

TOWN OF TIMNATH DESIGN CRITERIA MANUAL

Prepared for:

**Town of Timnath
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PART I – GENERAL STANDARDS

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1.1 PURPOSE

The Town of Timnath's Design Criteria Manual and Construction Specifications (Manual) is intended to provide guidance and standardization for the design and construction of public improvements in public rights-of-way and easements, design criteria and construction standards for earthwork and development on private property, and safety procedures during construction on public or private property. These standards, design criteria, and construction specifications have been adopted by the Town of Timnath and incorporated by reference into the Timnath Municipal Code, which refers to them as "the Design Manual." They shall apply to infrastructure design, construction, and earthwork on public or private property within the Town and to the extent the Town has jurisdiction by law or intergovernmental agreement within the Town's Growth Management Area (GMA), unless otherwise approved by the Town. These standards shall be the minimum necessary for planning, design, and construction of all improvements. Special situations, as determined by the Town Engineer, may require different standards. The Town of Timnath reserves the right to change or add to these minimum standards for a specific site in order to best serve the needs of the Town. These standards shall also govern any and all public improvements that may be outside of the Town's limits, but that are integral to the planned infrastructure systems of the Town.

Whenever the provisions of these standards are found to be inconsistent with any other regulations, codes, or laws, the Town Engineer shall determine the standard to apply. The Town's standards are considered supplemental to that required by regulations, codes, and laws and shall not relieve a Developer or Contractor from complying with such laws. In addition, the Town shall not be responsible for monitoring compliance with any regulation, code, or law. The Town may waive or modify the application of any of the Town's standards when it determines such waiver or modification serves the best interests of the Town. The "Town" herein refers to the Town Council, or the individual or council to whom the Town Council has delegated the authority to implement the requirements of the Town. For the provisions of this Manual, the designated person to interpret the application of these standards and specifications is the Town Engineer or his or her designee.

The Town shall have the authority to determine whether all design and construction is completed to a level equal to or exceeding the requirements set forth in these standards and specifications. Whenever any work is being completed contrary to these standards and specifications, the Town shall have the authority to order a work stoppage. In such case, all work progress shall stop until authorized to proceed by the Town. Enforcement of these standards and specifications shall be by the Town Manager or the Town Engineer or their designees.

It is the intent of these standards and specifications to complement the Town's Municipal Code and Land Use Code. It is also the intent of these standards and specifications to require all projects or phases of projects to be functionally complete; to protect the public health, safety, and welfare; to minimize public inconvenience resulting from construction and maintenance activities; to insure that public right-of-way are properly maintained during any construction; to protect the Town's infrastructure investment; to minimize future maintenance costs; to optimize the limited amount of physical space within public right-of-way and easements; to protect private property; to provide construction process guidance (i.e., materials testing, inspections, as-builts, etc.); to protect natural resources important to the community; and to provide minimum

design criteria that are generally accepted by the professional engineering community in the State of Colorado.

The Town of Timnath's review and approval of any plans, reports, drawings, or permits or the inspection and approval of any improvements constructed in accordance with these standards and specifications, does not constitute a representation, warranty, or guarantee by the Town of Timnath, the Town Manager, or the Town Engineer that such improvements are free from defects or will operate adequately for the purpose intended. The Town of Timnath, the Town Manager, and the Town Engineer shall not be responsible for any damage to persons or property by reason of failure to enforce the standards and specifications, failure to inspect or re-inspect work, failure to stop work, errors and omissions of the design engineer, or any work performed by Contractors, Developers, or project owners.

1.2 DEFINITIONS

"Code" -	Town's most current adopted Municipal Code by which this document is incorporated by reference
"Contractor" -	Corporation, association, partnership, or individual who has entered into an Agreement with the Developer to perform the Work
"Design Engineer" -	Individual, partnership, or corporation who is registered as a professional engineer in the State of Colorado and who is hired by the Developer to provide engineering services for this project
"Developer" -	Corporation, partnership, or individual who has entered into an agreement with the Town through an approved Development Agreement and who has hired the Contractor to perform the work
"GMA" -	Town of Timnath Growth Management Area
"Manual" -	Town of Timnath Design Criteria Manual and Construction Specifications
"Sanitation District" -	South Fort Collins Sanitation District (SFCSD), Boxelder Sanitation District
"Water District" -	Fort Collins – Loveland Water District, North Weld County Water District (NWCWD), East Larimer County Water District (ELCO)
"District" -	Water and/or sanitary sewer provider responsible for providing potable water service or sanitary sewer service for the Development and the Poudre Fire Authority responsible for providing emergency response services to the area
"Plans" or Approved Plans" -	Detailed and working drawings, including plan, profile, and detail sheets of the proposed improvements as approved by

the Town and signed and stamped by the Design Engineer

"Town Engineer" - Individual, company, or corporation hired by the Town of Timnath and designated by the Town to interpret the application of this Manual.

"Town" - Town of Timnath

1.3 REFERRAL AGENCIES

Through the development review process the Town of Timnath refers all projects to a variety of public agencies and private utility companies for their review and comment. Review agencies shall be specified by the Town and may include, but are not limited to, Larimer County, the City of Fort Collins, the Town of Windsor, Weld County, the City of Greeley, Fort Collins – Loveland Water District, East Larimer County Water District, North Weld County Water District, Boxelder Sanitation District, South Fort Collins Sanitation District, Poudre School District, Poudre Fire Authority, Cache La Poudre Irrigating Company, Colorado Geological Society, Colorado Division of Water Resources, Poudre River Water Commission, Xcel Energy, Poudre Valley REA, Qwest, Comcast, the Division of Wildlife, the OmniTRAX, Incorporated (railroad) and others as appropriate. Review comments are considered during the development review process and shall be addressed unless otherwise directed by the Town.

1.4 PERMITS AND FEES

Unless otherwise directed by the Town, the contractor and developer shall obtain all necessary permits and pay all associated fees, deposits, and taxes for any and all construction. Contractor and developer shall comply with local and municipal ordinances and applicable state and national codes. The contractor and developer are responsible to determine the type of permits required for their work, to acquire all permits before beginning work, and to follow all permit requirements in entirety. A copy of all permits shall be submitted to the Town and must be available for inspection at the job site at all times.

Permits shall include, but are not limited to, the following:

- *Town of Timnath* – Right-of-Way Work Permit, Grading Permit
- *Colorado Department of Public Health and the Environment* – Construction Dewatering Permit, Stormwater Discharge Permit and Stormwater Management Plan
- *U.S. Army Corps of Engineers* – 404 Permit
- *U.S. Environmental Protection Agency* – NPDES Permit
- *Colorado Department of Transportation* – Utility Crossing Permit, Access Permit
- *Larimer County* – Access Permit, Right-of-Way Work Permit
- *Railroad* – Utility Crossing Permit, Work in Right-of-Way Permit
- *Irrigation Company* – Utility Crossing Permit, Irrigation Company approval for ditch modifications

A Grading Permit may be requested by the developer that would allow site grading, including placement of fill material, to occur prior to final project approval and/or a pre-construction conference. A Grading Permit application shall require a separate submittal of an Overlot Grading Plan, Erosion Control Plan, opinion of grading and drainage cost, letter of credit, grading application, and grading fee, which will require review and approval by the Town of Timnath. No site grading, placement of fill material, or removal of excess fill material may occur without a Grading Permit or a development's pre-construction conference.

1.5 CONTRACTOR ELIGIBILITY

All contractors performing work on public infrastructure or within public rights-of-way and easements must be licensed to perform work in the State of Colorado, bonded, and insured. An annual contractor's business license shall be obtained from the Community Development Coordinator for all contractors and subcontractors performing work within Town limits. The license may be obtained once the applicable form is filled out and the fee is paid. The contractor must remain in good standing; the Town reserves the right to deny licensure and/or revoke a contractor's license.

1.6 NATURAL RESOURCES PROTECTION

It is the Town's intent to protect and enhance the natural resources within the Town and its GMA. To the extent reasonably feasible, unless otherwise approved by the Town and permitting agencies, development and construction will be designed to meet the following goals:

- Protect the Cache la Poudre River corridor so it remains a natural and diverse riparian habitat.
- Minimize disturbances to natural areas. Natural areas include: wetlands, riparian corridors, floodplains and floodways, migration routes and breeding grounds, natural drainage and water ways, significant trees and vegetation, lakes, ponds, and wildlife habitat and wildlife travel corridors as determined by the Colorado Division of Wildlife or a Town-approved biologist. Various permits require specific evaluations and provide regulations that are related to protecting natural areas.
- Minimize disturbance to all vegetation that is to be preserved. For example, development should avoid disturbance within tree drip lines, compacting the earth over tree and shrub root zones, raising the grade around trees, and disturbing natural dry land grasses.
- Minimize disturbances to wildlife and protect both threatened and endangered species. Evaluate wildlife impacts as required for various permits or as requested by the Town.
- Developers shall be responsible for obtaining a 404 Permit from the U.S. Army Corps of Engineers prior to discharging dredged or fill material into waters of the United States. The purpose of the 404 program is to insure that the physical, biological, and chemical quality of the nation's waters is protected from irresponsible and unregulated discharges of dredged or fill material that could permanently alter or

destroy these valuable resources.

- It shall be Town policy that there be no net loss of wetlands within the GMA due to development activities. If wetlands must be altered that fall outside of the U.S. Army Corps of Engineers jurisdiction (e.g., non-jurisdictional wetlands), then the wetlands must be mitigated at a minimum 1:1 ratio. Non-jurisdictional wetlands are not intended to include all wetlands created by man-made facilities, but only those that meet recognized criteria as a wetland as determined by a qualified professional. Mitigation shall be designed in a manner that reduces the impact of mosquitoes on surrounding areas. Mitigation shall occur within the GMA unless otherwise approved by the Town. Mitigation shall occur within the GMA unless otherwise approved by the Town.

1.7 REQUEST TO DIFFER FROM MANUAL

Any design that does not conform with this Manual must be approved by the Town in the form of a waiver. Requests to design or construct differently than that required by this Manual will be considered on a case-by-case basis following a waiver letter prepared by a Professional Engineer registered in the State of Colorado. Such requests shall be submitted in writing as an attachment with the project submittal. The request shall include the identifying issue, the reason that differing from this Manual is needed, the proposed alternative design or construction criteria, a thorough evaluation of the impact of the proposed variation from this Manual on capital and maintenance costs, affect of the proposed variation on the Town and other property owners, technical justification, a description of how the change will meet the goals and intent of this Manual, and supporting data.

At a minimum, the request shall meet all of the following criteria to be considered for approval:

- Special circumstances or conditions exist which limit or prevent the project from meeting the design standards. Financial hardship, loss of prospective profits and previously approved variances in other developments shall not be considered as special circumstances; and
- The request represents an alternative design that meets the intent of these standards, and
- The request will not be detrimental to the public interest or other property, nor in conflict with any other ordinance, code, regulation, or law, will not be detrimental to the public health, safety and welfare, and will not reduce the design life of the improvement nor cause the Town additional maintenance costs.

1.8 PRE-CONSTRUCTION REQUIREMENTS AND PROCEDURES

1.8.1 Signature of Plans

Before any development construction activity may begin, with the exception of work specifically allowed by an approved Grading Permit, final mylars that meet all standards of this Manual and that meet conditions of approval placed by the Town Council, must

be signed by all appropriate parties including the Mayor and Town Engineer, the Final Plat filed with Larimer or Weld County, and a pre-construction meeting held.

1.8.2 Submittal of Signed and Stamped Plans

Before any development construction activity may begin, five sets or more, as defined by staff, of signed and stamped bluelines and the original signed mylars shall be submitted to the Town. Each sheet of the bluelines shall be signed and stamped by the engineer of record, who shall be licensed in the State of Colorado and in responsible charge of the project's design.

1.8.3 Pre-Construction Conference

If the Town approves a Grading Permit application, site grading or placement of fill material may begin prior to final project approval and/or the pre-construction conference, as approved by staff in writing. See Section 1.4 for further information.

Unless otherwise approved by the Town, the Contractor shall be required to schedule a pre-construction conference to be held at least 72 hours prior to the start of construction. Unless otherwise approved, the pre-construction conference may not be scheduled until after the Subdivision Improvement Agreement has been approved by the Town Council, all permits acquired, all fees paid, proof of insurance and letter of credit provided, and financial securities are in place.

Pre-construction conference attendance is expected to include:

- Contractor and his superintendent
- Developer or owner
- Representatives of principal subcontractors and suppliers as appropriate
- The design engineer
- Representatives of the Town of Timnath
- Representatives of other involved agencies as appropriate

The purpose of the conference is to designate responsible personnel and establish a working relationship between all involved parties. Matters requiring coordination will be discussed and procedures for handling such matters established. The agenda will include, but not be limited to:

- Contractor's schedule
- Critical work sequencing
- Review of Contractor's product submittals related to public infrastructure
- Maintaining record documents
- Major equipment deliveries, staging, and haul routes
- Review of Contractor's Traffic Control and Water Control Plans
- Inspections
- Material testing
- Changes from approved plans

1.8.4 Notification Requirements

Contractor shall provide the following notifications prior to construction:

- Notify the Town of Timnath at least 5 working days prior to beginning construction and before closing or restricting any public thoroughfares, with prior written approval from the Town.
- Notify owners of adjacent property and utilities when prosecution of the work may affect them at least 48 hours prior to the expected disturbance.
- Have all utilities field-located by requesting such from the Utility Notification Center of Colorado and specific utility owners.
- Notify the Town of Timnath at least 48 hours prior to required testing and inspections. All testing and inspections should be performed Monday through Friday during normal business hours, unless otherwise approved by the Town.
- Notify and maintain regular contact with emergency services (i.e., Poudre Valley Fire Authority, Larimer County Sheriff) regarding upcoming road closures, construction sequencing, and daily traffic control that may affect emergency vehicle access and travel routes.
- Notify the Town of Timnath of any desired changes to the approved plans prior to performing such work.

