ORDINANCE NO. 2497

AN ORDINANCE ESTABLISHING POLICY FOR THE CONSTRUCTION OF WATER WORKS AND SEWER SYSTEMS; PROVIDING FOR THE UPGRADING OF WATERLINES TO PROVIDE ADEQUATE FIRE PROTECTION WITHIN THE CITY OF GRAND JUNCTION; PROVIDING FOR THE RELOCATION OF WATER AND SEWER LINES WITHOUT COMPENSATION TO THEIR OWNERS WHEN REQUIRED BY THE PUBLIC HEALTH, SAFETY AND WELFARE; PROVIDING FOR THE GRANTING OF FRANCHISES TO CONSTRUCT WATER WORKS AND SEWER SYSTEMS IN THE PUBLIC WAYS OF THE CITY; PROHIBITING THE CONSTRUCTION OF WATER WORKS AND SEWER SYSTEMS WITHIN THE CITY WITHOUT A FRANCHISE; PROHIBITING WORK IN ANY PUBLIC WAY WITHOUT OBTAINING A PERMIT; PROVIDING A PENALTY FOR THE VIOLATION OF THIS ORDINANCE; AND AMENDING CHAPTER 3 OF THE GENERAL ORDINANCES OF THE CITY OF GRAND JUNCTION BY THE ADDITION OF ARTICLE 3

WHEREAS, pursuant to Article XX of the Constitution of the State of Colorado and the municipal Charter of the City of Grand Junction adopted thereunder, and the statutes of the state and the ordinances of the city, the city owns and operates municipal water works and sewer systems, and provides water and sewer service and fire protection to users and consumers in the city; and

WHEREAS, the city may regulate the water supply used in the city for domestic, household, and all other purposes; and

WHEREAS, the city may grant to other municipalities and persons, upon such terms and conditions as may be prescribed by ordinance, the right of way, over, across and under streets and alleys for the purpose of laying, constructing, operating, maintaining, and repairing waterworks and all pipelines connected therewith; and

WHEREAS, the city may provide that no water service or sewer service or combination of them shall be furnished in the city unless the city shall have approved of the service; and

WHEREAS, the city must provide annexed areas with the same municipal services on the same general terms and conditions as the rest of the municipality receives; and

WHEREAS, the city may prohibit the laying, construction, operating, maintaining and repairing of water works and sewer systems and all pipelines connected therewith except those owned, constructed, permitted or franchised by the city; and

WHEREAS, the city may require the relocation of any utilities without compensation when the public health, safety and welfare requires the relocation; and

WHEREAS, the public policy of this state is that municipal utilities have total authority over the provision of water service to users inside and outside municipal boundaries; and

WHEREAS, in order to assure the continued financial integrity of

the municipal waterworks and sewer systems; to avoid the unnecessary duplication of facilities to the detriment of the rate payers; to assure the most reasonable water and sewer rates and conditions of service; to provide the same water and sewer services to annexed areas on the same general terms and conditions as the rest of the municipality receives; and to serve the best interests of the city and its rate payers, citizens and consumers, the city council has determined that the city should be the sole owner of waterworks and sewer system and pipelines connected therewith within the city, and the sole provider of water and sewer service and fire protection within the city.

NOW, THEREFORE, BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF GRAND JUNCTION:

31-60. CITATION. This ordinance shall be known as the "Water and Sewer Policy Ordinance" of the city, and shall be added as Article 3 to Chapter 3 of the General Ordinances of the City of Grand Junction.

31-61. RULE OF CONSTRUCTION. This ordinance shall be liberally construed, so as to establish the policy of the city for the construction of water works and sewer systems; to provide for the upgrading of water lines to provide adequate fire protection within the city; to provide for the relocation of water and sewer lines without compensation to their owners when required by the public health, safety and welfare; to protect and preserve the public ways of the city for the users thereof; to protect the people of the city and all the persons using or relying upon the public ways of the city; and to those ends, this ordinance shall be applicable to all public ways and waterworks and sewer systems and all pipelines connected therewith within the city.

31-62. UNLAWFUL ACTIVITY. It shall be unlawful for any person to make, construct, reconstruct, or alter any opening, excavation, tunnel, sidewalk, curb, gutter, driveway, street, or to perform any other work of any kind within the public way which will result in physical alteration thereof, for the purpose of laying, constructing, operating, maintaining and repairing any utilities and waterworks and sewer systems and all pipelines connected therewith, unless such person shall have first obtained a permit for the performance of such work, and unless such work shall be performed in conformity with the terms and provisions of this ordinance, any permits or franchises issued hereunder, and the engineering regulations, design standards, any construction testing and inspection specifications adopted by the city by resolution.

31-63. DEFINITIONS. For the purposes of this ordinance, the following words shall have the following meanings:

(1) "City" means the City of Grand Junction, Colorado.

(2) "Director" means the Public Works and Utilities Director of

the city or his authorized representative.

(3) "District" means any metropolitan, water, and/or sanitation district formed under Title 32, Article 3 1, C.R.S., as amended, and any conservancy district formed under Title 37, Article 45, C.R.S., as amended.

(4) "Permittee" means the holder of a valid permit.

(5) "Person" means any person, firm, partnership, district, corporation, municipal department, company or organization of any kind.

(6) "Public way" means any public street, way, place, alley, sidewalk, easement, park, square, plaza, and any city-owned right-of-way or any other public property owned or controlled by the city and dedicated to public use, including, without limitation, easements dedicated solely for utility purposes.

(7) "Service provider" means any person other than the city providing potable water or sewer services.

(8) "Specifications" means the engineering regulations, design standards, construction specifications and construction testing and inspection specifications adopted by the city by resolution.

(9) "Utility" means waterworks, sewer systems, pipelines, gas lines, electrical lines, telephone and telegraph lines, transportation systems, cable television and fiber optics systems, and any district or person providing the same for public use.

(10) "Work in the public way" means, without limitation, construction, reconstruction, repair, alteration of openings, excavation, tunneling, or any other work within or under public ways, including construction, maintenance and repair of all underground structures such as pipes, conduits, ducts, tunnels, manholes, vaults, buried cable, wire, or any other similar structure located below the surface of any public way, and installation of overhead poles used for any purpose.

