*. Landowner, its successors and assigns, hereby grants the City, its authorized agents and employees, the right to enter upon the Property to inspect the stormwater BMPs whenever the City reasonably considers an inspection necessary in carrying out the intent and purpose of this Agreement. For example, an inspection may occur: (i) to follow-up on reported deficiencies in Landowner's exercise of stormwater BMPs; or (ii) to address lack of submitted documentation Landlord is required to submit to the City; or (iii) to respond to citizen complaints. The City shall provide Landowner with copies of the inspection findings, including any directive to perform maintenance, repairs or replacements, if necessary, to the stormwater conveyance system on the Property.

7. *Default by Landowner/Remedies*. If Landowner fails to maintain the stormwater BMPs and associated stormwater conveyance system in good working condition acceptable to the City, the City may enter upon the Property and take whatever steps necessary to correct deficiencies, including those identified in the inspection report. Landowner is responsible to pay the costs the City incurred for those repairs. The City will provide an itemized list of the repairs in an invoice to

Landowner, which is due within 30 days of the date on the invoice. To secure any amount owed by Landowner to the City under this Paragraph, the City has the right to place a lien against the Property in the same manner as delinquent taxes, including accruing interest, penalties and administrative expenses until the lien is fully satisfied.

It is expressly understood and agreed that the City is under no obligation to routinely inspect, maintain or repair the stormwater BMPs or stormwater conveyance system; and in no event shall this Agreement be construed to impose those obligations on the City.

8. *No Liability of the City*. This Agreement imposes no liability of any kind whatsoever on the City and the Landowner agrees to hold the City harmless from any liability if the stormwater BMPs and/or stormwater conveyance system failure to operate properly.

9. *Compliance with other Laws*. This Agreement does not replace or change the requirements of the Landowner to comply with all other applicable federal, state and local laws, rules and regulations; specifically including, without limitation from the City's Code of Ordinances, Chapter 30 Soil Erosion and Sedimentation Control Ordinance 1826, Chapter 29 Stormwater System Ordinance 1846, Chapter 39 Wellhead Protection Ordinances 2056 and 2057 (including Section 29-8 Wellhead Protection & Stormwater Management Performance Standards).

10. *Binding Effect/Third Parties*. This Agreement is binding on and shall inure to the benefit of the parties to this Agreement and their respective successors. Neither party may assign this Agreement without the prior written consent of the other party. The parties do not intend to confer any benefits on any person, firm, corporation, or other entity which is not party to this Agreement.

11. *Governing Law*. This Agreement is governed under applicable Michigan law. Both parties had the assistance of or the opportunity to seek legal counsel regarding the signing of this Agreement. Therefore, no construction or ambiguity of this Agreement is resolved against either party.

12. *Waiver*. A party does not waive any of its rights under this Agreement if that party fails to complain about an act or omission by the other party, no matter the duration of that act or omission. And a waiver by either party, whether expressed or implied, of any breach of a provision in this Agreement is not considered a waiver or consent to any subsequent breach of this same or other provision.

13. *Exhibits*. This Agreement includes the following exhibits Landowner agrees to provide:

    Exhibit A: Legal description of the real estate for which this Agreement applies ("Property").

    Exhibit B: Location map(s) showing a location of the Property and an accurate location of each stormwater BMP affected by this Agreement.

    Exhibit C: A List of all stormwater BMPs, including Manufacturer, Model, and locational reference to Exhibit B.

14. *Headings*. Headings in this Agreement are for convenience only and are not intended to interpret or construe its provisions.

15. *Entire Agreement/Counterparts*. This Agreement supersedes all agreements previously made between the parties relating to the subject matter. There are no other understandings or agreements between them. The parties may sign this Agreement in counterparts, which together shall comprise a single agreement, and the effective date for which is the date it is signed by both parties.

16. *Authorization*. Each of the parties represents and warrants to the other that this Agreement and its execution by the individual(s) on its behalf are authorized by the city commission, the board of directors or other governing body or organizational agreement of that party.

17. *Definitions*. The terms set forth in this Agreement shall have the same meaning as commonly used, except any term that is defined under statutes, ordinances or laws identified above, or any other applicable state statute shall have the meaning set forth under that ordinance, statute or law, including any subsequent amendments.

18. *Recording*. The City reserves the right to file a memorandum reflecting the existence of this Agreement with the Kalamazoo County Register of Deeds.

Name of LANDOWNER

_____
By:
Its:

STATE OF MICHIGAN }
} ss.
COUNTY OF KALAMAZOO }

The foregoing instrument was acknowledged before me on _____, 20___, by _____.

_____
Notary Public
Kalamazoo County, Michigan
My commission expires: _____

CITY OF KALAMAZOO

_____
By: James J. Baker, P.E.
Its: Director of Public Services

STATE OF MICHIGAN }
} ss.
COUNTY OF KALAMAZOO }

The foregoing instrument was acknowledged before me on _____,
20□, by James J. Baker, Director of Public Services, City of Kalamazoo.

_____
Notary Public
Kalamazoo
County,
Michigan
My commission expires:
_____

Prepared By & After Recording Return To:
The Office of City Attorney - Aaron
Leal, City Attorney 241 West South
Street
Kalamazoo, MI 49007
(269) 337-8185

Attachment 4

Chemical Inventory and Storage Form

CHEMICAL INVENTORY AND STORAGE FORM
PART 1

KALAMAZOO DEPARTMENT OF PUBLIC SAFETY
RIGHT TO KNOW QUESTIONAIRE

DATE COMPLETED:		
NAME OF PREMISES:		
SITE ADDRESS:		
SITE TELEPHONE:		
EMERGENCY TELEPHONE:		(Numbers should be direct to facility representatives and available 24 hrs. Number should by-pass automated phone trees)
QUESTIONAIRE COMPLETED BY:		
PHONE:		
EMAIL ADDRESS:		
SITE USE: Please check most appropriate box	☐	CHEMICAL USER (Chemicals used in activities on site)
	☐	CHEMICAL PRODUCER (Chemicals manufactured at this site, includes packaging)
	☐	OTHER (Chemicals are stored on site, but not used or produced. Such as service stations, retail store, storage facility)

