Tindale-Oliver
& Associates, Inc.

National Impact Fee Roundtable

Public Safety Impact Fees and Alternatives – Fire Flow Methodology

Robert P. Wallace, P.E., AICP

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Public Safety Impact
Fees and Alternatives
Fire Flow Methodology

Presentation Overview

1. Methodology
2. Standards and Service Area
3. Basic Formula
4. Fee Schedule
5. Pro's and Con's

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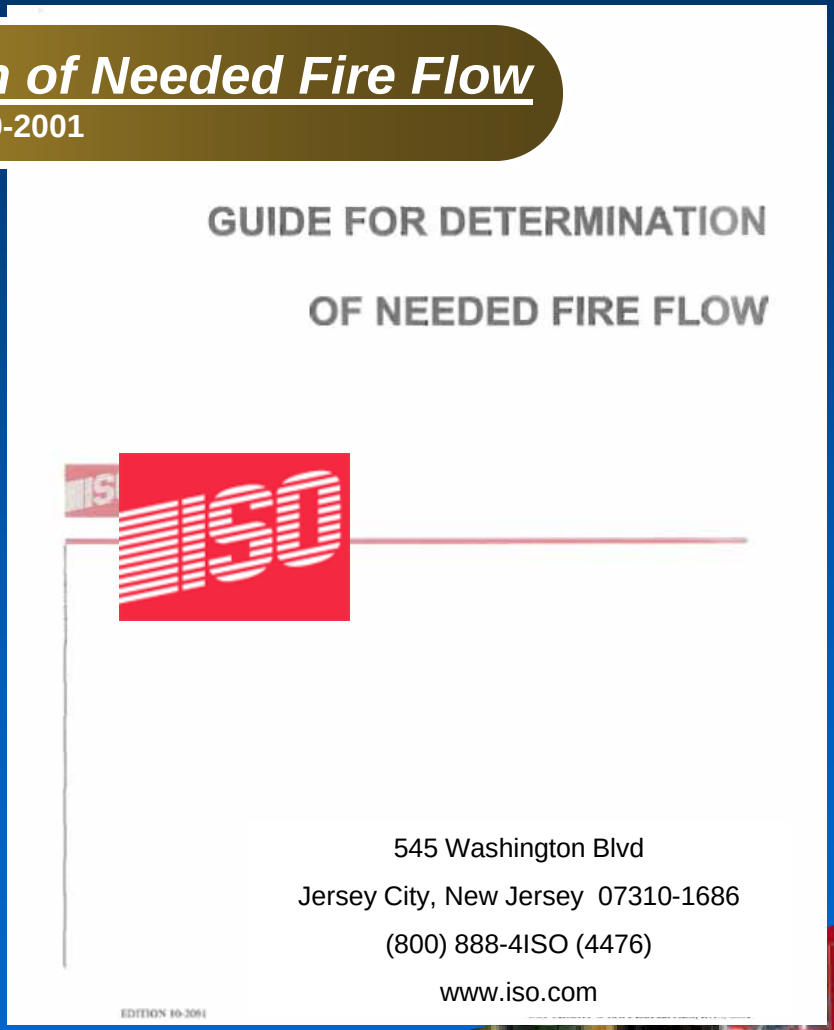
Fire Flow Methodology

