Section 14 (Composting) Engineering Design and Operations Plan
(Content Checklist and Suggest Table of Contents Outline)

☐ **Amendments/Modifications/Revisions Tracking Page**

Include title, date of approval, and section or appendix numbers associated with the changes.

☐ **SECTION 1: INTRODUCTION** — **Page, Plate, or Appendix #**

☐ Reg. 14.4 The owner or operator of a Class I, II or III composting facility shall submit an engineering design and operations plan to HMWMD and the local governing authority for review and approval prior to commencing facility construction, composting or feedstock storage operations. The plan shall describe how the facility will comply with all applicable requirements in these Solid Waste Regulations. _____

☐ Reg. 14.4.2(A) Include names, addresses, and telephone numbers of the owner and/or operator, and one or more persons having the authority to take action in the event of an emergency. _____

☐ Reg. 14.4.2(B) Include name of the composting facility, the physical address and legal description, location with respect to the nearest town, and mailing address, if different from physical address. _____

☐ Reg. 14.1.4 Compost Feedstock Types

Type 1: Agricultural crop residues, manure, untreated wood wastes, yard, paper and green wastes. _____

Type 2: Animal material, animal mortalities and source separated food wastes. _____

Type 3: Biosolids, solid waste, processed solid waste and sludges. _____

☐ Reg. 14.2.1(A) A Class I composting facility can receive Type1, 2 or 3 feedstocks. _____

☐ Reg. 14.6.1 Class I composting facilities have no limitation as to feedstock type or material volume except as may be specified in the certificate of designation or approved design and operations plan. _____

☐ Reg. 14.6.1(B) The owner or operator of a Class I composting facility shall develop and implement the facility approved waste characterization plan in accordance with Section 2.1.2(C) of these Solid Waste Regulations. _____

☐ Reg. 14.6.1(C) The owner or operator of a Class I composting facility shall only receive those feedstocks, bulking materials and liquid wastes specified in the approved design and operation plans for the facility. Acceptance of composting materials different from those originally approved, shall be in accordance with the facility's waste characterization plan. . _____

☐ Reg. 14.2.1(C) A Class I composting facility may accept feedstocks from multiple generators at one location for processing. _____

☐ Reg. 14.2.2 (A) A Class II composting facility can receive Type 1 or 2 feedstocks. _____

☐ Reg. 14.6.2 Class II composting facilities have no limitation as to feedstock type or material volume except as may be specified in the certificate of designation or approved design and operations plan. _____

☐ Reg. 14.6.2(B) The owner or operator of a Class II composting facility shall only receive Type I or Type II feedstock and only receive those liquid wastes specified in the approved design and operation plan. _____

☐ Reg. 14.2.2 (C) A Class II facility may accept feedstocks from multiple generators at one location for processing. _____

☐ Reg. 14.2.3(A) A Class III composting facility can only receive Type 1 feedstocks. _____

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☐ Reg. 14.2.3(B) A Class III composting facility is limited to a total volume of 50,000 cubic yards of feedstock, in-process and bulking materials at any one time (finished compost does not count towards this total). _____

☐ Reg. 14.2.2 (C) A Class III facility may accept feedstocks from multiple generators at one location for processing. _____

☐ **SECTION 2: LOCATION RESTRICTIONS** **Page, Plate, or Appendix #**

☐Reg. 2.1.17 Demonstrate that no wastes will be placed into groundwater or surface water. _____

☐ **SECTION 3: GEOLOGIC and HYDROGEOLOGIC CONDITIONS** **Page, Plate, or Appendix #**

An evaluation of potential impacts to existing surface water and groundwater quality, including but not limited to (Section 14.4.2(L):

☐Reg. 14.4.1 Per Section 14.4.1: All portions of the facility design and site investigation shall be reviewed and sealed by a Colorado registered professional engineer or reviewed and signed by a professional geologist, as appropriate. _____

☐Reg. 14.4.2(L)(1) A description of site geological and hydrogeological conditions; _____

☐Reg. 14.4.2(L)(2) Floodplain information including evidence that the proposed site is not located within a 100-year floodplain; _____

☐Reg. 14.4.2(L)(3) Public water supply information including the location of all water supply wells, springs, and surface water intakes within one mile of the proposed facility boundary; _____

☐Reg. 14.4.2(L)(4) Identification of all lakes, rivers, streams, springs, or bogs, on-site or within one-half mile of the proposed facility boundary; _____

