ORDINANCE NO. 2158

AN ORDINANCE REGULATING THE USE OF GRAYWATER WITHIN THE CITY AND COUNTY OF BROOMFIELD

BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY AND COUNTY OF BROOMFIELD, COLORADO:

Section 1. Chapter 13-42 of the Broomfield Municipal Code is hereby created to read as follows:

Chapter 13-42 Graywater Treatment System Regulations

13-42-010 - Authority, scope, and applicability

(A) Authority. This regulation is promulgated pursuant to the Colorado Water Quality Control Act (CWQCA), C.R.S. §§ 25-8-101 through 25-8-703. In particular, it is promulgated under C.R.S. § 25-8-205(1)(g) and 5 CCR 1002-86 ("Regulation 86").

(B) Purpose. The purpose of this regulation is to encourage the use of graywater in the City and County of Broomfield ("city"), and, because graywater is expected to carry human pathogens with various risk levels and pathways that have the potential to be dangerous to public health, to protect public health and water quality, and to describe requirements, prohibitions, and standards for the use of graywater for nondrinking water purposes, as authorized by C.R.S. § 25-8-205(1)(g).

(C) Scope. This regulation establishes the allowed users and allowed uses of graywater within the boundaries of the city, and establishes the minimum standards for the location, design, construction, operation, installation, and modification of graywater treatment works.

(D) Severability. The provisions of these regulations are severable, and if any provisions or the application of the provisions to any circumstances is held invalid, the application of such provision to other circumstances, and the remainder of these regulations shall not be affected thereby.

(E) Applicability.

(1) All graywater uses and graywater treatment works must comply with the minimum requirements of these regulations and of 5 CCR 1002-86.

a. Graywater treatment works may only be installed and operated within the jurisdiction of the city.

b. Graywater treatment works installed prior to the effective date of this regulation are allowed only if it can be demonstrated that they either meet the requirements of these regulations or were approved by the Water Quality Control Division prior to May 15, 2013 and pursuant to 5 CCR 1002-43 ("Regulation 43"), section 43.4(J) for on-site wastewater treatment systems ("OWTS") or pursuant to 5 CCR 1003-6 ("Regulation 6"), section IV.J for outdoor subsurface irrigation. Those systems are deemed to be in compliance with the requirements of these regulations unless or until any modification to the graywater treatment works is made.

c. Graywater treatment works installed under a local graywater control

program that is later revoked or rescinded must within 365 days:

1. Be physically removed or permanently disconnected; or
2. Be regulated under another jurisdiction's local graywater control program that assumes authority over the existing graywater treatment works. The existing graywater treatment works will need to comply with the city's Graywater Control Program, including any required graywater treatment works modifications.

d. In the event that a property with a compliant graywater treatment works is annexed or de- annexed into a jurisdiction with differing graywater requirements, the property owner must within 365 days:

1. Ensure the graywater treatment works is physically removed or permanently disconnected; or
2. Ensure the graywater treatment works is incorporated into another city, city and county, or county's local graywater control program. This includes conforming to the minimum requirements of the new local graywater control program and may include improving or modifying the graywater treatment works.

(2) Graywater use must meet the requirements adopted pursuant to these regulations. Unauthorized graywater use and discharges are prohibited.

(3) This regulation does not apply to: discharges pursuant to a Colorado Discharge Permit System ("CDPS") permit, wastewater that has been treated and released to state waters prior to subsequent use, wastewater that has been treated and used at a domestic wastewater treatment works for landscape irrigation or process uses, on-site wastewater treatment works authorized under 5 CCR 1002-43, reclaimed wastewater authorized under 5 CCR 1002-84, water used in an industrial process that is internally recycled, and rainwater harvesting.

(4) All graywater treatment works installed in the city must also meet the requirements of 5 CCR 1002-86 and Section 15 of the Broomfield Municipal Code effective at the time of system installation. In addition, all systems must be in compliance with any other applicable federal, state, and City and County of Broomfield requirements effective at the time systems were installed.

(F) Enforcement and Division oversight.

(1) The city's Building Division has exclusive enforcement authority regarding compliance with this ordinance.

(2) The Colorado Water Quality Control Division oversees state-wide implementation of this regulation

13-42-020 - Definitions

(A) *Agronomic rate* means the rate of application of nutrients to plants that is necessary to satisfy the nutritional requirements of the plants.

(B) *Agricultural irrigation* means irrigation of crops produced for direct human consumption, crops where lactating dairy animals forage, and trees that produce nuts or fruit intended for human consumption. This definition includes household gardens and fruit trees.

(C) *Closed sewerage system* means either a permitted domestic wastewater treatment works, which includes a permitted and properly functioning OWTS with a design capacity more than 2,000 gpd, or a properly functioning and approved or permitted OWTS with a design capacity of 2,000 gpd or less.

(D) *Commission* means the Water Quality Control Commission created by C.R.S. § 25-8-201.

(E) *Component* means a subpart of a graywater treatment works which may include multiple devices.

(F) *Cross-connection* means any connection that could allow any water, fluid, or gas such that the water quality could present an unacceptable health and/or safety risk to the public, to flow from any pipe, plumbing fixture, or a customer's water system into a public water system's distribution system or any other part of the public water system through backflow.

(G) *Design* means the process of selecting and documenting in writing the size, calculations, site specific data, location, equipment specification and configuration of treatment components that match site characteristics and facility use.

(H) *Design flow* means the estimated volume of graywater per unit of time for which a component or graywater treatment works is designed.

(I) *Dispersed subsurface irrigation* means a subsurface irrigation system including piping and emitters installed throughout an irrigation area.

(J) *Division* means the Department of Community Development's Building Division of the City and County of Broomfield. The Division is responsible for oversight and implementation of all graywater regulatory activities including, but not limited to, design review, inspection, enforcement, tracking, and complaints.