Emergency Contacts: (Include Private Alarm / Security Companies, Maintenance Staff)				
NAME	TITLE	BUSINESS PHONE	HOME PHONE	CELL PHONE

EMERGENCY VENDORS	
SPILL CLEAN UP COMPANY	
ADDRESS:	
PHONE NUMBERS REGULAR and AFTER HOURS NUMBERS:	

KALAMAZOO DEPARTMENT OF PUBLIC SAFETY
RIGHT TO KNOW QUESTIONAIRE

CHEMICAL TYPE SURVEY Check 1 Box for Each Category				
CHEMICAL TYPE	**SPECIFIED QUANTITY**	**HAVE AT OR ABOVE SPECIFIED QUANTITY**	**HAVE BUT BELOW SPECIFIED QUANTITY**	**DO NOT HAVE**
CLASS 1				
Explosives & Blasting Agents (Not including Class C Explosives)	Any Quantity	☐	☐	☐
CLASS 2				
Poison Gas	Any Quantity	☐	☐	☐
Flammable Gas	100 gal. Water Capacity	☐	☐	☐
Non-Flammable Gas	100 gal. water capacity	☐	☐	☐
CLASS 3				
Flammable Liquid	1000 gallons	☐	☐	☐
Combustible Liquid	10,000 gallons	☐	☐	☐
CLASS 4				
Flammable Solid (Dangerous when wet)	100 lbs.	☐	☐	☐
Flammable solid	500 lbs.	☐	☐	☐
Spontaneously Combustible Material	100 lbs	☐	☐	☐
CLASS 5				
Oxidizer	500 lbs	☐	☐	☐
Organic Peroxide	250 lbs	☐	☐	☐
CLASS 6				
Poison	500 lbs	☐	☐	☐
Irritating Material: Liquid	1000 gallons	☐	☐	☐
Irritating Material: Solid	500 lbs	☐	☐	☐
CLASS 7				
Radioactive Material (Yellow III Label)	Any Quantity	☐	☐	☐
CLASS 8				
Corrosives: Liquid	1000 gallons	☐	☐	☐
Corrosives: Solid	500 lbs	☐	☐	☐
NO DOT CATEGORY				
Known Human Carcinogen	Any Category	☐	☐	☐

The Michigan Occupational Safety and Health Act (MIOSHA) requires that the Department of Public Safety prepare and disseminate to our Officers a plan for executing the department's responsibilities with respect to each site within the City of Kalamazoo where hazardous chemicals are used or produced. There are no exemptions based on the quantity of chemicals at the site. The purpose of the act is to ensure firefighter safety.

KALAMAZOO DEPARTMENT OF PUBLIC SAFETY
RIGHT TO KNOW QUESTIONAIRE

HAZARDOUS CHEMICAL DEFINITIONS

Carcinogen – A chemical is considered to be a carcinogen if: 1) it has been evaluated by the International Agency for Research on Cancer (IARC) and found to be a carcinogen or potential carcinogen; or 2) it is listed as a carcinogen or potential carcinogen in the Annual Report on Carcinogens published by the National Toxicology Program (NTP) (latest edition), or 3) it is regulated by OSHA as a carcinogen.

Combustible liquid – Any liquid having a flashpoint at or above 100 degrees F (37.8 degrees C), but below 300 degrees F (93.3 degrees C), or higher, the total volume of which make up 99 percent or more of the volume of the mixture.

Corrosive (liquid and solid) – Any liquid or solid that causes visible destruction or irreversible damage to human skin tissue. Also, it may be a liquid that has a severe corrosion rate on steel.

Explosives and blasting agent (not including Class C explosives) – "Explosive" means a chemical that causes a sudden, almost instantaneous release of pressure, gas, and heat when subjected to sudden shock, pressure, or high pressure. "Blasting Agent" means a material designed for blasting. It must be insensitive that there is very little probability of: 1) accidental explosion, or 2) going from burning to detonation.

Flammable liquid – Any liquid having a flashpoint below 100 degrees F (37.8 C), except any mixture having components with flashpoints of 100 degrees F (37.8 C) or higher, the total of which makes up 99 percent or more of the total volume of the mixture.

Flammable gas – A gas that can burn with the evolution of heat and a flame. Flammable compressed gas is any compressed gas of which: 1) a mixture of 13 percent or less (by volume) with air is flammable, or 2) the flammable range with air is under 12 percent.

Flammable solid – A solid, other that a blasting agent, or explosive, that is liable to cause fire through friction, absorption or moisture, spontaneous chemical change, or retained hear from manufacturing or processing, or which can be ignited readily and when ignited burns so vigorously and persistently as to create a serious hazard.

Flammable solid (dangerous when wet) – **-** Water Reactive Material (Solid) - Any solid substance (including sludges and pastes) which react with water by igniting or giving off dangerous quantities of flammable or toxic gases. (Sec.171.8).

Irritating material - liquid and solid - A liquid or solid substance which, upon contact with fire or air, gives off dangerous or intensely irritating fumes.

Non-flammable gas - Any compressed gas other than a flammable compressed gas.

Organic peroxide - An organic compound that contains the bivalent -0-0 structure and which may be considered to be a structural derivative of hydrogen peroxide where one or both of the hydrogen atoms has been replaced by an organic radical.

Oxidizer - A chemical that initiates or promotes combustion in other materials, thereby causing fire either of itself or through the release of oxygen or other gases. Example being: chlorate, permanganate, inorganic peroxide, or a nitrate, that yields oxygen readily.

Poison (Less dangerous poisons, toxic) - substances, liquid or solids (including pastes and semi- solids) so toxic to man that they are a hazard to health during transportation.

Poison gas (Extremely dangerous poisons, highly toxic poisonous gases or liquids) - a very small amount of the gas, or vapor of the liquid, mixed with air is dangerous to life.

Radioactive material (yellow 111 label) - Any material, or combination of materials, that spontaneously gives off ionizing radiation.