☐Reg. 14.4.2(L)(5) Depth to, and thickness of, the uppermost aquifer; _____

☐Reg. 14.4.2(L)(6) Hydrologic properties of the uppermost aquifer; _____

☐Reg. 14.4.2(L)(7) Information regarding the existing quality of groundwater beneath the proposed facility; _____

☐Reg. 14.4.2(L)(8) The types and regional thickness of unconsolidated soils materials; _____

☐Reg. 14.4.2(L)(9) The types and regional thickness of consolidated bedrock materials; and _____

☐Reg. 14.4.2(L)(10) Geologic hazards such as slope stability, faulting, folding, rock fall, landslides, subsidence or erosion potential. _____

☐ **SECTION 4: DESIGN AND CONSTRUCTION REQUIREMENTS** **Page, Plate, or Appendix #**

☐Reg. 14.4.1 Per Section 14.4.1: All portions of the facility design and site investigation shall be reviewed and sealed by a Colorado registered professional engineer or reviewed and signed by a professional geologist, as appropriate. _____

☐ Reg. 14.4.2(C) Include site maps and plans drawn to a common recognized engineering scale illustrating the facility's surveyed property boundaries, location of processing and storage areas, adjoining properties, roads, fencing, existing and proposed structures, surface water containment and control structures and all proposed monitoring points for surface water and groundwater quality. _____

☐ Reg. 14.3.3(L) Groundwater Monitoring: A composting facility which has not received a specific waiver from groundwater monitoring from the Department and the local governing

authority, shall submit a Groundwater Monitoring Plan to the Department for review and approval in accordance with Section 2.2 of these Solid Waste Regulations. Monitoring parameters will be established based on the hydrogeologic data related to the site, the type of waste streams(s) accepted at the facility and waste characterization analyses performed on incoming wastes. _____

☐ Reg. 14.1.1(B) Provide that the facility's property boundary is surveyed by a Colorado registered professional land surveyor and that the drawing that illustrates the facility's property boundary is properly sealed by a Colorado registered land surveyor. _____

☐ Reg. 14.3.1(A) All engineered features of the facility design shall be reviewed and sealed by a Colorado registered professional engineer. _____

☐ Reg. 14.3.1(B) Surface Water Control: Surface water control features at compost facilities shall be designed, constructed and maintained:

1) To prevent flow onto the facility during peak discharge from a 25-year, 24-hour storm event;
2) To control and collect the on-site run-off water volume resulting from a 25-year, 24-hour storm event;
3) To contain and manage leachate;
4) Such that all storm water/leachate containment structures shall be constructed of a minimum of eighteen (18) inches of compacted soil or in-situ earthen material or other low permeability materials to achieve a hydraulic conductivity of less than or equal to 1×10^{-6} cm/sec; _____
5) Alternative liner designs that perform in an equivalent manner to the above liner design may be approved by the Department and the local governing authority based on a demonstration of alternate liner design's equivalent performance, the waste type and site specific technical information; _____
6) All storm water/leachate containment structures shall be dewatered within thirty (30) calendar days of a storm event so that full runoff storage capacity is maintained; and _____
7) Such that storm water/leachate containment structures shall be designed and maintained with a minimum 2 feet of free board measured from lowest elevation at any given time. _____

☐ Reg. 14.3.1(C) Leachate Control: A low permeability work pad area may be necessary to manage leachate generated from composting operations. Site-specific conditions, operational practices, feedstock, bulking material and liquid wastes will be evaluated to determine the necessity for a work pad. The work pad shall be an engineered feature that is designed and constructed to:

1) Ensure groundwater protection; _____
2) Be of sufficient slope to direct storm water/leachate to the appropriate collection and storage system; and _____
3) Withstand various temperatures and allow for heavy equipment operation, without damage or failure. _____

☐ Reg. 14.3.2(A) Composting facilities shall implement their approved quality assurance and quality control plan in constructing all engineered structures at the facility. _____

☐ Reg. 14.3.2(B) A construction certification report shall be submitted to the Department for review and approval, at a minimum, sixty (60) calendar days prior to acceptance of feedstock, liquid waste or bulking material. _____

☐ Reg. 14.3.2(C) The owner or operator of a composting facility shall provide copies of the construction record drawings for engineered features at the site and a report documenting facility construction, including the results of observations and testing carried out as part of the construction quality assurance plan, to the Department and local governing authority. _____