1.8.5 Commencement of Construction

In addition to all requirements of this Manual, the following shall apply:

- Construction shall commence within three years of the approved date of final plat or plan (date that Town Council approves the plans) and one year of the approved date shown on the construction drawing plans (the date the Town Engineer signs the drawings). If construction does not begin within one year for any reason, an extension must be requested from the Town of Timnath and plans must be resubmitted for review and approval at the direction of the Town Manager or their designee.
- Contractor shall have a copy of the approved signed and stamped plans, a copy of all permits, and a copy of the Town's construction specifications on the site at all times during construction.
- All necessary traffic control measures and public safety precautions shall occur prior to the commencement of construction and as approved by the Town.
- Installation of the approved temporary erosion control and water control measures shall be implemented before all other construction commences.

1.9 CONSTRUCTION REQUIREMENTS

1.9.1 Work Schedule

The Town limits all work related to approved projects to Monday through Friday, 7:00 a.m. to 7:00 p.m. No work shall be permitted on weekends or holidays or outside of normal working hours without prior written approval from the Town. Work activity done at times other than during normal working hours may require reimbursement to the Town for overtime costs for inspections. Work requests beyond normal working hours or on weekends/holidays must be submitted to the Town at least 5 working days prior to the requested date. Work performed outside of normal business hours will be approved at the Town's discretion. In the event of an emergency situation, the Town and Town Engineer shall be notified immediately. The developer will be required to pay for Town staff time for emergencies that occur outside normal working hours (8:00 a.m. to 5:00 p.m.).

1.9.2 Safety and Protection

Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the work. Contractor shall take all necessary precautions for the safety of and shall provide the necessary protection to prevent damage, injury or loss to:

- Employees and others on the work site
- Other persons who may be affected by the work
- Other property at the site or adjacent to, including but not limited to trees, shrubs, lawns, other landscaping, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of the work.

Contractor shall comply with all applicable laws, ordinances, rules, regulations and orders of any public body having jurisdiction for the safety of persons or property or to protect them from damage, injury or loss; and shall erect and maintain all necessary safeguards for such safety and protection. Where any of these are in conflict, the more stringent requirement shall be followed. Contractor shall also comply with all applicable OSHA regulations.

1.9.3 Environmental Controls

Contractor shall maintain erosion and water control measures to protect the project site, public right-of-way, and private property and prevent sediment pollution of adjacent water courses and properties. Contractor shall follow all permits, local, state, and federal codes. See Part 2 – Storm Drainage Criteria for erosion control requirements. See Specifications Section 02140 – Water Control for other construction water control requirements.

1.9.4 Construction Survey

Contractor shall be responsible for construction staking necessary for proper and accurate completion of all earthwork and construction within the Town. The Contractor shall provide experienced instrument personnel, competent assistants, and such instruments, tools, stakes, and other materials required to complete the survey, layout,

and measurement work. Survey work shall be performed by or under the direction of a licensed professional surveyor in the State of Colorado.

All work shall be performed to the lines, grades, and elevations shown on the approved plans. When construction falls within the following tolerances, the installation will be acceptable to the Town, with respect to the lines and grades. If the tolerances are not met, the Contractor shall be responsible for performing modifications to the facilities or redesign by the design engineer to bring the construction into the tolerances. The Design Engineer may impose stricter tolerances as necessitated by the project. Other construction specifications may affect the minimum tolerances shown below. The stricter standard shall govern.

Description:	Maximum Permissible Deviation from Alignment and Elevation shown on the Drawings:
Horizontal centerline alignment of pipelines	0.50 feet (6 inches)
Vertical elevation of pipelines (inside invert)	0.05 feet (5/8 inch)
Horizontal location of structures	0.50 feet
Vertical elevation of structures	0.10 feet
Vertical elevation of roadways	0.05 feet
Overlot grading	0.25 feet
Final grading	0.10 feet

Contractor shall remove and reconstruct work that is improperly located. Horizontal and vertical alignments shall be checked as the work progresses. Contractor shall report results to the Town Engineer or Inspector.

If the construction survey uncovers any discrepancies, the Contractor shall notify the design engineer prior to construction proceeding. The Contractor and design engineer are responsible for resolving apparent discrepancies and performing any subsequent modifications. Modifications to the approved plans shall follow the procedures of this Manual.

Two different datums exist for the Town of Timnath. The North American Vertical Datum 1988 (NAVD 1988) and the unadjusted NG Vertical Datum 1929. The NAVD 1988 shall be the datum used and take precedent over the NGVD 1929. The Colorado State Planes Coordinate System North Zone, North American Datum 1983-1992 is the coordinate system used in the Town. Electronic files submitted to the Town shall be tied to the above-mentioned datum systems.

1.9.5 Field Measurements and Inspection of Surfaces

Contractor shall verify grades, lines, levels, locations, and dimensions as shown on approved plans, and inspect surfaces that are to receive work before proceeding with excavating, clearing, fabricating, assembling, fitting, or erecting, or any other portion of the work. Contractor shall be solely responsible for accuracy of measurements and laying out its work.

Contractor and developer shall correct any errors or defects due to faulty measurements, improper layout, or failure to report discrepancies. Remove and replace work applied to defective substrates.

1.9.6 Traffic Control

Traffic control operations shall be conducted to ensure minimum interference with streets, walks, and adjacent facilities not part of construction project and to ensure maximum protection for vehicular and pedestrian traffic in the area affected by the project. Traffic control shall meet the following requirements:

- Schedule work so as to minimize inconvenience to businesses and residences located adjacent to the project. Coordinate with individual property and business owners.
- Do not close or obstruct streets, walks, or other occupied or used facilities without permission from authorities having jurisdiction. Provide alternate routes, including signage, around closed or obstructed traffic ways.
- Prepare Final Traffic Control Plan for approval by the Town of Timnath or others as appropriate and implement its specified measures.
- Traffic control at all locations within the project area shall be in general conformance with the approved MUTCD version.
- All construction zone traffic control devices, including but not limited to barricades, signs, arrow panels, variable message boards, flashing beacon (portable), and channelizing devices, shall be installed by the Contractor, maintained (including washing), replaced if damaged or stolen, removed when temporarily not in use, reset as necessary during the progress of construction, and removed entirely when the project is complete. Contractor shall provide traffic control inspection and supervisor services. At a minimum, daily inspection of all traffic control devices is required.
- Unless otherwise approved, all affected streets shall have a minimum of one lane open during non-construction hours for local access and appropriate signing shall be used. Driveway access shall be restored at the end of each construction day if at all possible. Closure of corridor streets will require temporary by-passes as a minimum.
- When streets are to be closed or restricted, notify all Emergency Services, including but not limited to fire, police, and ambulance, at least 48 hours in advance.
- Notify businesses and residents to inform them of traffic control and access procedures and allow adequate time (48 hours minimum) to remove vehicles prior to obstructing driveways, alleys, and street access.

1.9.7 Restoration

Contractor shall return all areas disturbed by the work to their original or better conditions in both function and appearance. Contractor shall be responsible for all finish

grading, cleaning, repairing, topsoil import, revegetation, and restoration of areas disturbed by the Work.

Seed shall be of latest crop available and shall meet Colorado Department of Agriculture Seed Laws, Chapter 35, Article 27. Seed that has become wet, moldy, or otherwise damaged in transit or in storage shall not be used. All seed shall be delivered in sealed bags showing weight, analysis, and vendor's name. All seed shall be Certified Seed (Blue Tag) if available. The seed mixture shown below shall be applied at a rate of 15-lbs/1000 sf based on Pure Live Seed (PLS) basis:

<u>Dry Land Seed Mix</u>	<u>% of Mix</u>	<u>Suggested Variety</u>
Western wheat grass	40%	Arriba
Blue grama	20%	Lovington
Green needle grass	10%	Lodorm
Slender wheatgrass	10%	Primar, Pryor
Buffalo grass*	10%	Sharps Improved, Bison, Cody
Little bluestem	5%	Pastura
Sideoats grama	5%	Vaughn, Niner

*Note: all varieties of buffalo grass must be primed with KNO3.

Apply seed by drilling or hydrospray. Drilling seed is the preferred method. Seed planted with a drill shall be covered with soil to a depth of ¼ to ¾ inch. Do not seed until soil is thawed. In areas where drilling is not possible, harrowing may be acceptable. In such case, broadcast the seed at double the normal rate, harrow again, and mulch. The mulch can either be hydromulch with a tackifier, certified weed free hay straw (spread at a rate of 2 tons per acre) crimped in 3-4" deep, an erosion control blanket, bonded fiber matrix, or combinations of straw and KoirMat or jute netting. If seed is hydroseeded, the mulch shall be applied in a second application on top of the seeding, not together.

Fertilizer shall be applied as follows:

<u>Commercial Fertilizer (13-16-24)</u>	<u>% Available by Weight</u>	<u>Application rate in lbs/acre</u>
Nitrogen	13	65
Phosphorous	16	80
Potassium	24	120

All seeded areas shall be kept in a damp condition, for at least 14 days after seeding to aid in germination. Some form of irrigation may be required to achieve this goal, and it is the responsibility of the Contractor to perform any and all necessary operations to that end. The means of irrigation shall be approved by the Town prior to implementation. Directed flows from large hoses, which could damage the mulch, will not be permitted. Contractor shall continue to provide regular required watering (at least once per week) until Final Acceptance is granted or seed bed is fully established with an average of 6 inches of growth, which ever comes later. Additional maintenance, as required by the Developer and/or Town to establish a viable restored area, may also be required.

All non-vegetative areas disturbed by the work shall also be restored to their original or better conditions in both function and appearance. This restoration shall include pavement, sidewalk, curb and gutter, landscaping, sod grass, trail, fence, signage, etc.

1.9.8 Material Testing

All material testing required by the Specifications is the responsibility of the Contractor. All field and laboratory test results shall be submitted to the Town Engineer in writing as soon as possible after completion of the test. Material testing shall be performed directly by or under the responsible charge of a professional engineer licensed in the State of Colorado. Material testing requirements (i.e., frequency, location) are included in the Specifications.

1.9.9 Inspection

Construction inspection will be performed by the Town Engineer or his or her appointed Inspector in order to observe key steps of the construction process, critical components, general conformance with these standards and specifications, and general conformance with the approved plans. The Developer shall be responsible to pay for all inspection by the Town of Timnath on a time and materials basis. Key inspections may occur for the following:

- Erosion control
- Traffic control
- Right-of-way grading
- Overlot and final grading
- Utility trenching and installation
- Drainage facilities
- Pavement and curb and gutter
- Traffic signs
- Striping

Neither the absence nor presence of inspections nor the results of inspections shall relieve the developer of any obligation required by the approved plans, these standards and specifications, or any formal agreement with the Town. The Town, Town staff, Town Engineer, and Inspector shall not be liable for the developer's performance.

Unless otherwise approved by the Town, quality control testing and inspection will follow the procedures in Chapter 23 of the *Larimer County Urban Area Street Standards, Loveland version*, latest addition (LCUASS). Inspections for water and sanitary sewer improvements shall be made by the appropriate District owning the facilities.

1.9.10 Stop Work Notice

Failure to comply with any provision of the Municipal Code or Manual without prior written approval from the Town shall result in the issuance of a Stop Work Notice. Upon receipt of such notice, all construction and related activities shall immediately cease except for that necessary to protect the safety of the public, protect property and utilities, and provide erosion control measures or others if approved by the Town Engineer. Compliance with items indicated on the Notice must be met before work will be allowed to proceed.

1.9.11 Changes From Approved Plans

Should circumstances warrant changes from the approved plans or specifications, the proposed revision must be submitted by the design engineer for review and approval by the Town. No work shall proceed on that portion of the project being revised until said revisions are submitted, approved, and distributed. Revisions may require submittal of a new mylar sheet (for signatures) indicating the change. The design engineer shall distribute signed and stamped revision sheets to the contractor, involved agencies, and the Town. Submit five or more copies, as needed, to the Town.

1.9.12 Unfavorable Construction Conditions

During unfavorable weather, wet ground, frozen ground, or other unsuitable construction conditions, the Contractor shall confine his operations to work that will not be affected adversely by such conditions. No portion of the work shall be constructed under conditions that would affect adversely the quality or efficiency thereof, unless special means or precautions are taken by Contractor to perform the work in a proper and satisfactory manner. The Contractor shall also protect all exposed utilities from damage due to unfavorable weather.

1.9.13 Record Documents and Certifications

Contractor shall keep neat and legible notes of measurements and calculations made by him in connection with the layout of the work. The developer shall be responsible for providing the Town a set of mylar Record Drawings that indicate any revisions or changes that occurred during the project's construction. Format of the Record Drawings shall be the same type, scale, and appearance as the final approved plans. Record Drawings shall record actual construction and specifically contain, but not be limited to,

- Field dimensions, elevations, and details (includes topographic survey of all detention ponds)
- Field changes which are made by minor deviations to the plans
- Details which are not on the original plans
- Surveyed elevations of manhole inverts in relation to the project datum
- Surveyed horizontal location of manhole lids and rim elevations
- Field locations of utilities changed or altered as part of the work

Electronic drawing files containing the as-built overall utility plan, utility information described above, and detention pond grading shall also be submitted to the Town. Either Microstation or Autocad formats are acceptable. Please verify appropriate version with the Town Engineer prior to submittal. Work to survey improvements for the Record Drawings shall be performed under the direction of a licensed professional surveyor in the State of Colorado.

Individual lot drainage certifications shall be prepared by a licensed professional engineer and submitted to the Town prior to a Certificate of Occupancy being released. All drainage facilities shall also be certified that they will function in accordance with the approved drawings and drainage report by demonstrating available pond volume, outlet structure elevations, overflow spillway elevation, and orifice sizes are as shown on the approved drawings. As-built hydrologic or hydraulic analyses are not required unless

the as-built conditions significantly deviate from the design as determined by the Town Engineer.

1.9.14 Initial Acceptance

Acceptance procedures shall follow Chapter 24 of the LCUASS and the Town's Municipal Code.