Methodology

Guide for Determination of Needed Fire Flow

Edition 10-2001



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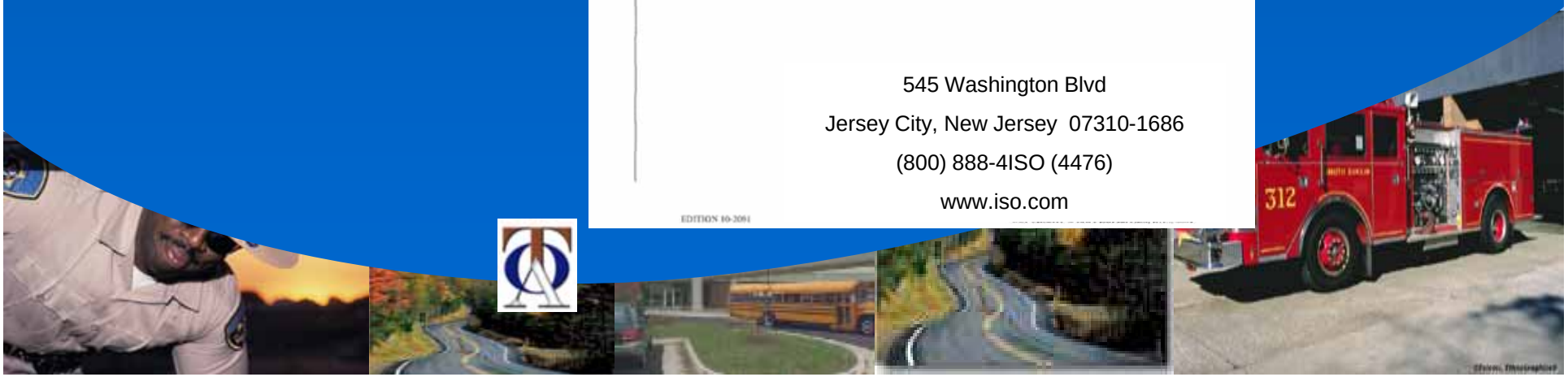

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A Look at Details Methodology

Definition of Fire Flow

Number of gallons of water needed per minute to effectively extinguish a fire

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A Look at Details Methodology

Residential vs. Non-residential Land Uses

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A Look at Details Methodology

(Needed Fire Flow (NFF))

NFF = (C)(O)(1+(X+P))

Where:

C = Construction Type Factor

O = Occupancy Type Factor

X = Exposure Factor Between Buildings

P = Communication Factor (Passageways)

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A Look at Details Methodology (Fire Flow for Construction Type Factor)

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

Where:

C = Fire Flow for Construction Type Factor

F = Coefficient For Each Construction Class

A = Effective Floor Area of Building

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A Look at Details Methodology

Residential Land Uses

Factors Considered in Service Delivery:

- ❑ Distance Traveled
- ❑ Coverage Area
- ❑ Number of Homes in Coverage Area

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A Look at Details Methodology

Non - Residential Land Uses

- Measured in Fire Flow
- Several Factors Affect Calculation
- Converted to Percent of Residential

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Standards & Service Area

Service Area

- Response Distance
  (Travel Speed x Response Time Standard)
- Coverage Area *(Square Miles)*
- Density *(Maximum Units in Coverage Area)*

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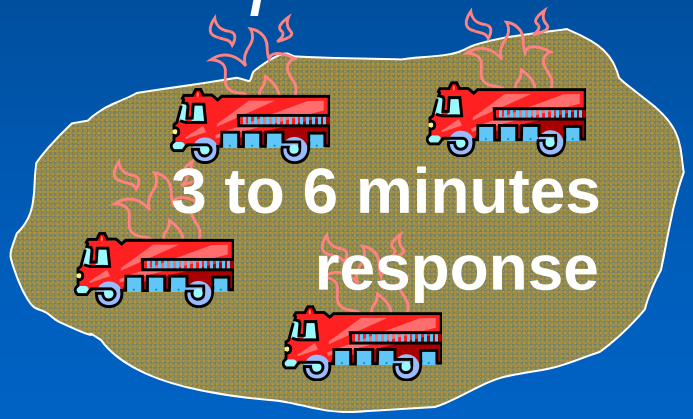
Standards & Service Area

Standards

Response Time



Stations Per Population

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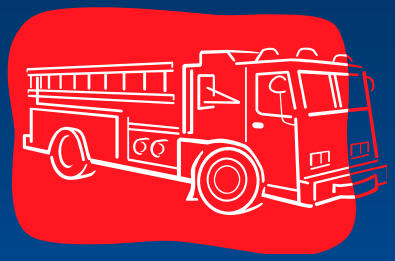
Basic Formula



