Public Works MISSOULA Engineering Division	**Engineering/Projects Section: Administrative Rule No. 416**
	Cold Weather Concrete Procedures

Adopted: September 10, 2008

Revised: _____

DEFINITIONS:

COLD WEATHER CONCRETING – Preparing, forming, placing and / or finishing of concrete pavement, curb / gutter, sidewalk (any concrete construction) within the City of Missoula rights-of-way and public easements when the air temperature is forty degrees fahrenheit (40° f) or colder, as recorded by the National Weather Service in Missoula, Montana.

HIGH EARLY CONCRETE – Concrete mixture designed for use in cold weather, also referred to as Type III or HE High-Early Strength or by an approved mix as allowed by ACI / ASTM standards, Montana Public Works Standard Specifications and approved by the City Engineer.

CONCRETE CURING / INSULATING BLANKET – Commercially available, electrically heated or unheated, specifically manufactured for the exclusive use of cold weather curing and insulating of concrete.

MPWSS Section 03310 – Montana Public Works Standard Specifications for Structural Concrete (most recent version); this standard is applied and implied anywhere Missoula Municipal Code (MMC) and / or Administrative Rule No. 416 does not otherwise direct more restrictive procedures.

ACI 306 – American Concrete Institute 306, guideline for cold weather concrete work; this standard is applied and implied anywhere MPWSS Section 03310, Missoula Municipal Code (MMC) and / or Administrative Rule No. 416 does not otherwise direct more restrictive procedures.

PURPOSE:

Administrative Rule No. 416 is intended to avoid failure of concrete construction within the City of Missoula rights-of-way and public easements during periods of cold weather. Administrative Rule No. 416 is designed to prevent safety hazards on City of Missoula rights-of-way and public easements, minimize financial hardship with regard to replacing failed concrete, and eliminate the inconvenience to motorists and pedestrians of multiple periods of concrete construction.

APPLICABILITY:

All City of Missoula Public Works inspection and code enforcement staff are required to ensure all construction sites within the City of Missoula rights-of-way and public easements comply with Administrative Rule No. 416. When non-compliance occurs, all Public Works inspection and code enforcement staff are required to implement enforcement procedures outlined within Administrative Rule No. 416. (see **REMEDY:** section below)

POLICY:

It is the responsibility of the licensed and bonded right-of-way contractor and / or permit holder(s) to know, understand and follow all requirements of Administrative Rule No. 416 – Cold Weather Concrete Procedures, at any and / or all construction sites within the City of Missoula rights-of-way and public easements.

Concrete construction prepared, placed and / or finished in cold weather conditions shall have said concrete, select crushed base and subgrade material protected from cold temperatures as defined herein.

Concrete construction within the City of Missoula rights-of-way or public easements is not permitted anytime the ambient air temperature is below twenty-five degrees fahrenheit (25° f); actual, as predicted or recorded by National Weather Service in Missoula Montana, whichever is lowest – unless directed / approved by the City Engineer.

All cold weather concrete work within the City of Missoula rights-of-way and public easements is subject to all standard and required inspections. Pre-pour form inspection is always required and it is during this inspection that the compacted select crushed base and / or compacted subgrade material will be inspected for depth, compaction and to ensure material is free of frost and is not in a frozen state.

Concrete shall not be placed on compacted select crushed base and / or compacted subgrade material that is in a frozen state or contains any ice, snow or frost. Tent and heat methods outlined below may be utilized in the concrete construction work zone to establish a suitable compacted select crushed base and / or compacted subgrade material for approval.

Administrative Rule No. 416 – Cold Weather Concrete Procedures; applies to all blends / mixes of concrete including but not limited to: High-Early (HE), Type I, Type II, Type III, Type IV, Type V and any / all other concrete design mixes. The following table outlines temperature maintenance and duration of treatments for cold weather concrete.