(K) *Facility* means any building, structure, or installation, or any combination thereof that uses graywater subject to a local graywater control program, is located on one or more contiguous or adjacent properties, and is owned or operated by the same person or legal entity. Facility is synonymous with the term operation.

(L) *Floodplain (100-Year)* means an area adjacent to a river or other watercourse which is subject to flooding as the result of the occurrence of a one hundred (100) year flood, and is so adverse to past, current or foreseeable construction or land use as to constitute a significant hazard to public or environmental health and safety or to property or is designated by the Federal Emergency Management Agency (FEMA) or National Flood Insurance Program (NFIP). In the absence of FEMA/NFIP maps, a professional engineer shall certify the floodplain elevations.

(M) *Floodway* means the channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than one foot or as designated by the Federal Emergency Management Agency or National Flood Insurance Program. In the

absence of FEMA/NFIP maps, a professional engineer shall certify the floodway elevation and location.

(N) *Graywater* means that portion of wastewater that, before being treated or combined with other wastewater, is collected from fixtures within residential, commercial, or industrial buildings or institutional facilities for the purpose of being put to beneficial uses. Sources of graywater are limited to discharges from bathroom and laundry room sinks, bathtubs, showers, and laundry machines. Graywater does not include the wastewater from toilets, urinals, kitchen sinks, dishwashers, or non-laundry utility sinks.

(O) *Graywater treatment works* means an arrangement of devices and structures used to: (a) collect graywater from within a building or a facility; and (b) treat, neutralize, or stabilize graywater within the same building or facility to the level necessary for its authorized uses.

(P) *Indirect connection* means a waste pipe from a graywater treatment works that does not connect directly with the closed sewerage system, but that discharges into the closed sewerage system though an air break or air gap into a trap, fixture, receptor, or interceptor.

(Q) *Legally responsible party*.

(1) For a residential property, the legally responsible party is the property owner.

(2) For a corporation, the legally responsible party is a responsible corporate officer, either:

a. a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy- or decision-making functions for the corporation, or

b. the manager of operating facilities, provided, the manager is authorized to make management decisions which govern the operation of the regulated facility including having the explicit or implicit duty of making major capital investment recommendations, and initiating and directing other comprehensive measures to assure long term environmental compliance with environmental laws and regulations; the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for approval application requirements; and where authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures.

(3) For a partnership or sole proprietorship, the legally responsible party is either a general partner or the proprietor, respectively.

(4) For a municipality, state, federal, or other public agency, the legally responsible party is a principal executive officer or ranking elected official, either

a. the chief executive officer of the agency, or

b. a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., regional administrators of EPA).

(R) *Limited local graywater control program* is a local graywater control program limited to existing graywater treatment works and which does not accept new graywater treatment works.

(S) *Local agency* means any local city, city or county, county agency including, but not limited to, a department, local public health agency, or district which is delegated the authority to administer all or a portion of the responsibilities of the local graywater control program.

(T) *Local graywater control program* is a local ordinance or resolution and, if applicable, rule, including implementation practices, authorized by a city, city and county, or county that is in compliance with the minimum requirements of this regulation.

(U) *Local public health agency* means any county, district, or municipal public health agency and may include a county, district, or municipal board of health.

(V) *Modification* means the alteration or replacement of any component of a graywater treatment works that can affect the quality of the finished water, the rated capacity of a graywater treatment works, the graywater use, alters the treatment process of a graywater treatment works, or compliance with this regulation and the local graywater control program. This definition does not include normal operations and maintenance of a graywater treatment works.

(W) *Mulch* means organic material including but not limited to leaves, prunings, straw, pulled weeds, and wood chips.

(X) *Mulch basin* means a type of irrigation or treatment field filled with mulch or other approved permeable material of sufficient depth, length, and width to prevent ponding or runoff. A mulch basin may include a basin around a tree, a trough along a row of plants, or other shapes necessary for irrigation.

(Y) *On-site wastewater treatment system or "OWTS"* means an absorption system of any size or flow or a system or facility for treating, neutralizing, stabilizing, or dispersing sewage generated in the vicinity, which system is not a part of or connected to a sewage treatment works.

(Z) *Percolation test* means a subsurface soil test at the depth of a proposed irrigation area to determine the water absorption capability of the soil, the results of which are normally expressed as the rate at which one inch of water is absorbed. The rate is expressed in minutes per inch.

(AA) *Potable water system* means a system for the provision of water to the public for human consumption through pipes or other constructed conveyances, where such system has less than fifteen service connections or regularly serves less than an average of at least 25 individuals daily at least 60 days per year.

(BB) *Professional engineer* means an engineer licensed in accordance with C.R.S. § 12-25-1.

(CC) *Public nuisance* means the unreasonable, unwarranted and/or unlawful use of property, which causes inconvenience or damage to others, including to an individual or to the general public.

(DD) *Public water system* means a system for the provision of water to the public for human consumption through pipes or other constructed conveyances, if such system has at least fifteen service connections or regularly serves an average of at least 25 individuals daily at least 60 days per year. A public water system is either a community water system or a non-community water system. Such term does not include any special irrigation district. Such term includes:

(1) Any collection, treatment, storage, and distribution facilities under control of the supplier of such system and used primarily in connection with such system.

(2) Any collection or pretreatment storage facilities not under such control, which are used primarily in connection with such system.

(EE) *Single family* means a detached or attached structure, arranged and designed as a single family residential unit intended to be occupied by not more than one family and that has separate water and sewer services connections from other dwelling units.

(FF) *Site evaluation* means a comprehensive analysis of soil and site conditions for a graywater irrigation area.

(GG) *Soil horizon* means layers in the soil column differentiated by changes in texture, color, redoximorphic features, bedrock, structure, consistence, and any other characteristic that affects water movement.