Spontaneously combustible material (Solid) - A solid substance (including sludge's and pastes) which may undergo spontaneous heating or self-burning under normal transportation conditions. These materials may increase in temperature and ignite when exposed to air.

CHEMICAL INVENTORY AND STORAGE FORM
PART 2

DRINKING WATER PROTECTION QUESTIONNAIRE

Please summarize the activities at this site, including principal products or services provided:

Please check the corresponding box if your facility has prepared any of the following:
☐ Pollution Incident Pollution Plan (PIPP)
☐ Risk Management Program/Plan (RMP)
☐ Spill Prevention Control and Countermeasures Plan (SPCC)
☐ Storm Water Pollution Prevention Plan (SWPPP)
☐ Hazardous Waste Contingency Plan (HWCP)
☐ Other Spill Contingency Plan, please explain.

Please check the corresponding box if your facility has prepared or is designated as any of the following:
☐ Listed as a Part 201 Site under Act 451
☐ Listed as a Part 213, Leaking Underground Storage Tank, Site under Act 451
☐ Baseline Environmental Assessment
☐ Due Care Plan
☐ Other known release of a regulated substance or ongoing contamination, please explain.

Kalamazoo's wellhead protection ordinance (No. 1825) defines the following as Regulated Substances:

1. Substances for which there is a materials safety data sheet (MSDS), and the MSDS cites possible health hazards
2. Hazardous Waste, as defined by the Resource Conservation and Recovery Act (RCRA) of 1976
3. Hazardous Substance, as defined by the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA)
4. Radiological materials
5. Biohazards

EXAMPLES OF REGULATED SUBSTANCES INCLUDE

A. PETROLEUM PRODUCTS Examples: Gasoline, Motor Oil, Heating Oil, Diesel, Used Oil
B. RADIOLOGICAL MATERIALS Common Uses: Gas Chromatography, Scientific Research, Gauges, Manufacturing, Medicine
C. INORGANIC COMPOUNDS (Metals, Metal Compounds and certain Acids and Bases) Examples: Chromium, Arsenic, Cyanide, Nitrate, Hydrochloric Acid, Sodium Hydroxide
D. FERTILIZERS, PESTICIDES, AND OTHER SYNTHETIC ORGANIC COMPOUNDS Examples: 10-10-10, Ammonium nitrate, Atrazine, Carbofuran, Simazine, Bone Meal
E. VOLATILE ORGANIC COMPOUNDS (VOCs) Examples: Paints, Varnish, Solvents, Thinners, Adhesives,
F. SALT Examples: Calcium Chloride, Sodium Chloride, Sand/Salt Mixtures

Do you use or store regulated substances onsite?

☐ **Yes** ☐ **No**

If you answered "no" to this question, you do not need to complete page 5 of the questionnaire.

DRINKING WATER PROTECTION QUESTIONNAIRE

Please check any boxes that describe the activities that occur at your property.

Commercial

- ☐ Analytical and clinical laboratories
- ☐ Animal feedlots
- ☐ Auto washes
- ☐ Boat builders/refinishers
- ☐ Car rental and service stations/automotive repair
- ☐ Commercial establishments with fleets of trucks and cars
- ☐ Concrete/asphalt/coal/tar companies
- ☐ Drum recycling and cleaning
- ☐ Dry cleaners and laundries
- ☐ Equipment repair
- ☐ Food processors/meat packers/slaughter houses
- ☐ Fuel oil distributors/stores
- ☐ Furniture stripping or refinishing
- ☐ Gas stations
- ☐ Junk and salvage yards
- ☐ Motor vehicle repair/service shops
- ☐ Pesticide application services/pesticide stores/retailers
- ☐ Petroleum bulk storage (wholesale)
- ☐ Photographic development
- ☐ Printing
- ☐ Salvage yards/impoundment lots
- ☐ Truck or rail tanker cleaning
- ☐ Wood preserving and treatment

Manufacturing

- ☐ Chemical, paint, and plastics manufacturing
- ☐ Furniture manufacturing
- ☐ Metal manufacturing (including metal plating)
- ☐ Mining operations/injection wells
- ☐ Other manufacturing (textiles, rubber, glass, etc.)
- ☐ Pulp and paper industry

Transportation

- ☐ Airport maintenance/fueling areas
- ☐ Governmental agencies with fleets of trucks and cars
- ☐ Salt piles/sand-salt piles
- ☐ Trucking/bus terminals
- ☐ Vehicle maintenance operations (transportation/trucking, contractors/construction, auto dealers)

Utilities

- ☐ Aboveground oil pipelines
- ☐ Electric power generation substations

Waste Disposal

- ☐ Landfills/dumps/transfer stations

If you store regulated substances onsite, please summarize the security measures at this site, including fencing, lighting, and flow valves (are they locked when not in use?):

DRINKING WATER PROTECTION QUESTIONNAIRE

REGULATED SUBSTANCES INVENTORY – INDOOR STORAGE AREAS

Our priority is to inventory materials stored in aggregate quantities greater than 55 gallons or 440 pounds. Aggregate quantity means the total storage amount of each material onsite, regardless of container size.

If your facility stores any regulated substances in INDOOR storage areas onsite, please list the specific types of materials below.

Material Name *(Chemical or Brand)*	Material Use	Container Type[1]	Container Material	Max. Quantity Stored Onsite (with Units)	Are floor drains present in storage area? If yes, are they connected to sanitary sewer, storm sewer, or other?		Containers properly labeled?	How often is the area inspected?	Are walls and floors impervious? Please list material.
Example: **Hydraulic oil**	**Lubricant**	**Drum**	**Steel**	**55 Gallons**	☐ Yes ☑ No		**Yes**	**Weekly**	**Yes, concrete**
					☐ Yes ☐ No				
					☐ Yes ☐ No				
					☐ Yes ☐ No				
					☐ Yes ☐ No				
					☐ Yes ☐ No				
					☐ Yes ☐ No				
					☐ Yes ☐ No				

[1] Examples: aboveground storage tank (AST), underground storage tank (UST), drum, bags, bottles, pails.