☐ Reg. 14.3.2(D) Facilities shall not commence operation until the Department has determined

the construction was completed in accordance with the approved engineering report/plans and specifications and has approved the construction documentation in writing. _____

☐ **SECTION 5: OPERATIONS** **Page, Plate, Appendix #**

☐ Reg. 14.3.3(A) Prohibited Materials: No composting facility may accept asbestos or asbestos containing materials, infectious waste, hazardous waste, polychlorinated biphenyl wastes or lead-acid batteries. _____

☐ Reg. 14.3.3(B) Financial Assurance: The owner or operator of a composting facility shall establish financial assurance in accordance with Section 1.8 of the Solid Waste Regulations. _____

☐ Reg. 14.3.3(C) Surface Water Control: A composting facility shall control surface water flowing onto the site and prevent surface water from leaving the site. All storm water/leachate containment structures shall be dewatered within thirty (30) calendar days of a storm event so that the full runoff storage capacity is maintained. Freeboard shall be maintained at a minimum of two (2) feet at all times. _____

☐ Reg. 14.3.3(D) Nuisance Conditions: A composting facility shall control on-site and prevent off-site nuisance conditions such as noise, dust, mud, odors, vectors and windblown debris. _____

☐ Reg. 14.3.3(E) Access Control: A composting facility shall control access to prevent illegal dumping, prevent unauthorized access and provide for site security both during and after business hours. Effective artificial barriers or natural barriers may be use in lieu of fencing.

☐ Reg. 14.4.2(I) Description of site security measures taken to ensure the site is secured during business hours to control public access, and prevent unauthorized vehicles and illegal dumping of wastes. _____

☐ Reg. 14.3.3(F) Signage: A composting facility shall erect and maintain signage that identifies the facility name, emergency contact information, and the materials that will and will not be accepted, and that ensures adequate traffic control. _____

☐ Reg. 14.3.3(G) Contingency Plan: A composting facility shall develop, maintain for current site conditions, and keep available at all times, a contingency plan which outlines the corrective or remedial procedures to be taken in the event of:

1) The delivery of unapproved feedstock, bulking material, liquid waste or other waste materials; _____
2) Contamination of surface water or groundwater; and _____
3) The occurrence of nuisance conditions either on-site or off-site. _____

☐ Reg. 14.3.3(H) Fire Protection: A composting facility shall properly implement its approved fire protection plan as required by local fire codes, and such plan shall be kept current with site conditions and compliant with local fire codes. _____

☐ Reg. 14.3.3(I) Odor Control: A composting facility shall implement its Department approved odor management plan as necessary to control on-site and prevent off site nuisance conditions, including the following:

1) Develop operational procedures to minimize on-site odors and prevent off-site odors (e.g., incorporating feedstocks with bulking materials as soon as practical). _____
2) Develop operational procedures to mitigate odors when they occur either on-site or off-site (e.g., use of biofilters). _____
3) Develop strategies for mitigating off-site odors (e.g., communication with neighbors, responding to complaints within 24 hours. _____

☐ Reg. 14.3.3(J) Personnel Training: A composting facility shall operate under the control of

properly trained individuals. Personnel shall be trained to recognize prohibited materials, take action when nuisance conditions occur, and implement emergency procedures when necessary. _____

☐Reg. 14.3.3(K) Pathogen Reduction: The owner or operator of a composting facility shall ensure that the composting process reduces pathogens. The pathogen reduction methodology shall be described in the facility's Design and Operations Plan per Section 14.4. Processes to reduce pathogens include, but are not limited to:

1) Windrow composting: the compost material must be maintained at a temperature of 55 degrees Celsius (131 degrees Fahrenheit) or higher for fifteen (15) days or longer. The fifteen days do not need to be consecutive. During the period when the compost is maintained at 55 degrees Celsius or higher, there shall be a minimum of five (5) turnings of the windrow. _____
2) Within-vessel composting: the compost material must be maintained at a temperature of 55 degrees Celsius (131 degrees Fahrenheit) or higher for three (3) days. _____
   Aerated static pile composting process: all in-process compost shall be covered with sufficient insulating material, and the pile shall be maintained at a temperature of 55 degrees Celsius (131 degrees Fahrenheit) or higher for a pathogen reduction period of three (3) days. _____
3) Alternative methods of compliance to meet requirements of Section 14.5.4 may be approved by the Department based on a demonstration that these methods achieve an equivalent pathogen reduction. _____