31-64. TYPES OF PERMITS TO WORK IN THE PUBLIC WAY. There shall be two types of permits to work in the public way:

(1) Annual permits: permits granted to persons to cover all work done in the public way for a period of one year.

(2) Individual permits: permits granted to persons for one specific project in the public way.

31-65. APPLICATION FOR PERMIT. A separate written application for the work to be done under an annual or individual permit shall be submitted to the Director on a form provided by the city. The application shall be submitted no later than five days prior to the planned start of work in the public way. Permittees may be

required to increase this time up to fourteen days when the work consists of more than a single spot excavation. The Director may require submission of plans and specifications. No work shall be started until the Director has approved the plans and specifications and permit application. The application when approved shall constitute a permit.

31-66. PERMIT, INSPECTION, AND TESTING FEES.

(a) Individual permit: A fee of twenty dollars shall be required to obtain each permit.

(b) Annual permit: A fee of one hundred dollars per year shall be required to obtain an annual permit.

(c) Inspection and testing fees: A fee of twenty dollars per hour shall be required for inspection and testing.

(d) The fees established by this section may be amended by city council resolution.

(e) Exemption: A water conservancy district shall not be required to pay any permit fees under this section.

31-67. PERFORMANCE/WARRANTY GUARANTEE FOR PERMITS.

(a) Individual Permit. Each permittee before being issued a permit shall provide the city, at the permittee's expense, a performance/warranty guarantee. This guarantee shall be in the form of cash, a letter of credit, or a bond. The guarantee shall be in any amount equal to one hundred percent of the Manager's estimate of the cost of restoration. The cost of restoration shall include the removal of defective material, recompaction of subgrade and base material and construction of surface improvements. The letter of credit shall run for a period of time at least one year beyond the anticipated acceptance date of the work identified in the permit. Such guarantees shall be extended if requested by the city engineer.

(b) Annual Permit. Any person doing work under an annul permit shall provide the city with ten thousand dollars cash or a letter of credit. The letter of credit shall run for a period of time at least one year beyond the anticipated acceptance date of any work done under the annual permit. If no refund request is received, the deposit shall be carried forward for use as the annual deposit for the following year.

(c) Other Guarantees. In lieu of (a) and (b) above, any public utility regulated by the State of Colorado Public Utilities Commission, persons holding a franchise from the city, mutual water districts, any governmental agency, or any metropolitan, water and/or sanitation district or conservancy district may provide the city with an annual letter signed by an appropriate officer guaranteeing (1) complete performance of the work

acceptable to the city, and (2) guaranteeing the correction of any defect in the work which the city discovers and for which the city gives written notice to the permittee within one year after the date when the city initially accepts the work. If the Director determines that any permittee fails to perform promptly under the conditions of this Section 37-67(c), that permittee shall be required to post a performance/warranty guarantee meeting the requirements of Sections 37-67(a) or 37-67(b). If the Director determines that the permittee then satisfactorily complies with this chapter for a one-year period while operating under the provisions of 37-67(a) and 37-67(b) the permittee shall again be eligible to operate with the annual guarantee letter provided in Section 37-67(c). Notwithstanding anything to the contrary contained in this section, any contractor performing work pursuant to a contract with the city shall adhere to the performance and payment requirements set forth in the contract documents.

31-68. PURPOSE OF PERFORMANCE/WARRANTY GUARANTEE.

(a) Any guarantee made hereunder shall serve as security for the performance of work necessary to repair the public way if the permittee fails to make the necessary repairs or to complete the work under the permit.

(b) The permittee, by acceptance of the permit, expressly guarantees complete performance of the work acceptable to the city and guarantees all work done by him for a period of one year after the date of acceptance, and agrees upon the demand to maintain and to make all necessary repairs during the one-year period. This guarantee shall include all repairs and actions needed as a result of:

(1) Defects in workmanship

(2) Settling of fills or excavations;

(3) Any unauthorized deviations from the approved plans and specifications;

(4) Failure to barricade;

(5) Failure to clean up during and after performance of the work;

(6) Any other violation of this ordinance.

(c) The one-year guarantee period shall run from acceptance of the work. If repairs are required during the subsequent one-year guarantee period, those repairs need only be guaranteed until the end of the initial one-year period starting with the date of initial acceptance. It is not necessary that a new one-year guarantee be provided for subsequent repairs after initial acceptance.

31-69. INSPECTION AND TESTING FEES AND PROCEDURES. At the time of

permit application, and at such construction intervals as may be established by the Director, all permittees shall pay for the costs of inspection and testing. Costs of inspection and testing shall be in accordance with this ordinance and the schedule of charges prepared by the Director and adopted by City Council resolution. Inspections will occur as follows:

(a) Individual and Annual Permits. Two inspections shall take place. First, the permittee shall notify the city immediately after completion of work operations and acceptance will be made if all work meets city and permit standards. Second, approximately thirty days prior to the expiration of the one year guarantee, the city shall perform an inspection of the completed work. If the work is still satisfactory, the cash or letter of credit for individual permit holders shall be returned less any amounts needed to complete work not done by permittee. The annual deposit shall be carried forward for use as the annual deposit the following year if no refund request is received. At any time prior to completion of the one-year warranty period, the city may notify the permittee of any needed repairs. Such repairs shall be completed within twenty-four hours if the defects are determined by the city to be an imminent danger to the public health, safety, and welfare. Nonemergency repairs shall be completed within thirty days after notice.

(b) Random Inspections. Random inspections may be made of procedures described in this Ordinance and the permittee shall correct his procedures if ordered to do so. Failure to do so may result in revocation of the permit.

(c) Testing.Testing may be accomplished by the Director as required by the specifications.

31-70. TIME OF COMPLETION. All work covered by the permit shall be completed by the date stated on the application. Permits shall be void if work has not commenced six months after issuance. Letters of credit or cash deposited as a performance/warranty guarantee for individual permits will be returned after voiding of the permit.