DRINKING WATER PROTECTION QUESTIONNAIRE

REGULATED SUBSTANCES INVENTORY – OUTDOOR STORAGE AREAS

Our priority is to inventory materials stored in aggregate quantities greater than 55 gallons or 440 pounds. Aggregate quantity means the total storage amount of each material onsite, regardless of container size.

If your facility stores any regulates substances in <u>OUTDOOR</u> storage areas onsite, please list the specific types of materials below.

Material Name *(Chemical or Brand)*	Material Use	Storage Container Type[1]	Storage Container Material	Max. Quantity Stored Onsite (with Units)	Secondary containment structure present? If yes, describe containment, including material and size.		How often is the area inspected?	Is the storage area covered?
Example: **Diesel**	**Truck Fuel**	**AST**	**Steel**	**500 Gallons**	☑ Yes ☐ No	**Concrete dike, 750 gallons**	**Weekly**	**Yes**
					☐ Yes ☐ No			
					☐ Yes ☐ No			
					☐ Yes ☐ No			
					☐ Yes ☐ No			
					☐ Yes ☐ No			
					☐ Yes ☐ No			
					☐ Yes ☐ No			
					☐ Yes ☐ No			

[1] Examples: aboveground storage tank (AST), underground storage tank (UST), drum, bags, bottles, pails.

Attachment 5

Guidance: When a Battery Cabinet or Diesel Generator is Proposed

THE CITY OF Kalamazoo
Department of Public Services

GUIDANCE: WHEN A BATTERY CABINET or DIESEL GENERATOR IS PROPOSED

1.0 References:

- MI EGLE SCP website: https://www.michigan.gov/egle/about/organization/materials-management/hazardous-waste/liquid-industrial-byproducts/spill-protection-and-reporting
- MI EGLE Minimum Well Isolation Distances guidance: https://www.michigan.gov/egle/-/media/Project/Websites/egle/Documents/Programs/DWEHD/Water-Well-Construction/Minimum-Well-Isolation-Distances.pdf?rev=4078b9f0ba1d4e16bf5f64f9cf3ee410&hash=786A80F3F0B3E9C7016FEF276023F77C
    - Michigan minimum well isolation distances vary depending on the type of well and the source of contamination, with examples including 50 feet for a private well from a fuel tank, and 75 feet from a septic tank or seepage pit. For public wells, these distances are often much greater, such as 800 feet from an animal yard for a Type IIb or III public well, and 2,000 feet from sources with certain chemical storage for Type I and Type IIa public wells. It is important to note that these are minimum distances, and a local health department can require greater distances based on site-specific conditions like geology or groundwater flow.
    - Local Health Departments are the primary authorities for well isolation distances, though the Michigan Department of Environment, Great Lakes, and Energy (EGLE) also has authority and can issue deviations based on site-specific conditions
- Wellhead Protection Ordinance, Chapter 39 of the City Code
- Stormwater Management Ordinance, Chapter 29 of the City Code
    - Section 29-4 (Discharge Prohibitions)
    - Section 29-8 (Requirement to prevent, control & reduce pollutants
- Wellhead Protection & Stormwater Management Performance Standards. Using the Performance Standards cited below, the City reviews proposed land and chemical use on private properties within the City's limits where there is the potential to have a spill or release (including but not limited to):
    - Section 3.2 Regulated Substances and Process Activities

- Section 3.3 Regulated Substance Storage Units
- Section 3.3.3 ASTs
- Section 3.3.7 Generators
- Section 7.0 Non-conforming Land Uses
- Section 7.2 Spill Contingency Planning
- Section 7.2.1 Regulated Substance Inventory
- Section 7.2.5 Use of Other Emergency Response Plans
- Section 9.3 Public Information Reporting – Illicit Discharges or Spill Releases
- Figure 1 Wellhead Protection (Capture Zones)

2.0 Requirements:

Chapter 29 and Chapter 30 require specific prohibitions within 1-year and 10-year Time of Travel (TOT) Capture Zones. Uses, as proposed in the site plan or non-site plan process, may be prohibited by ordinance. However, they can be approved with engineering controls that are designed and implemented consistently with the City's Performance Standards, Best Management Practices (BMPs), the City's Fire Code, and applicable State of Michigan and federal laws and regulations, and Chapter 39 require specific prohibitions within 1-year and 10-year TOT Capture Zones. Approval of non-conforming proposed uses will be determined by the Director of Public Services/City Engineer upon receipt of several conditions and submittals outlined below.

A) If the property is within a **1-year Drinking Water Capture Zone,** regulated substance storage/use shall not exceed 55 gallon/440 pound aggregate thresholds, according to the City's Wellhead Protection Ordinance. Any pre-ordinance, nonconforming land or chemical uses within a 1-year Capture Zone are required to conform to these standards and/or have a SCP.

- SCPs for the site may be submitted to the Site Plan Coordinator or to the Public Services, Water Programs Manager for review and approval to meet these requirements, as discussed in Section 7.2.5.

- Approval of chemical/land use above the threshold will require fulfillment and submittal of the items discussed below, and approval by the Director of Public Services/City Engineer.

B) Proposed land uses that are allowed within the **10-Year (and 5-year) Drinking Water Capture Zones** can exceeds the storage of regulated substances in quantities exceeding the 55 gallon/440 pound aggregate thresholds if required engineering controls are designed and implemented to conform to the specific land use standards within the Performance Standards and/or have a SCP for the site. In addition, nonconforming land uses within any Capture Zone are also required to conform to these standards and/or have a SCP.

- SCPs for the site may be submitted to the Site Plan Coordinator or to the Public Services, Water Programs Manager for review and approval to meet these requirements, as discussed in Section 7.2.5.

- Approval of chemical/land use above the threshold will require fulfillment and submittal of the items discussed above, and approval by the Director of Public Services/City Engineer.

C) If the property is **NOT in a 1-, 5- or 10-year Drinking Water Supply Capture Zone**, the City's Wellhead Protection Ordinance does not apply, and there is a potential for a release and a reasonable expectation that the site or adjoining parking areas may be directly or indirectly connected to the City's Stormwater System and/or associated surfaces waters from accidents and activities at the site, the following apply:

- The storage of presence of a regulated substance in a manner in which the substance could reasonably be released to the environment is prohibited.