(HH) *Soil profile test pit* means a trench or other excavation used for access to evaluate the soil horizons for properties influencing effluent movement, bedrock, evidence of seasonal high ground water, and other information to be used in locating and designing a graywater irrigation area.

(II) *Soil structure* means the naturally occurring combination or arrangement of primary soil particles into secondary units or peds; secondary units are characterized on the basis of shape, size class, and grade (degree of distinctness).

(JJ) *Suitable soil* means unsaturated soil in which the movement of water, air, and growth of roots is sustained to support healthy plant life and conserve moisture. Soil criteria for graywater subsurface irrigation are further defined in 5 CCR 1002-86.12.

(KK) *Subsurface irrigation* means a discharge of graywater into soil a minimum of four inches (4") and no deeper than twelve inches (12") below the finished grade.

(LL) *State waters* means any and all surface and subsurface waters which are contained in or flow in or through this state, but does not include waters in sewage systems, waters in treatment works of disposal systems, waters in potable water distribution systems, and all water withdrawn for use until use and treatment have been completed.

(MM) *Water Quality Control Division* means the Water Quality Control Division of the Colorado Department of Public Health and Environment.

Table 1. Abbreviations and Acronyms

ANSI	American National Standards Institute
BK	Blocky
C.R.S.	Colorado Revised Statutes
CDPS	Colorado Discharge Permit System
FEMA	Federal Emergency Management Agency
gpd	gallons per day
GR	Granular
mg/L	milligrams per Liter
MPI	Minutes Per Inch
NFIP	National Flood Insurance Program
NSF	NSF International, formally known as National Sanitation Foundation
O&M	Operations and Maintenance
OWTS	On-site Wastewater Treatment System(s)
PR	Prismatic

13-42-030 - Administration

(A) Permitting. No person or persons shall install, alter, repair, or use a system within the City

and County of Broomfield, State of Colorado, unless such person holds a valid permit, issued by the Division in the name of the property owner for the specific construction, remodeling, installation, or use, proposed at the location described on the permit. A permit is required for the expanded use of an existing system beyond the design capacity of said system.

(B) Fees.
  (1) A non-refundable fee shall be required of applicants for accepting and processing an application for a permit to construct and install any new system, for the repair or alteration of any existing system, or the use of any system. The fee shall be payable to the Division prior to issuance of a permit.
  (2) The city manager or his or her designee shall establish the amount of fees for a permit.
  (3) The Division may, at its discretion, waive any permit fee normally required for a system.

(C) Permit application requirements. The applicant must submit the following items to the Division when applying for a permit or renewal of a permit:
  (1) The graywater uses;
  (2) Location of the graywater treatment system;
  (3) Design flow calculations for the graywater treatment works;
  (4) The fixture(s) that are the source(s) of the graywater;
  (5) The design of the plumbing and irrigation system; if applicable;
  (6) A description of the products or components;
  (7) If applicable, any supporting soil analysis information;
  (8) If applicable, contact information for the system designer or professional engineer and operator;
  (9) Name and address of the legally responsible party; and
  (10) Must be signed by the legally responsible party.

(D) Changes to any of these items must be reported to the Division within 60 days of the changes.

(E) Permit expiration. Permits to install and construct a graywater treatment system expire at the end of 12 months from date of issue unless the permit is extended to a fixed date upon written request by the applicant and at the discretion of the Division.

(F) Renewal of a permit. The owner or seller of a property served by a graywater treatment system shall be responsible for renewing a permit prior to one (1) or more of the following events:
  (1) The sale of the property, as more fully defined in section 13-42-030(G), herein;
  (2) Any changes to or relocation of the proposed system or irrigation field;
  (3) The addition of one (1) or more fixtures connected to the system; and
  (4) Other conditions that the Division may deem appropriate.

(G) For the purposes of these regulations, the term sale shall mean the transfer, sale, or conveyance of any real property served by a graywater treatment system, and therefore subject to these regulations, but shall exclude the following types of transfers:
  (1) Change in ownership solely to include or exclude a spouse or child;
  (2) Transfer subject to life estate;
  (3) Transfer to effect foreclosure or forfeiture of real property, provided the subsequent sale of the foreclosed property by the foreclosing entity shall require the issuance or

renewal of a use permit;

(4) Transfer by redemption from a tax sale, provided, however, the subsequent sale of the redeemed property by the redeeming entity shall require the issuance or renewal of a use permit;

(5) Transfer creating or ending joint ownership if at least one person is an original owner of the property and/or his or her spouse or children;

(6) Transfer of property containing premises that have been demolished or are otherwise uninhabitable;

(7) Transfer for the vacating or granting of a public right of way;

(8) Transfer from a person to a trust or to themselves as trustee(s) of a trust estate; or

(9) New homes that have not yet been occupied.

(H) Transfer of a permit. Within 90 days of the sale or transfer of property to a new owner, the new owner shall contact the Division and have the permit placed in the new owner's name. If the new owner fails to have the permit transferred or does not wish to accept responsibility for the system, the system shall be physically removed or permanently disconnected within 90 days of the property transfer as set forth in section 13-42-070(B)(1)f.

(I) Denial of a permit.

(1) Denials of permits shall be made in writing by the Division stating reasons for the denial and requirements for reconsideration of the application.

(2) An applicant or permittee may appeal an order, decision, or determination made by the building official relative to the application and interpretation of this chapter according to the procedure set forth in Section 113 of the Building Code, as adopted and amended by the city.

(J) Disclaimer. The issuance of a permit and specifications of terms and conditions therein will not constitute assumption of liability, nor create a presumption that the Division or its employees may be liable for the failure or malfunction of any system; nor act as a certification that the system for which the permit was issued or the equipment used in the system (or any component thereof used in its operation) ensures continuous compliance with the provision of 5 CCR 1002-86, or rules and the regulations adopted thereunder or any terms and conditions of a permit.