31-71. INSURANCE. Before a public way permit is issued, the applicant shall submit to the Director a certificate of insurance in an amount set by City Council resolution. The certificate of insurance shall list the city and its officers, and employees, as additional named insureds. City departments, any public utility regulated by the State of Colorado Public Utilities Commission, mutual water companies, persons holding a franchise in the city, any governmental agency, and any metropolitan, water and/or sanitation district, or conservancy district shall be relieved of the obligation of submitting a certificate of insurance if the applicant carries insurance equal to an amount set by City Council resolution. Upon request, the applicant shall submit a letter certifying such coverage or self-insurance. If a person other than those named above signs the permit, a certificate of insurance

shall be provided.

31-72. TRAFFIC CONTROL. No permittee shall interrupt access to and from private property, block emergency vehicles, block access to fire hydrants, fire stations, fire escapes, water valves, underground vaults, valve housing structures, or any other vital equipment unless permission is obtained from the owner of that facility. If a street closing is required, the applicant shall submit a traffic control plan and obtain approval of the Director. It shall be the responsibility of the permittee to notify and coordinate all work in the public way with police, fire, ambulance, and transit departments.

When necessary for public safety, the permittee shall employ flag persons whose duties shall be to control traffic around or through the construction site. The use of flag persons may be required by the Director.

Unless approved by the Director, the permittee shall not impede rush hour traffic on arterial or collector streets during the morning or evening rush hours. No construction shall be performed nor shall any traffic lane be closed to traffic during the hours of seven a.m. to nine a.m. or three-thirty p.m. to six p.m. without the approval of the Director.

When it is necessary to obstruct traffic during the rush hours, a detour plan shall be submitted to the Director prior to starting construction. No permit will be issued until the plan is approved by the Director.

Unless provided otherwise by this section, the Director shall enforce the provisions of the American Traffic Safety Services Association (2nd ed. 1984) and the Federal highway Administration's Manual on Uniform Traffic Control Devices (1988), as they may be amended.

31-73. CONSTRUCTION STANDARDS AND RESPONSIBILITY FOR ALL PUBLIC IMPROVEMENTS. The permittee shall be fully responsible for the cost and actual performance of all work in the public way. The permittee shall do all work in conformance with the engineering regulations, construction specifications, and design standards adopted by the city. These standards shall apply to all work in the public way.

31-74. PROTECTION OF PAVED SURFACES FROM EQUIPMENT DAMAGE. Backhoe equipment outriggers shall be fitted with rubber pads whenever outriggers are placed on any paved surface. Tracked vehicles are not permitted on paved surface unless specific precautions are taken to protect the surface. The permittee will be responsible for any damage caused to existing pavement by the operation of such equipment and, upon order of the Manager, shall repair such surfaces. Failure to do so will result in the use of the permittee's Performance/Warranty Guarantee by the City to repair any damage.

31-75. PROTECTION OF PROPERTY. The permittee shall protect from injury any adjoining property by providing adequate support and taking other necessary measures. The permittee shall, at his own expense, shore up and protect all buildings, walls, fences or other property likely to be damaged during the work, and shall be responsible for all damage to public or private property resulting from failure to properly protect and carry out work in the public way.

31-76. RELOCATION AND PROTECTION OF UTILITIES. Before any permittee begins excavation in any public way, he shall make inquiries of all irrigation companies, utility companies, districts, municipal departments and all other agencies which might have facilities in the area of work to determine possible conflicts. The permittee shall request field locations of all facilities in the area at least forty-eight hours in advance of work. The permittee shall support and protect all pipes, conduits, poles, wires, or other apparatus which may be affected by the work from damage during construction or settlement of trenches subsequent to construction.

31-77. NOISE,DUST, DEBRIS, HOURS OF WORK. Each permittee shall conduct work in such manner as to avoid unnecessary inconvenience and annoyance to the general public and occupants of neighboring property. In the performance of the work, the permittee shall take appropriate measures to reduce noise, dust, and unsightly debris. No work shall be done between the hours of ten p.m. and seven a.m., nor at any time on Sunday, except with the written permission of the Manager, or in case of an emergency.

31-78. CLEAN-UP. As the work progresses, all public rights-of-way and private property shall be thoroughly cleaned of all rubbish, excess dirt, rock, and other debris. All clean-up operations shall be done at the expense of the permittee.

31-79. EMERGENCY WORK. Any person maintaining facilities in the public way may proceed with repairs upon existing facilities without a permit when emergency circumstances demand that the work be done immediately. Emergency work is defined to mean any work be done immediately. Emergency work is defined to mean any work necessary to restore water and sewer. The person doing the work shall apply to the Director for a permit on the first working day after such work has commenced. All emergency work shall require prior telephone notification to the Director.

31-80. PRESERVATION OF MONUMENTS. The permittee shall not disturb any surface monuments or survey hubs and points found on the line of work unless approval is obtained from the Director. Any points disturbed will be replaced at the permittee's expense.

31-81. BORING. Boring or other methods to prevent cutting of the pavement will be required upon request of the Director. It is the city's intent to require boring only when necessary on arterial

and major and minor collector streets with high volumes of traffic and/or serious accident potential.

31-82. SUSPENSION OR REVOCATION OF PERMITS AND STOP WORK ORDERS.

(a) any permit may be revoked or suspended by the Director, after notice to the permittee for:

(1) Violation of any condition of the permit or of any provision of this ordinance;

(2) Violation of any provision of any other ordinance of the city or state law relating to the work;

(3) Existence of any condition or the doing of any act which does constitute or cause a condition endangering life or serious damage to property.

(b) A suspension or revocation by the Director, and a stop work order, shall take effect immediately upon notice to the person performing the work in the public way.

(c) A stop work order may be issued by the Director to any person or persons doing or causing any work to be done in the public way without a permit, or in violation of any provision of this ordinance, or any other ordinance of the city.

(d) Any suspension or revocation or stop work order may be appealed by the permittee to the Director by filing a written notice of appeal within ten days of the action.

31-83. APPEALS PROCEDURE. Any decision rendered by the Director may be appealed within ten days by the permittee to the Utility Hearing Board in accordance with the rules and procedures established by State Statute 25-63 of the Grand Junction Code.