- Regulated Substance storage, use, and/or generation shall be designed to prevent spills and discharges of such materials to the environment (i.e. soil, groundwater, surface water and stormwater).

- SPCs are required for all sites located outside the capture zones that exceed the storage of regulated substances in quantities exceeding 55 gallons aggregate for liquid materials or 440 pounds aggregate for dry weights.

- SCPs for the site may be submitted to the Site Plan Coordinator or to the Public Services, Water Programs Manager for review and approval to meet these requirements, as discussed in Section 7.2.5.

For example, if a wet battery cabinet leaked or a diesel tank release were to occur during filling, routine operations or maintenance activities, or other incident, the release could reasonably be expected to impact the City's Stormwater System and associated surfaces waters. As a result, the City's Stormwater Management Ordinance applies.

Referring to Section 29-4 (Discharge Prohibitions) and Section 29-8 (Requirement to prevent control and reduce stormwater pollutants by the use of best management practices), a Stormwater Pollution Prevention Plan (SWPPP) and BMPs are necessary for proposed battery cabinets or diesel generators to prevent discharge of pollutants to the City's Stormwater System. A SWPPP is generally synonymous with the previously referenced SCP and the required BMPs are outlined in Section 3.3.7 of the attached Stormwater Performance Standards.

An SCP is not be required for a proposed propane generator, or battery cabinet or diesel tank if they contained regulated substances less than the 55 gallon/440 pound aggregate thresholds.

3.0 Are Spill Containment Plans Always Necessary For Battery Storage?

WET BATTERIES

A wet battery, also known as a flooded-cell or wet-cell battery, is a traditional type of rechargeable battery that uses a liquid electrolyte solution, such as sulfuric acid and water. They are commonly found in electric utilities, energy storage and cellphone towers. The electrolyte submerges lead plates within the battery's cells, and a chemical reaction between the plates and the liquid electrolyte generates electricity. These batteries require maintenance, such as checking the electrolyte level and adding distilled water.

A "wet" battery, specifically a lead-acid battery, can negatively impact the environment if it is not disposed of properly because it contains corrosive acid and toxic heavy metals like lead. If the battery leaks, these harmful substances can contaminate soil and water, harming plants, animals, and potentially human health.

Environmental hazards of improper disposal

- **Groundwater contamination:** When a wet battery corrodes, the acid and metals can seep into the ground, polluting groundwater and surface water.
- **Harm to wildlife:** Contaminated water can be toxic to aquatic life, disrupting entire ecosystems.
- **Soil damage:** Leaking battery acid can alter the pH of the soil, making it difficult for plants to grow.
- **Lead toxicity:** Lead is a potent neurotoxin that is harmful to both humans and plants.

Proper disposal and handling

- **Never dispose of a battery in regular trash:** Do not throw batteries in the garbage. They should be taken to a designated recycling center that can safely handle them.
- **Recycling is crucial:** Lead-acid batteries are highly recyclable, and recycling facilities have the proper procedures to neutralize the acid and recover the lead.
- **Handle with care:** When handling a battery, avoid spills. If a spill occurs, clean it up immediately with a neutralizer and dispose of the cleanup materials properly.

DRY BATTERIES

Dry cell batteries use Absorbed Glass Mat (AGM) technology and do not contain a liquid. They are a type of sealed, valve-regulated lead-acid (VRLA) battery, which means they do not contain free-flowing liquid electrolyte like traditional "wet cell" (flooded) batteries. They are typically used in portable electronics, such as toys, phones and laptops.

Key characteristics of dry batteries:

- **Maintenance-Free**: The sealed design eliminates the need for periodic watering, making them maintenance-free.
- **Non-Spillable**: The electrolyte is absorbed in a microporous glass mat material, so there is no risk of acid spills or corrosive fumes.
- **Decreased Dry-Out Risk**: They include a catalyst that helps lower float current and decreases the risk of the battery drying out, which is a common failure mode in some designs.
- **Installation Flexibility**: Because the electrolyte is immobilized, these batteries can be installed in various orientations (though typically upright in rack systems) and do not require the extensive ventilation or elaborate spill containment systems of wet batteries.

In a fire will a dry battery impact the environment?

Yes, a battery in a fire will impact the environment by releasing toxic gases into the air and, through the use of suppression water, potentially contaminating soil and water. The fire can cause the battery's internal chemicals to **vaporize**, creating hazardous air pollutants like hydrogen fluoride and potentially contributing to acid rain. The firefighting efforts themselves, which often involve large amounts of water, can cause **contamination through runoff**.

Air contamination:

- Vaporized battery chemicals can become airborne and travel beyond the immediate vicinity of the fire.
- These emissions can include toxic and corrosive substances such as hydrogen fluoride, nitrogen dioxide, and sulfur dioxide.
- In some cases, these vapors can contribute to acid rain.

Soil and water contamination:

- Firefighting efforts can use large volumes of water to extinguish the fire.
- This "suppression water" can collect toxic chemicals from the fire, leading to soil and water contamination as it runs off into drainage systems or the ground.

Other risks:

- Some battery components, like nickel and cadmium, are known carcinogens and can pose a risk if inhaled or if they contaminate the environment.

- Proper disposal of fire-damaged batteries is crucial to prevent further environmental contamination. Damaged batteries should be stored safely and taken to a household hazardous waste collection facility.

GEL BATTERIES

A gel battery is a dry battery since it does not use a liquid electrolyte. In a gel battery, the electrolyte is frozen with silica gel. This keeps the electrolyte inside the battery, preventing it from evaporating or spilling. This design stabilizes the battery and gives it a low self-discharge.

In a fire will a gel battery impact the environment?

Yes, a gel battery fire can impact the environment, though gel batteries are generally safer than other types like lithium-ion batteries. Gel batteries are associated with solar energy systems, RVs and boats, wheelchairs and other electric mobility devices. While gel batteries have a lower risk of explosion and don't typically emit flammable fumes, a fire can still produce toxic **smoke** containing heavy metals like lead and other hazardous components, and firefighting **suppression water runoff can carry contaminants** into the soil and water supply.