1.9.15 Final Completion and Acceptance

Acceptance procedures shall follow Chapter 24 of the LCUASS and the Town's Municipal Code.

Until final acceptance is granted, all maintenance and repair shall remain the responsibility of the developer unless otherwise approved by the Town. If identified deficiencies are not corrected and finally accepted within 120 days after the two year warranty period, the Town may cause the required corrections to be made at the expense of the developer using the financial security per the Subdivision Improvement Agreement. In addition, the Town may suspend building permits or certificates of occupancy until the corrections are made and the work is completed in a satisfactory manner.

1.10 WARRANTY

The developer shall warrant all work free of defects in workmanship or materials for a period of two years from the date of final construction acceptance by Town and shall be responsible for correcting any deficiencies that occur prior to final acceptance.

PART II – STORM DRAINAGE CRITERIA

PART II – STORM DRAINAGE CRITERIA

2.1 AUTHORITY

These storm drainage, stormwater quality, and erosion control standards, design criteria, and construction specifications have been adopted by the Town and shall apply to any public and private storm drainage improvements, including all development projects, within the Town of Timnath or lands considered for annexation within the Town's Growth Management Area (GMA). The Storm Drainage Criteria are not intended to interfere with, abrogate, or annul any other regulation, statute, or other provision of law. Where any provision of the Storm Drainage Criteria imposes restrictions different from those imposed by any other regulation or provision of law, that provision which is more restrictive or imposes higher standards shall govern.

2.2 REFERENCE STORM DRAINAGE STANDARDS

In order to provide engineering professionals with the latest tools and criteria related to the analysis and design of storm drainage infrastructure, the Town incorporates by reference the latest version of the Urban Storm Drainage Criteria Manual (USDCM, Volumes 1-3, by the Urban Drainage and Flood Control District (UDFCD), with modifications as noted in this section into this Manual. All storm drainage related work shall be designed and performed according to these minimum standards, which are subject to the interpretation of the Town. The USDCM together with all future amendments and requirements herein shall be together known as the Town of Timnath Storm Drainage Criteria. The USDCM may be ordered from the UDFCD web site at www.usfcd.org or by contacting them by phone at (303)-455-6277.

2.3 MASTER DRAINAGE PLAN

The Town of Timnath Master Drainage Plan (MDP) sets forth improvements required for existing and future growth areas within the GMA. It also specifies area specific drainage requirements, such as detention storage or allowable release rates. In addition to this Criteria Manual, requirements of the MDP shall be followed by all development. The Town's policy regarding design and construction of improvements required in the MDP is as follows:

The Town shall arrange for the design and construction of improvements required in the MDP for the existing Town limits and future growth areas when it is able to financially do so. The developer shall design and construct drainage systems for new development and redevelopment. This may include design and construction of master planned improvements that occur on the development's property or that are directly related to the development's drainage.

The developer shall design and construct temporary or interim drainage systems required due to the lack of adequate storm drainage facilities downstream of a new development

2.4 IRRIGATION DITCHES AND FACILITIES

It is the policy of the Town that irrigation ditches and associated facilities shall not be used for stormwater conveyance, even if these facilities have conveyed historic runoff from a property. The only exception to this policy will be for the use of irrigation ditches where the ditch company has provided written approval allowing stormwater conveyance, where it is demonstrated that the ditch can adequately convey irrigation and design stormwater flows simultaneously, where downstream irrigation structures and facilities are of sufficient capacity and condition (i.e., road crossings, diversion boxes, etc.), where the long term stability of the ditch is addressed, and where the ditch has been included as a conveyance facility in the Master Drainage Plan.

Irrigation ditches shall be assumed to be non-existent with respect to intercepting off-site contributing runoff (e.g., calculations for historic flow rates cannot assume collection, conveyance, detention, or redirection by an irrigation ditch). When an irrigation ditch crosses a property proposed for development, the development shall consider and make provisions for ditch overtopping that may spill upstream tributary runoff onto the property. This may require a hydraulic analysis of the ditch's capacity and analysis of low spill points. Any utility or road crossings or alterations to irrigation ditches shall be approved in writing by the irrigation company that owns the facility. Future maintenance of such alterations shall remain the responsibility of the ditch company or the homeowners association if approved by the Town.

2.5 FLOODPLAIN MANAGEMENT

The Town's floodplain management policies have two primary goals:

- *Reduce the vulnerability and danger to Town residents from flood damage.* These dangers include threats to life, safety, and public health as well as damage to properties, infrastructure, and disruption of the local economy. Protection from these hazards should be provided for floods having a one percent chance of occurrence in any given year (100-year floods) based on projected development in the watershed. Protection from the effects of larger, less frequent flooding can also be necessary where such flooding would cause unacceptable or catastrophic damages.
- *Preserve and enhance the natural values of floodplains.* Floodplains provide a significant natural resource that serves society by providing floodwater conveyance and storage, groundwater recharge, water quality enhancement, aesthetic pleasure, and essential habitat for plants and animals. Many natural floodplains, such as the Cache La Poudre River corridor, also have historic and cultural significance. It is in the public's best interest to protect these values.

Floodplain management requires comprehensive hydrologic, hydraulic, and land use criteria to achieve these two goals. The Town is part of the National Flood Insurance Program (NFIP). The NFIP was created in 1968 to provide a disaster relief insurance program, distribute responsibility for floodplain management to all levels of government, set national standards for regulating floodplain development, and to create a nationwide floodplain mapping program. Property owners within the Town limits can purchase flood insurance because of the Town's participation in the NFIP.

The Town’s Municipal Code contains specific regulatory requirements. In general, the code adopts a ½-foot rise floodway, allows fill in the flood fringe (the area outside of the floodway limits yet still within the 100-year floodplain), requires that any development within the floodway create zero rise in water surface elevation, prevents the construction of residential buildings within the floodway, and requires that the lowest floor elevation of all buildings be a minimum of 18 inches above the base flood elevation.

When development proposes to alter the floodway limits or create a floodway rise, a Conditional Letter of Map Revision (CLOMR) and Letter of Map Revision (LOMR) shall be submitted to FEMA for approval. No work requiring a CLOMR shall be allowed until receipt of FEMA’s approval. Development outside of the Town limits is under the floodplain management jurisdiction of Larimer County or the associated municipality(s).

2.6 HYDROLOGIC ANALYSIS STANDARDS

2.6.1 Rainfall Criteria

Unless otherwise shown in the Master Drainage Plan, the Town of Timnath adopts the Larimer County rainfall criteria, which were adopted in 1999. The criteria is based upon a 2-hour design storm and a regional analysis of historic rainfall data, which best represents rainfall distribution and intensities along the Northern Colorado Front Range. The purpose of adopting these rainfall criteria over other available rainfall criteria is that the rainfall study and committee of experts that developed the criteria is believed to be most applicable to the northern Colorado front range and of the most current gage data available. Rainfall criteria used by other entities are based on records over 30 years old, which are planned to be updated by NOAA. If the NOAA revisions indicate rainfall patterns substantially different than currently adopted by the Town, then the Town may consider changing the criteria. There also is the added benefit of using the same rainfall design storms that adjacent, primarily upstream, projects will be using (i.e., within the Boxelder Creek floodplain). The design rainfall is included in the following tables.

(1) Design Storm Hyetographs						
Time (min)	2-Year Intensity (in/hr)	5-Year Intensity (in/hr)	10-Year Intensity (in/hr)	25-Year Intensity (in/hr)	50-Year Intensity (in/hr)	100-Year Intensity (in/hr)
5	0.29	0.40	0.49	0.63	0.79	1.00
10	0.33	0.45	0.56	0.72	0.90	1.14
15	0.38	0.53	0.65	0.84	1.05	1.33
20	0.64	0.89	1.09	1.41	1.77	2.23
25	0.81	1.13	1.39	1.80	2.25	2.84
30	1.57	2.19	2.69	3.48	4.36	5.49
35	2.85	3.97	4.87	6.30	7.90	9.95
40	1.18	1.64	2.02	2.61	3.27	4.12
45	0.71	0.99	1.21	1.57	1.97	2.48
50	0.42	0.58	0.71	0.92	1.16	1.46
55	0.35	0.49	0.60	0.77	0.97	1.22
60	0.30	0.42	0.52	0.67	0.84	1.06
65	0.20	0.28	0.39	0.62	0.79	1.00
70	0.19	0.27	0.37	0.59	0.75	0.95
75	0.18	0.25	0.35	0.56	0.72	0.91
80	0.17	0.24	0.34	0.54	0.69	0.87
85	0.17	0.23	0.32	0.52	0.66	0.84

90	0.16	0.22	0.31	0.50	0.64	0.81
95	0.15	0.21	0.30	0.48	0.62	0.78
100	0.15	0.20	0.29	0.47	0.60	0.75
105	0.14	0.19	0.28	0.45	0.58	0.73
110	0.14	0.19	0.27	0.44	0.56	0.71
115	0.13	0.18	0.26	0.42	0.54	0.69
120	0.13	0.18	0.25	0.41	0.53	0.67

(2) Rainfall Intensity – Duration – Frequency Table (For Rational Method)			
Duration (min)	2-Year Intensity (in/hr)	10-Year Intensity (in/hr)	100-Year Intensity (in/hr)
5	2.85	4.87	9.95
6	2.67	4.56	9.31
7	2.52	4.31	8.80
8	2.40	4.10	8.38
9	2.30	3.93	8.03
10	2.21	3.78	7.72
11	2.13	3.63	7.42
12	2.05	3.50	7.16
13	1.98	3.39	6.92
14	1.92	3.29	6.71
15	1.87	3.19	6.52
16	1.81	3.08	6.30
17	1.75	2.99	6.10
18	1.70	2.90	5.92
19	1.65	2.82	5.75
20	1.61	2.74	5.60
21	1.56	2.67	5.46
22	1.53	2.61	5.32
23	1.49	2.55	5.20
24	1.46	2.49	5.09
25	1.43	2.44	4.98
26	1.40	2.39	4.87
27	1.37	2.34	4.78
28	1.34	2.29	4.69
29	1.32	2.25	4.60
30	1.30	2.21	4.52
31	1.27	2.16	4.42
32	1.24	2.12	4.33
33	1.22	2.08	4.24
34	1.19	2.04	4.16
35	1.17	2.00	4.08
36	1.15	1.96	4.01
37	1.13	1.93	3.93
38	1.11	1.89	3.87
39	1.09	1.86	3.80
40	1.07	1.83	3.74
41	1.05	1.80	3.68
42	1.04	1.77	3.62
43	1.02	1.74	3.56
44	1.01	1.72	3.51
45	0.99	1.69	3.46
46	0.98	1.67	3.41
47	0.96	1.64	3.36
48	0.95	1.62	3.31
49	0.94	1.60	3.27
50	0.92	1.58	3.23
51	0.91	1.56	3.18
52	0.90	1.54	3.14
53	0.89	1.52	3.10
54	0.88	1.50	3.07

55	0.87	1.48	3.03
56	0.86	1.47	2.99
57	0.85	1.45	2.96
58	0.84	1.43	2.92
59	0.83	1.42	2.89
60	0.82	1.40	2.86
80	0.68	1.18	2.39
100	0.59	0.98	2.06
120	0.51	0.84	1.82

2.6.2 Methodology

Hydrologic analysis shall be performed using the Rational Method, most recent EPA-SWMM Version, or CUHP and UDSWMM in accordance with USDCM criteria. See Section 2.8 regarding allowable analysis methodology when detention storage facilities are required. No other hydrologic analysis method or model will be accepted.

2.6.3 Design Storm Frequency

The minor and major storm design frequencies shall not be less than those shown in the following table:

Land Use	Minor Storm Frequency	Major Storm Frequency
Residential	2-year	100-year
Commercial/Industrial/Public Buildings	10-year	100-year
Parks, Greenbelts, etc.	2-year	100-year

2.6.4 Historic Runoff

Off-site historical runoff that flows across a proposed development boundary shall be analyzed in addition to the development's historic conditions runoff. Historic runoff is defined as the existing conditions runoff that occurs at the date of the proposed development's drainage study. Per drainage law, off-site historic runoff must be accepted and conveyed through or across the development without negatively impacting up or downstream properties. The historic runoff shall be conveyed to its original outfall location unless otherwise approved by the Town Engineer and downstream property owner(s).

Historic sheet or overland flow that leaves a development in a concentrated manner (i.e., from a detention pond outlet pipe) may create negative impacts on downstream properties even if the peak flow rate is at or below the total historic flow rate leaving the development. This is because concentrated flow has more impact and erosive potential than sheet flow. In such cases, a drainage easement will likely be required from the downstream property owner as a condition of approval from the upstream development.

2.7 HYDRAULIC DESIGN STANDARDS

Hydraulic analysis and design of storm drainage facilities shall be performed in accordance with USDCM criteria or HEC-22 Urban Drainage Design Manual (FHWA 2001). Allowable software includes HEC-RAS, HEC-2, EXTRAN, EPA-SWMM Ver. 5,

UDSEWER, UDINLET, Flowmaster, Culvertmaster, and StormCAD by Husted Methods, and HY-8.