Concrete construction post-placement curing requirements:

TEMPERATURE RANGE (degrees fahrenheit)	CONCRETE TREATMENT	TREATMENT DURATION
40° - 34°	1 – insulating concrete blanket	7 - days
33° - 25°	2 – insulating concrete blankets	10 – days
24° - 15°	3 – insulating concrete blankets	14 – days
below 15°	* tent and heat	7 – days or as per inspector

(monitoring and adjustments in the concrete treatment will be required during above listed treatment duration – i.e. colder temperature may require additional blankets or tent and heat, for a longer duration)

* tent and heat:

- create an enclosure.
  - enclosure shall be at least one and one-half (1-1/2) times the size (area) of the concrete work zone.
  - enclosure shall be comprised of heavy-weight, 8-mil or heavier, polyethylene or polypropylene material or other approved material.
  - enclosure shall be heated by use of an electric, gasoline, natural gas or propane heating device.
    - a heated-hose system designed for concrete curing may also be used to thaw select crushed base and subgrade compacted materials with review and approval of the City Engineer.
  - enclosure shall be vented so as to allow proper curing of concrete.
- maintain a minimum temperature of forty degrees fahrenheit (40° f) at all times.

The licensed and bonded right-of-way contractor assumes all risk and liability for placing concrete in cold weather. Said contractor is not relieved in any way of the responsibility of obtaining all specified and required inspections, testing, approvals and final acceptance results of concrete construction within the City of Missoula rights-of-way and public easements during cold weather construction. Removal and replacement of any and / or all concrete placed during cold weather conditions afflicted by cold temperature (freeze / frost) damage or failure is entirely at the licensed and bonded right-of-way contractors' expense. All finished concrete construction is subject to final acceptance and approval of the City Engineer; in the event of any question of the integrity of the finished concrete construction, core samples may be requested and tested by a certified and approved geotechnical engineer selected by the City Engineer at the expense of the licensed and bonded right-of-way contractor.

REMEDY:

Upon determination by any City of Missoula Public Works inspection or code enforcement staff that any construction site is not in compliance with Administrative Rule No. 416; the construction permit holder(s) and / or licensed and bonded right-of-way contractor will be notified of the violation(s). A violation notice will be posted at the construction site requiring the permit holder(s) and / or licensed and bonded right-of-way contractor to bring the construction site and violations into compliance with Administrative Rule No. 416, within four (4) hours. Failure to comply with the required remedy actions will constitute a failure of the concrete construction and require removal and replacement as directed by the City of Missoula Public Works inspectors, code enforcement staff and / or City Engineer.

AUTHORITY:

Missoula Municipal Code (MMC) 12.12.050 Construction specifications for City sidewalks and curbs – Generally.

> All concrete sidewalks, curbs, driveway approaches and alley approaches, placed in the City right-of-way, shall be constructed in accordance with City of Missoula standard specifications and Standard Drawings and Montana Public Works Standard Specifications (MPWSS) most recent edition. If there is a conflict between the City and MPWSS standards, City standards shall govern except as modified in this ordinance. (Ord. 3244, 2004; Ord. Prior code §28-71)

Missoula Municipal Code (MMC) 12.12.070 Construction specifications for City sidewalks and curbs – Concrete requirements.

> All concrete used in sidewalk, curb, driveway approach and alley approach construction placed in the City right-of-way shall meet the standards set forth in Montana Public Works Standard Specifications (MPWSS) Section 03310, for M-4000 Concrete. (Ord. 3244, 2004; Ord. 2108, 1980; prior code §28-72)

Missoula Muniipal Code (MMC) 12.12.080 Inspection by City Engineer.

> All work must be inspected by the City Engineer, or a designated agent, and must be done to the entire satisfaction of the City Engineer, or such inspector. The contractor must give the Engineer advanced notice to inspect the forms a minimum of four working hours prior to placing concrete. The City Engineer, or such inspector, shall at all times have direct supervision over the construction and repairing of all sidewalks, curbs and alley approaches, and may at any time, when sidewalks, curbs, or alley approaches are not being constructed or repaired in accordance with this chapter, have authority to order the contractor constructing or repairing such sidewalks, curbs, or alley approaches to suspend work thereon until such construction or repairing thereon shall be made to conform in all respects with the specifications set forth in this chapter and must be done to the entire satisfaction of the City Engineer. (Ord. 3244, 2004; Ord. Prior code §28-90)

Montana Code Annotated (MCA) 7-14-4122 – Construction and maintenance of sidewalks, curbs, and gutters.

(1) The city or town council has power to regulate and provide for the construction or repair of sidewalks, foot pavements, curbs, gutters, or any combination thereof.

(2) If the owner of any lot fails to comply with the provisions of the ordinance within such time as may be prescribed thereby, the council may contract for the construction and repair of such sidewalks, pavements, curbs, gutters, or any combination thereof and the city or town may pay for the same. The amount so paid is a lien upon the lot and may be enforced or the amount may be recovered against the owner by a suit before any court of competent jurisdiction.

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