31-84. PENALTY. If any person, firm or corporation, district, officers and agents of a corporation or district responsible for its actions or inaction, and the partners or a partnership, firm or joint venture, shall violate or cause the violation of any of the provisions of this ordinance, they shall be guilty of a separate offense for each and every day or portion thereof during which a violation is committee, continues or is permitted and upon conviction of any such violation such person, firm or corporation, including but not limited to its partners r officers or agents, shall be punished by a fine of not more than nine hundred ninety-nine dollars or by imprisonment for not more than one hundred and eighty days, or by both such fine and imprisonment for each such violation.

31-85. ACTIONS FOR VIOLATION. If any person violates any order of the Director, or otherwise fails to comply with any provisions of this Ordinance or the orders, rules, regulations and permits issued hereunder, the city may commence an action in a court of

record for appropriate legal and equitable relief. In such action, the city may recover from the defendant reasonable attorney fees, court costs, deposition and discovery costs, expert witness fees and other expenses of investigation, enforcement action, administrative hearings and litigation, if the city prevails in the action or settles at the request of the defendant.

RELOCATION OF WATER AND SEWER FACILITIES

31-86. PROJECTS COORDINATION. All providers of water and sewer services and the city shall, as far in advance as possible when working in public streets and drainageways, coordinate through the Director all projects, each with the other, to minimize current and future anticipated conflicts between public ways and waterworks and sewer facilities.

31-87. FUTURE ALTERATION MINIMIZATION. Project planning and engineering conducted by the city and providers of water and sewer services shall consider present and future plans in order to avoid or minimize future alterations in such improvements and facility locations. In cooperation with the provider of water and sewer service, the Director may indicate general location restrictions that would avoid future conflicts.

31-88. RELOCATION COST LIABILITIES. When waterworks, sewer systems, pipelines connected therewith, and utilities require relocation due to improvement, changes, or alteration of streets or drainageways, redevelopment of urban areas, construction of mass transit systems, installation of city-owned waterworks and sewer protection of the public health, safety and welfare, all costs associated with waterworks and sewer systems relocation and restoration to the equivalent of their preimprovement condition will be included and considered as part of the total public way improvement cost, and shall be paid by the service provider.

31-89. ADJUSTMENT COST LIABILITIES. The costs of adjusting manholes and valve boxes when such work is necessitated by pavement repair or street resurfacing will be borne by the service provider. Unless the service provider notifies the city in advance that it will perform the work or desires the manholes to be covered, adjustments will be performed by the city in accordance with city standards, and the city will provide a list specifying locations of work performed together with the bill for such work.

31-90. PERMIT APPLICATION REVIEW. To the extent that work in the public way is regulated by other city ordinances which require that such work be done under a permit from the city, the Director shall have the prerogative to review such permit applications for work in the public way for the purpose of requiring relocation of the proposed facility in the public way, and compliance with construction standards of the city for work in the public way.

31-91. WORK RESULTING FROM PERMIT NONCOMPLIANCE COST LIABILITY. Should a service provider elect to perform work without

coordinating the project or perform the work without observing proper permit conditions, the cost of any future relocations which would not have been required if the coordination or permit conditions had been observed shall be paid by the service provider.

31-92. PERMIT GRANT OR DENIAL. The Director shall respond to permit applications, approving or denying the application as submitted or conditioned upon specific requirements.

31-93. CITY COUNCIL DETERMINATION. The City Council may require the relocation without compensation of any waterworks, sewer system or pipelines connected therewith by ordinance declaring that the public health, safety and welfare requires such relocation.

UPGRADING WATER LINES TO PROVIDE FIRE PROTECTION.

31-94. UPGRADING WATER LINES AND HYDRANTS. To ensure adequate fire protection to users, owners, and the City, the Director is empowered to require that all water facilities, hydrants and lines in the City be upgraded as may be required to meet the following minimum standards:

(1) Water shall be supplied at a residual hydrostatic pressure of not less than 20 pounds per square inch (psi), nor more than 125 psi.

(2) A pipeline providing water to one and two family residences shall be at least six inches in diameter; in all other circumstances, pipelines shall be at least eight inches in diameter. A larger pipeline size may be required based on the other standards adopted herein.

The standards and processes set forth in the December 1984 "Guide for Determination of Required Fire Flow" published by the Insurance Services Office, 160 Water Street, New York, New York, are hereby adopted by this reference. One copy shall be kept in the Office of the City Clerk for public reference.

a) The maximum distance from a hydrant to a one or two family dwelling shall be 500 feet; except that on a dead-end line, 300 feet shall be the maximum distance from a hydrant to any structure or use.

b) The maximum distance from a hydrant to any other structure or use (including multi-family structures containing more than two residential uses and all commercial) shall be 300 feet.

c) Hydrants shall meet the standards set forth in the American Water Works Association Standard C502 with hose thread dimensions as follows:

1. Steamer: Mueller 4-512

2. Outside diameter of male thread = 5.282 inches
3. Diameter of root of male thread = 4.932 inches
4. Four threads per inch
5. Pitch diameter = 5.12
6. 2-1/2 inch outlet.

d) The distance of a hydrant to a structure or use shall be determined by the shortest readily accessible right-of-way or other accessway drivable by a fire department engine.

(3) Only PVC pipe shall be allowed. For pipe between 8 in. and 12 in. inside diameter the standard established by the American Waterworks Association designated C-900 shall be the minimum. For pipe over 12 in. American Waterworks Association Standard C-905 shall apply.

31-95. CITY COUNCIL DETERMINATION. To ensure adequate fire protection to users, owners and the city, the city council shall be empowered to declare by ordinance the necessity that water lines shall be upgraded for the health, safety and welfare of the parties to meet the requirements of section 31-94 of this ordinance and the specifications of the city. The cost of upgrading water lines to meet the requirements of this section shall be the obligation of the service provider.

FRANCHISES.

31-96. FRANCHISES. No franchise giving or granting to any person the right or privilege to erect, construct operate or maintain or use any waterworks, sewer system or pipelines connected therewith to provide water or sewer to any user or consumer within the city; or to use the public ways of the city for any purpose; or to interconnect any building, structure or facility of any kind to any waterworks; sewer system or pipelines connected therewith other than to the waterworks and sewer systems of the city shall be given or granted unless such franchise shall be given or granted by ordinance. No such ordinance shall be considered, except for waterworks and pipelines connected therewith, until after the question of the granting of any franchise necessary for such purpose and required by law shall be submitted to and approved by a majority of the qualified, taxpaying electors of the city at an election held for such purpose at the expense of the applicant for such franchise.