Impact Fee = (Demand x Unit Cost) - (Credit)

Impact Fee = (New Growth) - (New Revenue)





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Basic Formula

Non-Residential Fire Flow Demand as a Percent of Residential Demand

Land Use	Type of Const. Factor	AVG Floor Area	Base Fire Flow Need	Occupancy Factor	Expo-sure	Total Fire Flow Need	% of Single Family Home
SINGLE FAMILY Single Family Unit	1.0	1,500	697	0.75	0.60	837	100%
INDUSTRY Over 100,000 sf	0.8	150,000	5,577	1.25	0.00	6,971	465%
OFFICE 10,001-50,000 sf	0.8	30,000	2,494	0.75	0.05	1,964	100%
RETAIL 10,001-50,000 sf	0.8	30,000	2,494	1.00	0.05	2,619	175%
INSTITUTION 10,001-50,000 sf	0.8	30,000	2,494	0.75	0.05	1,964	100%





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Basic Formula

Capital Costs

Fire, Land, Facilities and Equipment

- **Residential Land Uses**
  - **Base System Costs**
- **Non-Residential Land Uses**
  - **Expanded System Costs**

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Basic Formula

Capital Costs

EQUIPMENT Capital Item	Total Inventory	Average per Station	Cost Per Unit	Capital Cost/Station
Total Equipment Cost Per Station				**$956,667**
Total Land & Improvement Cost Per Station				**$1,123,750**

Total Capital Cost Per Station	**$2,080,417**
Total Base Station Cost (For Single Family Home)	**$1,690,417**

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Basic Formula

Capital Costs As A Percent of Residential

Fire Flow (Gallons per minute)	Stations Req'd and Other Equipment	Quick Attack / Brush-Tanker Truck Req'd	Pumper Tank Req	Ladder Truck Req'd	Total Cost	% of Residential Unit (<1,500 GPM) Total Response Cost
Less than 1,000	1.0	1.0	1.3	0.0	$1,690,417	100%
1,001 – 2,000	1.0	1.0	1.3	0.0	$1,690,417	100%
2,001 – 3,000	1.3	1.0	1.7	1.0	$2,736,350	162%
3,001 – 4,000	1.8	1.0	2.4	1.0	$3,506,100	207%
4,001 – 5,000	2.0	2.0	2.7	1.0	$3,964,000	234%
5,001 – 6,000	2.5	3.0	3.3	1.0	$4,883,750	289%
Over 6,000	3.0	4.0	4.0	2.0	$6,388,500	378%
AVG Unit Cost	$1,173,760	$150,000	$275,000	$585,000		

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Basic Formula

Credit and Recoupment

- Considers Both:
  - Actual Historical Expenditures
  - Policy / CIP Planned Future Expenditures
- Calculation Options:
  - Average Unit Valuation by Land Use
  - Per Capita Expenditure
- Expressed as Present Value

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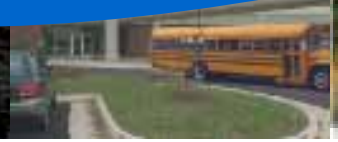
Fee Schedule

Based on Varying Response Time

LAND USE TYPE	Unit	SqFt	OPTION 1 3.0	OPTION 2 4.0	OPTION 3 5.0	OPTION 4 6.0
RESIDENTIAL Single Family	Dwelling	1500	$196	$110	$70	$49
INDUSTRIAL 10,001-50,000 sf	Building	1000	$290	$163	$104	$72
OFFICE 10,001-50,000 sf	Building	1000	$130	$73	$47	$33
RETAIL 10,001-50,000 sf	Building	1000	$228	$128	$82	$57
INSTITUTIONAL 10,001-50,000 sf	Building	1000	$130	$73	$47	$33





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Pro's and Con's of Fire Flow

PRO's

- ISO Standardized Formulas, Process
- Relates Demand to Cost
- Direct Relationship to Fire Services

CON's

- ✓ Nexus Related to Other Services (EMS, Prevention, etc.) Not as Direct

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Questions & Answers

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