SUMMARY

Wet batteries have the potential to leak liquid acids, these harmful substances can contaminate soil and water, water supplies, creeks, etc. Suppression water from a fire can cause large quantities of contaminated runoff and impact on the environment in the same manner.

While dry and gel batteries are safer and present less of an environmental risk than wet battery types, a fire involving them is still a hazardous event. For all types of batteries (wet, dry or gel) it is crucial to take proper precautions, including fire containment and management of runoff, to mitigate environmental damage and public health risks.

Preventative measures to reduce the potential for chemical releases to the environment are always necessary but not the same for all circumstances. ***To determine the need for a Spill Containment Plan, follow the Requirements in Section 2.0 above***.

4.0 Development Submittals for the City of Kalamazoo Review:

Primary items required for submittal to the City for scenarios described above (A to C) are as follows:

1) The **plans/cut sheets/schematics** to review proposed battery cabinet and/or diesel generator installations or modifications.

2) A **Chemical Storage Inventory (CSI)** form completed including the type of battery contents or diesel tank contents.

   – List the maximum on-site use at any one time of fluids, quantities and container sizes on the spreadsheet 6 and/or 7, types of security; and total quantities of liquids and solids.

3) A **Site-Specific Spill Containment Plan (SCP)** or equivalent document with details of how a spill/release will be prevented, or if a spill occurs, and how it will be handled. What is being prevented? Entry to buildings, lakes, streams, wetlands or the ground (i.e. groundwater) that could impact humans and/or the environment. It is important that spill release plans and emergency equipment are available, and staff is trained in advance should the release of chemicals to the environment occur. It is also necessary that the City receive immediate notification of any potential or actual impacts from a spill to the City's utilities, right-of-ways or properties. SPCs shall include as applicable:

   - **Safety Data Sheets (SDS)** – for actual products/chemicals used.

   - Diesel generator information: Secondary spill containment (e.g., double walled diesel tank); intestinal monitoring; lead detection alarms (including remote alarms at unstaffed locations), overhead roofing, spill pallets, berms, dikes, sumps, standpipes, curbing to prevent runoff, and roof drains to prevent run on/off. Submit details for all items and a cut sheet for the generator. Depict the spill containment system as described in the SCP on the plans (details and cut sheets).

   - Battery cabinet information: If the batteries contain regulated substances (lead, acid, lithium, etc.) provide secondary spill containment, type(s) of batteries proposed, a CSI form with total regulated substance weight for solids and total volume for liquids (as required), containment sufficient to fully contain rupture of all batteries without impacting soil or groundwater, spill trays, security provisions, etc. Include provisions to make sure the batteries are not tampered with (intrusion alarms, surveillance cameras, etc.).

- Spill/Release Response Preparation: Response and cleanup plans, spill kits, etc. and spill kit locations on a plans/maps; routine personnel inspections, maintenance and spill. response training; emergency and non-emergency notifications; and, routine operations or maintenance.

- Any SCP template or equivalent document is acceptable as long as it fulfills the requirements of the City's ordinances and Performance Standards. Examples of SPCs can be provided by the City upon request and are to be used strictly as guidelines.

5.0 Spill/Release Reporting

1) Public Safety, City of Kalamazoo, to report imminent health and safety incidents

i. **911** - call any time

ii. **269- 337-8994** – for non-emergencies call Kalamazoo Public Safety Central Dispatch

2) State Release Reporting - Michigan Department of Environment, Great Lakes, and Energy (EGLE) – Enforcement

The "Release Notification Requirements in Michigan" document was compiled to help owners and operators of facilities in Michigan, including vehicles and farms, determine their potential notification and reporting requirements in the event of a chemical release. Check your permits, licenses, registrations, pollution prevention plans, and local ordinances for additional release reporting requirements.

ANYTIME - Report environmental releases to the State's 24-hour Pollution Emergency Alert System (PEAS) Hotline at 800-292-4706.

DURING BUSINESS HOURS – CALL THE LOCAL STATE CONTACT
EGLE Kalamazoo District Main Office 269-567-3500

i. **All Spill or Release Reports:**
Donovan Thomas for 269-615-4451

Thomas, Donovan (EGLE) <ThomasD38@michigan.gov>

ii. **Spill or Releases to the City's MS4 Storm Sewer System, Creek, Surface Water** or **Wetland**
Janelle Hohm for ER Reporting 269-568-2699

Hohm, Janelle (EGLE) HOHMJ@michigan.gov

<u>2) City of Kalamazoo Spill or Release Reports</u> that impact the City of Kalamazoo's properties, utilities, ROW, water pumping stations, MS4 Storm Sewer System, Creek, Surface Water, or Wetland

i. **269-337-8000** - call any time and report incidents to the City of Kalamazoo Call Center

ii. **269-370-1939** or 269-337-8583 Environmental Services assistance to address impacts involving the City of Kalamazoo

Attachment 6

Snow Melt and Geothermal System Policy

THE CITY OF Kalamazoo Department of Public Services	**Standard Department Policy (SDP)** **Path:** PSD_ADM_MA_55 Snow Melt and Geothermal System Policy.doc
Title: Snow Melt and Geothermal System Policy	
Approved By: James J. Baker, PE, Public Services Director and City Engineer	
Date Issued: January 5, 2026	James J Baker

1. Purpose and Authority

This policy establishes procedures governing snow melt and geothermal systems.

Authority for this regulation, provided under Kalamazoo City Code Chapter 39 (Wellhead Protection).

This policy supplements but does not replace the City's enforcement powers under that section.