31-97. UNLAWFUL ACTS. Unless a franchise has been given or granted under the provisions of section 31-96, it shall be unlawful for any person to erect, construct, operate or maintain or use any waterworks or sewer system or pipelines connected therewith within the city in order to provide water or sewer service to any use or consumer within the city; or to use the public ways of the city for such purposes; or to interconnect any building, structure or facility of any kind to any waterworks or sewer system or pipelines connected therewith other than to the waterworks and sewer system of the city.

31-98. EXEMPTED SERVICE PROVIDERS. Service providers who are providing service pursuant to agreements with the city shall not be subject to the provisions of section 31-96 and 31-97.

31-99. CONDEMNATION AND APPROPRIATION OF PUBLIC AND PRIVATE WATERWORKS AND SEWER SYSTEMS. To provide municipal water and sewer services to its users and residents, the city shall have the right and power to condemn and appropriate as much public and private property as is necessary for the construction and operation of waterworks, sewer systems and pipelines connected therewith in such manner as may be prescribed by law; and to condemn and appropriate any publicly or privately owned waterworks, sewer systems and pipelines connected therewith not owned by the city in such manner as may be prescribed by law for the condemnation of real estate.

SEVERABILITY

31-100. SEVERABILITY. If any section, subsection, paragraph, sentence, clause or phrase of this ordinance or the code provisions reenacted hereby should be declared invalid for any reason whatever, such decision shall not affect the remaining portions of this ordinance or code provisions, which shall remain in full force and effect.

31-101. NECESSITY. The City Council of Grand Junction hereby finds and declares that this ordinance is necessary for the immediate preservation of the peace, health and safety.

READ, PASSED ON FIRST READING AND ORDERED PUBLISHED this 17th day of October, 1990.

William E. McCurry

_____
President of the Council

Attest:

Neva B. Lockhart, CMC

_____
City Clerk

PASSED and ADOPTED this 7th day of November, 1990.

William E. McCurry

_____
President of the Council

Attest:

Neva B. Lockhart, CMC

_____
City Clerk

I HEREBY CERTIFY that the foregoing ordinance, being Ordinance No. 2497, was introduced, read, and ordered published by the City Council of the City of Grand Junction, Colorado, at a regular meeting of said body held on the 17th day of October, 1990, and that the same was published in The Daily Sentinel, a newspaper published and in general circulation in said City, at least ten days before its final passage.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed the official seal of said City this 8th day of November, 1990.

Neva B. Lockhart

_____
Neva B. Lockhart, CMC
City Clerk

Published: October 23, 1990

Published: November 9, 1990

Effective: December 9, 1990

GUIDE FOR DETERMINATION OF REQUIRED FIRE FLOW

INSURANCE SERVICES OFFICE

160 WATER STREET
NEW YORK, N.Y. 10038

DECEMBER, 1974

FOREWORD

This guide has been especially prepared for use by the Public Protection Grading personnel of Insurance Services Office and other fire insurance rating organizations. It is being made available to municipal officials, consulting engineers, and other interested parties as an aid in estimating fire flow requirements for municipal fire protection. It should be recognized that this publication is a "guide" in the true sense of the work, and requires knowledge and experience in fire protection engineering for its effective application.

Second Edition
December, 1974

INSURANCE SERVICES OFFICE

GUIDE FOR DETERMINATION OF REQUIRED FIRE FLOW

1. An estimate of the fire flow required for a given fire area may be determined by the formula:

$F = 18\ C\ (A)^{0.5}$

where

F = the required fire flow in gpm
C = coefficient related to the type of construction
C = 1.5 for wood frame construction
= 1.0 for ordinary construction
0.9 for heavy timber type buildings
= 0.8 for noncombustible construction
= 0.6 for fire-resistive construction

Note: For types of construction and/or materials that do not fall within the categories given, use a coefficient reflecting the difference. Coefficients shall not be greater than 1.5 nor less than 0.6 and may be determined by interpolation. Such interpolation shall be between consecutive types of construction as listed above. Definitions of types of construction are included in the Appendix.

A = the total floor area (including all stories, but excluding basements) in the building being considered. For fire-resistive buildings consider the 6 largest successive floor areas if the vertical openings are unprotected; if the vertical openings are properly protected, consider only the 3 largest successive floor areas.

The fire flow as determined by the above shall not exceed

8,000 gpm for wood frame construction
8,000 gpm for ordinary and heavy timber construction
6,000 gpm for noncombustible construction
6,000 gpm for fire-resistive construction

except that for a normal 1-story building of any type of construction the fire flow shall not exceed 6,000 gpm.

The fire flow shall not be less than 500 gpm.

For 1-family and small 2-family dwellings not exceeding 2 stories in height see note 10.

2. The value obtained in No. 1 above may be reduced by up to 25% for occupancies having a low fire hazard or may be increased by up to 25% for occupancies having a high fire hazard. As a guide for determining low or high hazard occupancies see the lists in the Appendix.

The fire flow shall not be less than 500 gpm.

3. The value obtained in Number 2 above may be reduced by up to 50% for complete automatic sprinkler protection. Where buildings are either fire resistive or non-combustible construction, and have a low fire hazard, the reduction may be up to 75%. The percentage reduction made for an automatic sprinkler system will depend upon the extent to which the system is judged to reduce the possibility of fires spreading within and beyond the fire area. Normally this reduction will not be the maximum allowed without proper system supervision including water flow and valves.

4. To the value obtained in No. 2 above a percentage should be added for structures exposed within 150 feet by the fire area under consideration. This percentage shall depend upon the height, area, and construction of the building(s) being exposed; the separation, openings in the exposed building(s), the length of exposure, the provision of automatic sprinklers and/or outside sprinklers in the building(s) exposed, the occupancy of the exposed building(s), and the effect of hillside locations on the possible spread of fire.

The percentage for any one side generally should not exceed the following limits for the separations shown:

Separation	Percentage
0-10 feet	25%
11-30	20
31-60	15
61-100	10
101-150	5

The total percentage shall be the sum of the percentages for all sides, but shall not exceed 75%.