(K) Inspections. After receiving an application as required in section 13-42-030(C) for a graywater treatment system permit, or renewal of a permit, the application shall be reviewed by the Division and an inspection of the premises (site visit), unless previously made, shall be made by the Division or an approved third party inspector. The Division shall review each application along with test results and other required information. The Division will determine if the proposed system is in compliance with this ordinance after which a permit may be issued. The owner or seller of a property shall be responsible for any costs associated with the inspection of a graywater treatment system upon sale of the property as defined in Section 13-42-030 (F).

(L) Authorization to enter upon property. For the purpose of inspection and enforcing applicable rules and regulations and the terms and conditions of any permit issued pursuant to these regulations, authorized members of the Division and/or a third party inspector may enter upon private property at reasonable times and upon reasonable notice for the purpose of determining whether operating graywater treatment systems are functioning in

compliance with this ordinance and with the terms and conditions of any permit issued thereunder, as well as to inspect and conduct tests in evaluating any permit application. The owner or occupant of the property having a graywater treatment system shall permit authorized members of the Division access to the property to conduct required tests, take samples, monitor compliance, and make inspections.

13-42-040 - Graywater use categories

(A) General: The graywater use categories allowed are defined below. A single facility may have multiple graywater treatment works as long as all applicable use and design requirements are satisfied.

(B) Category A: single family, subsurface irrigation. Category A graywater use must meet the following:
  (1) Allowed users: single family.
  (2) Allowed graywater sources: graywater collected from bathroom and laundry room sinks, bathtubs, showers, and laundry machines.
  (3) Allowed uses: outdoor, subsurface irrigation within the confines of the legal property boundary
  (4) Design flow: the design flow for a single family graywater treatment works is limited to a 400 gallons per day (gpd) or less combined flow for all approved uses.

(C) Category B: non-single family, subsurface irrigation, 2,000 gallons per day (gpd) or less. Category B graywater use must meet the following:
  (1) Allowed users: non-single family users.
  (2) Allowed graywater sources: graywater collected from bathroom and laundry room sinks, bathtubs, showers, and laundry machines.
  (3) Allowed uses: outdoor, subsurface irrigation within the confines of the legal property boundary.
  (4) Design flow: the design flow for a non-single family graywater treatment works is limited to 2,000 gallons per day (gpd) or less for outdoor irrigation for the entire facility.

(D) Category C: single family, indoor toilet and urinal flushing, subsurface irrigation. Category C graywater use must meet the following:
  (1) Allowed users: single family.
  (2) Allowed graywater sources: graywater collected from bathroom and laundry room sinks, bathtubs, showers, and laundry machines.
  (3) Allowed uses: indoor toilet and urinal flushing and outdoor, subsurface irrigation within the confines of the legal property boundary.
  (4) Design flow: the design flow for a single family graywater treatment works is limited to 400 gallons per day (gpd) or less combined flow for all approved uses.

(E) Category D: non-single family, indoor toilet and urinal flushing, subsurface irrigation. Category D graywater use must meet the following:
  (1) Allowed users: non-single family users.
  (2) Allowed graywater sources: graywater collected from bathroom and laundry room sinks, bathtubs, showers, and laundry machines.
  (3) Allowed uses: indoor toilet and urinal flushing and outdoor, subsurface irrigation within the confines of the legal property boundary.

(4) Design flow: there is no maximum design flow for a non-single family graywater treatment works for indoor toilet and urinal flushing. There is no maximum design flow for the amount of wastewater from the facility that can go to a closed sewerage system. The design flow is limited to 2,000 gallons per day (gpd) or less for outdoor irrigation for the entire facility.

13-42-050 - Flow projections

(A) Flow projections for all graywater treatment works
(1) Graywater treatment works must be sized appropriately using the following flow projection methods:
a. Residential users: flow to graywater treatment works must be calculated on the occupancy and the fixtures connected to the graywater treatment works. The calculated graywater flow is the number of occupants multiplied by the estimated graywater flow in terms of gpd/occupant from the attached fixtures.
1. The occupancy must be calculated based on a minimum of two (2) occupants for the first bedroom and one (1) occupant for each additional bedroom.
2. The estimated graywater flow from each fixture is based on the design flow of the fixture, or if the fixture's design flow is unknown, then the estimated graywater flow per occupant is based on the following gallons per day per occupant.
i. Traditional fixtures: 25 gpd/occupant for each shower, bathtub, and wash basin and 15 gpd/occupant for each clothes washer.
ii. Water saving fixtures: 20 gpd/occupant for each shower, bathtub, and wash basin and 8 gpd/occupant for each clothes washer.
b. Non-residential users: Graywater treatment works must be sized in accordance with fixture or water use records taking into account the number of fixtures attached to the graywater treatment works.

13-42-060 - Design criteria

(A) Design criteria for all graywater treatment works. The following minimum design criteria are required for all graywater treatment works. All graywater treatment works must:
(1) Meet all design requirements of this regulation and meet any additional design requirements of the Colorado Plumbing Code.
(2) Each treatment component or combination of multiple components must have a design flow greater than the calculated peak graywater production, if upstream of the storage tank or if no tank is present.
(3) Include a diversion valve that directs graywater to either the graywater treatment works or a closed sewerage system. The diversion valve must be:
a. Easily operable;
b. Clearly labeled;
c. Constructed of material that is durable, corrosion resistant, watertight;
d. Designed to accommodate the inlet and outlet pipes in a secure and watertight manner; and

e. Indirectly connect the bypass line to the closed sewerage system.

(4) Not have any piping that allows the treatment process(es) or a storage tank to be bypassed prior to graywater use.