2.7.1 Street Capacity

The hydraulic capacity of all urban streets shall be calculated in accordance with USDCM criteria. Rural streets without curb and gutter shall convey the entire minor and major storm runoff within the street right-of-way. The entire minor storm runoff shall be conveyed within the roadside swale. The major storm runoff shall not exceed a depth of 24 inches in the roadside swale or 6 inches at the edge of asphalt. Allowable urban street inundation shall be per the following table:

Street Classification	Minor Storm Inundation Standard	Major Storm Inundation Standard
Local (Residential or Commercial/Industrial)	No curb overtopping. Maximum depth for vertical curb and gutter of 0.50 feet. Maximum depth for roll over curb and gutter of 0.46 feet. Flow may spread to the street crown but not overtop the crown.	Maximum depth of 6 inches over the crown or 18 inches at the flowline, whichever is less. Residential, commercial, and industrial buildings shall be no less than 18 inches above the 100-year water surface elevation at the ground line or lowest building entrance.
Minor Collector	No curb overtopping. Maximum depth for vertical curb and gutter of 0.50 feet. Maximum depth for roll over curb and gutter of 0.46 feet. Flow spread must leave at least one lane width free of water.	Maximum depth of 6 inches over the crown or 18 inches at the flowline, whichever is less. Residential, commercial, and industrial buildings shall be no less than 18 inches above the 100-year water surface elevation at the ground line or lowest building entrance.
Major Collector and Commercial Collector	No curb overtopping. Maximum depth of 0.50 feet. Flow spread must leave at least one lane width free of water.	Maximum depth of 6 inches over the crown or 18 inches at the flowline, whichever is less. Residential, commercial, and industrial buildings shall be no less than 18 inches above the 100-year water surface elevation at the ground line or lowest building entrance.
Minor Arterial (2-lane)	No curb overtopping. Maximum depth of 0.50 feet. Flow spread must leave at least one-half (1/2) of the roadway width free of water in each direction.	Maximum depth shall not exceed the street crown (0 inch depth at the crown, no crown overtopping) or 18 inches at the flowline, whichever is less. Residential, commercial, and industrial buildings shall be no less than 18 inches above the 100-year water surface elevation at the ground line or lowest building entrance.

Major Arterial (4- and 6-lane)	No curb overtopping. Maximum depth of 0.50 feet. Flow spread must leave at least one-half (1/2) of the roadway width free of water in each direction.	Maximum depth shall not exceed the street crown (0 inch depth at the crown, no crown overtopping) or 18 inches at the flowline, whichever is less. Residential, commercial, and industrial buildings shall be no less than 18 inches above the 100-year water surface elevation at the ground line or lowest building entrance.
*Note: Allowable flow depth is measured vertically from the gutter flowline at the curb face.		

2.7.2 Cross Street Flow And Crosspans

Crosspans are allowed for passing storm drainage flow across roadways. They shall be designed and constructed in accordance with the LCUASS, Loveland version.

Cross street flow shall be no more than 6 inches deep in the crossspan for minor storm events and 18-inches deep during major storm events and shall not exceed the allowable street inundation shown in Section 2.7.1.

2.7.3 Inlets

UDINLET by the UDFCD or HEC-22 shall be used for inlet design. To account for conditions that decrease the capacity of inlets, such as debris clogging, pavement overlays, parked vehicles, and variations in design assumptions, the theoretical capacity calculated for an inlet shall be reduced by the following factors:

Inlet Type	Grade Condition	% Of Theoretical Capacity Allowed
CDOT Type R, 5 ft length	Sump or continuous grade	88
CDOT Type R, 10 ft length	Sump or continuous grade	92
CDOT Type R, 15 ft length	Sump or continuous grade	95
Combination Type 13	Sump	65
Combination Type 13	Continuous grade	66
Grated Type 13 or C	Sump	50

Inlets shall be placed in all sump locations. Overflow swales shall be designed for the major storm runoff to protect property and prevent excessive street flooding during cases of inlet clogging at sump locations. Both CDOT Type R and Combination Type 13 inlets will be allowed on all street types. Grated CDOT Type 13 inlets may be used in alleys or private drives with a valley gutter. Grated Type C inlets may be used in swales or ditches.

2.7.4 Storm Sewer

Storm sewer shall be designed in accordance with USDCM criteria or HEC-22. In all cases, hydraulic and energy grade line calculations shall be performed with the 100-year HGL shown on profile drawings. Storm sewer pipe within the public right-of-way may be reinforced concrete pipe (RCP or HERCP, Class 3 minimum) or polyvinyl chloride pipe (PVC, SDR-35 minimum), 15-inch diameter minimum size, or reinforced concrete box culvert (RCB, precast or cast-in-place). A minimum of 3' earth cover is required for all Class III RCP. In areas where a 3' minimum earth cover cannot be met, a waiver letter must be submitted to the Town by a professional engineer. Class IV and V RCP shall be used in load-bearing areas where 3' minimum earth cover cannot be met, as approved by the Town Engineer. All RCP storm sewer joints shall be R-4 rubber o-ring type, watertight to 10 psi. Storm sewer pipe outside of the public right-of-way and under private ownership may also be double walled HDPE with watertight joints, 15-inch diameter minimum size. Storm sewers shall not operate under pressure conditions during the minor storm event.

2.7.5 Manholes

Manholes shall be placed wherever there is a change in pipe size, change in direction, abrupt change in elevation or slope, junction between two or more pipe systems or laterals, or when the following maximum distance is reached.

Pipe Size (diameter in inches)	Maximum Allowable Distance Between Manholes
15 to 36	400 feet
36 to 60	500 feet
60 and larger	750 feet

The interior diameter of all "straight through" storm sewer manholes shall be a minimum of the following size.

Pipe Size (diameter in inches)	Minimum Manhole Barrel Interior Diameter
15 to 24	48 inch
24 to 42	60 inch
42 to 48	72 inch

Precast manhole tees shall be used for pipe sizes greater than 48-inch diameter. Round manholes shall have interior benching to the springline of the connecting pipes. The recommended drop across a round manhole is 0.20 feet but shall be no less than 0.05 feet if circumstances prevent a greater drop.

2.7.6 Culverts

Culverts shall be designed in accordance with Hydraulic Design Series 5 (HDS-5) by the FHWA. Inlet and outlet control conditions shall be evaluated with all calculations shown

in the drainage report. The hydraulic and energy grade lines shall be calculated for each culvert and included in the drainage report with the 100-year HGL shown on the profile drawings. Concrete headwalls are recommended for all culvert applications to improve efficiency and minimize culvert failures. Energy dissipation and erosion protection shall be designed for all culverts. All culverts shall be reinforced concrete pipe (RCP or HERCP, Class 3 minimum, 15-inch diameter minimum) or reinforced concrete box culvert (RCB, precast or cast-in-place). The maximum culvert headwater to diameter ratios shall be as follows:

Storm Frequency	Headwater to Diameter (H_w/D)
10-Year	≤ 1.0
100-Year	≤ 1.5

The minimum culvert capacities shall be for the 10-year storm event for local and collector streets and the 100-year storm event for arterial streets. No street overtopping is allowed of arterial streets during the 100-year storm event.

2.7.7 Swales And Drainage Channels

Major drainage channels shall be designed to convey the 100-year storm runoff with a minimum of 1 foot of freeboard following the design guidelines in the USDCM. Channel stability, erosive velocities, and shear stress shall be evaluated and addressed. Supercritical flow conditions will not be allowed. If necessary, grade control and bank protection shall be designed. Unless otherwise approved, water surface profiles shall be computed for all open channels conveying greater than 100 cfs using a step backwater analysis program like HEC-RAS or HEC-2. The analysis may also be required for the 10-year discharge. The energy grade line for the design flow rate shall be at or below the channel's top of bank elevation. All residential, commercial, and industrial buildings shall be at least 18 inches above the 100-year water surface elevation at the ground line or lowest building entrance.

The design of minor drainage channels or swales shall be done in accordance with the USDCM. Design parameters are shown in Volume 1, Major Drainage, Section 3.2.7, Table MD-2 on page MD-27 of the USDCM.

2.8 DETENTION STORAGE REQUIREMENTS

2.8.1 Detention Policy

The policy of the Town of Timnath shall be to require regional and/or on-site detention for all new development in the GMA as set forth in these criteria unless otherwise stated in the Town's Master Drainage Plan (MDP). Temporary or interim detention/retention facilities may be required if the downstream facilities have not yet been constructed per the MDP. Unless otherwise specified in the MDP, all stormwater detention facilities shall be designed to over detain and release at the 10-year historic flow rate during a 100-year storm event and at the 2-year historic flow rate during a 2-year storm event and have at least 1-foot of freeboard. Embankment slopes shall be a maximum of 4:1 (H:V).

All detention facilities shall also have extended duration detention stormwater quality improvements (See Section 2.10).

Hydrograph routing and modeling procedures using UDSWMM or EPA-SWMM Version 5 shall be used to size detention facilities for tributary catchment areas and developments larger than 40 acres in size, facilities classified as regional in nature, and for developments with complex drainage systems as required by the Town Engineer. Simplified on-site detention sizing procedures described in the USDCM (i.e., FAA method) will be accepted for other smaller developments. Prior to beginning analysis, it is recommended that the design engineer discuss their proposed approach with the Town Engineer.

2.8.2 Retention Ponds

Retention facilities are not recommended as a permanent solution for drainage problems and they are not normally allowed in the Timnath area, but may be considered only if special circumstances exist and normal detention storage is not possible. Retention Areas and/ or Detention Ponds must meet the landscaping requirements for open space if they are being used as open space; consult the Timnath Town Code for landscaping requirements. If allowed, retention facilities shall be sized to contain a volume greater than or equal to twice the 2-hour, 100-year storm runoff volume plus 1-foot of freeboard or 1.5 times the 24-hour, 100-year storm runoff volume plus 1-foot of freeboard, whichever is greater. Unless otherwise approved by the Town Engineer, runoff stored in retention facilities shall be mechanically removed and disposed of off-site by the property owner within 72 hours after each storm event. Retention facilities shall also be located so that no human occupied or critical structure will be flooded if overtopping occurs and designed so that failure of the dam embankment will not occur.

2.8.3 Emergency Spillways

All detention and retention facilities shall have emergency spillways. Emergency spillways shall be designed assuming full debris blockage of the primary outlet structure, have the capability to convey the peak 100-year storm discharge entering the pond, have a crest elevation equal to or above the pond's 100-year water surface elevation, and shall have at least 6-inches of freeboard during the 100-year peak discharge. The emergency spillways shall have erosion protection from the upstream (pond side) crest to at least 10 feet beyond the embankment toe of slope using buried riprap or articulated concrete blocks designed to handle the peak 100-year flow conditions. A concrete cutoff wall that is a minimum of 10 inches thick, 4 feet deep, and that extends at least 5 feet into the embankment beyond the spillway opening shall be used to permanently define the crest elevation and to provide erosion protection. Spillway design and erosion protection shall be completed at the time of final design.

2.8.4 New Jurisdictional Dams

New jurisdictional class dams are not desired and shall not be allowed without approval from the Town. If allowed by the Town, design of the storage facility shall be subject to approval and regulation by the Colorado State Engineer's Office (SEO), long term maintenance shall be the responsibility of the homeowner's association, and the facility

shall be designed, constructed, and maintained to meet SEO criteria for jurisdictional structures.

2.9 EXISTING JURISDICTIONAL DAMS

Jurisdictional dams are classified by the Colorado State Engineer's Office (SEO) as either low, moderate, or high hazard structures depending on conditions downstream. Dams are classified as high hazard structures when in the event of failure there is potential for loss of life. Dams presently rated as low or moderate hazard structures may be changed to a high hazard rating if development occurs within the potential path of spillway discharges or flooding due to the dam failing. In this case, the reservoir owners would be liable for the cost of upgrading the structure to meet the higher hazard classification requirements. Reservoir owners are often irrigation companies or municipalities. Development occurring downstream of a jurisdiction dam shall be responsible for verifying with the reservoir owner and the SEO whether the dam's hazard classification will require modification due to the proposed development. Coordination, analysis, design, and construction of improvements is the sole responsibility of the Developer and the reservoir owner. Written notification must be provided to the Town documenting the hazard classification, proposed conditions caused by development, required improvements, and approval by both the reservoir owner and the SEO prior to the Town approving any such development.

It shall be Town policy to restrict development to areas outside of the jurisdictional dam water surface elevation created by a 100-year storm. It shall also be Town policy to restrict development to areas outside of the jurisdictional dam 100-year floodplain, which is defined as one of the following:

- The 100-year floodplain downstream of the emergency spillway to a suitable natural conveyance or storage area such as the Cache La Poudre River or another reservoir. Assume the dam is full to the elevation of the emergency spillway crest at the beginning of the 100-year storm so that the 100-year storm is routed through the reservoir and over the spillway.
- The natural 100-year floodplain that would form if its owner removed the dam.

2.10 STORMWATER QUALITY AND EROSION CONTROL STANDARDS

Both temporary (construction) and permanent stormwater quality best management practices (BMPs) shall be designed for all developments in accordance with the USDCM Volume 3 and with Larimer County's NPDES Phase II permit. As a minimum for permanent BMPs, extended duration detention shall be designed as part of every detention pond and stormwater quality treatment manholes shall be designed for all commercial and industrial land uses. Grass filter strips, buffers, and bioswales should be used whenever possible to separate impervious areas, particularly in parking lots. Outfalls to the Cache La Poudre River shall require additional treatment such as constructed wetlands.

Construction BMPs are essential to the protection of water quality in the GMA. An erosion and sediment control report shall be submitted to the Town for review and acceptance as either a separate document or as part of the drainage report. An erosion

and sediment control plan (24"x36" drawing(s)) must also be submitted to the Town for review and acceptance with all development submittals. The plan must be consistent with the report and must be accepted by the Town prior to the issuance of a grading or building permit. The plan should provide for sediment entrapment, inlet and outlet protection, slope protection, protection of soil stockpiles, mulching, minimizing bare soil areas, and revegetation. The contractor and developer shall be responsible for installation and maintenance of all erosion control measures. In addition to the report and plan submitted to the Town, the developer and contractor shall be responsible for preparing a Stormwater Management Plan and receiving approval from the State of Colorado prior to beginning construction. Two copies of the approved Stormwater Management Plan and approval notification shall be provided to the Town.

2.11 DRAINAGE CERTIFICATIONS

All new developments and existing areas/lots that are performing grading or excavating are required to submit for review and approval individual lot site drainage plans as part of the building permit package. Once the site has been graded according to the approved plans, a drainage certification of the grading and drainage facilities shall be provided to the Town before a Certificate of Occupancy will be issued. The certification must specify designed and actual as-built conditions. Any variation from the approved plans must be noted and proven to function properly within the standards of these criteria and within the overall approach to the site's designed grading and drainage plan. Supporting calculations to justify any variation from the approved plans shall be provided. Calculations may include, but not be limited to detention pond volumes, spillway crest elevations, outlet structure parameters and elevations, storm sewer invert elevations, pipe capacities, and swale capacities. All certifications shall be submitted to the Town Engineer at least two weeks prior to the release of a certificate of occupancy. The drainage certification shall be signed and stamped by a Colorado registered Professional Engineer.