5. The value obtained in No. 2 above is reduced by the percentage (if any) determined in No. 3 above and increased by the percentage (if any) determined in No. 4 above.

The fire flow shall not exceed 12,000 gpm nor be less than 500 gpm.

Note 1: The guide is not expected to necessarily provide an adequate value for lumber yards, petroleum storage, refineries, grain elevators, and large chemical plants but may indicate a minimum value for these hazards.

Note 2: Judgment must be used for business, industrial, and other occupancies not specifically mentioned.

Note 3: Consideration should be given to the configuration of the building(s) being considered and to the fire department accessibility.

Note 4: Wood frame structures separated by less than 10 feet shall be considered as one fire area.

Note 5: Party Walls:- Normally an unpierced party (common) wall may warrant up to a 10% exposure charge.

Note 6: High one-story building:- When a building is stated as 1 = 2, or more stories, the number of stories to be used in the formula depends upon the use being made of the building. For example consider a 1 = 3-story building. If the building is being used for high-piled stock, o for rack storage, the building would probably be considered as 3 stories and, in addition, an increased percentage for occupancy may be warranted. However, if the building is being used for steel fabrication and the extra height is provided only to facilitate movement of objects by a crane, the building would probably be considered as a 1-story building and a decreased percentage for occupancy may be warranted.

Note 7: If a building is exposed within 150 feet, normally some percentage increase for exposure will be made.

Note 8: Where wood shingle roofs could contribute to spreading fires, add 500 gpm.

Note 9: Any noncombustible building is considered to warrant an 0.8 coefficient.

Note 10: Dwellings;- For districts of 1-family and small 2-family dwellings not exceeding 2 stories in height, the following short method may be used. (For other residential buildings, the regular method should be used.)

Distance between buildings	Suggested required fire flow
Over 100 ft.	500 gpm
31-100 ft.	750-1000

11-30 ft.	1000-1500
10 ft. or less	1500-2000*

* If the buildings are continuous, use a minimum of 2500 gpm.

Also consider Note 8.

Outline of Procedure

A. Determine the type of construction.

B. Determine the ground floor area.

C. Determine the height in stories.

D. Using tables in the Appendix, determine the required fire flow to the nearest 250 gpm.

E. Determine the increase or decrease for occupancy and apply to the value obtained in D above. Do not round off the answer.

F. Determine the decrease, if any, for automatic sprinkler protection. Do not round off the value.

G. Determine the total increase for exposures. Do not round off the value.

To the answer obtained in E, subtract the value obtained in F and add the value obtained in G.

Round off the final answer to the nearest 250 gpm if less than 2500 gpm and to the nearest 500 gpm if greater than 2500 gpm.

Use of Tables (Steps A, B, C, D)

The tables use the GROUND AREA of the building and the height of the building in stories. Using the table corresponding to the type of construction, look under the number of stories and locate the ground area of the building(s) being considered between two ground areas given in the table. The corresponding fire floor is found in the left column.

Examples

a. Given: A 3- story building of ordinary construction of 7300 square feet (ground area). Using the table C = 1.0, in the 3-story column, 7300 square feet falls between 7100 and 8500 square feet and the corresponding fire flow is 2750 gpm.

b. Given: A 3-story building of ordinary construction of 7300 square feet (ground area) communicating to a 5-story building of ordinary construction of 9700 square feet (ground area) for a total ground area of 17,000 square feet. Determine the total floor area which equals 3 (7300) + 5 (9700) = 70,400 square feet. Using the table C = 1.0, under the one story column for 70,400 square feet the corresponding fire flow is 4750 gpm.

c. Given: A 3-story wood frame building of 7300 square feet (ground area) communicating with a 5-story building of ordinary construction of 9700 square feet (ground area) for a total ground area of 17,000 square feet.

Determine the total floor area for each type of construction and for the fire area which is 3 (7300) = 21,900 square feet of wood frame construction, 5 (9700) = 48,500 square feet of ordinary construction, and a total area of 70,400 square feet with 31% being of wood frame construction and 69% being of ordinary construction. Under the one-story column in the wood frame construction table (C = 1.5), an area of 70,400 square feet has a corresponding fire flow of 7250 gpm. Similarly, under the one-story column in the ordinary construction table (C = 1.0), an area of 70,400 square feet has a corresponding fire flow of 4750 gpm. In this case, the fire flow will be 31% (720) = 69% (4750) = 2250 + 3280 = 5530 gpm or, to the nearest 250 gpm = 5500 gpm.

d. Given: A 2-story building consisting of 10,000 square feet (ground area) of wood frame construction, 15,000 square feet (ground area) of ordinary construction, 20,000 square feet (ground area) of noncombustible construction, and 25,000 square feet (ground area) of fire resistive construction. The total floor area is 140,000 square feet. The maximum fire flow for wood frame construction is at 85,100 square feet (see table). Note: "When the total area exceeds the upper limit for the poorest type of construction, limit the floor area of the best type(s) of construction so that the total area considered does not exceed the upper limit for the poorest type of construction." Consider 2 x 10,000 = 20,000 square feet of wood frame construction, plus 2 x 15,000 = 30,000 square feet of ordinary construction plus 2 x 20,000 = 40,000 square feet (limited to 35,100 square feet) of noncombustible construction. The fire flow will be 24% x 8000 (wood frame) + 35% x 6750* (ordinary) + 41% x 5500* (noncombustible) = 1920 + 2362 + 2255 = 6537 gpm, or to the nearest 250 gpm, = 6500 gpm.

*based upon 140,000 square feet.

e. Given: A 2-story building of ordinary construction of 105,000 square feet (ground area) communicates with a 1-story building of noncombustible construction of 80,000 square feet (ground area). Normally the required fire flow would be determined by proportioning as in "c" above. This would result in a required fire flow of 7460 gpm, or 7500 gpm. However, it is to be noted

that the total area of the 2-story building alone results in a fire flow of 8,000 gpm and, of course, the logical answer would be 8,000 gpm. Any time the total area result in the use of an upper limit for fire flow, the possibility of a portion of the fire area justifying the upper limit must be investigated.

f. Given: A normal 1-story building of ordinary construction of 210,000 square feet (ground area). The table gives a required fire flow of 8,000 gpm, however, since this is a normal 1-story building, the maximum fire flow is 6,000 gpm.

g. Given: A normal 1-story building of ordinary construction of 80,000 square feet communicates with a normal 1-story building of noncombustible construction of 85,000 square feet. Normally the required fire flow would be determined by proportioning as in "c" above. This would result in a required fire flow of 6480 gpm, or 6500 gpm. However, since these are normal 1-story buildings the maximum fire flow is 6,000 gpm.