(5) Include a tank to collect and store graywater, except for a subsurface irrigation system that discharges to a mulch basin. The storage tank must:
   a. Be constructed of durable, non-absorbent, water-tight, and corrosion resistant materials;
   b. Be closed and have access openings for inspection and cleaning;
   c. Be vented:
      1. for indoor tanks: the tanks must be vented to the atmosphere outside of the house;
      2. for outdoor tanks: the storage tank must have a downturned screened vent;
   d. Have an overflow line:
      1. with the same or larger diameter line as the influent line;
      2. without a shut off valve;
      3. that is trapped to prevent the escape of gas vapors from the tank; and
      4. that is indirectly connected to the closed sewerage system;
   e. Have a valved drain line with the same or larger diameter line as the influent line that is indirectly connected to the closed sewerage system;
   f. Be a minimum of 50 gallons;
   g. Be placed on a stable foundation;
   h. If located outdoors, not be exposed to direct sunlight; and
   i. Have a permanent label that states "CAUTION! NON-POTABLE WATER. DO NOT DRINK."

(6) For indoor toilet or urinal flushing systems (categories C and D) graywater treatment works must have a backup potable water system connection. For subsurface irrigation systems (categories A and B) graywater treatment works may, but are not required to, have a backup potable water system that provides potable irrigation water when graywater is not being produced or is produced in insufficient quantities. A backup potable water system connection must meet the following requirements:
   a. For non-public water system, potable water system connections: uncontrolled cross connections between a potable water system and a graywater treatment works are prohibited. All cross connections must be protected by a reduced pressure principle backflow prevention zone assembly or an approved air gap.
   b. For public water system, potable water system connections: uncontrolled cross connections between a public water system and a graywater treatment works are prohibited. The graywater treatment works design must protect the public water system from cross connections by meeting the requirements of 5 CCR 1002-11: Colorado Primary Drinking Water Regulations.

(7) Not be used as a factor to reduce the design, capacity, or soil treatment area requirements for OWTS or domestic wastewater treatment works.

(8) Have any wastewater from graywater treatment works (e.g., filter backwash water) be properly contained and disposed into a closed sewerage system or an

approved underground injection control ("UIC") well.

(9) Have all graywater piping clearly distinguished and must be clearly labeled, including pipe identification and flow arrows.

(10) If located in a 100-year floodplain area, meet or exceed the requirements of FEMA and the local emergency agency. The graywater system must be designed to minimize or eliminate infiltration of floodwaters into the system and prevent discharge from the system into the floodwaters.

(11) Not be located in floodways.

(12) Be located within the confines of the legal property boundary and not within an easement.

(B) Design criteria for subsurface irrigation systems.

(1) The following minimum design criteria are required for all graywater treatment works being used for subsurface irrigation. All subsurface graywater irrigation systems must:

a. Have the subsurface irrigation components of the graywater irrigation system installed a minimum of four inches (4") and a maximum of twelve inches (12") below the finished grade.

b. Have the subsurface irrigation components of the graywater irrigation system installed in suitable soil, as defined in section 5 CCR 1002-86.8(36).

c. Have a minimum of twenty-four inches (24") of suitable soil between the subsurface irrigation components of the graywater irrigation system and any restrictive soil layer, bedrock, concrete, or the highest water table. Restrictive soil layers are soil types 4, 4A, and 5 in Table 3.

d. Include controls, such as valves, switches, timers, and other controllers, as appropriate, to ensure the distribution of graywater throughout the entire irrigation zone.

e. If utilizing emitters, the emitters must be designed to resist root intrusion and be of a design recommended by the manufacturer for the intended graywater flow and use. Minimum spacing between emitters shall be sufficient to deliver graywater at an agronomic rate and to prevent surfacing or runoff.

f. Have all irrigation supply lines be polyethylene tubing or PVC Class 200 pipe or better and Schedule 40 fittings. All joints shall be pressure tested at 40 psi (276 kPa), and shown to be drip tight for five minutes before burial. Drip feeder lines can be poly or flexible PVC tubing.

g. Meet the following setback distances in Table 12-1 in 5 CCR 1002-86.

Table 2. Graywater System Setback Requirements

Minimum Horizontal Distance Required from:	Graywater Storage Tank	Irrigation Field
Buildings	5 feet	2 feet
Property line adjoining private property	10 feet	10 feet

Property line adjoining private property with supporting property line survey	1.5 feet	1.5 feet
Water supply wells	50 feet	100 feet
Streams and lakes	50 feet	50 feet
Seepage pits or cesspools	5 feet	5 feet
OWTS disposal field	5 feet	25 feet
OWTS tank	5 feet	10 feet
Domestic potable water service line	10 feet	10 feet
Public water main	10 feet	10 feet

h. The irrigation field must be located on slopes of less than thirty percent (30%) from horizontal.

i. Protocols for determining the size of the subsurface irrigation area. The irrigation area must be determined using one of the following protocols:

1. Site evaluation protocol: The following site evaluation must be conducted to determine the appropriate size of the irrigation area for all subsurface irrigation systems, except single family dispersed subsurface irrigation systems (category A and C dispersed subsurface irrigation systems) that are sized using the irrigation area equation protocol as defined in in 5 CCR 1002-86.12(B)(1)(i)(ii). The site evaluation must include:

i. Site information, including:

(a) a site map; and

(b) location of proposed graywater irrigation area in relation to physical features requiring setbacks in Table 2.

ii. Soil investigation to determine long-term acceptance rate of a graywater irrigation area as a design basis. Soil investigation must be completed by either:

(a) a visual and tactile evaluation of soil profile test pit; or

(b) a percolation test.

iii. Irrigation rates must not exceed maximum allowable soil loading rates in Table 3 based on the finest textured soil in the twenty-four inches (24”) of suitable soil beneath the subsurface irrigation components.