Lot certifications are required to insure that lot grading was completed according to the approved grading plan. The certification should show a lot site plan with proposed and as-built conditions of the lot including the following items:

1. Grades on any portion of the lot shall have a minimum slope of 2%.
2. Runoff should flow away from occupied structures, a minimum of 10% in the first five feet. There must be positive drainage away from all foundation openings (i.e. windows, walk-outs).
3. Ground elevations shall be a minimum of 0.5' below the top of foundation as outlined in the adopted International Building Code.

The following items must be included on the final as-built site grading plan:

1. Signature and stamp of surveyor or engineer who prepared the site grading plan.
2. Title block with surveyor's (or engineer's) contact information, date, property address, north arrow, and scale.
3. Outline of building foot-print(s), driveways, and other permanent structures.
4. Lot lines, lot size, easements, setbacks – properly labeled and dimensioned.
5. Any drainage features including but not limited to: swales, culverts, underdrains, headwalls and riprap. Detail size, length, type etc...

6. Spot elevations shall be included at building corners, lot corners, flowlines, low and high point and drainage facility inverts.
7. Slope arrows with grade percentages including significant grade breaks.
8. Contour lines can or should be included to better define the grading trend or specific grading features. This is mainly encouraged on larger estate lots.

The certification must also include a discussion of the intent of the approved grading and drainage plan, whether the lot meets the approved plan, and that it is certified to drain properly according to these criteria.

2.12 DRAINAGE PLAN AND REPORT REQUIREMENTS

There are two main phases to storm drainage planning and design: preliminary and final designs.

2.12.1 Preliminary Drainage Report

The purpose of the Preliminary Drainage Report is to identify and define drainage problems and preliminary solutions to those problems, which may occur on- and off-site as a result of the development. Problems that exist on-site prior to development must be addressed during the preliminary phase. The report must be submitted in association with the preliminary plat, or as determined by the Town Engineer, and must contain all reference material such as figures, tables, portions of other studies, etc. in the appendix. All reports shall be typed on 8½" x 11" paper and bound. The grading and drainage plans shall be either bound in the report or included in a pocket attached to the report's back cover. The report shall include a cover letter presenting the preliminary design for review and shall be prepared by or under the supervision of a professional engineer who is registered in the State of Colorado. The report shall contain a certification sheet that states the following:

"I hereby certify that this report for the preliminary drainage analysis and design of (Name of Development) was prepared by me or under my direct supervision in accordance with the provisions of the Town of Timnath Manual for the owners thereof."

Registered Professional Engineer
State of Colorado No. _____
(Affix Seal)

The Preliminary Drainage Report shall be in general accordance with the following outline and contain the applicable information listed:

- I. Project Location and Description
 - A. Location
 - a. Township, range, section, ¼ section

- b. Local streets within and adjacent to the development
 - c. Major open channels, facilities, and flow paths
 - d. Names of surrounding developments and landmarks
 - e. Vicinity map
 - B. Project Description
 - a. Total area in acres
 - b. Existing conditions (land use, ground cover, average slope, etc.)
 - c. Major open channels
 - d. Project description
 - e. Irrigation facilities

- II. Drainage Basins and Sub-Basins
 - A. Major Basin Description
 - a. Reference to the Town of Timnath Master Drainage Plan
 - b. Major basin drainage description and characteristics
 - c. Identification of all nearby irrigation facilities within 100 feet of the property boundary
 - d. Drainage patterns
 - e. Major basin problems affecting the development
 - B. Sub-Basin Description
 - a. Historic drainage patterns and flow rates
 - b. Off-site drainage patterns, impacts on the development, and flow rates

- III. Drainage Design Criteria
 - A. Regulations. Discuss any optional criteria or deviation from the Manual
 - B. Development Criteria and Constraints
 - a. Discussion of previous drainage studies related to the property or adjacent properties that influence or are influenced by the proposed drainage design and how the plan will affect drainage for the site.
 - b. Discussion of the drainage impact of site constraints such as streets, utilities, existing structures, irrigation facilities, and site plans.
 - C. Hydrologic Criteria
 - a. Identify the design rainfall
 - b. Identify the design storm recurrence intervals
 - c. Identify the hydrologic analysis methodology
 - d. Identify detention storage requirements, allowable release rates, and design methodology
 - D. Hydraulic Criteria
 - a. Identify various capacity references and requirements
 - b. Identify anticipated detention outlet type or function
 - c. Identify channel grade control criteria used
 - d. Floodplain impacts and 100-year base flood elevations
 - e. Identify outfall conditions (i.e., lake, channel, or river water surface elevation)
 - f. Discussion of other key drainage facility design criteria from the Town of Timnath Manual

- IV. Drainage Facility Design
 - A. General Concepts
 - a. Discussion of concept, approach, and typical drainage patterns (both existing and proposed)
 - b. Discussion of compliance with historical and off-site runoff considerations
 - B. Specific Details
 - a. Discussion of drainage problems encountered and solutions at specific design points
 - b. Discussion of detention storage and outlet design
 - c. Discussion of infrastructure requirements (inlets, storm sewer, swales, and channels)
 - d. Discussion of permanent stormwater quality BMPs
- V. Stormwater Quality
 - A. Permanent BMPs
 - a. Discussion of proposed permanent BMPs and conformance with the Town of Timnath Manual
 - B. Temporary (Construction) BMPs
 - a. Discussion of proposed temporary sediment and erosion control BMPs during the construction process
- VI. Conclusions
 - A. Compliance with the Town of Timnath Manual
 - B. Drainage concept
 - a. Effectiveness of the proposed drainage plan and designs to control storm runoff
 - b. Influence and affect of proposed development on the Town's Master Drainage Plan
 - c. Approval of affected irrigation company or other property owners to be obtained
 - d. Drainage easements required
 - e. Variance requests and supporting documentation
- VII. Appendices
 - A. Hydrologic Analyses
 - a. Land use assumptions regarding adjacent properties
 - b. Basin characteristics and parameters
 - c. Minor and major storm event computations at specific design points
 - d. Historic and fully developed runoff computations at specific design points
 - B. Hydraulic Analyses
 - a. Preliminary street capacity calculations
 - b. Preliminary storm sewer sizing
 - c. Preliminary inlet sizing
 - d. Preliminary swale sizing
 - e. Preliminary culvert sizing
 - f. Preliminary open channel sizing
 - g. Preliminary grade control, bank protection, erosion protection, and energy dissipation sizing
 - h. Preliminary detention pond design and outlet sizing including minor and major storm event water surface elevations

- C. Reference Information
- D. Drawings
 - a. Drainage plan
 - b. Grading plan
 - c. Historic basin map

2.12.2 Preliminary Drainage Plan

A drainage plan of the proposed development shall be provided at a scale no smaller than 1"=200' on a 24" x 36" drawing. The plan shall contain the following information

- Existing and proposed contours at 2-foot maximum intervals (1-foot intervals preferred)
- Property lines, lot lines, and easements
- Streets with names
- Existing irrigation facilities, ditches, drainage structures, and sizes
- Overall drainage basin boundary and sub-basin boundaries
- Proposed flow direction arrows
- Proposed drainage facilities including: inlets, storm sewers, culverts, swales, channels, crosspans, and other appurtenances, including typical cross sections of swales and channels
- Proposed outfall point(s) for runoff to leave the development without damaging downstream properties
- Routing and accumulation of flows at various critical design points for the minor and major storm events
- Detention facilities and outlet works, including proposed minor and major storm event volumes and water surface elevations
- Location and elevations of all defined 100-year floodplains affecting the property
- Location of all existing and proposed utilities if they affect drainage patterns
- Routing of off-site flows through the development
- Proposed on-site drainage easements
- Proposed off-site drainage easements

2.12.3 Final Drainage Report

The purpose of the Final Drainage Report is to update the preliminary design concepts and to present the final design details for the drainage facilities discussed in the Preliminary Drainage Report. The Final Drainage Report must be submitted in association with the final plat, or as determined by the Town Engineer. Any change to the preliminary drainage concepts must be presented. The report shall be in the same format as the Preliminary Drainage Report. It shall also contain a certification sheet as follows:

"I hereby certify that this report for the final drainage analysis and design of (Name of Development) was prepared by me or under my direct supervision in accordance with the provisions of the Town of Timnath Manual for the owners thereof."

Registered Professional Engineer
State of Colorado No. _____
(Affix Seal)

The Final Drainage Report shall be prepared in accordance with the outline shown above for the Preliminary Design Report but contain final design information. Final design analysis and calculations shall be provided for each of the proposed elements of the drainage plan.

2.12.4 Final Drainage Plan and Construction Drawings

Proposed drainage improvements shall be constructed in accordance with the accepted Final Drainage Report. The construction drawings shall be submitted in conformance with the Final Plat for review and acceptance prior to construction. The drawings shall include all drainage facilities and components as shown and described in the Final Drainage Report.

The information required for the drawings shall be in accordance with the Town of Timnath Manual, sound engineering principles and practice, and the Town's development requirements. Drawings shall include geometric, dimensional, structural, foundation, bedding, hydraulic, landscaping, and other details needed to construct the storm drainage facilities. The drawings shall also include detailed proposed grading information including spot elevations, slopes, and the minimum lowest opening elevations and top of foundation elevations of residential, commercial, and industrial buildings indicating at least 18-inches freeboard above the 100-year water surface elevation in streets, channels, ditches, swales, detention ponds, floodplains, or other facilities. The accepted Final Drainage Plan shall be included as part of the overall construction drawings.

PART III – STREET DESIGN CRITERIA

PART III – STREET DESIGN CRITERIA

3.1 AUTHORITY

These street standards, design criteria, and construction specifications have been adopted by the Timnath Town Council and shall apply to any public and private transportation improvements, including all development projects, within the Town's Growth Management Area (GMA).

3.2 REFERENCE STREET STANDARDS

The Town of Timnath adopts by reference the LCUASS with modifications as noted in this section. All transportation work shall be designed and performed according to these standards, which are subject to the interpretation of the Town.

3.3 STANDARD STREET CROSS SECTIONS

The Town of Timnath adopts the City of Loveland typical street cross sections as shown in the LCUASS and as included in the Standard Details of this manual. City of Loveland standard street details shall also be used. Culvert crossings of the roadside ditches shall be limited to a minimum separation of 250 feet on collector streets and 500 feet on arterial streets or more separation as required by normal access control requirements. All proposed transportation improvements shall be based upon these street cross sections and details.

For perimeter streets, the developer shall provide all required right-of-way fronting the project property on the development's side of the street centerline and shall, as a minimum, construct the development's half of all street improvements (street section, curb and gutter, sidewalk, landscaping). In no case will "half streets" be allowed. There shall always be at least two full traffic lanes or more if required by the Traffic Impact Study. If developer is required to provide improvements on the opposite side of the street then such improvements may be eligible for a reimbursement agreement.

3.4 TRANSPORTATION MASTER PLAN

The Town of Timnath Transportation Master Plan shall be used as the basis for street classifications and improvement requirements. The Town may, if it so desires, contribute to the oversizing of transportation improvements, which will be designed and constructed by the developer.

3.5 COUNTY LINE ROAD

The Town has annexed the full width of County Line Road, otherwise known as either Larimer County Road 1 or Weld County Road 13 depending upon jurisdiction. At the writing of these standards, an agreement is being pursued with the Town of Windsor regarding access control, annexation, and design standards for bordering roads. Any developer proposing a project where a road will impact or borders Windsor shall contact the Town for specific design and annexation requirements.

3.6 STREET CONSTRUCTION POLICY

3.6.1 Street Construction Responsibility

The responsibility for right-of-way acquisition, surveying, design, and construction of all new streets, paving of existing roads, and widening of existing roads necessary to provide adequate transportation service to, or within, a development rests exclusively with the Developer. All traffic generated by a Development must meet the transportation level of service requirements adopted by the Town of Timnath. All traffic generated by a Development that impacts service outside of the Town of Timnath GMA must also meet the transportation service requirements, agreements, and specifications of Larimer County, Weld County, the City of Fort Collins, or the Town of Windsor, whichever is the affected governing agency.

The following list outlines the improvements that are considered to be an integral part of the street construction:

- Street grading and subgrade preparation or stabilization
- Concrete curb and gutter
- Concrete sidewalk
- Pavement section including aggregate base course and asphaltic or Portland cement concrete pavement
- Traffic signals
- Traffic signing
- Pavement markings
- Railroad crossings
- Ditch and drainage crossings
- Street lighting
- Water distribution system
- Sanitary sewer system
- Storm drainage system

3.6.2 Required or Minimum Street Improvements

On-Site Criteria. The Developer is responsible for all improvements internal to and/or adjoining the site or properties controlled by the Developer, and for improvements off-site and necessary to construct the required on-site or adjoining improvements. Improvements shall be designed and constructed in accordance with the Design Criteria. Certain portions of these improvements may be eligible for reimbursement.

Off-Site Criteria. Any Development which does not have direct access to an improved arterial street will be required to improve certain off-site streets as deemed necessary by the Town Engineer to provide adequate access to the nearest improved arterial street. Improved access shall be provided in the most reasonable direction(s) of travel to major activity centers and arterial streets. These should be identified by the Development's transportation impact study. In some cases, more than one off-site street may need to

be improved. Pavement thickness shall be based on a 20-year design life including both projected site generated and background traffic growth.

Minimum Requirements. Where required, street improvements must include, at a minimum, a 34-foot wide paved street cross section (edge of pavement to edge of pavement) on a base that is adequate to accommodate the ultimate street classification as designated by the Transportation Master Plan or in accordance with the Manual, whichever criteria is more stringent. Street improvements must also include sidewalks, trails, and/or bike lanes, 4-foot gravel shoulders along both pavement edges, and drainage swales and culverts. Streets shall be designed, both horizontally and vertically, to accommodate their future ultimate classification. In some cases, as determined by the Town Engineer, the off-site street shall be designed and constructed to include curb, gutter, and sidewalk.