☐Reg. 14.4.2(J) Description of employee training, including recognition of prohibited material, actions taken to mitigate nuisance conditions and implementation of contingency plan. _____

☐ Reg. 14.4.2(D) Incorporate maximum facility capacity and a description of the types of materials to be composted, including:

1) Estimated quantities of feedstocks; _____
2) Estimated quantities of liquid wastes; _____
3) Estimated quantities of bulking materials; _____
4) Estimated quantities of in-process material; and _____
5) Estimated quantities of finished product on-site. _____

☐Reg. 14.4.2(E) Include Mass balance evaluation for feedstocks, and bulking materials to determine an acceptable mixture for efficient composting. _____

☐Reg. 14.4.2(F) Include a detailed description of the composting operation specifically defining all procedures, activities, waste acceptance practice, pathogen reduction methodology and periods of non-activity. _____

☐Reg. 14.4.2(S) Include a detailed description of sampling procedures for testing of finished compost. _____

☐Reg. 14.5.2 Sampling Frequency: Finished compost shall be sampled and tested once every 10,000 cubic yards of compost produced, or annually, whichever is more frequent. The Department, in consultation with the local governing authority, may require additional sampling and testing when a change in feedstocks, bulking material, liquid waste or operational practices warrant greater frequency._____

☐Reg. 14.5.4 Sampling Methodology: Sample collection, preservation, and analysis shall assure valid and representative analytical results. Sampling procedures shall be described in the facility's design and operation plan. _____

☐Reg. 14.7.1 Each composting facility shall maintain, at a minimum, the following applicable records:

1) Type and amount of feedstock(s), liquid waste(s), and bulking material(s) received, processed and remaining on-site; _____

2) Amount of finished compost sold, used on-site or distributed off site; _____
3) Water quality monitoring data; _____
4) Liquid waste analytical data; _____
5) Feedstock analytical data; _____
6) Compost analytical data; _____
7) Operational monitoring data including time and temperature readings; _____
8) Windrow/pile aeration data; _____
9) Financial assurance documentation; _____
10) Design and operations plan; _____
11) Certificate of designation; _____
12) Waiver demonstration documentation; and _____
13) Facility personnel training records _____

☐Reg. 14.7.2 These records shall be maintained at the facility, unless otherwise approved by the Department and local governing authority, and shall be made available to the local governing authority, and the Department, upon request during business hours. _____

Operational Records (Section 5):

☐Reg. 2.4.2(B) Inspection records and training procedures. _____

☐Reg. 2.4.2(D) Design documentation for controlling leachate. _____

☐Reg. 2.4.2(E) Any demonstrations, certifications, findings, data or documents required by Reg. 2.2 Groundwater Monitoring. _____

☐Reg. 2.4.2(F) Any closure and post-closure care plans, along with monitoring, testing, or analytical data required by section 2.5 and 2.6. _____

☐Reg. 2.4.2(H) Cost estimates and financial assurance documentation required by section 1.8. _____

☐Reg. 2.4.2(I) Information demonstrating compliance with waivers required by section 1.5. _____

☐Reg. 2.1.2 Waste Characterization Plans. _____

☐Reg. 2.1.4, 2.1.5, 2.1.15, 2.1.18, 3.1.2(L), and Appendix B (subsection B3) Information and field records obtained as required by the Groundwater Sampling and Analysis Plan, and, at a minimum, specify that the HMWMD and the local governing body will be notified of any changes to the Groundwater Sampling and Analysis Plan. _____

Reports and Plans (Section 5):

☐Reg. 2.1.4, 2.1.5, 2.1.15, 2.1.18, 2.2, 3.3.2(L), and Appendix B Prepare a Groundwater Sampling and Analysis Plan. _____

☐Reg. 2.1.4, 2.1.5, and 3.3.2(L) Prepare a groundwater and surface water impact contingency plan. _____

☐Reg. 2.1.2 Prepare a Waste Characterization Plan that addresses how testing and detection of hazardous wastes will be conducted. _____

☐Reg. 2.1.6, 2.5.7, Prepare a storm water management plan to address how the facility will assure run-on and run-off control. _____