Table 3. Soil Type Description and Maximum Hydraulic Loading Rate

Soil Type	USDA Soil Texture	USDA Structure – Shape	USDA Soil Structure-Grade	Percolation Rate (MPI)	Loading Rate for Graywater (gal./sq. ft./day)
0	Soil Type 1 with more than 35% Rock (>2mm); Soil Types 2-5 with more than 50% Rock (>2mm)	--	0 (Single Grain)	Less than 5	Not suitable without augmentation 1.0 with augmentation
1	Sand, Loamy Sand	--	0	5-15	Not suitable without augmentation 1.0 with augmentation
2	Sandy Loam, Loam, Silt Loam	PR BK GR	2 (Moderate) 3 (Strong)	16-25	0.8
2A	Sandy Loam, Loam, Silt Loam	PR, BK, GR 0 (none)	1 (Weak) Massive	26-40	0.6
3	Sandy Clay Loam, Clay Loam, Silty Clay Loam	PR, BK, GR	2, 3	41-60	0.4
3A	Sandy Clay Loam, Clay Loam, Silty Clay Loam	PR, BK, GR 0	1 Massive	61-75	0.2
4	Sandy Clay, Clay, Silty Clay	PR, BK, GR	2, 3	76-90	Not suitable
4A	Sandy Clay, Clay, Silty Clay	PR, BK, GR 0	1 Massive	91-120	Not suitable
5	Soil Types 2-4A	Platy	1, 2, 3	121+	Not suitable

iv. Suitable soil may consist of original, undisturbed soil or original soil that is augmented. Not suitable soil may be augmented as

needed to ensure suitable soil is used.

v. If the original soil is augmented, the mixture used for augmentation must meet the following criteria to ensure that suitable soil is achieved:
   (a) The mixture must have an organic content that is at least five percent (5%) and no greater than ten percent (10%);
   (b) The mixture must be a well blended mix of mineral aggregate (soil) and compost where the soil ratio depends on the requirements for the plant species; and
   (c) The mineral aggregate must have the following gradation:

Sieve Size	Percent Passing
3/8	100
No. 4	95 - 100
No. 10	75 - 90
No. 40	25 - 40
No. 100	4 - 10
No. 200	2 - 5

vi. If the original soil is augmented, the additional soil must be tilled into the native soil a minimum of six inches (6") below irrigation application zone.

vii. Soil types 0 and 1 must be augmented before use. Soil type 4, 4A, and 5 are not suitable for subsurface irrigation.

2. Irrigation area equation protocol: The following irrigation area equation protocol may be used to determine the appropriate size of the irrigation area for single family, dispersed subsurface irrigation systems (categories A and C dispersed subsurface irrigation systems). This protocol cannot be used to size mulch basins.
LA = GW / (CF x ET x PF)
Where:
LA = Landscaped area (square feet);
GW = Estimated graywater flow (gallons per week);
CF = 0.62 (square foot x inch / gallon) = (7.48 gallons / 1-cu-ft) / 12 inch/ft);
ET = Evapotranspiration rate (inch / week), as determined by USDA Natural Resources Conservation Service CO652.0408 "Figure CO4- 1: Map of Colorado Climate Zones" dated April 1978, or weekly averages based on actual conditions;
PF = Plant factor, 0.5.

(2) Mulch basin irrigation system requirements. The following minimum design criteria

are required for graywater treatment works using mulch basin systems for subsurface irrigation:

a. Mulch shall be permeable enough to allow rapid infiltration of graywater.
b. The minimum void space mulch basin volume must be either:
    1. Three (3) times the anticipated average daily flow for graywater treatment works without a storage tank to allow for graywater volume surges and to prevent surfacing or runoff.
    2. One and a half (1.5) times the anticipated average daily flow for graywater treatment works with storage tank meeting the 5 CCR 1002-86.11(Ag)(5) design criteria.
c. Piping to mulch basins must discharge a minimum of four inches (4") below grade into a container for dispersal of graywater into the mulch basin. The container must be designed to have four inches (4") of freefall between the invert of the discharge pipe and the mulch. The container must have an access lid for observation of flow and to check mulch levels.
d. The mulch basin must have a minimum depth of twelve inches (12") below grade and not more than twenty four (24") below grade.
e. A filter is not required.

(3) Dispersed subsurface irrigation system requirements. The following minimum design criteria are required for graywater treatment works using dispersed irrigation systems for subsurface irrigation:

a. Include a cartridge filter, which must meet the following requirements:
    1. A minimum of 60 mesh;
    2. Located between the storage tank and the irrigation system;
    3. If a pump is being used to pressurize the graywater distribution system, the filter must be located after the pump.

(C) Design criteria for indoor toilet and urinal flushing graywater treatment works (categories C and D).

(1) Category C: single family, indoor toilet and urinal flushing graywater treatment works The following minimum design criteria are required for graywater treatment works for category C: single family, indoor toilet, and urinal flushing:

a. The graywater treatment works must be certified under "Class R" of NSF/ANSI 350 Onsite Residential and Commercial Water Reuse Treatment Systems.
b. If a disinfection process is not part of NSF/ANSI 350-2011 equipment, separate disinfection system equipment is required. For graywater treatment works that use sodium hypochlorite (bleach), the graywater treatment works must be capable of providing a free chlorine residual of 0.2 to 4.0 mg/L in the graywater throughout the indoor graywater plumbing system.
c. The graywater treatment works must include a dye injection system that is capable of providing a dye concentration that is visibly distinct from potable water.
d. For category C indoor toilet and urinal flushing graywater treatment works that are also capable of using graywater for subsurface irrigation, the system may be designed to allow graywater to be diverted to the subsurface irrigation graywater treatment works prior to the disinfection and dye process, however

after the point of diversion the subsurface irrigation portion of the system must meet the requirements in in 5 CCR 1002-86.12(B).