Adjacent to Development. Additionally, where street upgrades are needed to comply with the Design Criteria and/or the Transportation Master Plan, the Developer shall be responsible for the design and construction of street improvements adjacent to the exterior boundary of the subject property. When such improvements are designed and constructed, they shall be extended along the entire boundary(s) of the property at the horizontal and vertical location that establishes the approved alignment for the ultimate classification. Half streets will not be allowed, therefore, the Developer is responsible for constructing full improvements on their half of the street and at least one through traffic lane, bike lane, and gravel shoulder for the opposite half of the street. Additional improvements (i.e., turn lanes, etc.) may also be required on the opposite half of the street if required by the Design Criteria, Transportation Master Plan, or the Development's Transportation Impact Study.

Street Transitions. All transitions necessary to safely shift traffic back onto an existing street shall typically be designed and constructed off-site of the Development. Transitions may be approved on-site in situations where traffic safety or operational concerns warrant a waiver of the off-site transition requirement. The off-site transition(s) may be installed as a permanent street improvement (i.e., long-range pavement thickness and location) or as a temporary improvement (i.e., interim thickness and location as approved by the Town Engineer). Permanent off-site transitions may be eligible for future reimbursement by a future Developer, while temporary off-site transitions will not be eligible for reimbursement.

3.6.3 Exceptions for Off-Site Construction Responsibility

- A Developer may not be responsible for constructing the off-site street improvements needed to serve the development if circumstances meet any of the following conditions:
- The off-site street improvements are included in the Transportation Master Plan, the most recent 5-year capital improvement plan, the funds necessary for construction of the improvements have been appropriated by the Town Council, and the improvements are scheduled for construction within three years from the time of the Town Council's approval of the final plat for the Development; or

- The improvements are included in a fully funded plan by another public agency, such as the Colorado Department of Transportation or Larimer County, and are scheduled for construction within three years from final plat approval.

3.6.4 Reimbursement Policy

Developments may be eligible for reimbursement of street and trail improvements made off-site and/or adjacent to the development if the requirements of this reimbursement policy are followed as outlined in the Subdivision Improvement Agreement (SIA). In addition, those improvements for which transportation impact fees are collected are also eligible for credit or reimbursement under the provisions of this section.

Non-Transportation Impact Fee Streets. When any Developer, as a Town required condition of development, constructs a public street, alley, or pedestrian-bike way to serve the property through undeveloped areas or areas that may redevelop, or the Developer constructs a public street, alley, or pedestrian-bike way along the perimeter of the property, the entire cost of such construction, including acquisition of all necessary rights-of-way, shall be the responsibility of the Developer. The installing Developer may enter into a reimbursement agreement with the Town such that, as a condition of approval of subsequent development or redevelopment of property adjacent to the newly constructed public street, alley, or pedestrian-bike way, the Town may collect reimbursement from the subsequent development, as outlined in the SIA.

Transportation Impact Fee Streets. Upon prior budget appropriation by the Town Council, a Developer may receive a reimbursement against a portion of the cost of public street improvements installed and paid for by such Developer on specified arterial streets designated in the Transportation Master Plan and the approved street capital improvement plan. Payment of such reimbursement shall be subject to the following:

Required but Unnecessary for the Development Street Over-Sizing Improvements. If the Town requires a Developer to construct street over-sizing improvements that are not necessary to safely serve the development and these improvements are identified as part of the street capital improvement plan, then the Town may reimburse the Developer, in full or in part and in such a manner as the Town deems appropriate, for approved construction costs as soon as funds are available after completion and final acceptance of the street improvements by the Town.

Required and Necessary Over-Sizing Improvements. If the over-sizing improvements are necessary to safely serve the Development, as determined by the Town, and the improvements are part of the street capital improvement plan, the Town may reimburse the Developer for approved construction costs or as predefined in the *Development Agreement*.

Timing of Reimbursement. The timing of the reimbursement will be outlined in the SIA

Development Obligation. On capital improvement plan streets, each Development is obligated for providing the financial equivalent of a local street adjacent to their property meeting all current standards. This includes at least 34 feet of pavement, vertical curb and gutter, and sidewalk or the required road cross section based on the most-current

Transportation Impact Study (TIS) street designation. The limits of this obligation may be extended off-site, as determined by the Town when required to connect street improvements adjacent to the property with the portion of existing arterial street that meets the current standards. If the Development is approved in an area that is far removed from any other existing curb, gutter, sidewalk, or bike lane, the Town has the option of requiring the Developer to put the money necessary to construct the required curb, gutter, sidewalk, or bike lane into the street capital improvement account to be used by the Town to build these improvements when it is needed in the future.

PARKING LOT DESIGN CRITERIA

Please reference Chapter 19 of the LCUASS and the Timnath Town Code, Chapter 16, Article 2, with modifications as noted in this section. All transportation work shall be designed and performed according to these standards, which are subject to the interpretation of the Town.

Drainage. To ensure proper drainage, parking lots shall have a minimum grade of 2% and a maximum grade of 8%.

Parking Stall Dimensions. Parking stalls shall be dimensioned using the guidelines outlined in the Timnath Town Code. Please note that in some instances the street dimensions located in the Town Code vary from the LCUASS; the Town Code shall take precedent.

Handicap Parking. Handicap parking spaces shall be required for all retail, office, business, industrial, institutional uses, as well as multi-family units. Handicap parking spaces shall be designated as being for the handicapped with painted symbols and standard identification signs. Handicap parking spaces shall be located as close as possible to the nearest accessible building entrance. For every eight (8) handicap parking spaces there must be at least one (1) van-accessible space. If there is only one (1) handicap parking space, that space must be van-accessible. Number of Handicap Parking Spaces are outlined in the following table.

Total Parking Spaces in Lot	Minimum Required Number of Handicap Parking Spaces
1-25	1
26-50	2
51-75	3
76-100	4
101-150	5
151-200	6
201-300	7
301-400	8
401-500	9
501-1000	2% of total

1000 and over	20 plus 1 for every 100 over 1000
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Parking Space Requirements. Minimum Number Of Off Street Parking Spaces: The minimum number of off street parking spaces to be provided for a use is listed in the following table. All parking ratios are based upon the gross floor area contained within the building. When the computation of the required off street parking spaces results in a fraction, the requirement shall be rounded to the nearest whole interval. Fractions of 0.5 or less shall be rounded to the next lowest whole number. Fractions greater than 0.5 shall be rounded to the next highest whole number. Parking amounts required for uses in B zone districts will be handled on a case-to-case basis.

The required off street parking spaces for a use which is not specifically listed, shall be determined by the Town based upon the requirements of other listed similar uses.

MINIMUM OFF STREET PARKING REQUIREMENTS FOR SPECIFIC USES	
RESIDENTIAL USE TYPES	
Single-family detached dwelling	2 space per dwelling unit
Accessory dwelling unit	1 space per dwelling unit
<i>Attached dwelling units: (Multi-Family)</i>	
Studio or efficiency	1.1 spaces per dwelling unit
1 bedroom	1.5 spaces per dwelling unit
2 bedrooms	1.7 spaces per dwelling unit
3 bedrooms	2.0 spaces per dwelling unit
Elderly (60 or over)	0.6 space per dwelling unit
Human Service Establishments (ie: Hospice, Nursery Homes, Group homes etc.)	1 space per 8 beds
Mobile home park	1 space per mobile home space
Retirement home	0.6 space per dwelling unit
OFFICE USE TYPES	
Financial services; bank, savings and loan, credit union	1 space per 400 square feet
General offices	1 space per 400 square feet
<i>Live/work structure:</i>	
Residential portion only	The minimum off street parking requirement for attached dwelling units as required by this subsection. 1 space per dwelling unit
Nonresidential portion only	The greater of the minimum off street parking requirement as required by this subsection for the specific use less 1 space The lesser of: 1 space per 300 square feet or 1 space for each non-resident employee

COMMERCIAL USE TYPES	
General	1 space per 300 square feet
Agricultural sales and service, nursery	1 space per 600 square feet for buildings plus 1 space per 2,000 square feet of outdoor storage and display
Auto and equipment services (ie: Repair Garages, Sales Center & Storage Yards)	1 space per 400 square feet of office space plus adequate space for vehicle storage and display
Equipment rental, sales and storage facilities	1 space per 400 square feet of office space plus adequate space for vehicle storage and display
Bar, tavern or nightclub	1 space per 100 square feet
Medical offices, labs and clinics	1 space per 200 square feet
Bed and breakfast inn	1 space per 2 guest rooms or suites
Building maintenance services	1 space per 400 square feet
Business office support services	1 space per 500 square feet
Business park	1 space per 500 square feet
Campground	1 space per 400 square feet of office space
<i>Commercial center:</i>	
Less than 10 acres	1 space per 250 square feet
10 - 30 acres	1 space per 300 square feet
Over 30 acres	1 space per 300 square feet
Communication services	1 space per 400 square feet
<i>Construction sales and services:</i>	
Completely enclosed	1 space per 600 square feet
Includes outside activities	1 space per 600 square feet
Consumer convenience and repair services	1 space per 400 square feet
General food sales	1 space per 300 square feet
Funeral home or mortuary	1 space per 400 square feet
Hotel/motel	1 space per 1 guestroom or suite plus 1/2 space per 100 square feet of restaurant space plus 1/2 space per 4 seats of meeting space
Kennels	1 space per 400 square feet of office space
Laundry services (large scale activity)	1 space per 750 square feet
Liquor sales	1 space per 300 square feet
Mixed commercial-residential	See the specific requirements for the commercial and residential uses
Personal services; barber and beauty shops, photo studios, etc.	1 space per 400 square feet
Pharmacy	1 space per 300 square feet
<i>Recreation, commercial:</i>	
Arcade or game room	1 space per 300 square feet
Bowling alley	4 spaces per lane
Commercial stable	1 space per 5 stalls

Golf course	4 spaces per hole
Golf driving range	1 space per tee
Ice and rollerskating rink	1 space per 150 square feet
Miniature golf course	1 space per hole
Swimming pool	1 space per 150 square feet of pool area
Tennis, handball or racquetball facilities	3 spaces per court
Theater	1 space per 4 seats
<i>Restaurants:</i>	
Drive-in or fast food	1 space per 100 square feet
Outdoor seating	1 space per 200 square feet
Sit down - served at table	1 space per 100 square feet
<i>Retail, general:</i>	
Department store, market, etc.	1 space per 300 square feet
Furniture or appliances	1 space per 600 square feet
Veterinary service	1 space per 200 square feet
CIVIC USE TYPES	
General:	1 space per 300 square feet
Administrative and safety services	1 space per 400 square feet
Cemetery	1 space per 400 square feet of office space
Recreational and Community Center	1 space per 150 square feet
Bar	1 space per 100 square feet plus office and remaining area: 1 space per 400 square feet
<i>Cultural services:</i>	
Library	1 space per 600 square feet
Museum	1 space per 1,000 square feet
Daycare Services & Preschools	1 space per 400 square feet
<i>Educational institutions:</i>	
Elementary or junior high	2 spaces per classroom
Senior high	1 space per 4 students
Hospital	2 spaces per bed
Public assembly	1 space per 4 seats
Public park and recreation services	Per Development Plan
Religious institution	1 space per 4 seats
INDUSTRIAL USE TYPES	
Construction or contractor yards & Batch Plants	1 space per 750 square feet
Custom manufacturing	1 space per 750 square feet
Garbage service companies	1 space per 200 square feet
<i>General industry:</i>	

Heavy & Light	1 space per 750 square feet
General retail services (limited)	1 space per 300 square feet
Mining operations	1 space per 400 square feet of office space
Research and development	1 space per 400 square feet
Recycling Facilities	1 space per 1,000 square feet centers
Warehouse & Distribution Center	1 space per 1,000 square feet

PART IV – WATER UTILITY CRITERIA

PART IV – WATER UTILITY CRITERIA

4.1 AUTHORITY

These street standards, design criteria, and construction specifications have been adopted by the Timnath Town Council and shall apply to any public and private water improvements, including all development projects, within the Town of Timnath or lands considered for annexation within the Town's Growth Management Area (GMA).

4.2 REFERENCE WATER STANDARDS

The following water districts are located in the Town of Timnath: Fort Collins – Loveland Water District, North Weld County Water District, and East Larimer County Water District. The location of the development will determine the district that will provide water service, subject to approval by the Town Engineer. The Town of Timnath adopts by reference the relevant water district's standards, latest edition, with modifications as noted in this section. All water infrastructure work shall be designed and performed according to these standards, which are subject to the interpretation of the Water District or Town.

It is the Town's policy that developers consult with the Water Districts for the design, special conditions, and construction of the water distribution system required by the development. The Water Districts will be sent a referral form and a copy of the overall construction drawings for review and approval. The developer shall address all comments made by the Water District and obtain the Water District's approval signature on the final mylars prior to sign off by the Town.

4.3 DISTRICT UTILITY SYSTEM

4.3.1 District Utility System

The water distribution system shall include all those facilities of the water system under the complete ownership and control of the District up to the point where the customer's service system begins. The distribution system includes the network of conduits, valves, and appurtenances used for the delivery of water from the District's source to the customer's system.

4.3.2 District Source Facilities

Source (water supply) facilities are owned and operated by the Water District. The source facilities shall include all components of the facilities utilized in the production, treatment, storage, and delivery of water to the distribution system.

4.3.3 Customer System

The customer's water system shall include those facilities beyond the termination of the distribution system, which typically occurs at the curb stop. The water service line from the curb stop to the building is part of the customer's system.