SNOW MELT AND GEOTHERMAL SYSTEM POLICY

The City of Kalamazoo's Snow Melt and Geothermal System Policy (Policy or policy), presented herein, applies to all proposed snow melt systems and geothermal systems within the City of Kalamazoo and in all areas served by City of Kalamazoo municipal water or connected to City of Kalamazoo storm sewer. This policy also applies to existing non-conforming systems that are modified, altered, expanded, relocated, replaced, or subject to site plan review. This policy is necessary to prevent contamination of groundwater, surface water and environmental resources that over 200,000 Kalamazoo County residents rely on for drinking water and recreation. Failure to comply with this policy may result in disconnection from the City of Kalamazoo municipal water system and/or storm sewer system.

Geothermal systems and snow melt systems are NOT allowed in 1 year capture zones. *At all other locations served by City of Kalamazoo municipal water or storm sewer the following requirements apply for all geothermal systems and snow melt systems:*

- *Wells containing chemicals/additives (glycol, biocides, corrosion inhibitors, etc.) shall be encased in casing pipe from ground surface through all aquifers and shall extend 20 feet into blue clay or bedrock (whichever is shallower). Casing pipe shall be SCH80 PVC or SDR-11 HDPE. Annular space shall be sealed with grout.*
- *Below grade header piping and mains that contain chemicals/additives shall be encased in concrete or casing pipe w/ end seals. At utility crossings, system mains shall be installed 24" minimum under other utilities*
- *In ground header and main shutoff valves with purge valves, drains and pressure testing ports shall be provided.*
- *Zone control with zone isolation, purge valves, drains and pressure testing ports in all utility areas shall be provided to allow digging to occur in the area without causing a release of system fluids.*
- *Signage clearly marking the system area, especially in areas containing other underground utilities shall be provided. Signage includes: signs on posts, signs on buildings, concrete stamping, plaques or castings in concrete, etc.*
- *System(s) shall include audible low-pressure alarm, automatic pump shutoff and automatic system supply and return valve closure. Upon loss of pressure, system shall alarm, pumps shut off and valves close inside building.*
- *Stormwater containment shall be provided to prevent discharge of system additives/chemicals to the*

environment. Containment shall be consistent with the requirements in the City of Kalamazoo Performance Standards for Groundwater Protection within Capture Zones and Stormwater Management.

- *In-building containment shall be provided in equipment and chemical storage/handling areas to prevent releases from escaping the building and entering the environment.*
- *A Spill Contingency Plan (SCP) meeting the requirements of the City of Kalamazoo Performance Standards for Groundwater Protection within Capture Zones and Stormwater Management shall be provided.*
- *Spill Kit(s) shall be provided adjacent to the system and locations shall be depicted in the SCP.*
- *Participation in the MISSDIG system is required for all systems in the ROW and in areas with City utilities. System owners are responsible for marking system locations prior to sub-surface activities occurring.*
- *Extraction or pumping of groundwater for geothermal purposes is not allowed if there is potential to exacerbate or cause migration of contaminant plumes or cause cross-contamination between aquifers.*
- *Provide the following for City review: system plans and specifications, system fluid capacity, flow rate(s), operating pressure(s) and temperature(s), CSI form with total chemicals/additives and SDS', SCP and as-builts.*

The City of Kalamazoo reserves the right to institute additional requirements as necessary to protect water resources, the environment, public property and private property from the release of regulated substances (as defined in the Wellhead Protection Ordinance and Performance Standards) or prevent exacerbation of contamination.

Attachment 7

Precipitation Intensity, Duration and Frequency Table

Precipitation Intensity, Duration and Frequency Table

Point precipitation frequency estimates (inches)
NOAA Atlas 14 Volume 8 Version 2
Data type: Precipitation Depth
Time series type: Partial Duration
Project area: Midwestern States
Location name (ESRI Maps): K Michigan USA
Station Name: KALAMAZOO STATE HOSP
Latitude: 42.2833 Degree
Longitude: -85.6000 Degree
Elevation (USGS): 950 ft

PRECIPITATION FREQUENCY ESTIMATES

by duration for ARI (years):	1	**2**	5	**10**	25	50	100
5-min:	0.333	0.390	0.484	0.565	0.680	0.772	0.866
10-min:	0.488	0.570	0.709	0.827	0.996	1.13	1.27
15-min:	0.595	0.696	0.864	1.01	1.22	1.38	1.55
30-min:	0.826	0.971	1.21	1.42	1.72	1.95	2.20
60-min:	1.04	1.23	1.57	1.87	2.31	2.67	3.04
2-hr:	1.24	1.49	1.93	2.32	2.91	3.39	3.90
3-hr:	1.36	1.64	2.14	2.60	3.29	3.86	4.48
6-hr:	1.62	1.92	2.48	3.00	3.81	4.50	5.26
12-hr:	1.94	2.24	2.79	3.32	4.15	4.87	5.65
24-hr:	2.29	**2.59**	3.15	**3.68**	4.52	5.25	6.05
2-day:	2.61	2.98	3.64	4.24	5.16	5.93	6.77
3-day:	2.88	3.26	3.94	4.57	5.52	6.32	7.19
4-day:	3.10	3.49	4.19	4.84	5.82	6.65	7.54
7-day:	3.66	4.10	4.88	5.59	6.66	7.55	8.52
10-day:	4.18	4.66	5.50	6.26	7.38	8.31	9.29
20-day:	5.78	6.36	7.33	8.15	9.32	10.20	11.20
30-day:	7.16	7.84	8.93	9.82	11.00	12.00	12.90
45-day:	8.94	9.76	11.10	12.10	13.40	14.40	15.30
60-day:	10.50	11.40	12.90	14.10	15.60	16.60	17.50

Date/time (GMT): Thu Jan 9 17:13:31 2025
pyRunTime: 0.02613544464111328

Attachment 8

Stormwater Treatment Inspection Reports

Annual Inspection Report

Horizontal Flow In-Line Stormwater Treatment Unit

Inspections to be performed and reported annually. Reports are due Nov 1st.

Inspection Date: _____

Inspector's Name: _____ **Title:** _____

Company Performing Inspection (if performed by off-site company): _____

Treatment Unit Site Information

Business Name: _____ **Site Address:** _____

Contact Person: _____ **Title:** _____

Phone Number: _____ **Fax Number:** _____

Email Address: _____

Manufacturer & Model of Treatment Unit(s) Installed: _____

Number of Treatment Units Installed / Inspected: _____

Observed Condition of Treatment Unit(s)

The depth of oil and sediment in the unit can be measured from the ground surface.