APPENDIX

TYPES OF CONSTRUCTION

For the specific purpose of using the Guide, the following definitions may be used:

Fire-Resistive Construction.- Any structure that is considered fire-resistive by any of the four model building codes.

Noncombustible Construction.- Any structure having all structural members including walls, columns, piers, beams, girders, trusses, floors, and roofs of noncombustible material and not qualifying as fire-resistive construction.

Ordinary Construction.- Any structure having exterior walls of masonry or other noncombustible material in which the other structural members, including but not limited to columns, floors, roofs, beams, girders, and joists, are wholly or partly of wood or other combustible material.

Heavy timber type buildings are required to satisfy a number of specific provisions (see any of the four model building codes).

Wood Frame Construction.- Any structure in which the structural members are wholly or partly of wood or other combustible material and the construction does not qualify as ordinary construction.

OCCUPANCY

Low Hazard Occupancies:

Apartments
Asylums
Churches

Clubs
Colleges and Universities
Dormitories
Dwellings
Hospitals
Hotels
Institutions
Libraries, except Large Stack Room Areas
Museums
Nursing, Convalescent and Care Homes
Office Buildings
Prisons
Public Buildings
Rooming Houses
Schools Tenements

High Hazard Occupancies:

Aircraft Hangers
Cereal, Feed, Flour and Grist Mills
Chemical Works - High Hazard
Cotton Picker and Opening Operations
Explosives and Pyrotechnics Manufacturing
High Piled Combustible Storage in excess of 21 feet high
Linoleum and Oilcloth Manufacturing
Linseed Oil Mills
Match Manufacturing
Oil Refineries
Paint Shops
Pyroxylin Plastic Manufacturing and Processing
Shade Cloth Manufacturing
Solvent Extracting
Varnish and Paint Works
Wood Working with Flammable Finishing
Other occupancies involving processing, mixing, storage and dispensing flammable and/or combustible liquids.

Experience has shown that the following credits should normally be applied for the occupancies listed:

Dwellings*, apartments, and dormitories -25%
Hospitals -20%
Elementary schools -20%
Junior and Senior high schools -15%
Open parking garages -25%

*when applying the standard method.

For other occupancies, good judgment should be used, and the percentage increase or decrease will not necessarily be the same for all buildings that are in the same general category - for example "Colleges and Universities": this could range from a 25% decrease for buildings used only as dormitories to an increase for a chemical laboratory. Even when considering high schools, the

decrease should be less if they have extensive shops.

It is expected that in commercial buildings no percentage increase or decrease for occupancy will be applied in most of the fire flow determinations. In general, percentage increase or decrease will not be at the limits of plus or minus 25%.

EXPOSURES

When determining exposures it is necessary to understand that the exposure percentage increase for a fire in a building (x) exposing another building (y) does not necessarily equal the percentage increase when the fire is in building (y) exposing building (x). The Guide gives the maximum possible percentage for exposure at specified distances. However, these maximum percentages should not be used for all exposures at those distances. In each case the percentage applied should reflect the actual conditions but should not exceed the percentage listed.

The maximum percentage for the separations listed generally should be used if the exposed building meets all of the following conditions:

a. Same type or a poorer type of construction than the fire building.
b. Same or greater height than the fire building.
c. Contains unprotected exposed openings.
d. Unsprinklered.

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FIRE FLOW VS GROUND AREA

Wood Frame Construction

(ground area in square feet)

$F=18C(A)^{0.5}$

F= gpm; C=1.5

A=area in sq. ft.

gpm	1	2	3	4	5	6	Stories
500							
	500	300	200	100	100	100	

750							
	1,100	600	400	300	200	200	
1000							
	1,700	900	600	400	300	300	
1250							
	2,600	1,300	900	700	500	400	
1500							
	3,600	1,800	1,200	900	700	600	
1750							
	4,800	2,400	1,600	1,200	1,000	800	
2000							
	6,200	3,100	2,100	1,600	1,200	1,000	
2250							
	7,700	3,900	2,600	1,900	1,500	1,300	
2500							
	9,400	4,700	3,100	2,400	1,900	1,600	
2750							
	11,300	5,700	3,800	2,800	2,300	1,900	

3000							
	13,400	6,700	4,500	3,400	2,700	2,200	
3250							
	15,600	7,800	5,200	3,900	3,100	2,600	
3500							
	18,000	9,000	6,000	4,500	3,600	3,000	
3750							
	20,600	10,300	6,900	5,200	4,100	3,400	
4000							
	23,300	11,700	7,800	5,800	4,700	3,900	
4250							
	26,300	13,200	8,800	6,600	5,300	4,400	
4500							
	29,300	14,700	9,800	7,300	5,900	4,900	
4750							
	32,600	16,300	10,900	8,200	6,500	5,400	
5000							
	36,000	18,000	12,000	9,000	7,200	6,000	
5250							

	39,600	19,800	13,200	9,900	7,900	6,600	
5500							
	43,400	21,700	14,500	10,900	8,700	7,200	
5750							
	47,400	23,700	15,800	11,900	9,500	7,900	
6000							
	51,500	25,800	17,200	12,900	10,300	8,600	
6250							
	55,700	27,900	18,600	13,900	11,100	9,300	
6500							
	60,200	30,100	20,100	15,100	12,000	10,000	
6750							
	64,800	32,400	21,600	16,200	13,000	10,800	
7000							
	69,600	34,800	23,200	17,400	13,900	11,600	
7250							
	74,600	37,300	24,900	18,700	14,900	12,400	
7500							
	79,800	39,900	26,600	20,000	16,000	13,300	

7750							
	85,100	42,600	28,400	21,300	17,000	14,200	
8000							

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FIRE FLOW VS GROUND AREA
Ordinary Construction
(ground area in square feet)