☐ SECTION 6: CLOSURE PLAN REQUIREMENTS

Page, Plate, or Appendix #

☐Reg. 14.8.2 Closure Plan: If at any time a composting facility ceases operation, including the discontinued receipt, processing and sale of materials for more than one hundred eighty (180) days, the owner or operator shall notify the Department and local governing authority and unless otherwise approved by the Department and the local governing authority, the owner or operator must begin implementation of its Closure Plan. Closure activities shall not exceed ninety (90) days in length. Extension of the closure period may be granted by the Department and the local governing authority if the owner or operator demonstrates that closure will, of necessity, take longer than ninety (90) days and all measures necessary to prevent threats to human health and the environment will be taken. _____

☐Reg. 14.8.3 A complete and accurate description and schedule of all steps necessary to achieve closure of the composting facility. Such steps shall include the following criteria:

1) The removal of all stored raw feedstock, bulking material, and liquid waste to a permitted solid waste facility or a facility where the wastes may be beneficially reused with approval from the Department and local governing authority; _____
2) The removal of all other wastes on-site, including those wastes generated by closure activities, to a permitted solid waste facility; _____
3) The removal of work pad areas; _____
4) The removal of all storm water control and collection structures, unless specifically approved by the Department and local governing authority to remain on-site; _____
5) The removal of all tanks, structures and equipment; _____
6) Site restoration including regarding and revegetation; and _____
7) The removal of partially composted feedstocks and bulking materials to a permitted solid waste facility or another compost facility with approval from the Department and local governing authority. _____

☐Reg. 14.8.4 Within fourteen (14) calendar days of commencing implementation of the Closure Plan, the facility shall provide written notification to the Department and the local governing authority. _____

☐Reg. 14.8.5 Within thirty (30) calendar days of completing closure activities the owner/operator of the facility shall provide written notification to the Department and local governing authority to document that the requirements and conditions of the closure plan have been achieved. _____

☐Reg. 14.8.6 Following closure of the facility, a notation must be placed on the deed notifying any potential purchaser that the property has been used as a composting facility. _____

☐ SECTION 7: POST-CLOSURE PLAN REQUIREMENTS

Page, Plate, or Appendix #

☐Reg. 14.9.1 Per Section 14.9.1: Following closure of the composting facility the owner or operator must conduct post-closure care, which shall consist of at least the following:

1) Continued monitoring, sampling and testing of soil, groundwater or surface water as defined in the post-closure plan; _____
2) Inspection and maintenance of any cover material or vegetation; and _____

3) An annual report submitted to the Department and local governing authority detailing post-closure care activities during the prior year. _____

☐Reg. 14.9.2 The post-closure care and maintenance period shall be for a minimum of five (5) years. The length of the post-closure period may be: _____

1) Decreased by the Department after consultation with the local governing authority if the owner or operator demonstrates that the reduced period is sufficient to protect human health and the environment; _____
2) Increased by the Department after consultation with the local governing authority if it is determined that the lengthened period is necessary to protect human health and the environment. _____

☐Reg. 14.9.2 Following completion of the post-closure care period the owner or operator must submit a certification signed by an independent Colorado registered professional engineer for approval by the Department and the local governing authority, verifying that post-closure care has been completed in accordance with the post-closure plan and has been placed in the operating record. _____

☐ **FINAL ENGINEERING and HYDRGEOLOGIC APPROVALS** **Page, Plate, or Appendix #**

☐Reg. 14.3.1(A); 14.4.1 Ensure that all portions of the facility design, associated plates and figures, all site investigations, the EDOP document, and closure and post-closure plans have been reviewed and sealed by a Colorado professional engineer or reviewed by a professional geologist (as appropriate per profession). _____

☐ **APPENDIX TITLES**

☐ A: Groundwater Monitoring Plan

☐ B: Odor Management Plan

☐ C: Contingency Plan

☐ D: Waste Characterization Plan

☐ E: Fire Protection Plan

☐ F: Construction Quality Assurance Plan

☐ G: Waiver Requests and Supporting Information

OTHER (e.g. site investigation supporting information and reports, permits, etc.)**:**

☐ H: _____

☐ I: _____

☐ J: _____

☐ K: _____

☐ L: _____

☐ M: _____

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☐ N: _____

☐ O: _____

☐ P: _____

☐ **FIGURES, DRAWINGS, and ENGINEERING PLATES** **Page, Plate, or Appendix #**

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☐ **TABLES**

Page, Plate, or Appendix #

☐ **LIST ANY ADDITIONAL SUPPORTING DOCUMENTS**

Page, Plate, or Appendix #

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