(2) Category D: non-single family, indoor toilet and urinal flushing graywater treatment works, The following minimum design criteria are required for category D: non-single family, indoor toilet and urinal flushing:

a. The graywater treatment works must be certified under "Class R" or "Class C" of NSF/ANSI 350 Onsite Residential and Commercial Water Reuse Treatment Systems. Required classification shall be dictated by the size of the graywater treatment works and if the graywater sources are residential or commercial as defined by NSF/ANSI 350.

b. Separate disinfection system equipment is required if a disinfection process is not part of NSF/ANSI 350-2011 equipment. A graywater treatment works must be capable of providing a free chlorine residual of 0.2 to 4.0 mg/L in the graywater throughout the indoor graywater plumbing system.

c. The graywater treatment works must include a dye injection system that is capable of providing a dye concentration that is visibly distinct from potable water.

d. For category D indoor toilet and urinal flushing graywater treatment works that are also capable of using graywater for subsurface irrigation, the system may be designed to allow graywater to be diverted to the subsurface irrigation graywater treatment works prior to the disinfection and dye process, however after the point of diversion the subsurface irrigation portion of the system must meet the requirements in 5 CCR 1002- 86.12(B).

e. For graywater treatment works that have a capacity to receive greater than 2,000 gallons per day, the design must be prepared under the supervision of and submitted with the seal and signature of a professional engineer licensed to practice engineering in the State of Colorado in accordance with the requirements of the Colorado Department of Regulatory Agencies (DORA) – Division of Registrations.

(D) Signage requirements for non-single family graywater treatment works (categories B and D).

(1) All required notifications shall include posting of signs of sufficient size to be clearly read with the language below in the dominant language(s) expected to be spoken at the site.

(2) All non-single family graywater treatment works (categories B and D). All non-single graywater treatment works must comply with the following signage requirements.

a. A permanent warning sign must be visible at all fixtures from which graywater is collected. The signs must state that, "WATER FROM THIS FIXTURE IS REUSED. CHEMICALS, EXCRETA, PETROLEUM OILS AND HAZARDOUS MATERIALS MUST NOT BE DISPOSED DOWN THE DRAIN";

b. Each room that contains graywater treatment works components must have a sign that says "CAUTION GRAYWATER TREATMENT WORKS, DO NOT DRINK, DO NOT CONNECT TO THE POTABLE DRINKING WATER SYSTEM. NOTICE: CONTACT BUILDING MANAGEMENT BEFORE PERFORMING ANY WORK ON THIS WATER SYSTEM."

(3) Non-single family, subsurface irrigation non-single family graywater treatment works (categories B and D). Non-single family, subsurface irrigation graywater treatment works (categories B and D, if applicable) must comply with the following signage requirement:
Each irrigation area must have a sign that says "CAUTION GRAYWATER BEING USED FOR IRRIGATION. DO NOT DRINK, DO NOT CONNECT TO THE POTABLE DRINKING WATER SYSTEM."

(4) Non-single family, indoor toilet or urinal flushing, non-single family graywater treatment works (category D). Non-single family, indoor toilet and urinal flushing graywater treatment works (category D) must comply with the following signage requirement:
Each toilet and urinal must have a sign that says: "TO CONSERVE WATER, THIS BUILDING USES TREATED NON-POTABLE GRAYWATER TO FLUSH TOILETS AND URINALS."

13-42-070 - Operation and Maintenance

(A) Operations and maintenance (O&M) manual. All graywater systems must have an O&M manual. The O&M manual must include the following items:
(1) A graywater treatment works description including: equipment list, design basis data including but not limited to, design volumes, design flow rates of each component and service area, system as- built drawing, and process description.
(2) Maintenance information for the graywater treatment works including but not limited to: component maintenance schedule, instructions for component repair, replacement, or cleaning, replacement component source list, testing and frequency for potable containment device, and instructions for periodic removal of residuals.
(3) Operational ranges for parameters including but not limited to: disinfectant concentration levels, filter replacement parameters, pressure ranges, tank level, and valve status under normal operation.
(4) Step-by-step instructions for starting and shutting down the graywater treatment works including but not limited to: valve operation, any electrical connections, cleaning procedures, visual inspection, and filter installation.
(5) A guide for visually evaluating the graywater treatment works and narrowing any problem scope based on alarm activations, effluent characteristics, system operation, and history.
(6) A list of graywater control measures in which the graywater treatment works must be operated.

(B) Control measures. Control measures are operational requirements representing best management practices that graywater systems must follow when operating a graywater treatment works.
(1) Control measures that apply to all graywater uses. All graywater treatment works must be operated in accordance with the following control measures:
a. Graywater must be collected in a manner that minimizes the presence or introduction of:
1. hazardous or toxic chemicals in the graywater to the greatest extent possible;

2. human excreta in the graywater to the greatest extent possible;
3. household wastes; and
4. animal or vegetable matter.

b. Use of graywater is limited to the confines of the facility that generates the graywater.

c. The graywater treatment works must be operated and maintained in accordance with the O&M manual, including all manufacturer recommended maintenance activities.The O&M manual must remain with the graywater treatment works throughout the system's life and be updated based on each modification and approval made to the system.

d. Prior to or upon change of ownership or occupancy, the O&M manual must be transferred to the new owner or tenant.

e. Prior to or upon transfer of the property to a new owner, the transferor must provide written notice of the presence of the system on the property to the new owner (the new legally responsible party). The notice must include a copy of the O&M manual, any operational and maintenance records, and the most recent permit issued.

f. If the new owner does not obtain a permit to continue to operate the system as required by section 13-42-030(H), the system shall be physically removed or permanently disconnected within 90 days of the property transfer.

g. For category D graywater treatment works that have a capacity to receive greater than 2,000 gallons per day (gpd), operational and maintenance records must be maintained for a minimum of the past five (5) years.

h. The owner or operator of a graywater treatment works must minimize exposure of graywater to humans and domestic pets.

i. Graywater use and graywater treatment works must not create a public nuisance.

j. Graywater must not be stored for more than 24 hours unless the graywater has been treated by a graywater treatment works that meets the design requirements of 5 CCR 1002-86.12. All graywater must be stored inside a tank(s) that meets the design requirements of 5 CCR 1002-86.12(A)(5).

k. Temporary or semi-temporary connections from the potable water system or public water system to the graywater treatment works are prohibited. Permanent connections from the potable water system or public water system to the graywater treatment works must meet the design requirements of 5 CCR 1002-86.11(A)(6).