4.4 WATER SERVICE REQUIREMENTS

The following requirements apply to work on water services:

- All work shall be done in accordance with the Water District's specifications. The Water District shall be notified prior to any work regarding water services.
- It shall be the builder's/contractor's responsibility to protect the water meter from freezing or other physical damage during construction and acceptance by the owner, it shall be the owner's responsibility to protect the meter from freezing or other physical damage after acceptance.
- Licenses and Permits Required. Work required within the public right-of-way shall require a Right-of-Way Work Permit from the Town. All water service installations shall be performed by a contractor who has an individual working for him that possesses a current master plumber's card and that individual shall personally accomplish or directly supervise the installation work.
- Any required street cut must meet prior approval of the Town and be done in accordance with the Town's Manual.
- The contractor shall pay for all permits, fees, and licenses prior to the start of construction. An annual contractor's business license shall be obtained from the Community Development Coordinator for all contractors and subcontractors performing work within Town limits. The license may be obtained once the applicable form is filled out and the fee is paid

4.5 INSPECTION AND QUALITY CONTROL

All water system construction work shall be inspected by the appropriate Water District, who shall have the authority to halt construction when, in their opinion, the Water District believes that their specifications or proper construction practices are not being followed. Whenever any such violation occurs, the Water District shall notify the Town and, in writing, order further construction to cease until all deficiencies are corrected.

Except as otherwise provided, no pipe shall be backfilled or covered without observation by a representative of the District. Any person making an installation without such observation shall be required to remove all backfill or any other covering placed over the facility to be inspected at their own expense.

The Water District's water system shall be protected from cross-connection and backflow contamination or pollution. The contractor shall isolate within its customers' internal distribution system(s) or its customers' private water system(s) such contaminants or pollutants that could backflow or siphon back into the water system.

The contractor shall provide for the maintenance of a continuing program of cross-connection control which will systematically and effectively prevent cross-connections, actual or potential, between the potable water system and non-potable water systems, plumbing fixtures and industrial piping systems.

All water service line construction shall be done in accordance with the specifications of the Water District. The scope of these specifications shall include all new water service line installations from the Water District's mains to the associated plumbing of the building or any other facility requiring water use.

In addition to the Water District, the Town shall be notified prior to the need for inspections. A representative of the Town may or may not choose to accompany the Water District inspector or inspect the facilities or construction as it relates to other infrastructure.

PART V – SANITARY SEWER CRITERIA

PART V – SANITARY SEWER CRITERIA

5.1 AUTHORITY

These street standards, design criteria, and construction specifications have been adopted by the Timnath Town Council and shall apply to any public and private sanitary sewer improvements, including all development projects, within the Town of Timnath or lands considered for annexation within the Town's Growth Management Area (GMA).

5.2 REFERENCE SANITARY SEWER STANDARDS

The Town of Timnath adopts by reference the South Fort Collins Sanitation District and the Boxelder Sanitation District standards, latest edition, with modifications as noted in this section. All sanitary sewer infrastructure work shall be designed and performed according to these standards, which are subject to the interpretation of the Districts or Town. The location of the development will determine the district that will provide sanitary sewer service, subject to approval by the Town Engineer.

It is the Town's policy that developers consult with the Districts for the design, special conditions, and construction of the sanitary sewer collection system required by the development. The developer shall determine which sewer service District they will annex in to, subject to approval by the Town Engineer. The appropriate District will be sent a referral form and a copy of the overall construction drawings for review and approval. The developer shall address all comments made by the District and obtain the District's approval signature on the final mylars prior to sign off by the Town.

5.3 SANITARY SEWER SERVICE REQUIREMENTS

The following requirements apply to work on sanitary sewer services:

- All work shall be done in accordance with the appropriate District's specifications. The District shall be notified prior to any work regarding sanitary sewer services.
- Licenses and Permits Required. Work required within the public right-of-way shall require a Right-of-Way Work Permit from the Town. All sanitary sewer service installations shall be performed by a contractor who has an individual working for him that possesses a current master plumber's card and that individual shall personally accomplish or directly supervise the installation work.
- Any required street cut must meet prior approval of the Town and be done in accordance with the Town's Manual.

The contractor shall pay for all permits, fees, and licenses prior to the start of construction. An annual contractor's business license shall be obtained from the Community Development Coordinator for all contractors and subcontractors performing work within Town limits. The license may be obtained once the applicable form is filled out and the fee is paid. The contractor must remain in good standing; the Town reserves the right to deny licensure and/or revoke a contractor's license.

5.4 INSPECTION AND QUALITY CONTROL

All sanitary sewer construction shall be inspected by the appropriate District, who shall have the authority to halt construction, upon notifying the Town, when, in their opinion, the District believes that their specifications or proper construction practices are not being followed. Whenever any such violation occurs, the District shall notify the Town and, in writing, order further construction to cease until all deficiencies are corrected. Except as otherwise provided, no pipe or manhole shall be backfilled or covered without observation by a representative of the District. Any person making an installation without such observation shall be required to remove all backfill or any other covering placed over the facility to be inspected at their own expense.

All sanitary service line construction shall be done in accordance with the specifications of the appropriate District. The scope of these specifications shall include all new sanitary sewer service line installations from the main line to the associated plumbing of the building or any other facility requiring sewer connection.

In addition to the District, the Town shall be notified prior to the need for inspections. A representative of the Town may or may not choose to accompany the District inspector or inspect the facilities or construction as it relates to other infrastructure.

PART VI – FIRE PROTECTION STANDARDS

PART VI – FIRE PROTECTION STANDARDS

FIRE PROTECTION STANDARDS

All developments shall meet the fire protection standards and requirements of the Poudre Fire Authority. The Authority will be sent a referral form and a copy of the construction drawings for review and approval. The developer shall address all comments made by the Authority prior to overall approval by the Town.

6.1 ADDRESSING

6.1.1 Address Numerals

Address numerals shall be visible from the street fronting the property, and posted with a minimum of 6 inch numerals on a contrasting background. (Bronze numerals on brown brick are not acceptable). 97UFC901.4.4

6.1.2 Street Names

Street names shall be reviewed and verified prior to being put in service. 97UFC 901.4.5

6.2 ACCESS

6.2.1 Required Access – Fire Lane

A fire lane is required. This fire lane shall be visible by painting and signage, and maintained unobstructed at all times. A fire lane plan shall be submitted for approval prior to installation. In addition to the design criteria already contained in relevant standards and policies, any new fire lane must meet the following general requirements:

- Be designed as a flat, hard, all-weather driving surface (asphalt or concrete) capable of supporting fire apparatus weights. Compacted road base shall be used only for temporary fire lanes or at construction sites.
- Have appropriate maintenance agreements that are legally binding and enforceable.
- Be designated on the plat as an Emergency Access Easement.
- Maintain the required minimum width of 20 feet throughout the length of the fire lane.

If a fire lane cannot be provided, the building shall be fire sprinklered. 97UFC 901.2.2.1; 901.3; 901.4.2; 902.2.1

6.2.2 Required Access – Fire Lanes

Fire access roads (fire lanes) shall be provided for every facility, building or portion of a building hereafter constructed or moved into or within the PFA's jurisdiction when any portion of an exterior wall of the first story of the building is located more than 150 feet from fire apparatus access as measured by an approved route (from a public street) around the exterior of the building or facility. This fire lane shall:

- Be designed as a flat, hard, all-weather driving surface (asphalt or concrete) capable of supporting fire apparatus weights. Compacted road base shall be used only for temporary fire lanes or at construction sites.
- Have appropriate maintenance agreements that are legally binding and enforceable.
- Be designated on the plat as an Emergency Access Easement.

- Maintain the required minimum width of 20 feet throughout the length of the fire lane.

A fire lane plan shall be submitted for approval prior to installation. If a fire lane is not provided, all buildings out of access (exceeding the 150-foot requirement) shall be equipped with an approved automatic fire-sprinkler system. 97UFC 901.2.2.1; 901.3; 901.4.2; 902.2.1

6.3 TURNING RADII

Minimum turning radii for emergency-response apparatus on any fire apparatus roadway is 25 feet inside, 50 feet outside. 97UFC 902.2.2.3

6.4 WATER SUPPLY

Fire hydrants, where required, must be the type approved by the water district having jurisdiction and the Fire Department. Hydrant spacing and water flow must meet minimum requirements based on type of occupancy. Minimum flow and spacing requirements include: Commercial, 1,500 gpm at 20 psi residual pressure, spaced not farther than 300 feet to the building, on 600-foot centers thereafter; residential within Urban Growth Area, 1,000 gpm at 20 psi residual pressure, spaced not farther than 400 feet to the building, on 800-foot centers thereafter; residential outside Urban Growth Area, 500 gpm at 20 psi residual pressure, spaced not farther than 400 feet to the building, on 800-foot centers thereafter. These requirements may be modified if buildings are equipped with automatic fire sprinkler systems. 97UFC 901.2.2.2

6.5 CUL-DE-SAC

A dead-end street cannot exceed six-hundred-sixty (660) feet in length. The turn-around at the end of the street must have an outside turning radius of fifty (50) feet or more, and an inside turning radius of twenty-five (25) feet. Short fire lanes are permitted to facilitate a second point of access when the street is longer than 660 feet. All structures beyond the 660-foot limit shall be fire sprinklered if a second point of access cannot be provided. FCLUC 3.6.2(B)(C);3.6.6(I); 97UFC 902.2.2.3

6.6 SPRINKLERS

6.6.1 Three Stories/Automatic Fire Sprinklers

An automatic sprinkler system shall be installed throughout apartment houses three or more stories in height or containing 17 or more dwelling units; in congregate residences three or more stories in height and having an occupant load of 50 or more; and in hotels three or more stories in height or containing 20 or more guest rooms. Residential or quick-response standard sprinkler heads shall be used in dwelling units and guest-room portions of the building. 97UFC 1003.2.9

6.6.2 Building Area

A proposed building exceeding 5,000 square feet for type V construction shall be fire contained or fire sprinklered, unless a variance is approved by the Town Manager or their designee. Such variance shall be pursuant to policies established by the Town and

after obtaining the advice and expertise of the Fire Authority. (Group H4 Occupancy > 3,000 SF = AS) 97UBC Table9-B (City of Fort Collins Amendment).

6.6.3 Fire Department Connection

Fire department connections shall be installed remote from the buildings, and located on the street or fire lane side of buildings, fully visible and recognizable from the street or nearest point of fire department vehicle access or as otherwise approved by the fire code official. If possible, a fire hydrant shall be located within 100 feet of the FDC. PFA Bureau Policy

6.6.4 Fire Line Requirement

Buildings that are required to be fire sprinklered shall have a minimum 6-inch fire line unless hydraulic calculations can support a smaller fire line.

6.6.5 Knox Box Required

Poudre Fire Authority requires a "Knox Box" to be mounted on the front of every new building equipped with a required fire sprinkler system or fire alarm system. 97UFC 902.4; PFA BUREAU POLICY 88-20

6.6.6 Balcony Fire Protection and Open-Flamed Cooking Devices

Balconies on all multi-family dwellings of Type V construction are required to be equipped with automatic fire sprinklers. Charcoal burners and other open-flame cooking devices shall not be operated on combustible balconies or within 10 feet of combustible construction, unless the buildings, balconies and decks are protected by an approved automatic fire sprinkler system. LP-gas-fueled cooking devices having an LP-gas container with a water capacity greater than 2.5 pounds shall not be located on combustible balconies or within 10 feet of combustible construction (regardless of automatic sprinklers). IFC 308.3.1 and 308.3.1.1

6.7 STANDPIPES

6.7.1 Standpipes and Fire Pump

Buildings four or more stories in height are required to be equipped with firefighting standpipes in every stairwell. The standpipe system must be capable of supplying a minimum 100 psi to the top floor; an approved fire pump may be required to obtain this minimum pressure. IFC 905.3.1

6.7.2 Stairwell Signage

Approved stairwell identification signs shall be posted at each floor level in all enclosed stairways in buildings four or more stories in height. 97UFC1210.4 and Appendix I-C

6.8 HAZMAT

6.8.1 Hazardous Materials

Toxic, corrosive, or reactive materials, or flammable/combustible liquids (as defined in the Uniform Fire Code) if used, stored, or handled on site, must have a Hazardous Materials Impact Analysis (HMIA) completed and supplied to the Planning Department and the Fire Department. (What do you have? How much? How do you prevent it from being a public threat?) FCLUC3.4.5

PART VII – UNDERDRAIN CRITERIA

PART VII – UNDERDRAIN CRITERIA

7.1 AUTHORITY

This Manual has been adopted by the Town and shall apply to any underdrain, building perimeter drain, or other groundwater collection/protection systems, including all development projects, within the Town of Timnath or lands considered for annexation within the Town's Growth Management Area (GMA).

7.2 POLICY

It is the Town's policy that developers (or builders for single lots) shall be responsible for investigating, evaluating, and resolving groundwater issues. Any necessary improvement to address groundwater issues shall meet all Federal, State, and local regulatory requirements. All improvements shall be privately owned and maintained to ensure full long term functionality. The developer shall submit designs and construction drawings to the Town for review and approval as part of the overall construction drawings submittal. The developer shall also obtain all permanent easements necessary for the construction of underdrain systems.

7.3 AREA-WIDE UNDERDRAINS AND COLLECTION SYSTEMS

- The owner, homeowners association, or metropolitan district if serving more than one dwelling, shall own and maintain any area underdrain or underdrain collection system. Covenants, approved by the Town, must specify ownership and ensure adequate maintenance by the owner or homeowners association.
- A professional engineer registered in the State of Colorado must design, stamp and sign the area-wide underdrain and collection system plans. The Town shall review the signed plans. Approval of the plans by the Town does not relieve the professional engineer, the applicant, developer, or owner from the responsibility to construct and maintain a workable system. The area-wide underdrain and collection system must comply with all applicable Town, state, and federal regulations in place at the time of construction.
- The design engineer shall inspect and certify in writing to the Town that the area underdrain or underdrain collection system was constructed according to the Town-approved plans. The Town shall not issue any building permits for the premises served by the area underdrain or underdrain collection system until receipt of the design engineer's certification and as-built plans. As-built plans must conform to requirements in the Town's Design Manual. All area underdrains and underdrain collection systems shall have a positive gravity outlet piped to an approved underdrain collection system or to another approved conveyance system.
- The Town may approve installation of the area underdrain or underdrain collection system in public rights-of-way, public open space, or public pedestrian trail systems. In no case shall underdrain utilities run under a street's pavement section, sidewalk, or

pedestrian trail except for crossings at a 90 degree angle, or as approved by the Town Engineer.