$F=18C(A)^{0.5}$
F=gpm; C=1.0
A=area in sq. ft.

gpm	1	2	3	4	5	6	Stories
500							
	1,200	600	400	300	200	200	
750							
	2,400	1,200	800	600	500	400	
1000							
	3,900	2,000	1,300	1,000	800	700	
1250							
	5,800	2,900	1,900	1,500	1,200	1,000	
1500							
	8,200	4,100	2,700	2,100	1,600	1,400	

1750							
	10,900	5,500	3,600	2,700	2,200	1,800	
2000							
	13,900	7,000	4,600	3,500	2,800	2,300	
2250							
	17,400	8,700	5,800	4,400	3,500	2,900	
2500							
	21,300	10,700	7,100	5,300	4,300	3,600	
2750							
	25,500	12,800	8,500	6,400	5,100	4,300	
3000							
	30,100	15,100	10,000	7,500	6,000	5,000	
3250							
	35,200	17,600	11,700	8,800	7,000	5,900	
3500							
	40,600	20,300	13,500	10,200	8,100	6,800	
3750							
	46,400	23,200	15,500	11,600	9,300	7,700	

4000							
	52,500	26,300	17,500	13,100	10,500	8,800	
4250							
	59,100	29,600	19,700	14,800	11,800	9,900	
4500							
	66,000	33,000	22,000	16,500	13,200	11,000	
4750							
	73,300	36,700	24,400	18,300	14,700	12,200	
5000							
	81,100	40,600	27,000	20,300	16,200	13,500	
5250							
	89,200	44,600	29,700	22,300	17,800	14,900	
5500							
	97,700	48,900	32,600	24,400	19,500	16,300	
5750							
	106,500	53,300	35,500	26,600	21,300	17,800	
6000							
	115,800	57,900	38,600	28,900	23,200	19,300	
6250							

	125,500	62,800	41,800	31,400	25,100	20,900	
6500							
	135,500	67,800	45,200	33,900	27,100	22,600	
6750							
	145,800	72,900	48,600	36,500	29,200	24,300	
7000							
	156,700	78,400	52,200	39,200	31,300	26,100	
7250							
	167,900	84,000	56,000	42,000	33,600	28,000	
7500							
	179,400	89,700	59,800	44,900	35,900	29,900	
7750							
	191,400	95,700	63,800	47,900	38,300	31,900	
8000							

INSURANCE SERVICES OFFICE

FIRE FLOW VS GROUND AREA
Non-combustible Construction
(ground area in square feet)

$F=18C(A)^{0.5}$
F=gpm; C=0.8
A=area in sq. ft.

gpm	1	2	3	4	5	6	Stories
500							
	1,900	1,000	600	500	400	300	
750							
	3,700	1,900	1,200	900	700	600	
1000							
	6,100	3,100	2,000	1,500	1,200	1,000	
1250							
	9,100	4,600	3,000	2,300	1,800	1,500	
1500							
	12,700	6,400	4,200	3,200	2,500	2,100	
1750							
	17,000	8,500	5,700	4,100	3,400	2,800	
2000							
	21,800	10,900	7,300	5,500	4,400	3,600	
2250							
	27,200	13,600	9,100	6,800	5,400	4,500	
2500							
	33,200	16,600	11,100	8,300	6,600	5,500	

2750							
	39,700	19,900	13,200	9,900	7,900	6,600	
3000							
	47,100	23,600	15,700	11,800	9,400	7,900	
3250							
	54,900	27,500	18,300	13,700	11,000	9,200	
3500							
	63,400	31,700	21,100	15,900	12,700	10,600	
3750							
	72,400	36,200	24,100	18,100	14,500	12,100	
4000							
	82,100	41,200	27,400	20,500	16,400	13,700	
4250							
	92,400	46,200	30,800	23,100	18,500	15,400	
4500							
	103,100	51,600	34,400	25,800	20,600	17,200	
4750							
	114,600	57,300	38,200	28,700	22,900	19,100	

5000							
	126,700	63,400	42,200	31,700	25,300	21,100	
5250							
	139,400	69,700	46,500	34,900	27,900	23,200	
5500							
	152,600	76,300	50,900	38,200	30,500	25,400	
5750							
	166,500	83,300	55,500	41,600	33,300	27,800	
6000							

INSURANCE SERVICES OFFICE

FIRE-FLOW VS GROUND AREA
Fire Resistive Construction
(ground area in square feet)

$F=18C(A)^{0.5}$
F=gpm; C=0.6
A=area in sq. ft.

gpm	1	2	3	4	5	6	Stories
500							
	3,300	1,700	1,100	800	700	600	
750							

	6,600	3,300	2,200	1,700	1,300	1,100	
1000							
	10,900	5,500	3,600	2,700	2,200	1,800	
1250							
	16,200	8,100	5,400	4,100	3,200	2,700	
1500							
	22,700	11,400	7,600	5,700	4,500	3,800	
1750							
	30,200	15,100	10,100	7,600	6,000	5,000	
2000							
	38,700	19,400	12,900	9,700	7,700	6,500	
2250							
	48,300	24,200	16,100	12,100	9,700	8,100	
2500							
	59,000	29,500	19,700	14,800	11,800	9,800	
2750							
	70,900	35,500	23,600	17,700	14,200	11,800	
3000							

	83,700	41,900	27,900	20,900	16,800	13,900	
3250							
	97,700	48,900	32,600	24,400	19,500	16,300	
3500							
	112,700	56,400	37,600	28,200	22,500	18,800	
3750							
	128,700	64,400	42,900	32,200	25,700	21,500	
4000							
	145,900	73,000	48,600	36,500	29,200	24,300	
4250							
	164,200	82,100	54,700	41,100	32,800	27,400	
4500							
	183,400	91,700	61,100	45,900	36,700	30,600	
4750							
	203,700	101,900	67,900	50,900	40,700	34,000	
5000							

	225,200	112,600	75,100	56,300	45,000	37,600	
5250							
	247,700	123,900	82,600	61,900	49,500	41,300	
5500							
	271,200	135,600	90,400	67,800	54,200	45,200	
5750							
	295,900	148,000	98,600	74,000	59,200	49,300	
6000							