(C) Control measures that apply to subsurface irrigation graywater use. Subsurface irrigation graywater treatment works must be operated in accordance with the following additional control measures:

(1) Agricultural irrigation with graywater is prohibited.

(2) Irrigation is prohibited when the ground is frozen, plants are dormant, during rainfall events, or the ground is saturated.

(3) Irrigation scheduling must be adjusted so that application rates are closely matched with soil and weather conditions.

(4) Graywater must be applied in a manner that does not result in ponding, runoff, or unauthorized discharge to state waters. For dispersed subsurface irrigation systems,

the graywater must be applied at an agronomic rate. For mulch basins systems, the graywater must not be applied in excess of the soil adsorption rate.

(5) For mulch basin systems, mulch must be replenished and undergo periodic maintenance as needed to reshape or remove material to maintain surge capacity and to prevent ponding and runoff.

(D) Control measures that apply to indoor toilet and urinal flushing graywater use. Indoor toilet and urinal flushing graywater treatment works (categories C and D) must be operated in accordance with the following additional control measures.

(1) Graywater for toilet and urinal flushing use must be disinfected.

a. Graywater treatment works that utilize chlorine for disinfection must have a minimum of 0.2 mg/L and a maximum of 4.0 mg/L of free chlorine residual throughout the indoor graywater plumbing system, including fixtures.

b. Single family graywater treatment works that utilize non-chemical methods, such as UV, for disinfection must have a chlorine puck present in each toilet or urinal tank.

(2) Graywater for toilet and urinal flushing must be dyed with either blue or green food grade vegetable dye and be visibly distinct from potable water.

(E) Certified operator. A graywater treatment system must be operated by qualified personnel who meet any applicable requirements of 5 CCR 1003-2, the Water and Wastewater Facility Operators Certification Requirements.

13-42-080 - Licensing

(A) Prior to approval for use, all graywater treatment systems must be inspected, verified, and accepted by the Division or an approved third party inspector.

(B) In accordance with Chapter 15 of the Broomfield Municipal Code, it shall be unlawful for any person to conduct, carry on, or engage in the business, trade, or calling of plumbing, or to install plumbing, in or on any building, structure, or land in the city, for any compensation whatsoever, without first having obtained a plumbing contractor's license from the building official or his or her designee.

(C) In accordance with the State of Colorado Electrical and Plumbing regulations it is lawful for homeowners to perform their own plumbing and electrical work on their own homes as long as this is their primary residence.

13-42-090 - Remedies for noncompliance

(A) Compliance orders. Whenever the Division determines that any activity is occurring that is not in compliance with a graywater treatment system permit and/or the requirements of this chapter, the Division may issue a written compliance order to the legally responsible party containing a compliance schedule. The schedule shall contain specific actions the legally responsible party must complete, including dates for the completion of the actions. It shall be unlawful for any person to fail to comply with any compliance order requirement.

(B) Suspension and revocation of permit. The Division may suspend or revoke a graywater treatment system permit for violation of any provision of this chapter, violation of the permit, and/or misrepresentations by the permittee or the permittee's agents, employees, or independent contractors.

(C) Stop work orders. Whenever the Division determines that any activity is occurring that is not in compliance with an approved permit and/or the requirements of this chapter, the Division can order such activity stopped upon service of written notice upon the legally responsible party or a person responsible for or conducting such activity. Such person shall immediately stop all activity until authorized in writing by the Division to proceed. Service shall be by United States Postal Service mail or hand delivery. If a responsible person cannot be located, the notice to stop shall be posted in a conspicuous place upon the area where the activity is occurring. The notice shall state the nature of the violation. The notice shall not be removed until the violation has been cured or authorization to remove the notice has been issued by the Division. It shall be unlawful for any person to fail to comply with a stop work order.

(D) Civil proceedings. In case of any violation of any provision of this chapter, or any amendment thereof, the Division may, at its discretion, initiate civil proceedings including injunction, mandamus, abatement, declaratory judgment, or other appropriate actions or proceedings, to prevent, enjoin, abate, remove, or otherwise correct any such unlawful condition. Civil remedies provided for under this section are not exclusive and shall not preclude prosecution for criminal violations under the provisions of this chapter.

(E) Criminal proceedings. Any person who fails to comply with any of the provisions of this chapter shall be deemed guilty of a misdemeanor and, upon conviction, shall be punishable as provided in chapter 1-12, B.M.C.

13-42-100 - Graywater System Database

(A) A Graywater System Database shall be indefinitely maintained by the Division and must include, at a minimum, the following information:
  (1) Legal address of the facility with a graywater treatment works;
  (2) Allowed graywater uses at the facility;
  (3) A description of the graywater treatment works;
  (4) The legally responsible party associated with the graywater treatment works; and
  (5) Where required, the certified operator associated with the graywater treatment works.

(B) Changes to any of these items must be reported to the Division within 60 days.

Section 2. This ordinance shall be effective seven days after publication following final passage.

INTRODUCED AND APPROVED after first reading on August 10, 2021, and ordered published in full.

INTRODUCED A SECOND TIME and approved on September 14, 2021, and further ordered published.

THE CITY AND COUNTY OF BROOMFIELD, COLORADO

Mayor

ATTEST:

Assistant City and County Clerk

SEAL

APPROVED AS TO FORM:

NCR

City and County Attorney

First Publication: August 15, 2021

Second Publication: September 19, 2021