Sediment

- Less than 1 inch of sediment on bottom ☐
- 1 to 7 Inches of sediment on bottom ☐
- More than 7 Inches of sediment on bottom ☐

Oil

- No oil on water surface ☐
- Oily sheen on water suface ☐
- More than 1/8 inch of oil on water surface ☐

Generally, annual maintenance is recommended but the required maintenance frequency will vary with the amount of pollution on your site (number of hydrocarbon spills, amount of sediment, etc.). It is recommended that the frequency of maintenance be increased or reduced based on local conditions. Maintenance should be performed immediately after an oil spill or once the sediment depth reaches the values specified in your unit manufacturer's maintenance specifications. Maintenance of these units is performed from the surface via vacuum truck. These units must be maintained to ensure long-term environmental protection through continual performance.

Maintenance / Repair Needed on Treatment Unit(s)

- No repair or maintenance needed at this time ☐
- Unit is **not** functioning properly and needs to be repaired ☐
- Vactoring of oils and/or sediment needed ☐
- Item(s) needing repair: _____

Maintenance / Repair Performed on Treatment Unit(s)

- Oil and/or sediment has been vactored out of unit ☐
- Necessary repairs have been made ☐
- Necessary Repairs have not been made but are scheduled to be completed ☐

Comments: _____

Please Email this report to: StormWaterReports@kalamazoocity.org

Questions regarding stormwater compliance under this Agreement may be directed to the City's Stormwater Compliance Assistance staff at 269-337-8343.

Please contact the installer of your BMP(s) for specific maintenance requirements

Rev 9/2022

Annual Inspection Report

Stormwater Basin Treatment Unit or General BMP

Inspections to be performed and reported annually. Reports are due Nov 1st.

Inspection Date: _____

Inspector's Name: _____ **Title:** _____

Company Performing Inspection (if performed by off-site company): _____

Stormwater BMP Site Information

Business Name: _____ **Site Address:** _____

Contact Person: _____ **Title:** _____

Phone Number: _____ **Fax Number:** _____

Email Address: _____

Stormwater BMP type Installed: _____

Number of Stormwater BMPs inspected: _____

Observed Condition of Stormwater BMP

- Scouring, erosion or loss of vegetation ☐
- Debris or trash present ☐
- Excessive vegetation ☐
- Mosquito breeding ☐
- Algae bloom ☐
- Sediment accumulation in the basin ☐

Generally, annual maintenance is recommended but the required maintenance frequency will vary with the amount of pollution on your site(number of hydrocarbon spills, amount of sediment, etc.). It is recommended that the frequency of maintenance be increased or reduced based on local conditions. Maintenance should be performed immediately after an environmental spill. Stormwater BMP(s) must be maintained to ensure long-term environmental protection through continual performance.

Maintenance/Repair Needed on Stormwater BMP(s)

No repair or maintenance needed at this time ☐

BMP Structure is **not** functioning properly and needs to be repaired ☐ Item(s) needing repair: _____

Maintenance/Repair Performed on Stormwater BMP(s)

Necessary Repairs have not been made but are scheduled to be completed ☐ Necessary repairs have been made ☐

Comments: _____

Please Email this report to: Environmental Support Specialist, richardsona@kalamazoocity.org

For Questions, contact: Environmental Support Specialist, 269-337-8343

Please contact the installer of your stormwater BMP(s) for specific maintenance requirements

Rev 9/2022

Annual Inspection Report

Vertical Flow-Thru Stormwater Treatment Unit (Filter Insert)

Inspections to be performed and reported annually. Reports are due Nov 1st.

Inspection Date: _____

Inspector's Name: _____ **Title:** _____

Company Performing Inspection (if performed by off-site company): _____

Treatment Unit Site Information

Business Name: _____ **Site Address:** _____

Contact Person: _____ **Title:** _____

Phone Number: _____ **Fax Number:** _____

Email Address: _____

Manufacturer & Model of Treatment Unit(s) Installed: _____

Number of Treatment Units Installed / Inspected: _____

Observed Condition of Treatment Unit(s)

Leaves and/or other debris in sediment chamber and / or filter media ☐

Leaves, debris and sediment in and around treatment unit is restricting stormwater flow into and through unit ☐

Sediment	Filter Media
Less than 1 inch of sediment in sediment chamber ☐	Filter media fairly clean, only requiring surface cleaning ☐
Several Inches of sediment in sediment chamber ☐	Filter media is dark and covered with a sediment layer ☐
More than 5 Inches of sediment in sediment chamber ☐	Filter media is completely plugged with sediment and/or debris ☐

The unit must be maintained on a regular schedule to prevent saturation of the filter media by contaminants and blockage from sedimentation and debris buildup. Maintenance can be accomplished by removing cover, vacuuming debris and sediment from the sediment chamber with a wet/dry vacuum and replacing the filter media if necessary. A typical recommended change-out of the filter media would be every 4 to 6 months. Sedimentation maintenance may be needed more often depending on the location and season. A clean-out after heavy leaf fall is recommended.

Maintenance / Repair Needed on Treatment Unit(s)

No repair or maintenance needed at this time ☐

Sediment & debris need to be removed and filter media cleaned ☐

Sediment & debris need to be removed and filter media replaced ☐

Unit is **not** functioning properly and needs to be repaired ☐

Item(s) needing repair: _____

Maintenance / Repair Performed on Treatment Unit(s)

Sediment chamber has been cleaned ☐

Filter media has been cleaned ☐

Filter media has been replaced ☐

Necessary repairs have been made ☐

Necessary repairs have not been made but, are scheduled to be completed ☐

Comments: _____

Please Email this report to: StormWaterReports@kalamazoocity.org

Questions regarding stormwater compliance under this Agreement may be directed to the City's Stormwater Compliance Assistance staff at 269-337-8343.

Please contact the installer of your BMP(s) for specific maintenance requirements

Rev 9/2022