- The applicant, developer, builder, contractor, and owner shall indemnify the Town for all costs of repair (including repair of public areas, streets, landscaping, and utilities) and liability for failure of the system.
- The design engineer shall demonstrate that the underdrain system will not adversely affect the existing historical subsurface groundwater courses, flows, rates, or water levels at any well. If the groundwater could potentially be affected, mitigation efforts must be presented, approved by the Town Engineer, and implemented. Monitoring requirements may be enacted indefinitely.
- The design engineer shall demonstrate that the underdrain system will not affect wetland or river habitats.
- Underdrains shall not discharge into any utility trench, nor shall cleanouts connect into sanitary or storm sewer manholes, except as approved by the Town Engineer.
- The underdrain system discharge must be monitored by the applicant, developer, or owner to ensure that the discharge is of good water quality and will not violate any applicable Federal, State, or local regulations in place at the time of discharge. Additional long term monitoring requirements may be made on a case by case basis, possibly indefinitely.

7.4 BUILDING PERIMETER AND FOUNDATION UNDERDRAINS

- Building perimeter underdrains or foundation drains shall meet the same requirements as shown in Section 5.3 for area-wide underdrains and collection systems.
- Building perimeter underdrains shall be designed by a professional engineer for the protection of building foundations and underground structures.

PART VIII – LIGHTING DESIGN STANDARDS

PART VIII – LIGHTING DESIGN STANDARDS

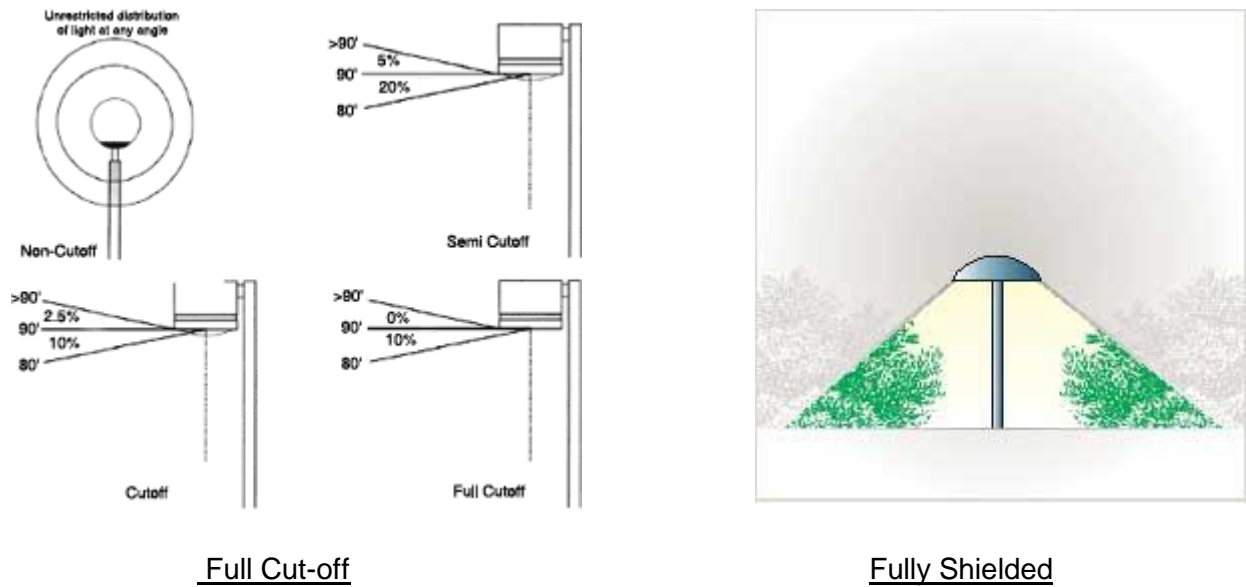
8.1 AUTHORITY

This Manual has been adopted by the Town and shall apply to any public and private lighting design, including all development projects, within the Town or lands considered for annexation within the Town's Growth Management Area (GMA).

8.2 DEFINITIONS

Outdoor lighting shall be provided where required for safety and security. The following standards are intended to allow for adequate lighting to meet the functional needs of safe circulation and of protecting people and property while guarding against light trespass, light pollution and glare, or negatively affecting safe movement of traffic and pedestrians. Application of these standards will also help maintain the unique rural environment of the Town of Timnath through protecting the nighttime sky and community environment.

"Full cutoff" is a luminaire light distribution where zero candela intensity occurs at or above an angle of 90° above nadir. Additionally the candela per 1000 lamp lumens does not numerically exceed 100 (10 percent) at or above a vertical angle of 80° above nadir. This applies to all lateral angles around the luminaire.



"Fully shielded" means provisions are made in a luminaire, internally or externally, to prevent light emissions from causing glare or light trespass impacts.

"Glare" is the sensation produced by luminance within the visual field that is sufficiently greater than the luminance to which the eyes are adapted to cause annoyance, discomfort, or loss in visual performance and visibility.

"Light source" is the bulb and lens, and the diffuser or reflective enclosure

"Light trespass" is the encroachment of light from lighting systems of one property onto another property.

"Lighting system" includes all components required for one or more luminaires to produce light for a specific application.

"Lumen" is a measure of brightness of a lamp (provided by the manufacturer)

"Luminaire" is a complete lighting unit consisting of a lamp or lamps together with the parts designed to distribute the light, to position and protect the lamps and to connect the lamps to the power supply. Sometimes includes ballasts and photocells.

"Roll" is the angular position of the luminaire around an axis through the light center that is an extension of the 0-180 degree horizontal angle.

"Tilt" is the angular position of the luminaire around an axis through the light center and along the 90-270 degree horizontal angles. When the luminaire is level the tilt is zero degrees.

"Visibility" is the quality or state of being perceivable by the eye. In outdoor applications it is sometimes defined in terms of the distance at which an object can be just perceived by the eye.

8.3 GENERAL LIGHTING STANDARDS

Exterior lighting shall be evaluated in the development review process to ensure that the functional and security needs of the project are met in a way that does not adversely affect the adjacent properties or neighborhood. Proposed lighting will be examined considering the light sources, level of illumination, hours of illumination, and the need for illumination in relation to the effects of the lighting on the adjacent property owners and the neighborhood.

No lighting shall be used in any way that could interfere with the safe movement of vehicles on public streets or be confused with traffic control devices, emergency or warning signals. Blinking, flashing, flickering lights shall not be allowed, except for temporary holiday displays.

Maximum light levels and intensities shall not exceed those appropriate for the lighting need. Surrounding environments shall be taken into consideration when designing light systems to avoid negatively impacting them. The following publications on exterior lighting by the Illuminating Engineering Society of North America are recommended resources for lighting designers: RP-8-00, RP-20-98 and RP-33-99.

Natural areas and natural features shall be protected from light trespass from off site light sources.

Upon repair, replacement, or relocation of any luminaire existing on the effective date of this ordinance shall be made to comply with the ordinance. Lighting not in compliance

with the ordinance 5 years from the effective date of the ordinance shall be brought into compliance.

8.4 RESIDENTIAL OUTDOOR LIGHTING

When installed, exterior lighting systems on residential properties shall comply with the following standards:

- A lighting plan, showing compliance with all applicable lighting standards, shall be submitted to the Town for review and approval.
- Acceptable lamp types include: Incandescent, Fluorescent and High Pressure Sodium. Mercury Vapor lamps shall not be used.
- Luminaires shall be fully shielded or full cutoff when the light source exceeds 1200 lumens. For luminaires under 1200 lumens, the lamp must be frosted or installed within a translucent cover. Exempt: Floodlights. (Architects and Builders are encouraged to shield all exterior light sources through the use of recessed down lights or fully shielded luminaires on the street side of all buildings.)
- Floodlights are to be aimed no higher than 45 degrees from horizontal. Visors, louvers or shielding must be provided where necessary to avoid light trespass and glare.
- Security floodlights shall be controlled by both a motion/light sensor and switch.
- Pole luminaires shall be no higher than sixteen (16) feet from the ground. No luminaire shall be mounted at a height exceeding the height of buildings or structures on the property.
- Landscape and feature lighting shall not create glare and shall be designed so that all light is directed toward the object to be illuminated. Fully shielded or louvered luminaires shall be used to avoid stray light.

8.5 COMMERCIAL AND INDUSTRIAL OUTDOOR LIGHTING

When installed, exterior lighting systems on commercial or industrial properties shall comply with the following standards:

- A lighting plan, showing compliance with all applicable lighting standards, shall be submitted to the Town for review and approval.
- Pole heights, including bases, shall not exceed 25'. Where commercial or industrial properties border residential properties, light poles located within 25' of the property line shall not exceed 20' in height, including bases. Taller poles may be allowed when approved by the Planning Commission or Council through a development application review process.

- Tilting or rolling of luminaires shall not be allowed. Exception: To increase safety and visibility without causing glare, or creating light spillage onto residential properties.
- All parking lot and exterior building luminaires, except those required for security purposes, shall be extinguished within one (1) hour of business closing and remain extinguished until one (1) hour prior to the opening hour of business. When only a portion of a parking lot is used after hours, only lights related to that portion shall be used.
- Acceptable lamp types include: Incandescent, Fluorescent, Induction and High Pressure Sodium. Metal Halide may be used where high color rendering is critical for safety and security. Mercury Vapor lamps shall not be used.
- Luminaires shall be fully shielded or full cutoff when the light source exceeds 1200 lumens. For luminaires under 1200 lumens, the lamp must be frosted or installed within a translucent cover. Exempt: Floodlights.
- Floodlights are to be aimed no higher than 45 degrees from horizontal. Visors, louvers or shielding must be provided where necessary to avoid light trespass and glare. Incandescent security floodlights shall be controlled by both a motion/light sensor and switch.
- Under-canopy lighting shall be of full cut-off design with a flat lens. Luminaires may be flush or surface mounted.
- Landscape, sign and feature lighting shall not create glare and shall be designed so that all light is directed toward the object to be illuminated. Fully shielded or louvered luminaires shall be used to avoid stray light.
- Exterior lighting shall be designed in accordance with standards and practices of the Illuminating Engineering Society of North America, current publications. Lighting designs shall take into account security and safety needs along with the light levels of surrounding areas to avoid extreme contrasts in lighting levels.
- Lighting levels for outside areas used at night shall conform to the following tables. Parking Lots shall not exceed ten (10) footcandles, except for loading and unloading platforms where the maximum lighting level shall be twenty (20) footcandles.

Parking Lots: Maintained Illuminance Values (footcandles)*		
Criteria	Basic	Enhance Security
Minimum Horizontal Illuminance	0.2	0.5
Maximum Uniformity Ratios (Horizontal)		
Average to Minimum	5:1	5:1
Maximum to Minimum	20:1	15:1

*IESNA RR-03 Fourth Edition

Pedestrian Ways Along Roadways*: Maintained Illuminance Values (footcandles)**		
Walkways/Bikeways	Residential**	Commercial
Average Horizontal Illuminance	0.3	0.4
Average-to-Minimum Uniformity Ratios (Horizontal)	6:1	4:1

*Excluding public streets

**Values generated from ANSI/ESNA RP-8-00(6/27/00)

- Horizontal illumination levels measured fifteen (15) feet beyond the property line of a site adjacent to residential properties or public right-of-ways shall not exceed one-tenth (0.1) footcandle as a direct result of the on-site lighting.
- Service station or gas pump areas shall be illuminated in accordance with recommendations as presented in The IESNA Lighting Handbook, ninth edition.
- Special Applications not addressed
 - a. Auto Sales/Display Lots
 - b. Parks
 - c. Signage
 - d. Façade Lighting
 - e. Lighting used for recreation fields/courts

8.6 RESIDENTIAL AND PUBLIC STREET LIGHTING

Street lighting within the Town limits is provided and installed by local electric utility companies, Poudre Valley Rural Electric Association (PVREA) and Xcel Energy. The Town has set standards for acceptable luminaire types and will maintain separate working agreements with PVREA and Xcel to ensure these standards are maintained within the town limits. Schematics of acceptable street lighting poles have been included at the back of this section.

Local utilities shall provide street lighting systems as follows:

- All systems will be engineered by the utility to provide for public safety.
- Lighting design criteria shall be based on the recommended practices of the Illumination Engineering Society of North America publication ANSI/IESNA RP-8-00. (When using Tables 2-4 and 9 within RP-8-00, design shall be based on "Collector" and "Local" road types.)
- Only full cutoff or fully shielded luminaires approved by the Town of Timnath shall be installed.
- Tilting or rolling of luminaires shall not be allowed. Exception: To increase safety and visibility without causing glare, or creating light trespass onto residential properties.

- Street lighting within residential zones shall be accomplished using luminaires with NEMA distributions Types II (roadway), III (asymmetric) or IV (forward through).
- Height standards for lighting shall be limit to:
Residential Zones, Interiors: Sixteen (16) feet
Residential Zones, Entries to: Twenty (20) feet
Commercial Zones: Thirty five (35) feet
- Light sources shall be High Pressure Sodium. Exception: In commercial zones with high levels of pedestrian traffic, white light sources (metal halide, fluorescent, or induction lamps) may be used for pedestrian scale luminaires, no higher than sixteen (16) feet.
- When existing luminaires are replaced, they shall only be replaced with approved luminaire types and in accordance with these design standards.
- Placement of street lighting shall be coordinated with the towns overall design for each new or improved development. (Examples of issues: Intersections; Pedestrian crossings; Signage; Vegetation; Buildings; and Structures)
- The developer shall provide the Town with one light pole per every 50 poles erected in the development to adequately supply the Town for future maintenance needs. The number of poles given to the Town shall be no less than one and no more than three and shall be given to the Town immediately prior to final acceptance.